TUGAS AKHIR – MO141326

Analisis Menghitung Total Tegangan Instalasi Pipa Bawah Laut. Studi Kasus: Cluster I PT PHE. WMO

Bagas Adiyan Prastowo
NRP. 04311540000118

Dosen Pembimbing:
Ir. Imam Rochani, M.Sc
Ir. Handayanu, M.Sc., Ph.D.

DEPARTEMEN TEKNIK KELAUTAN
Fakultas Teknologi Kelautan
Institut Teknologi Sepuluh Nopember
2020

FINAL PROJECT - MO141326

Total Stress Analysis on Subsea Pipeline During Installation. Case Study : Cluster I PT.PHE WMO

Bagas Adiyan Prastowo
NRP. 04311540000118

Supervisors:
Ir. Imam Rochani, M.Sc
Ir. Handayanu, M.Sc., Ph.D.

Ocean Engineering Department
Faculty of Marine Technology
Sepuluh Nopember Institute of Technology
2020

LEMBAR PENGESAHAN

ANALISIS MENGHITUNG TOTAL TEGANGAN INSTALASI PIPA BAWAH LAUT. STUDI KASUS : CLUSTER I PT. PHE WMO

TUGAS AKHIR

Diajukan untuk memenuhi salah satu syarat memperoleh gelar Sarjana Teknik (S.T)
pada Program Studi S-1 Departemen Teknik Kelautan Fakultas Teknologi
Kelautan Institut Sepuluh Nopember Surabaya

Oleh :

BAGAS ADIYAN PRASTOWO 04311540000118

Disetujui Oleh :

1. Ir. Imam Rochani, M.Sc (Pembimbing 1)

.....

2. Ir. Handayanu, M.Sc., Ph.D (Pembimbing 2)

.....

3. Nur Syahroni, S.T, M.T, Ph.D (Penguji 1)

.....

4. Dr. Yeyes Mulyadi, S.T, M.Sc. (Penguji 2)

.....

Surabaya, Januari 2020

i

ANALISIS MENGHITUNG TOTAL TEGANGAN INSTALASI PIPA BAWAH LAUT. STUDI KASUS : CLUSTER I PT. PHE WMO

ABSTRAK

Perpipaan bawah laut atau *Offshore Pipeline* merupakan jalur yang digunakan untuk mengalirkan fluida baik itu berbentuk minyak, gas maupun fluida 3 *Phase* (fluida yang mengandung minyak, gas dan air). Sebelum fluida dapat dialirkan dari fasilitas ke fasilitas yang lain, tahap instalasi pipa harus dilakukan terlebih dahulu. Untuk instalasi pipa sendiri biasanya dilakukan dengan menggunakan *barge* yang memiliki *stinger* dibelakangnya. *Stinger* adalah alat yang digunakan sebagai pembantu instalasi pipa dengan cara membentuk kurva *overbend* pada pipa guna mengurangi besar *total stress* pada pipa sehingga pipa tidak mengalami *overstress*. Tugas akhir ini menghitung tentang beberapa variabel yang berpengaruh untuk menentukan keberhasilan suatu instalasi pipa bawah laut. Variabel tersebut divariasikan untuk mencari konfigurasi variabel yang paling optimal untuk mengurangi total tegangan dan regangan pada saat instalasi. Variabel yang divariasikan adalah kedalaman, *stinger radius of curvature* dan kekuatan *tensioner* pada *barge.* Tahap pertama yaitu melakukan analisis statis pada data-data yang sudah ditentukan dimana pada tahap analisis ini, *barge* yang digunakan untuk instalasi dianggap diam (statis) dan dengan keadaan tidak ada gelombang. Hasil dari analisis statis menunjukan bahwa besar total tegangan yang terjadi pada daerah kritis *overbend* adalah sebesar 273.7 Mpa atau setara dengan 76% dari SMYS pipa berdiameter 8 inch API 5L grade X52. Sedangkan pada daerah *sagbend* sebesar 80.7 Mpa atau setara dengan 22% dari SMYS. Kemudian tahap berikutnya adalah mencari RAO *pipelay barge* untuk selanjutnya dimasukan pada analisis dinamis dimana pada tahap ini dilakukan 5 arah derajat pembebanan yaitu 0°, 45°, 90°, 135°, 180° . Pada hasil analisis dinamis ditemukan bahwa *design case* yang paling optimal adalah *design case* ke-2 yaitu dengan konfigurasi kedalaman 53 meter, *stinger radius of curvature* sebesar 300 meter dan *tension* sebesar 30 ton. Hasil dari *design case* tersebut memiiki nilai tegangan dan regangan yang paling kecil pada hampir tiap arah pembebanan.

Kata kunci : Instalasi Pipa, *overbend, sagbend, stress, strain, stinger, tension*

TOTAL STRESS ANALYSIS ON SUBSEA PIPELINE DURING INSTALLATION. CASE STUDY : CLUSTER I PT. PHE WMO

ABSTRAK

Subsea pipeline or Offshore Pipeline is a way used to transport fluids in the form of oil, gas or 3 Phase fluids (fluids that containing oil, gas and water). Before the fluid can be drained from the facility to other facilities, the pipe installation stage must be carried out first. For the pipe installation itself is usually done by using a barge that has a stinger behind it. Stinger is a tool used as a helper installation of pipes by forming an overbend curve on the pipe in order to reduce the total stress on the pipe so that the pipe does not experience overstress. This final project calculates several influential variables to determine the success of an subsea pipeline installation. These variables are varied to find the most optimal variable configuration to reduce the total stress and strain during installation. Variables that are varied are depth, stinger radius of curvature and tension strength on the barge. The first stage is to do a static analysis of the data that has been determined where at this stage of analysis, the barge used for the installation is considered static and with no wave conditions. The results of the static analysis showed that the total amount of stress that occurred in the overbend critical region was 273.7 Mpa or equivalent to 76% of the SMYS pipe 8 inch API 5L grade X52. Whereas in the sagbend region was 80.7 MPa or equivalent to 22% of SMYS. Then the next step is to search for RAO of pipelay barge for further inclusion in a dynamic analysis where at this stage a 5 degree direction load is carried out by 0 °, 45 °, 90 °, 135 °, 180 °. In the results of dynamic analysis it was found that the most optimal design case is the second design case with a depth configuration of 53 meters, stinger radius of curvature of 300 meters and tension of 30 tons. This results of the design case have the smallest stress and strain values in almost every direction of loading.

Keyword-*pipeline installation,overbend, sagbend, stress, strain, stinger, tension*

KATA PENGANTAR

Puji syukur kehadirat Tuhan Yang Maha Esa atas segala rahmat-Nya sehingga tugas akhir ini dapat tersusun hingga selesai. Tidak lupa penulis juga mengucapkan banyak terimakasih atas bantuan dari pihak yang telah berkontribusi dengan memberikan sumbangan dalam sebuah materi maupun gagasan pikirannya.

Serta harapan kami semoga laporan ini dapat menambah pengetahuan dan pengalaman bagi para pembaca, untuk ke depannya dapat memperbaiki bentuk maupun menambah isi tugas akhir ini agar dikemudian harinya menjadi lebih baik lagi.

Karena keterbatasan pengetahuan maupun pengalaman penulis, maka penulis yakin masih banyak kekurangan dalam tugas akhir ini, oleh karena itu penulis sangat mengharapkan saran dan kritik yang membangun dari pembaca demi kesempurnaan tugas akhir ini.

Surabaya, Januari 2020

Penulis

UCAPAN TERIMAKASIH

Pada kesempatan ini penulis menyampaikan terima kasih kepada semua pihak yang telah membantu selama pengerjaan tugas akhir ini, diantaranya kepada :

1. Allah SWT yang telah memberikan kemudahan dan kelancaran selama pengerjaan tugas akhir ini.
2. Kedua orang tua penulis yang telah senantiasa memberi dukungan berupa semangat dan materil selama tugas akhir ini dibuat.
3. Bapak Ir. Imam Rochani, M.Sc. dan bapak Ir. Handayanu, M.Sc., Ph.D. yang telah menjadi dosen pembimbing dan memberikan saran serta masukan selama masa pengerjaan tugas akhir ini.
4. Setiap dosen pengajar semua mata kuliah selama 4,5 tahun di Teknik Kelautan yang sudah memberi ilmu yang berharga untuk penulis.
5. Bapak Annas Humaidy, Bapak Catur dan Ibu Nita selaku pembimbing penulis yang telah memberikan ilmu dan bimbingannya kepada penulis selama penulis melakukan Kerja Praktik di PT PHE WMO sehingga ilmu yang telah diberikan dapat berguna bagi penulis selama mengerjakan.
6. Amril dan Bagus yang telah membantu penulis pada saat penulis sedang melakukan kerja praktik.
7. Baim, Pipo dan Jordy selaku teman seperjuangan dalam penyelesaian tugas akhir ini.
8. Teman-Teman “RA” dan “arek2” yang selalu menghibur dan menemani penulis selama menjalankan studi hingga saat ini.
9. Teman-teman TRITONOUS yang 4 tahun ini bersedia membantu penulis menyelesaikan tahap-tahap sistem kredit siswa (sks) dan memberikan cerita asam-manis selama perjuangan kuliah.
10. Mbak dan mas 2012, 2013, 2014 yang sudah dengan lapang dada memberi masukan selama menghadapi perjuangan kuliah, mengajarkan *software*, meminjamkan buku, membagi cerita tentang dunia kerja, dan mau direpotkan dengan seribu pertanyaan penulis tentang tugas akhir ini.
11. Seluruh pihak yang telah membantu penulis dalam menyelesaikan tugas akhir ini, yang tidak bisa disebutkan satu per satu.

DAFTAR ISI

LEMBAR PENGESAHAN.....Error! Bookmark not defined.

ABSTRAK..... **ii**

KATA PENGANTAR.....**iv**

UCAPAN TERIMAKASIH.....**v**

DAFTAR GAMBAR.....**x**

DAFTAR TABEL..... **xii**

BAB I PENDAHULUAN.....**1**

1.1 Latar Belakang.....1

1.2 Rumusan Masalah.....2

1.3 Tujuan.....3

1.4 Manfaat.....3

1.5 Batasan Masalah.....3

1.6 Sistematika Penulisan.....4

1.6.1 BAB I Pendahuluan.....4

1.6.2 BAB II Tinjauan Pustaka dan Landasan Teori.....4

1.6.3 BAB III Metodologi Penelitian.....4

1.6.4 BAB IV Hasil dan Pembahasan.....5

1.6.5 BAB V Kesimpulan dan Saran.....5

BAB II TINJUAN PUSTAKA DAN DASAR TEORI.....**7**

2.1 Tinjauan Pustaka.....7

2.2 Dasar Teori.....8

2.3 Metode Instalasi Pipa Bawah Laut.....8

2.3.1 Metode S-Lay.....9

2.3.2 Metode J-Lay.....10

2.3.3 Metode Reel Lay.....11

2.3.4 Metode Towing 12
2.4 Stinger 15
2.5 Overbend 15
2.6 Sagbend 16
2.7 Tegangan Pada Pipa 17
2.7.1 Tegangan Normal 17
2.7.2 Tegangan Geser 18
2.7.3 Tegangan Von Mises 19
2.7.4 Tegangan Pada *Overband* 20
2.7.5 Tegangan Pada *Sagbend* 21
2.7.6 Tegangan Tensioner 22
2.7.7 Analisa perhitungan *tension* yang dibutuhkan 23
2.8 Analisa Dinamis 24
2.9 Spektrum Jonswap 25
2.10 Analisa Pipelaying dengan Software Offpipe 25
2.10.1 Arah Pembebanan dan Sistem Koordinat Software Offpipe 26
2.11 Respon Dinamis Struktur Terapung 26
2.12 Perhitungan berat pipa yang terendam 27
2.13 Kode dan Standar 30
2.14 Allowable Stress Criteria 30
2.15 Allowable Strain Criteria 33
BAB III METODOLOGI PENELITIAN 35
3.1 Skema Diagram Alir 35
3.2 Penjelasan Diagram Alir 37
BAB IV ANALISA DAN PEMBAHASAN 39
4.1 Penjelasan Analisis Statis dan Dinamis Instalasi Pipa 39
4.1.1 Penjelasan Analisis Statis 40
4.1.2 Penjelasan Analisis Dinamis 40

4.2 Pengumpulan dan Identifikasi Data 40
4.2.1 Data Properti Pipa 41
4.2.2 Data Lapisan *Corrosion Coating* dan *Concrete Coating* 42
4.2.3 Data *Pipelaying Barge* 43
4.2.4 Data *Stinger* 43
4.2.5 Data *Roller* pada *Barge* dan *Stinger* 44
4.2.6 Data Lingkungan 45
4.3 Analisis statis S-Lay pada pipa saat instalasi 48
4.3.1 Design Case Analisis Statis 48
4.3.2 Hasil Analisis Statis S-Lay 50
4.4 Permodelan *Pipe Laying Barge* 60
4.5 Analisis *Response Amplitudo Operator* (RAO) 64
4.5.1 Gerakan *Surge* 64
4.5.2 Gerakan *Sway* 65
4.5.3 Gerakan *Heave* 66
4.5.4 Gerakan *Roll* 66
4.5.5 Gerakan *Pitch* 67
4.5.6 Gerakan *Yaw* 68
4.6 Analisis Dinamis S-Lay pada Pipa saat Instalasi 68
4.6.1 Design Case Analisis Dinamis 71
4.6.2 Hasil Analisis Dinamis Total Tegangan Maksimal Arah 0° 72
4.6.3 Hasil Analisis Dinamis Total Tegangan Maksimal Arah 45° 75
4.6.4 Hasil Analisis Dinamis Total Tegangan Maksimal Arah 90° 78
4.6.5 Hasil Analisis Dinamis Total Tegangan Maksimal Arah 135° 82
4.6.6 Hasil Analisis Dinamis Total Tegangan Maksimal Arah 180° 85

BAB V PENUTUP 89

5.1 Kesimpulan 89

5.2 Saran 90

DAFTAR PUSTAKA 91

DAFTAR GAMBAR

Gambar I.1. Sistem Perpipaan Bawah Laut (Guo 2014) 1
Gambar II.1. Metode Instalasi Pipa Bawah Laut (Zenalabidi, 2010) 9
Gambar II.2. Instalasi dengan Metode S-Lay (Bai, 2014).....10
Gambar II.3. Metode Instalasi Pipa Bawah Laut dengan Metode *J-Lay* (Kenny, 1993).11
Gambar II.4. Metode Instalasi Pipa Bawah Laut dengan Metode *Reel Lay* (Zenalabidi, 2010) 12
Gambar II.5. Metode Instalasi Pipa Bawah Laut dengan Metode *Bottom Tow* (Zenalabidi, 2010) 13
Gambar II.6.Metode Instalasi Pipa Bawah Laut dengan Metode *Surface Tow* (Zenalabidi, 2010) 13
Gambar II.7. Metode Instalasi Pipa Bawah Laut dengan Metode *Mid-depth* Tow (Zenalabidi, 2010).....14
Gambar II.8. Metode Instalasi Pipa Bawah Laut dengan Metode *Off-bottom Tow* (Zenalabidi, 2010).....15
Gambar II.9. Pembebanan Aksial Pada Bawang Tubular (Gere dan Timoshenko, 2009) 17
Gambar II.10. Model *Catenary* pada daerah *Sagbend* (Guo, 2014) 21
Gambar II.11. *General Arrangement of Tensioner* (SAS, 2009).....22
Gambar II.12. *Heading* dan Sistem Koordinat pada *Software* OFFPIPE.....26
Gambar II.13. Gerakan pada Struktur Terapung 27
Gambar II.14. *Hoop Stress* pada Pipa (Bai, 2014).....31
Gambar II.15. Faktor yang mempengaruhi *Longitudinal Stress* pada Pipa (Bai, 2014)..32
Gambar III.1 Diagram Alir Metode Penelitian.....35
Gambar III.2 Diagram Alir Metode Penelitian (lanjutan) 36
Gambar IV.1. Peta Jalur Lokasi Pipa 8” PHE-12 ke KE-5 CPP 41
Gambar IV.2. Peta Wilayah Kerja PT. PHE WMO.....45
Gambar IV.3. Grafik Total Tegangan pada Kedalaman 53 meter.....51
Gambar IV.4. Grafik Kurva S-Lay pada Kedalaman 53 meter. 51
Gambar IV.5. Grafik Total Tegangan pada Kedalaman 56 meter.....52
Gambar IV.6. Grafik Kurva S-Lay pada Kedalaman 56 meter. 53
Gambar IV.7. Grafik Total Tegangan pada Kedalaman 59 meter.....54
Gambar IV.8. Grafik Kurva S-Lay pada Kedalaman 59 meter. 54
Gambar IV.9 Grafik Maksimal Tegangan per Case 55

Gambar IV.10 Grafik Maksimal Stress Per Kedalaman 56
Gambar IV.11 Permodelan *Barge* pada MOSES 60
Gambar IV.12 Permodelan *Barge* Tampak *Isometric* 60
Gambar IV.13 Permodelan *Barge* Tampak Samping 61
Gambar IV.14 Permodelan *Barge* Tampak Atas 61
Gambar IV.15 Permodelan *Barge* Tampak *Bow* 62
Gambar IV.16 Permodelan *Mooring Barge* Tampak Isometri 62
Gambar IV.17 Permodelan *Mooring Barge* Tampak Samping 63
Gambar IV.18 Permodelan *Mooring Barge* Tampak Atas 63
Gambar IV.19 Permodelan *Mooring Barge* Tampak *Bow* 64
Gambar IV.20 Grafik RAO Gerakan Surge 64
Gambar IV.21 Grafik RAO Gerakan Sway 65
Gambar IV.22 Grafik RAO Gerakan Heave 66
Gambar IV.23 Grafik RAO Gerakan Roll 66
Gambar IV.24 Grafik RAO Gerakan Pitch 67
Gambar IV.25 Grafik RAO Gerakan Yaw 68
Gambar IV.26. Distribusi Total Tegangan Dinamis Maksimal Arah 0° 72
Gambar IV.27 Kurva S-Lay Dinamis arah 0° 73
Gambar IV.28 Distribusi Total Tegangan Dinamis Maksimal Arah 45° 75
Gambar IV.29 Kurva S-Lay Dinamis Arah 45° 76
Gambar IV.30 Distribusi Total Tegangan Dinamis Maksimal Arah 90° 78
Gambar IV.31 Kurva S-Lay Dinamis Arah 90° 78
Gambar IV.32 Distribusi Total Tegangan Dinamis Maksimal Arah 135° 82
Gambar IV.33 Kurva S-Lay Dinamis Arah 135° 83
Gambar IV.34 Distribusi Total Tegangan Dinamis Maksimal Arah 180° 85
Gambar IV.35 Kurva S-Lay Dinamis Arah 180° 86
Gambar IV.36 Grafik Maksimal Tegangan tiap Arah Pembebanan 88

DAFTAR TABEL

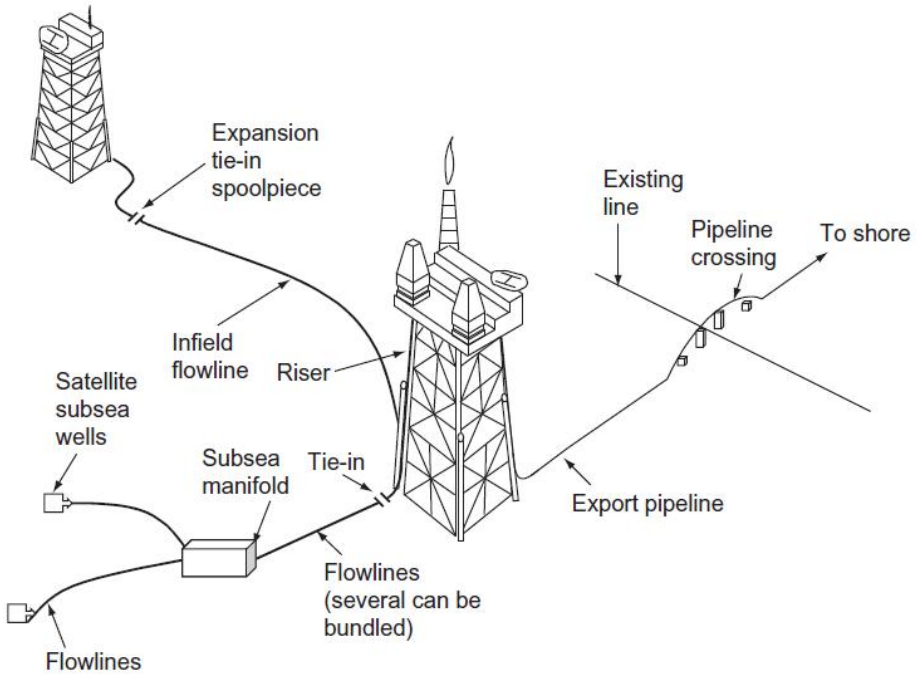
Tabel II-1. *Simplified Laying Criteria* DNV OS F-101 33
Tabel IV-1 Data Properti Pipa.....41
Tabel IV-2 Data Properti Pipa (lanjutan) 42
Tabel IV-3 Data *Pressure* dan Temperatur Pipa 42
Tabel IV-4. Data Berat Pipa 42
Tabel IV-5. Data Tebal *Coating* Pipa.....42
Tabel IV-6. Data *Sacrificial Anode Pipa* 43
Tabel IV-7. Ukuran Dimensi Barge 43
Tabel IV-8. Data *Tensioner pada Barge* 43
Tabel IV-9. Data *Stinger* yang Digunakan 43
Tabel IV-10. Konfigurasi *Roller Support* pada *Barge* 44
Tabel IV-11. Konfigurasi *Roller Support* pada *Stinger* 44
Tabel IV-12. Data Arus 1 Tahunan pada Cluster I.....46
Tabel IV-13. Data Arus 10 Tahunan pada Cluster I.....46
Tabel IV-14. Data Ketinggian Gelombang Signifikan dan Periode.....46
Tabel IV-15. Data *Extreme Wave* dan *Ts* 47
Tabel IV-16. Data Parameter JONSWAP 47
Tabel IV-17. Data Parameter Air Laut.....47
Tabel IV-18. Data Tanah.....47
Tabel IV-19. Data Kedalaman per Kilometer Point.....48
Tabel IV-20.Design Case Analisis Statis Kedalaman 53 Meter 48
Tabel IV-21 Design Case Analisis Statis Kedalaman 56 Meter 49
Tabel IV-22 Design Case Analisis Statis Kedalaman 59 Meter 50
Tabel IV-23. Variabel yang Digunakan untuk Analisis Statis 50
Tabel IV-24. Hasil Total Tegangan daerah *Overbend* pada Kedalaman 53 meter 52
Tabel IV-25. Hasil Total Tegangan daerah *Overbend* pada Kedalaman 56 meter 53
Tabel IV-26. Hasil Total Tegangan daerah *Overbend* pada Kedalaman 59 meter 55
Tabel IV-27. Ringkasan Hasil Analisis Statis.....57
Tabel IV-28. Ringkasan Hasil Analisis Tegangan dan Regangan Statis 58
Tabel IV-29 Variabel yang Digunakan untuk Analisis Dinamis 69
Tabel IV-30 Variabel Durasi dan Interval Waktu Analisis Dinamis 69
Tabel IV-31 Hasil Analisis Dinamis Tegangan Arah 0° 73

Tabel IV-32 Hasil Analisis Dinamis Regangan Arah 0° 74
Tabel IV-33 Hasil Analisis Dinamis Tegangan Arah 45° 76
Tabel IV-34Hasil Analisis Dinamis Regangan Arah 45° 77
Tabel IV-35 Hasil Analisis Dinamis Tegangan Arah 90 ° 79
Tabel IV-36 Hasil Analisis Dinamis Regangan Arah 90° 81
Tabel IV-37 Hasil Analisis Dinamis Tegangan Arah 135° 83
Tabel IV-38 Hasil Analisis Dinamis Regangan Arah 135° 84
Tabel IV-39 Hasil Analisis Dinamis Tegangan Arah 180° 86
Tabel IV-40 Hasil Analisis Dinamis Regangan Arah 180° 87

BAB I
PENDAHULUAN

1.1 Latar Belakang

Minyak dan gas alam merupakan contoh sumber daya mineral yang penting dan dibutuhkan oleh kita sebagai manusia. Seperti yang diketahui, Indonesia merupakan salah satu negara yang kaya akan sumber daya alam, termasuk sumber daya mineral. Dengan cadangan minyak bumi dan gas alam yang melimpah diperlukan fasilitas – fasilitas yang mendukung untuk memanfaatkan sumber daya alam tersebut dengan optimal, salah satunya yaitu perpipaan bawah laut sebagai fasilitas transfer fluida dari satu platform ke platform lainnya. Sebelum dapat digunakan sebagai alat transportasi minyak dan gas, *pipeline* harus melewati beberapa tahap. Tahap yang paling awal yaitu perencanaan desain pipa. Pada saat melakukan tahap desain pipa, seorang *pipeline engineer* akan menentukan ukuran properti pipa yang akan digunakan (diameter dan ketebalan dinding pipa), pemilihan tingkat spesifikasi material yang akan digunakan berdasarkan tegangan, stabilitas, hidrodinamik, *span*, korosi dan spesifikasi *riser*.



Gambar I.1. Sistem Perpipaan Bawah Laut (Guo 2014)

Setelah melalui tahap desain, pipa akan dipesan untuk melakukan fabrikasi dan pelapisan *coating* pada pipa yang kemudian akan dipasang di bawah laut (tahap instalasi). Langkah pertama pada tahap instalasi yaitu penentuan metode instalasi yang sesuai dengan

kondisi lingkungan. Pada instalasi *pipeline* juga harus diperhatikan terkait distribusi besar tegangan dan regangan agar pipa dapat diletakan di bawah laut tanpa mengalami kerusakan. Pada saat melakukan instalasi pipa dengan menggunakan metode S-lay, ada dua *region* yang rawan mengalami besar tegangan dan regangan yang berlebihan. Yang pertama adalah daerah *overbend* yaitu daerah pada *stinger* dimana pipa mulai mengalami kelengkungan, terutama pada daerah ujung *stinger*. Yang kedua adalah daerah *sagbend* yaitu daerah dimana pipa mulai mengalami kelengkungan karena pipa sudah menyentuh dasar laut. Melihat pentingnya faktor tegangan dan regangan dalam melakukan instalasi pipa, ada beberapa kode yang mengatur besar maksimal tegangan dan regangan yang terjadi pada pipa, salah satunya yaitu DNV OS-F101. Untuk mengurangi tegangan dan regangan agar sesuai dengan kode yang berlaku, maka analisis total tegangan dan regangan pipa pada saat instalasi berlangsung harus dilakukan.

Analisis stress pada pipa bawah laut harus dilakukan sesuai dengan *codes* yang berlaku saat instalasi pipa berlangsung, *testing* dan saat pipa itu sendiri beroperasi,untuk analisis stress yang dilakukan pada instalasi pipa bawah laut adalah *hoop stress*, *longitudinal stress* dan *equivalent stress* (Yong Bai, 2014).

Melihat pentingnya tegangan dan regangan sebagai faktor utama dalam kerusakan pipa saat instalasi berlangsung, pada tugas akhir ini penulis akan menganalisis proses instalasi pipa yang berfokus pada studi kasus *pipeline* yang menghubungkan platform PHE 12 ke platform CPP2 daerah Cluster I milik PT.PHE WMO.

1.2 Rumusan Masalah

Adapun permasalahan yang akan dihadapi dalam Tugas Akhir ini adalah :

1. Berapa besar total tegangan dan regangan yang dialami pipa pada daerah kritis *sagbend* dan *overbend* saat proses instalasi dengan kondisi statis dengan variasi kedalaman, *radius of stinger* dan *tension*?
2. Berapa nilai RAO (*response amplitude operator*) barge pada saat instalasi S-Lay berlangsung?
3. Berapa besar total tegangan dan regangan yang dialami pipa pada daerah kritis *sagbend* dan *overbend* saat proses instalasi dengan kondisi dinamis dengan variasi kedalaman, *radius of stinger* dan *tension* ?

1.3 Tujuan

Dari perumusan masalah diatas, dapat diambil tujuan yang ingin dicapai dalam tugas akhir ini adalah :

1. Mengetahui besar tegangan pada daerah kritis *overbend* dan *sagbend* pada kondisi statis dan dinamis
2. Mengetahui nilai RAO *pipelaying barge* yang digunakan pada saat instalasi pipa berlangsung.
3. Menganalisa konfigurasi variasi kedalaman, *stinger radius of curvature*, dan besar *tensioner* yang paling optimal untuk instalasi pipa dan keadaan lingkungan yang berlaku

1.4 Manfaat

Setelah hasil dari analisa dari penelitian didapatkan, diharapkan dapat menjadi suatu acuan dalam proses instalasi *pipeline*. Harapan lain yaitu akan pemahaman mengenai instalasi pipa bawah laut dengan metode S-Lay, dengan variasi kedalaman dan variasi tension tensioner selama proses instalasi.

1.5 Batasan Masalah

Batasan masalah dalam penelitian ini adalah sebagai berikut :

1. Metode instalasi *pipeline* menggunakan S-Lay.
2. Profil *seabed* dianggap datar.
3. Beban lingkungan yang diperhitungkan adalah beban gelombang dan beban arus
4. Arah sudut datang pembebanan gelombang diasumsikan pada 0°, 45°, 90°, 135, 180°
5. Pembebanan angin dan perhitungan bangunan atas *barge* tidak dimodelkan.
6. Analisis permodelan *pipe laying barge* dan instalasi pipa S-Lay mengunakan *software* MOSES dan OFFPIPE
7. Analisa dilakukan pada pipa berdiameter 8.625 inch.

8. Tinggi roller pada instalasi bersifat konstan.
9. Panjang stinger ±40 meter.
10. Jenis stinger yang digunakan adalah jenis *fixed stinger*.
11. Tegangan dan konfigurasi pada tali tambat yang optimal tidak diperhitungkan pada tugas akhir ini.
12. Code yang digunakan untuk cek tegangan maksimum yang di injinkan adalah DNV OS F-101 mengenai *Rules for Submarine Pipeline System.*

1.6 Sistematika Penulisan

Sistematika penulisan yang digunakan dalam penyusunan tugas akhir ini adalah sebagai berikut :

1.6.1 BAB I Pendahuluan

Menjelaskan tentang latar belakang disusunnya tugas akhir, perumusan masalah, tujuan, batasan masalah, manfaat, serta sistematika penulisan yang digunakan dalam tugas akhir ini.

1.6.2 BAB II Tinjauan Pustaka dan Landasan Teori

Pada bab ini penulis akan membahas tinjauan pustaka dan dasar teori yang menjadi sumber referensi penulis dalam menyelesaikan tugas akhir ini. Secara rinci bab ini berisikan tinjauan pustaka yang menjadi acuan dari penelitian tugas akhir, dasar-dasar teori, rumus-rumus dan code/rules yang digunakan dalam penelitian tugas akhir ini dicantumkan dalam bab ini.

1.6.3 BAB III Metodologi Penelitian

Menjelaskan berisi tentang alur pengerjaan tugas akhir ini dengan tujuan untuk memecahkan masalah yang diangkat dalam bentuk diagram alir atau flow chart yang disusun secara sistematik yang dilengkapi pula dengan data data penelitian serta penjelasan detail untuk setiap langkah pengerjaanya.

1.6.4 BAB IV Hasil dan Pembahasan

Berupa merupkana pembahsan dari hasil analisa-analisa yang telah dilakukan pada penelitian, meliputi analisa hasil, dan pembahasan hasil analisa.

1.6.5 BAB V Kesimpulan dan Saran

Kesimpulan penting yang diperoleh dari hasil analisa dan pembahasan yang telah dilakukan. Pada bab ini juga berisikan saran sebagai tindak lanjut penelitian untuk permasalahan terkait.

(Halaman ini sengaja dikosongkan)

BAB II
TINJUAN PUSTAKA DAN DASAR TEORI

2.1 Tinjauan Pustaka

Perkembangan Ekplorasi dan eksploitasi minyak dan gas di lepas pantai pertama kali ditemukan pada tahun 1940 di teluk meksiko. Pada saat itu, perkembangan dunia migas mengalami percepatan ditunjukan dengan adanya pengeboran *off-shore* dan juga mendapatkan perhatian khusus terhadap penanggulangan bencana yang mungkin terjadi dalam eksplorasi. Selanjutnya pada tahun 1954, dipasang offshore *pipeline* di dasar laut untuk pertama kalinya. Offshore *pipeline* memiliki metode pemasangan berbeda-beda sesuai keadaan lingkungan di lokasi pemasangan. Untuk perairan dangkal, metode pemasangan yang sering dipakai adalah metode S-lay yaitu pada kedalaman dengan katagori shallow water hingga *deep water*. Sedangkan untuk metode pemasangan J-lay digunakan untuk kedalaman dengan katagori *intermediate water* hingga *deepwater water* untuk meminimalisir tegangan yang terjadi. Yang dimaksud *shallow water* adalah laut dari garis pantai hingga kedalaman 500 feet, *intermediate water* adalah perairan dengan kedalaman 500-1000 feet, sedangkan untuk *deepwater* adalah perairan yang kedalamannya diatas 1000 feet (Guo *et al*, 2014).

Fasilitas yang digunakan untuk instalasi pipa metode S-lay adalah *lay barge* atau bisa juga menggunakan semi-submersible vessel. Spesifikasi *barge* yang digunakan untuk instalasi pada umumnya sudah terpasang alat yang bernama *stinger* di bagian belakang *barge*. Setelah pipa disambung dengan cara di-las, pipa diturunkan pelan-pelan ke dasar laut melewati *stinger* dan *barge* akan berjalan ke depan dengan menggunakan sistem tambatnya. Dalam tujuan mengurangi tegangan, pipelay *barge* juga dilengkapi dengan support berupa roller yang menopang berat pipa diatas *barge*. Agar kecepatan laju pipa saat dilepaskan ke dasar laut tidak terlalu cepat dan tidak terlalu lambat, maka diatas *barge* pada ujung roller pertama dipasang tensioner. Pada saat melewati *stinger* pipa akan membentuk lengkungan yang disebut *sagbend* dan jari-jari dari *stinger* tersebut yang akan mengontrol seberapa besar lengkungan pipa yang terjadi pada daerah *sagbend* (Bai, 2014).

Putri (2017) telah melakukan penelitian dengan menganalisa instalasi pipa metode S-lay dengan variasi kedalaman. Hasil akhir dari analisis peniliti berupa nilai kedalaman optimal yang dapat digunakan dengan sudut *stinger* 8.88° dan panjang *stinger* konstan yang sudah diperoleh dari data. Melihat hasil penelitian diatas yang tidak memvariasikan *tension*

maka dalam analisis ini penulis akan memvariasikan *tension* untuk mengetahui *tension* yang optimal pada saat instalasi pipa bawah laut berlangsung.

Selain itu *tension* juga berperan penting dalam berhasilnya instalasi pipa bawah laut.. *Tensioner* pada saat instalasi berperan dalam menentukan pipa tersebut memiliki total tegangan yang cukup mulai dari barge, stinger hingga daerah kritis (*overbend* dan *sagbend*). Jika *tension* yang digunakan pada pipa terlalu besar maka pipa akan terhimpit dan dapat mengalami kerusakan seperti analisis yang dilakukan oleh Irsyad (2017) tentang *Concrete Crushing* dan *Concrete Sliding* pada *Pipeline* saat Instalasi menggunakan metode S-lay.

Untuk karakteristik gerakan *lay* barge pada saat *pipe laying*, Panambang (2007) telah melakukan penelitian terhadap tegangan pipa berdasarkan gerakan *barge*. Dalam penelitiannya, peneliti telah melakukan perhitungan besaran *tension* yang dibutuhkan berdasarkan gerakan barge dan menyimpulkan bahwa besaran *tension* yang digunakan bergantung pada berat pipa yang tercelup saat instalasi.

Berdasarkan penelitian-penelitian tersebut penulis mengajukan penelitian mengenai analisis Menghitung Total Tegangan instalasi pipa bawah laut dengan menggunakan variasi kedalaman dan *tension tensioner* yang digunakan di lokasi Cluster I milik PT. PHE WMO.

2.2 Dasar Teori

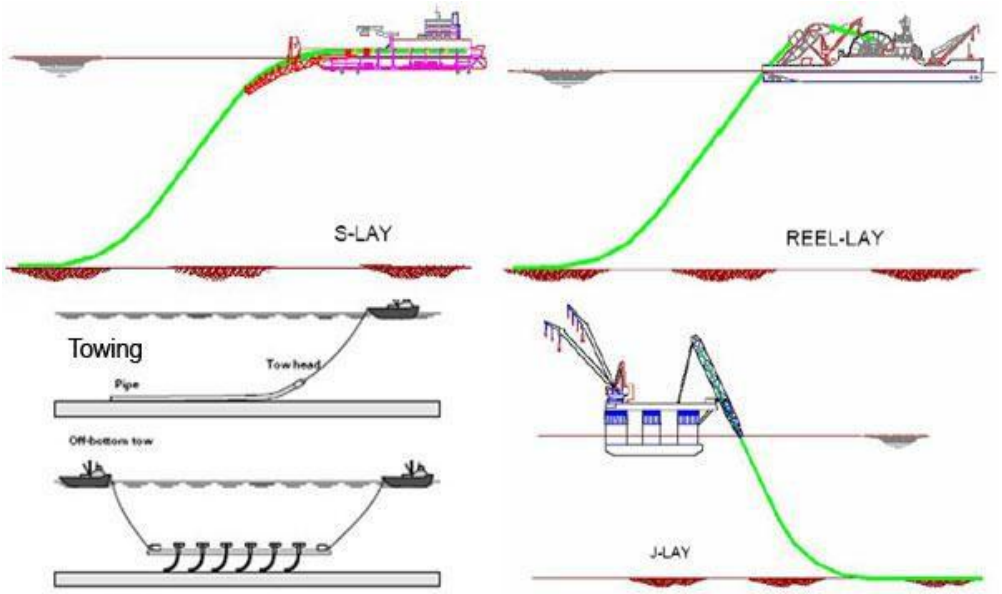
Dasar teori yang digunakan dalam kajian tugas akhir ini meliputi metode instalasi pipa, proses instalasi pipa, code dan standart yang digunakan untuk melakukan instalasi pipa, teori tentang gaya yang bekerja pada saat instalasi pipa berlangsung.

2.3 Metode Instalasi Pipa Bawah Laut

Pipa bawah laut didesain untuk transportasi fluida seperti minyak, gas atau air dalam jumlah besar dan jarak yang jauh melalui laut atau daerah di lepas pantai. *Pipeline* bekerja 24 jam sehari, 365 hari dalam setahun selama umur pipa yang bisa sampai 30 tahun atau bahkan lebih. Bahan pipa dipilih berdasarkan aspek-aspek rancangan antara lain diameter pipa, tekanan internal dan eksternal, beban kerja, suhu dari muatan yang dialirkan, code compliance, dan biaya yang ditetapkan.

Proses instalasi pipa bawah laut mengunakan kapal pemasangan yang khusus atau *lay barge*. Ada beberapa metode untuk instalasi pipa bawah laut, metode yang umumnya digunakan yaitu S-Lay, J-Lay dan Reeling. Berdasarkan pada metode tersebut, pipa akan mengalami beban yang berbeda selama instalasi berlangsung. Sebuah analisis instalasi

dilakukan untuk mengetimasi gaya tarik minimum yang terjadi pada pipa, karena efek beban pipa ada dalam kriteria desain kekuatan. Berikut gambar beberapa jenis metode instalasi pipa :



Gambar II.1. Metode Instalasi Pipa Bawah Laut (Zenalabidi, 2010)

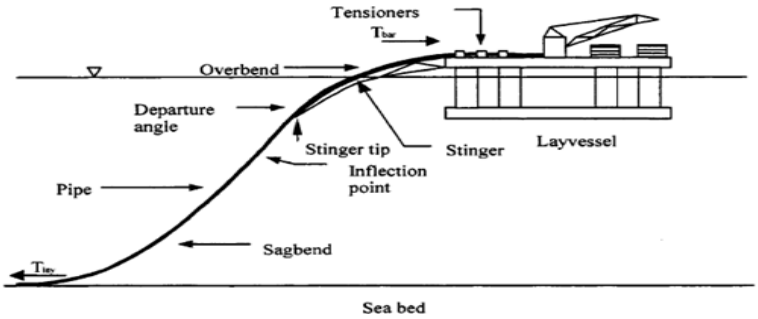
2.3.1 Metode S-Lay

Perbedaan teknologi dan perlatan-perlatan yang telah berkembang dalam pemasangan pipa di lepas pantai menentukan instalasi pipa berdasarkan paramater yang ada. Dalam daerah kedalaman dangkal hingga kedalaman 600 meter metode untuk instalasi pipa bawah laut yaitu menggunakan metode *S- Lay*, disebut *S-Lay* dikarenakan kurva yang dibentuk pipa saat mencapai dasar laut mebentuk huruf "S". Secara singkat mengenai proses instalasi menggunakan metode S-Lay yaitu sebagai berikut :

Pada *Lay-Barge* biasanya terdapat tempat untuk pengelasan pipa *(welding station)*, mesin *tension,* NDT *station* untuk mengecek pengelasan dan *coating station*. Ketika pipa sudah dilas menjadi beberapa sambungan kemudian dilanjutkan proses pemasukan pipa ke laut, pada proses tersebut pipa akan terbantu masuk ke laut karena adanya gerakan *barge* akibat mekanisme jangkarnya. Beberapa *roller* ditempatkan diatas *stinger* dan *barge. Roller* ini membantu pipa ketika pipa bergerak dari *barge* masuk ke laut.

Roller ditempatkan pada *stinger* dan pada *vessel*, bersamaan dengan *tensioner*, akan menciptakan kekuatan lengkungan pada pipa (Bai, 2005). *Tensioner* dalam metode *S-Lay* berfungsi menarik pipa yang akan di instalasi ke arah dalam *barge* untuk memastikan bahwa tegangan yang terjadi pada pipa tidak melebihi tegangan izin. Laut yang lebih dalam

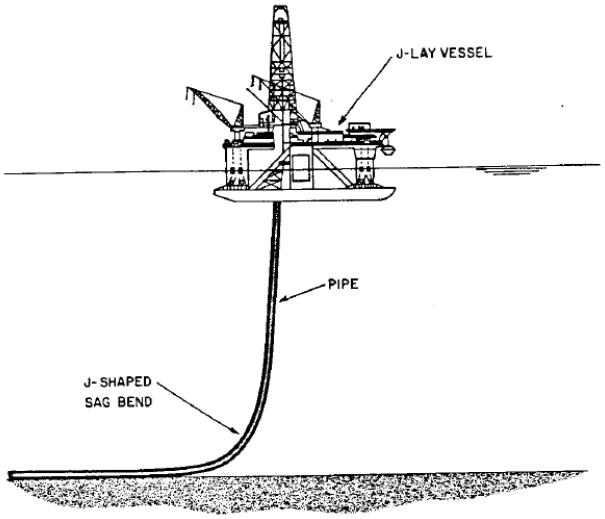
membutuhkan kekuatan *stinger* dan *tensioner* yang lebih besar. Kecepatan dalam pemasangan pipa dengan metode *S-Lay* sekitar 4 – 5 km per harinya. Ukuran pipa maksimum yang bisa dilakukan dengan metode ini adalah 60" OD (Allseas Solitair, 2000). Penjelasan tentang metode instalasi ini diperjelas dengan adanya Gambar di bawah ini :



Gambar II.2. Instalasi dengan Metode S-Lay (Bai, 2014)

2.3.2 Metode J-Lay

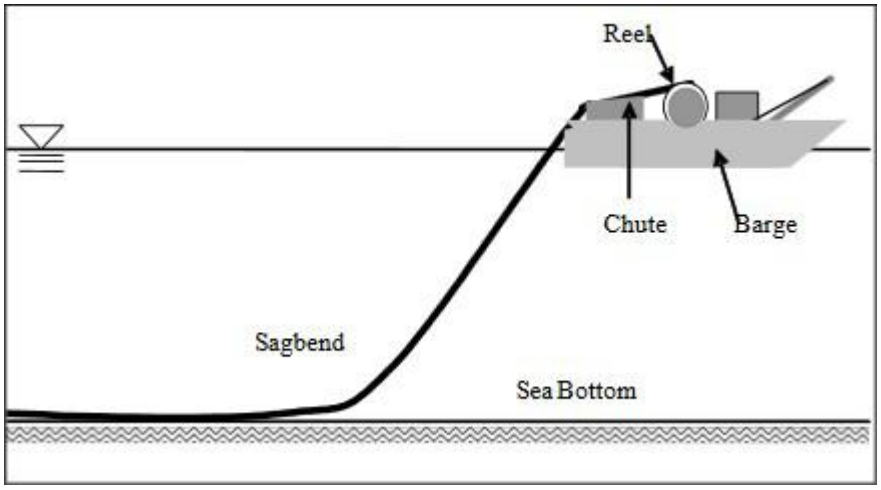
Dalam metode ini digunakan untuk instalasi pipa bawah laut dengan kedalaman yang sangat dalam. Dalam metode ini, kapal menggunakan sebuah menara sentral, biasanya dikonversi dari kapal pengeboran hal ini dilakukan cara pengelasan pada posisi vertikal dan peluncuran pipa dari menara sentral. Pada metode ini tidak ada daerah kritis pada tekukan atas *(overbend)* dan hanya ada pada bagian tekukan bawah (*sagbend*) sebagai daerah kritis. Kesulitan terbesar dalam metode ini adalah untuk melakukan pengelasan vertikal, meskipun membawa keuntungan dibandingkan dengan metode *S-Lay* untuk perairan dalam. Metode *J-Lay* memiliki tingkat produksi yang relatif rendah karena terbatasnya jumlah *work station*. Pada daerah *sagbend*, gerakan *surge* dan *heave* mempunyai pengaruh yang signifikan terhadap tegangan pada *pipeline* sedangkan gerakan *pitch* tidak signifikan pengaruhnya terhadap tegangan *bending* pada *pipeline*, (Brewe dan Dixon, 1969). Kecepatan pasang sekitar 1 – 1,5 km per hari. Ukuran maksimum yang bisa diinstal adalah 32" OD, (Saipem S-7000, 2002). Penjelasan tentang metode instalasi ini diperjelas dengan adanya Gambar II.3 di bawah ini :



Gambar II.3. Metode Instalasi Pipa Bawah Laut dengan Metode *J-Lay* (Kenny, 1993)

2.3.3 Metode Reel Lay

Metode *reel lay* merupakan metode pemasangan pipa dengan cara menggulung pipa panjang pada sebuah gulungan berukuran yang sangat besar, kemudian pipa tersebut akan dipasang di dasar laut seperti pada pemasangan kabel bawah laut. Dalam metode ini umumnya pipa yang dinstal adalah pipa berukuran diameter kecil atau pipa yang fleksibel. Pipa yang dipakai tidak diselimuti dengan beton akan tetapi harus tetap didesain supaya stabil setelah proses instalasi, hal dimaksudkan agar pipa dapat digulung *reel*. Adapun selimut yang digunakan untuk melindungi pipa adalah bahan-bahan yang *flexsibel* tanpa kerusakan seperti jenis bahan *epoxy*. Jika pipa ini dinstall secara *horizontal* maka akan berbentuk *S-Lay* namun jika dinstall secara vertikal maka akan berbentuk *J-Lay*. Metode ini lebih murah jika dibandingkan dengan metode lain ditinjau dari sisi waktu dan biaya, namun terbatas untuk pipa dengan ukuran diameter kecil. Penjelasan tentang metode instalasi ini diperjelas dengan adanya Gambar II.4 di bawah ini :



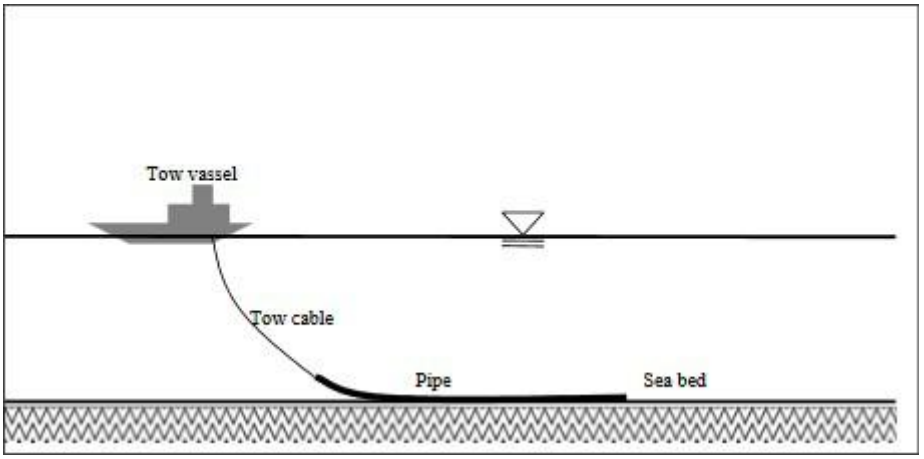
Gambar II.4. Metode Instalasi Pipa Bawah Laut dengan Metode *Reel Lay* (Zenalabidi, 2010)

2.3.4 Metode Towing

Metode *towing* biasanya diguankan untuk proses instalasi pipa bawah laut dengan kondisi perairan laut yang relatif dangkal dan kondisi perairan yang tenang. Secara umum metode ini digunakan dengan cara menarik pipa yang sudah disiapkan di darat dan kemudian ditarik ke tempat instalasi dengan cara ditarik oleh tug boat. Masing-masing segmen antara 200-300 meter yang kemudian diberi akses menuju perairan melalui *launching ramp* atau *roller* yang dibangun sepanjang pantai menuju surf zone. Setelah segmen pipa yang telah siap (telah melewati pemeriksaan) ditarik ke laut dengan menggunakan *barge*/*tow vessel* yang berada 1000 meter atau lebih dari pantai. Metode towing biasanya dilengkapi dengan menggunakan pelampung atau buoy yang dikenakan pada pipa untuk mempermudah pipa ditarik.

Selain bottom tow, diperlukan minimal dua buah kapal, satu di depan dan satu di belakang. Dalam controlled depth tow, kecepatan kapal harus disesuaikan dengan kedalaman pipa yang diinginkan pada saat towing. Berdasarkan kedalaman dan keadaan perairannya towing method dibedakan menjadi beberapa metode berdasarkan posisi pipa terhadap dasar laut, sebagai berikut :

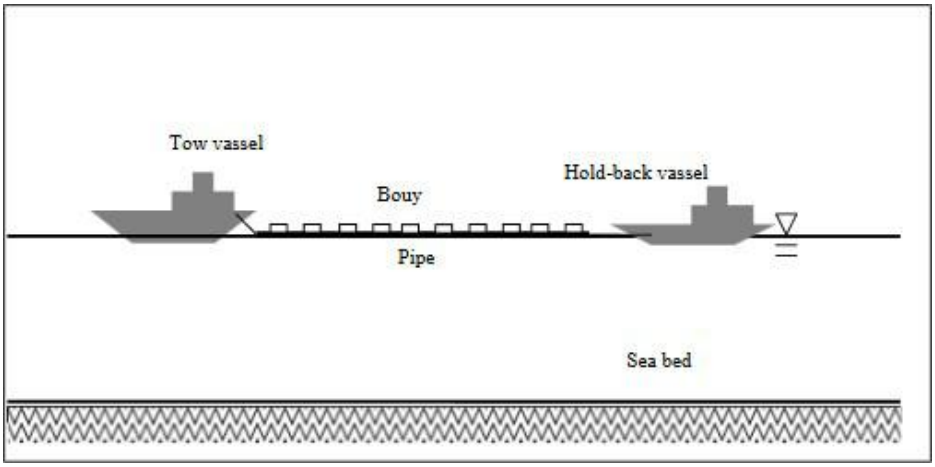
1. Bottom Tow



Gambar II.5. Metode Instalasi Pipa Bawah Laut dengan Metode *Bottom Tow* (Zenalabidi, 2010)

Pada Gambar II.5 diatas merupakan metode instalasi pipa yang akan dipasang yang telah disiapkan di darat (*onshore*) untuk menjalani seluruh proses fabrikasi. Selanjutnya pipa yang telah selesai menjalani proses fabrikasi di tarik dengan kapal menuju tempat pemasangan. Selama proses mobilisasi pipa dari darat menuju tempat pemasangan terdapat kontrak antara pipa dengan dasar lautan. Selanjutnya langkah yang dilakukan ialah pemasangan proteksi terhadap abrasi yang terjadi pada pipa. Disamping itu pengaruh arus laut dan gelombang menyebabkan kestabilan pipa mengalami gangguan umumnya installation contractor menggunakan pelapis dari concrete untuk menjaga kestabilan pipa selama pipa ditarik ke lokasi pemasangan.

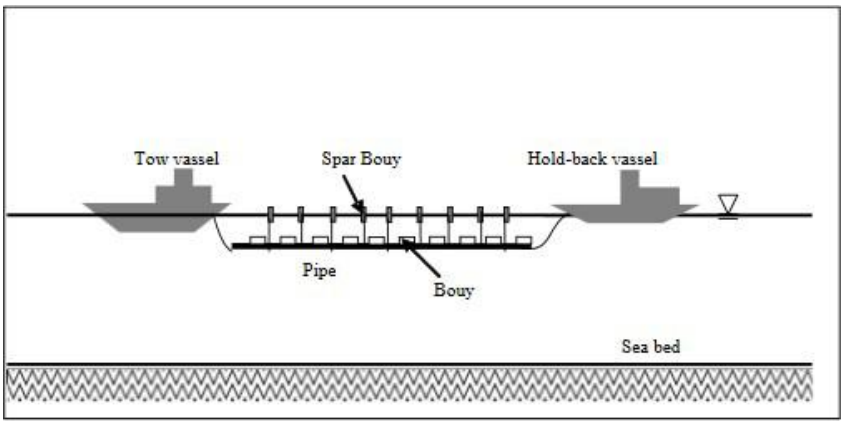
2. Surface Tow



Gambar II.6.Metode Instalasi Pipa Bawah Laut dengan Metode *Surface Tow* (Zenalabidi, 2010)

Pada Gambar II.6 diatas merupakan metode instalasi pipa sama dengan metode bottom tow dimana pipa yang akan dipasang yang telah disiapkan di darat (onshore) untuk menjalani seluruh proses fabrikasi. Selanjutnya pipa yang telah selesai menjalani proses fabrikasi di tarik dengan kapal menuju tempat pemasangan. Selama proses mobilisasi pipa yang ditarik mengapung diatas permukaan laut dengan menggunakan tangki-tangki pengapung. Resiko yang dihadapi lebih besar karena pengaruh ombak dan arus laut sangat besar terhadap pipa. Diantara seluruh metode *tow to side*, metode *surface tow* merupakan metode yang dapat digunakan untuk manarik pipa terpanjang.

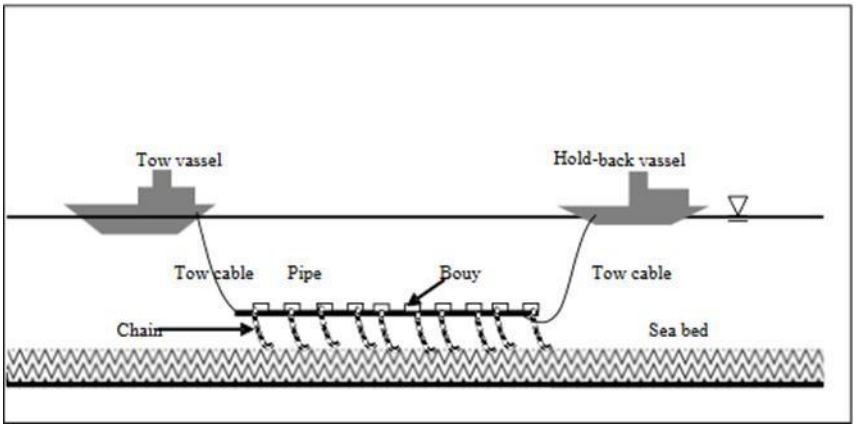
3. Mid-depth Tow



Gambar II.7. Metode Instalasi Pipa Bawah Laut dengan Metode *Mid-depth* Tow (Zenalabidi, 2010)

Pada metode Gambar II.7 sebelumnya pipa yang ditarik melayang pada suatu kedalaman tertentu yang dapat diatur. Metode ini merupakan metode paling baik karena tidak menghadapi resiko abrasi, pengaruh ombak dan arus laut serta dapat melewati pipa lepas pantai yang sudah ada (existing offshore pipeline). Metode ini membutuhkan kapal penarik dan kapal triller untuk menjaga dan tegangan yang terjadi selama penarikan.

4. Off-bottom Tow



Gambar II.8. Metode Instalasi Pipa Bawah Laut dengan Metode *Off-bottom Tow* (Zenalabidi, 2010)

Pada Gambar II.8 diatas merupakan metode instalasi sama dengan metode *bottom tow* dimana pipa yang akan dipasang yang telah disiapkan di darat *(onshore)* untuk menjalani seluruh proses fabrikasi. Selanjutnya pipa yang telah selesai menjalani proses fabrikasi di tarik dengan kapal menuju tempat pemasangan. Selama proses mobilisasi pipa dari darat menuju tempat pemasangan tidak terdapat kontak antara pipa dengan dasar lautan karena pipa melayang beberapa meter diatas dasar lautan. Selanjutnya langkah yang dilakukan ialah sistem *bouyancy* untuk *pipeline* system harus diperhitungkan berat dalam airnya.

2.4 Stinger

Stinger berfungsi sebagai pengarah pipa pada *roller* yang terletak antara tubular sehingga pipa dapat meluncur ke bawah dari *barge stern* sampai ke *seabed*. *Stinger* terdiri dari beberapa model yang mana sudut kemiringannya dapat berubah, yaitu:

- *Hidraulic*
- *Cable*
- *Bouyancy*

Stinger yang terapung mempunyai *bouyancy* yang mengangkat pipa keatas untuk menyeimbangkan beban pipa.

2.5 Overbend

Daerah *overbend* biasanya dimulai dari *tensioner* pada *deck barge*, melalui *barge*

ramp, dan turun ke *stinger* sampai pada titik *lift-off* dimana pipa tidak lagi didukung oleh

stinger. Pada daerah *overbend* ini diharapkan total tegangan akibat dari berat pipa sendiri, momen *bending* pada tumpuan, atau *roller* tidak melebihi 85% SMYS, dengan kata lain *bending stress* maksimum yang dialami pipa pada daerah *overbend* lebih kecil dari 85% SMYS. Persamaan regangan tekuk *(bending strain)* pipa adalah :

$$\varepsilon = \frac{D}{2R} \quad \text{.....(2.1)}$$

Dimana :

D = diamater luar pipa

R = jari-jari kurvatur dari *overbend*

Sedangkan persamaan untuk tegangan aksial tekuk (*axial bending stress)*

adalah :

$$\sigma = \frac{ED}{2\sigma 0DF} \quad \text{.....(2.2)}$$

Dimana F = faktor desain (0,85)

σ_0 = SMYS (*Specified Minimum Yield Stress*)

2.6 Sagbend

Daerah *sagbend* biasanya dimulai dari titik *inflection* sampai titik *touch down* pada *seabed*. Tegangan pada *overbend* di kontrol oleh jari-jari *stinger*, *depature angle* dan pengaturan *roller*. *Stress* yang terjadi pipa di daerah

sagbend diharapkan kurang dari 87% SMYS. Tegangan-tegangan pada *sagbend* diperluas dengan parameter-parameter berikut :

- Tinggi mula-mula
- Tension pipa pada titik awal
- Lengkungan overbend

- Parameter-parameter pipa

2.7 Tegangan Pada Pipa

2.7.1 Tegangan Normal

Tegangan normal adalah tegangan yang bekerja dalam arah tegak lurus terhadap bidang dan dapat berupa tegangan tarik (*tensile stress*) atau tegangan tekan (*compressive stress*).

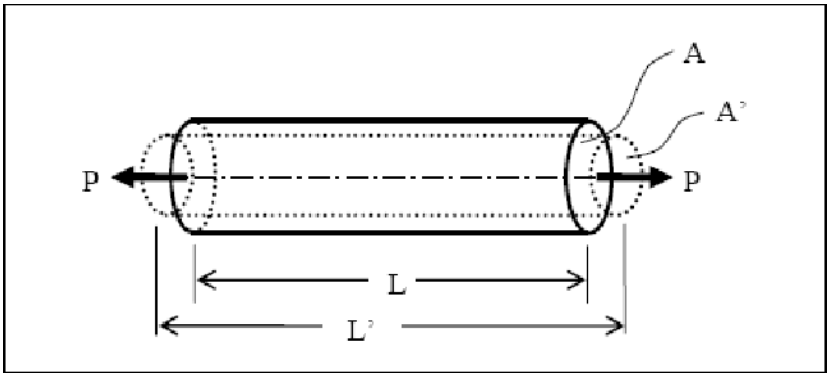
$$\sigma = \frac{P}{A} \quad \text{..... (2.3)}$$

Dengan :

σ = tegangan normal (N/m2)

P = gaya tarik/tekan (N)

A = luas penampang melintang (m2)



Gambar II.9. Pembebanan Aksial Pada Bawang Tubular (Gere dan Timoshenko, 2009)

Pada gambar II.9 batang tubular dengan luas penampang A dan panjang L mengalami pembebanan *aksial* akibat gaya tarik P. Akibat gaya ini, batang akan mengalami perubahan panjang sebesar:

$$\Delta L = L' - L \quad \text{..... (2.4)}$$

Dengan :

ΔL = pertambahan panjang (m)

L’ = panjang batang setalah menerima beban (m)

L = panjang batang mula-mula (m)

Perbandingan antara pertambahan panjang (ΔL) dengan panjang mula-mula disebut sebagai regangan *aksial* dan dirumuskan sebagai berikut:

$$\varepsilon = \frac{\Delta L}{L} \quad \text{..... (2.5)}$$

Hal ini berarti jari-jari penampangnya juga mengalami perubahan dari R menjadi R’. Regangan ini disebut dengan regangan radial dan secara matematis dirumuskan sebagai berikut:

$$\varepsilon = \frac{R^{-R}}{R} \quad \text{.....(2.6)}$$

Dengan :

ε = *aksial strain* (m)

R = jari-jari penampang mula-mula (m)

R’ = jari-jari penampang setelah menerima beban (m)

Perbandingan antara regangan radial dengan regangan aksial disebut sebagai perbandingan *Poisson*. Secara matematis dirumuskan sebagai berikut :

$$\nu = \frac{\varepsilon'}{\epsilon} \quad \text{..... (2.7)}$$

Dengan :

ε = aksial strain (m)

ε’ = radial strain (m)

2.7.2 Tegangan Geser

Tegangan geser (*shear stress*) adalah tegangan yang bekerja dalam arah tangensial terhadap permukaan bahan.

$\tau = V/A$ ..... (2.8)

Dengan :

τ = tegangan geser (N/m^2)

V = gaya geser (N)

A = luas penampang melintang (m^2)

Tegangan geser yang bekerja pada suatu elemen bahan disertai regangan geser. Tegangan geser tidak mempunyai kecenderungan untuk memperpanjang atau memperpendek elemen dalam arah x, y, dan z. Ini berarti panjang sisi elemen tidak berubah, oleh karenanya tegangan geser menyebabkan perubahan bentuk elemen.

2.7.3 Tegangan Von Mises

Pada elemen tiga dimensi, bekerja tegangan-tegangan searah sumbu x, y, dan

z. Pada tiap-tiap sumbu dapat diketahui tegangan utama (σ_1, σ_2, σ_3) yang dihitung dari komponen tegangan dengan persamaan berikut :

$$\begin{bmatrix} \sigma_x - \sigma_0 & \sigma_{xy} & \sigma_{xz} \\ \sigma_{xy} & \sigma_y - \sigma_0 & \sigma_{yz} \\ \sigma_{xz} & \sigma_{yz} & \sigma_z - \sigma_0 \end{bmatrix} = 0 \quad \text{..... (2.9)}$$

Dengan :

σ_0 = tegangan utama yang bekerja pada sumbu

σ_x = tegangan arah sumbu x

σ_y = tegangan arah sumbu y

σ_z = tegangan arah sumbu z

σ_{xy} = tegangan arah sumbu xy

σ_{xz} = tegangan arah sumbu xz

σ_{yz} = tegangan arah sumbu yz

Penggabungan tegangan-tegangan utama pada suatu elemen merupakan suatu cara

untuk mengetahui nilai tegangan maksimum yang terjadi pada node tersebut. Salah satu cara mendapatkan tegangan gabungan adalah dengan menggunakan formula tegangan *Von Misses* yaitu :

$$\sigma_e = \left[[0.5(\sigma_1 - \sigma_2)^2 + (\sigma_2 - \sigma_3)^2(\sigma_3 - \sigma_4)^2]\right]^{0.5} \quad \text{.....(2.10)}$$

Dengan :

σ_e = tegangan *Von Misses*

σ1 = tegangan utama 1

σ2 = tegangan utama 2

σ3 = tegangan utama 3

2.7.4 Tegangan Pada *Overband*

Overbend terjadi terutama pada *stinger* dan pada sebagian *lay barge*. Peletakan penumpu *roller* didesain sehingga membentu *radius curvature* tertentu dan diatur agar dapat mengontrol besar tegangan pada *overbend.* Besar momen yang terjadi disepanjang *stinger* terdistribusi pada gambar. Besar tegangan momen lentur yang terjadi pada *stinger* dapat dihitung dengan persamaan berikut :

$$\sigma_a = \frac{ED}{2Rcv} \quad \text{.....(2.11)}$$

Dimana :

σa = Momen lentur (MPa)

E = *Modulus Young*

Rcv = Radius Curvature

Radius curvature minimum pada *stinger* ditentukan dengan persamaan sebagai berikut

$$\text{Rcv} = \frac{ED}{2\sigma yfD} \quad \text{.....(2.12)}$$

Dimana :

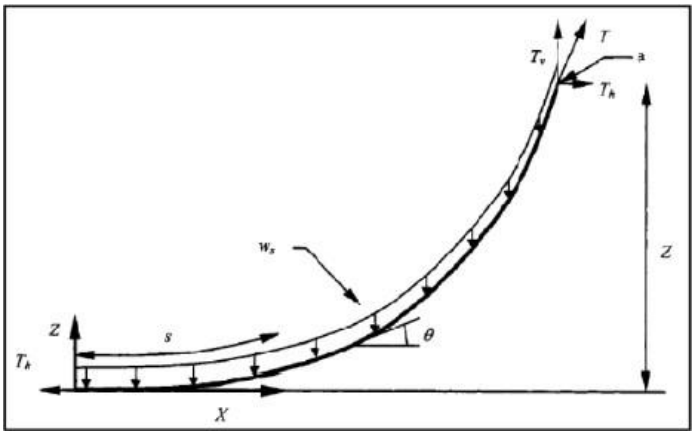
σa = Momen lentur (Mpa)

E = *Modulus Young*

Rcv = *Radius Curvature*

2.7.5 Tegangan Pada *Sagbend*

Ketika *pipeline* mencapai dasar laut pada saat instalasi, maka *pipeline* akan membentuk kurva tertentu secara alami akibat terjadinya defleksi yang besar. Bentuk kurva tersebut disebut dengan *sagbend*. Kurva *sagbend* sangat dipengaruhi oleh besar gaya aksial yang diberikan oleh *tensioner*. Model *catenary* merupakan model yang dapat digunakan dalam perhitungan hubungan antara gaya tarik *tensioner* dan bentuk kurva. Komponen horizontal dari gaya tarik nilainya konstan dari titik sentuh/jatuh di dasar laut hingga ke ujung *stinger*. Berikut Gambar II.10 model *catenary* untuk memperjelas penjelasan sebelumnya :



Gambar II.10. Model *Catenary* pada daerah *Sagbend* (Guo, 2014)

Pada titik jatuh didasar laut, *radius curvature* merupakan yang terbesar dan nilainya dapat dihitung berdasarkan persamaan diatas dengan kondisi batas.

$\frac{1}{R} = W_s/T_h$ ..... (2.13)

Hubungan antara kurva *sagbend* dan *regangan* pada pipa sebagai berikut :

$E = r/R$ ..... (2.14)

Persamaan *catenary shape* pada *sagbend* diekspresikan sebagai berikut :

$z = \frac{T_h}{W_s}(\cosh\frac{XW_s}{T_h} - 1)$ ..... (2.15)

Dimana :

x = jarak horizontal dari *touch down point*

z = kedalaman

Th = gaya horizontal pada dasar laut

Ws = berat pipa tercelup perunit

Kemudian :

$$\frac{d_\theta}{d_s} = \frac{d^2z}{dx^2} cos\theta = \frac{W_s}{T_h} cosh \frac{X_{ws}}{T_h} cos\theta \quad \text{.....(2.16)}$$

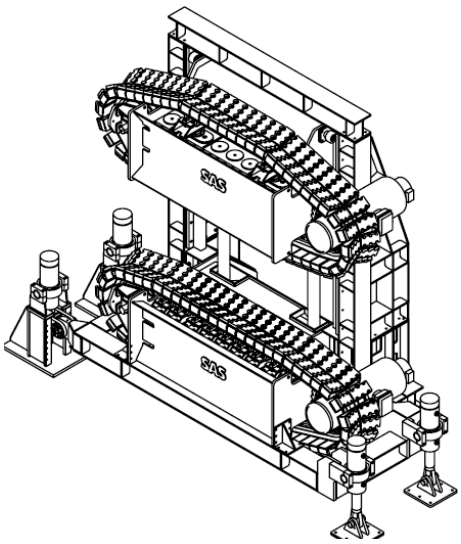
Dimana :

θ = sudut terhadap x aksis

s = panjang bentang pipa

2.7.6 Tegangan Tensioner

Tensioner merupakan mesin penarik yang menarik pipa menuju *stinger*. Selain itu *tensioner* juga berfungsi sebagai pengontrol besar kurva yang terbentuk di *sagbend* dan mengatur momen pada *stinger*. Dengan mengatur beban-beban tersebut maka bentuk-bentuk kegagalan seperti deformasi *plastis*, *buckling* dan *collapse* dapat dihindari. Seperti yang telah dijelaskan sebelumnya bahwa besar gaya *tensioner* ini berkisar antara 100 kN hingga 150 kN untuk kedalaman laut yang dangkal dan 300 kN untuk laut dalam. *Tensioner* biasanya terdiri dari track bawah yang terhubung secara *loop*. Berikut Gambar II.11 memperjelas sebuah tensioner pada salah satu *barge* :



Gambar II.11. ***General Arrangement of Tensioner*** **(SAS, 2009)**

2.7.7 Analisa perhitungan *tension* yang dibutuhkan

Tujuan dibutuhkannya insinyur pipa adalah untuk mengontrol bentuk catenary agar pipa baik dalam kondisi overbend maupun sagbend tetap dibawah besaran yang dianjurkan dan menggunakan besaran tension seminim mungkin. Selama barge bergerak ke depan dan menahan tension pada pipa, bersama dengan besaran berat pipa yang tercelup dan kedalaman laut, semua faktor tersebut menentukan bentuk catenary dari pipa yang akan diinstalasi . Dalam Offshore Pipeline Construction Volume I (2004) dijelaskan bahwa kita dapat mengontrol besaran tension yang digunakan sesuai dengan gerakan barge dengan persamaan sebagai berikut:

$$T = H + wd$$

Dimana,

T = Applied Tension (kN)

H = Komponen gaya horizontal dari T (kN)

w = Berat pipa tercelup (N/m)

d = Kedalaman laut (m)

2.8 Analisa Dinamis

Menurut Chakrabakti ada dua pendekatan dasar yang dipertimbangkan dalam menganalisa masalah struktur terapung, yaitu dengan metode frekuensi *domain* dan *time domain*. Dalam *American Proteleum Institute* 1987 API RP 2T membagi analisa dinamis struktur lepas pantai kedalam 2 metode analisa *domain* yaitu :

1. *Frequency domain analysis* adalah simulasi kejadian pada saat tertentu dengan interval frekuensi yang telah ditentukan sebelumnya. Frekuensi *domain* juga dapat digunakan untuk memperkirakan respon gelombang acak termasuk gerakan *platfrom* dan percepatan, gaya *tension* dan sudut. Keuntungan dari analisis ini adalah lebih menghemat waktu perhitungan dan juga *input* atau *output* lebih sering digunakan oleh perancang. Namun kekurangan metode ini adalah semua persamaan *non-linier* harus diubah dalam bentuk *linear.*
2. *Time domain analysis* adalah penyelesaian gerakan dinamis struktur berdasarkan fungsi waktu. Pendektan yang dilakukan dalam metode ini menggunakan prosedur integrasi waktu dan akan menghasilkan respon *time history* berdasarkan waktu x(t). Metode *time domain* solution secara umum digunakan untuk tahap final detail desain dan untuk mengecek solusi *frequency domain*. Metode *time domain* biasanya digunakan untuk analisis kondisi ekstrim tetapi tidak digunakan untuk analisis *fatigue* atau analisis kondisi lebih moderat dimana analisis *linierasasi* berkerja lebih efisien. Sejak integrasi numerik langsung persamaan *motion* dilakukan, pengaruh-pengaruh fungsi-fungsi *nonlinier* gelombang relevan dan *variabel-variabel motion* diikutkan. Keuntungan dari metode *time domain* dibandingkan metode *frequency domain* adalah semua tipe *non- linier* (matrik sistem dan beban-beban eksternal) dapat dimodelkan dengan lebih tepat. Ketidakuntungannya adalah memerlukan waktu menghitung yang lebih banyak, seperti *periode* simulasi memerlukan waktu panjang. Simulasi *time domain* dapat dikerjakan menurut beberapa skema integrasi. Untuk dapat mewakili kondisi sebenarnya simulasi minimal dilakukan selama 3 jam. Dalam menyelesaikan persamaan

tersebut menggunakan prosedur integrasi waktu, satu didapat solusi pada pola respon *time history* (t). Pada umumnya semua matrik sistem (massa, *damping* dan kelakuan) dapat difungsikan sebagai *response* atau waktu, seperti pada kasus vektor beban (analisis non-linier) matrik sistem konstan memberikan analisis *linier*. *Ouput* dari analisis *time domain* adalah *respon time series* dimana :

a. Simulasi gelombang reguler dapat digunakan untuk memprediksikan *transfer function* dengan mengambil *respon respon amplitude* dengan *input amplitudo* gelombang.
b. Spektrum respon dapat dihitung dari *time series*, memberikan informasi yang sama dengan analisis frekuensi domain.
c. Respon ekstrim dapat diestimasi secara langsung dari puncak respon selama simulasi.

2.9 Spektrum Jonswap

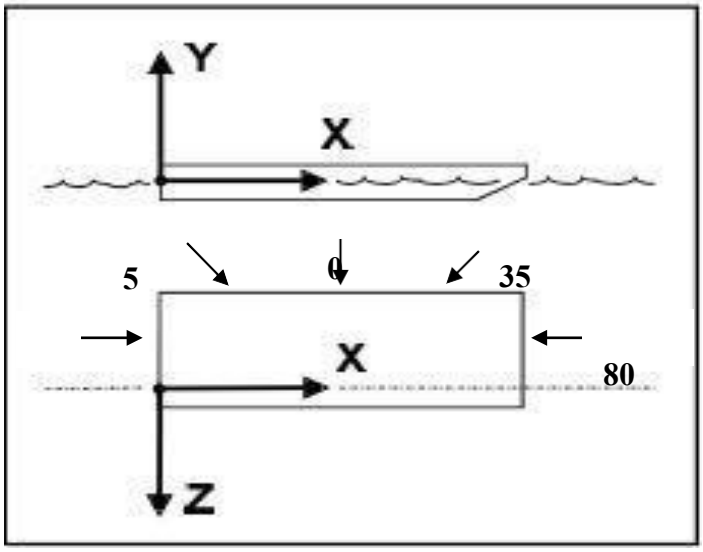
Hasselman pada tahun 1973 setelah menganalisis data yang dikumpulkan pada proyek *Joint North Sea Wave Observation Project (*JONSWAP*)* menemukan bahwa *spektrum* gelombang tidak pernah secara utuh berkembang. Spektrum mulai berkembang melalui persmaaan *non-linier*, interaksi antar gelombang untuk waktu dan jarak yang lama. Sehingga perlu ditambahkan faktor *artificial* ke persamaan Pierson-Moskowitz untuk memperbaiki pengukurannya. *Spektrum JONSWAP* adalah persamaan *spektrum* Pierson-Moskowitz dikali dengan *extra peak enhancement factor* atau γr. Harga γ = 3,3 biasanya diterapkan untuk analisis gelombang di Laut Utara. Suatu hal yang menarik, persamaan JONSWAP ini sekarang banyak dipakai oleh perusahaan-perusahaan minyak yang beroperasi di Indonesia dalam merancang anjungan dan fasilitas lautan lainnya, tetapi dengan mengambil harga γ yang lebih rendah yaitu berkisar 2,5 atau 2 (Djatmiko dan Sujantoko, 2000). Rumus untuk mendapatkan *spektrum jonswap* adalah :

$$S(\omega)\alpha g^2\omega^{-5}\exp\left[-1{,}25\left(\frac{\omega}{\omega_0}\right)^{-4}\right]\gamma^{\exp\left[-\frac{(\omega-\omega_0)^2}{2\tau^2\omega_0^2}\right]} \quad \text{(2.21)}$$

2.10 Analisa Pipelaying dengan Software Offpipe

Permodelan sistem instalasi pipa di dalam *software offpipe* diawali dengan memasukkan data *properties* pipa yang telah diperoleh sebelumnya seperti *outside diameter, wall thickness*, berat pipa, dll. Setelah memodelkan properties pipa kemudian dimodelkan *laybarge* yang diawali dengan memasukkan data panjang, lebar, tinggi dan sarat *laybarge*. Permodelan *laybarge* di dalam *software offpipe* juga memasukkan jenis support yang akan digunakan selama proses instalasi seperti tensioner dan *simple pipe support*. Permodelan *stinger* pada penelitian tugas akhir ini menggunakan dengan panjang 42 meter yang di bagi menjadi 5 bagian, di setiap bagiannya terdapat *simple pipa support*.

2.10.1 Arah Pembebanan dan Sistem Koordinat Software Offpipe



Gambar II.12. *Heading* dan Sistem Koordinat pada *Software* OFFPIPE

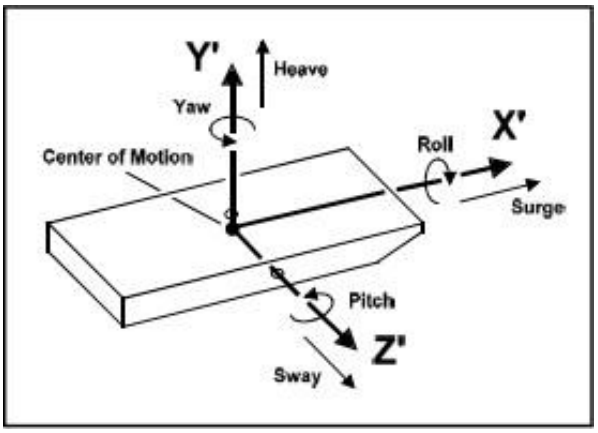
Dalam Gambar II.16 menjelaskan bahwa pada *software offpipe* arah pembebanan data lingkungan dijelaskan pada gambar di bawah, arah pembebanan 0^0 mengikuti arah gerak *laybarge* dan selanjutnya arah pembebanan mengikuti kaidah tangan kanan. Tirik koordinat x-y berada pada

draft laybarge dan terdapat pada buritan laybarge. Koordinat x menunjukkan panjang, koordinat y menunjukkan tinggi dan koordinat z menunjukkan lebar dari laybarge.

2.11 Respon Dinamis Struktur Terapung

Setiap struktur terapung yang bergerak diatas permukaan laut selalu mengalami gerakan osilasi. Gerakan osilasi ini terdiri dari 6 macam gerakan, yaitu 3 macam gerakan translasional dan 3 macam macam gerakan rotasional. Macam gerakan tersebut meliputi :

a. *Surging* : Gerak osilasi translasi pada sumbu-x
b. *Swaying* : Gerak osilasi translasi terhadap sumbu-y
c. *Heaving* : Gerak osilasi translasi terhadap sumbu-z
d. *Rolling* : Gerak osilasi rotasional terhadap sumbu-x
e. *Pitching* : Gerak osilasi rotasional terhadap sumbu-y
f. *Yawing* : Gerak osilasi rotasional terhadap sumbu-z.



Gambar II.13. Gerakan pada Struktur Terapung

Dari Gambar II.13 diatas dapat diketahui bahwa hanya tiga macam gerakan yang merupakan gerakan *osilasi* murni yaitu *heaving, rolling*, dan *pitching.* karena gerakan ini bekerja di bawah gaya atau momen pengembali ketika struktur tersebut dari posisi kesetimbangannya. Untuk gerakan, *surging, swaying,* dan *yawing,* struktur tidak kembali menuju posisi kesetimbangannya semula, kecuali terdapat gaya atau momen pengembali yang menyebabkannya bekerja dalam arah berlawanan.

2.12 Perhitungan berat pipa yang terendam

Perhitungan berat pipa saat terendam sangat diperlukan untuk menentukan kebutuhan tension pada tensioner. Tiap-tiap lapisan pipa tersebut memiliki berat sendiri sesuai dengan massa jenis masing-masing lapisan dan ukurannya. Untuk dapat mengetahui berat pipa luasan pipa tersebut perlu diketahui dulu, oleh karena itu dalam perhitungan berat pipa yang terendam diperlukan perhitungan diameter tiap tiap lapisan menggunakan persamaan dibawah ini,

$$D_i = OD - 2\,.\,WT \quad \text{..... (2.22)}$$

$$D_{cc} = OD + 2\,.\,t_{cc} \quad \text{..... (2.23)}$$

$$Dconc = D_{cc} + 2\,.\,t_{conc} \quad \text{..... (2.24)}$$

$$D_{fj} = OD + 2\,.\,t_{cc} + 2\,.\,t + t_{fj} \quad \text{..... (2.25)}$$

Dengan,

D_i = Diameter dalam pipa

WT = Tebal pipa

t_{cc} = Tebal anti korosi

D_{cc} = Diameter anti korosi 22

D_{conc} = Diameter concrete coating

t_{conc} = Tebal concrete coating

D_{fj} = Diameter field joint coating

t_{fj} = Tebal lapisan field joint coating

OD = Diameter luar pipa

Kemudian dari persamaan diatas dimasukkan ke perhitungan berat pipa tiap lapisan pipa. Sederhananya perhitungan berat pipa menggunakan konsep kerapatan massa dimana kerapatan massa bergantung oleh massa suatu benda dengan volume benda tersebut. Begitu pun pada perhitungan berat pipa per satuan panjang yang mana sama dengan perkalian antara kerapatan massa dengan luasan benda tersebut atau sama dengan volume per satuan panjang dari benda tersebut

$$W_{st} = \frac{\pi}{4} . (OD^2 - D_i^2)\rho_{st} \quad \text{.....(2.26)}$$

$$W_{cc} = \frac{\pi}{4} . (D_{cc}^2 - OD^2)\rho_{cc} \quad \text{.....(2.27)}$$

$$V_{conc} = \frac{\pi}{4} . (D_{conc}^2 - D_{cc}^2) \quad \text{.....(2.28)}$$

$$W_{conc} = V_{conc} * \rho_{conc} \quad \text{.....(2.29)}$$

Dengan,

W_{st} = Berat baja pada pipa

ρ_{st} = Massa jenis baja

W_{cc} = Berat anti korosi

ρ_{cc} = Massa jenis anti korosi

V_{conc} = Volume concrete coating

W_{conc} = Berat concrete coating

ρ_{conc} = Massa jenis concrete coating

Bouyancy adalah salah satu faktor yang perlu dipehitungkan untuk memperkirakan berat pipa yang terendam. Lalu dalam proses penyambungan 1 pipa dengan pipa lainnya diperlukan adanya field joint coating untuk melindungi serta memberikan bouyancy yang sesuai pada bagian ujung pipa yang sebelumnya masih berupa pipa besi utuh. Semua faktor ini diperlukan untuk menghitung berat pipa yang terendam. Persamaan dibawah ini dapat digunakan untuk menghitung berat total pipa yang terendam beserta lapisan yang

melindunginya,

$$B = \frac{\pi}{4} \cdot {D_{conc}}^2 \cdot \rho_w \quad (2.30)$$

$$W_1 = W_{st} \cdot L_j + (W_{cc} + W_{conc}) \cdot (L_j - 2 \cdot L_{cb}) \quad (2.31)$$

$$W_2 = \rho_{fj} \cdot \left[\pi \cdot L_{cb} \cdot \frac{{D_{fj}}^2 - OD^2}{2} + 2 \cdot \pi \cdot C_b \cdot {t_{fj}}^2 \cdot \left[\frac{OD}{2} + \left(t_{fj} \right) \cdot \frac{2}{3} \right] \right] \quad (2.32)$$

$$W_3 = -2 \cdot \pi \cdot \rho_{conc} \cdot C_b \cdot {t_{conc}}^2 \cdot \left(\frac{D_{cc}}{2} + \frac{t_{conc}}{2} \right) \quad (2.33)$$

$$W_{air} = \frac{(W_1 + W_2 + W_3)}{L_j} \quad (2.34)$$

$$W_{sa} = W_{air} + \frac{\xi}{100} \cdot V_{conc} \cdot \rho_w = B \quad (2.35)$$

Dengan,

B = Bouyancy pipa

ρ_w = Massa jenis air

W_1 = Berat pipa tanpa field joint coating

L_j = Panjang pipa

L_{cb} = Panjang Cutback

W_2 = Berat field joint coating

ρ_{fj} = Massa jenis field joint coating

C_b = Panjang concrete bevel

W_3 = Efek dari concrete bevel

2.13 Kode dan Standar

DNV OSF-101 edisi tahun 2012 merupakan panduan dan pedoman praktis untuk properti proses instalasi pipa bawah laut yang dikeluarkan oleh lembaga independen terpercaya *(Det Norkse Veritas).* DNV OS-F101 mengatur prosedur pemilihan material, fabrikasi, instalasi, inspeksi, pengujian, *commisioning,* operasi, perawatan, kualifikasi ulang dan pelepasan pipa *(abandonment).*

Format yang digunakan dalam DNV OS-F101 menggunakan *LRFD (Load and Resistance Factor Design)* dan *ASD (Allowable Stress Design)*. Selama proses instalasi maupun operasi sistem perpipaan lepas pantai menerima pembebanan yang bersifat fluktuatif baik dari beban lingkungan, beban insiden maupun beban instalasi. Dalam kondisi aktual, ketidakpastian beban tersebut diantisipasi dengan mengalikan faktor tertentu untuk beban yang terjadi.

2.14 Allowable Stress Criteria

Berdasarkan DNV OSF 101 Sec.13 G 300, kriteria besaran tegangan yang dapat diterima pada saat overbend dan sagbend adalah sebesar,

$$\sigma_{eq} < 0{,}87.SMYS \quad \text{.....(2.36)}$$

dimana σ_{eq} adalah tegangan ekivalen yang mana merupakan kombinasi tegangan dari *hoop stress, longitudinal stress,* dan *shear stress*. Sedangkan SMYS adalah *Specified Minimum Yield Strength*, yaitu tegangan minimum dari material yang digunakan.

Untuk menghitung tegangan ekivalen (σ_{eq}) diperlukan beberapa besaran dari *hoop stress* (σh) yang mana adalah besaran perbedaan tekanan yang dikarenakan adanya pengaruh dari tekanan didalam dan diluar pipa yang menekan bagian radial dari pipa, seperti pada Gambar II.14. Jika hal ini tidak diperhitungkan dengan baik dan *hoop stress* yang terjadi terlalu besar, maka dinding pipa tidak mampu menahan tegangan yang terjadi karena sudah melewati titik *yield strength* materialnya dan pada akhirnya pipa akan pecah. Untuk mencegah hal ini DNV OS F101 menjadikan *hoop stress* sebagai kriteria yang penting dalam proses mendesain pipa dan merumuskannya sebagai berikut :

$$\sigma_h = (p_i - p_e)\frac{D-t_2}{2t_2} \quad \text{(2.37)}$$

Dengan,

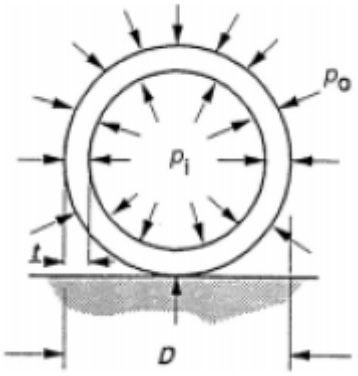
σh = *Hoop Stress*

pi = Tekanan internal

pe = Tekanan eksternal

D = Pipeline Outside Diameter

t2 = t-tcorr



Gambar II.14. *Hoop Stress* pada Pipa (Bai, 2014)

Kemudian, diperlukan juga besaran *longitudinal stress* yang mana terjadi dikarenakan *poisson ratio* dari material dan perubahan temperatur yang terjadi (Palmer dan King, 2008). Dalam operasinya, pipeline akan mengalami tekanan internal yang bekerja melingkar di seluruh permukaan dinding pipa (*circumferential tensile stress*), kemudian akibat *circumferential stress* akan membuat ukuran *pipeline* semakin membesar, sehingga diameter pipa akan membesar dan menekan pada arah *longitudinal* dan akhirnya pipa akan berkurang panjangnya akibat *longitudinal stress*. Selain itu, pipa akan mengalami ekspansi ke segala arah akibat adanya perubahan suhu dan menimbulkan *longitudinal stress* yang digambarkan pada Gambar II.15. Menurut DNV OS F101 *longitudinal stress* dapat dirumuskan sebagai berikut :

$$\sigma_1 = \frac{N}{\pi(D-t_2)t_2} + \frac{M}{\frac{\pi(D^4-(D-2t_2)}{32D}} \quad \text{.....(2.38)}$$

, dimana

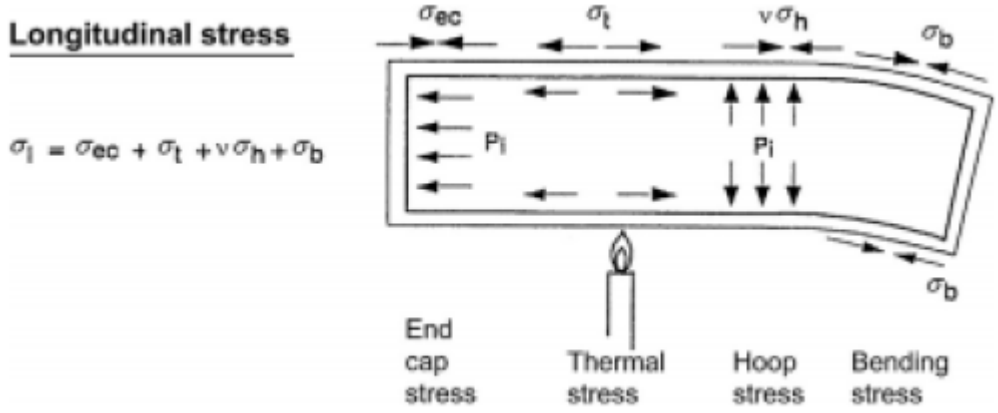
σl = *Longitudinal stress*

N = Gaya aksial yang terjadi pada dinding pipa

M = Bending moment

D = Diameter luar pipa

t2 = Ketebalan pipa (t-tcorr)



Gambar II.15. Faktor yang mempengaruhi *Longitudinal Stress* pada Pipa (Bai, 2014)

Terakhir, adalah tangential shear stress yang mana adalah tegangan geser akibat adanya tekanan dari luar dan pergerakan fluida di dalam pipa. Secara teori, tangential shear stress adalah gaya yang bekerja sejajar bidang dan mengakibatkan defleksi dan bahkan momen puntir pada bidang tersebut. Dalam kasus pipeline, pipeline akan dipengaruhi oleh gaya dari luar yaitu gaya merata dari tekanan yang disebabkan lingkungan laut dan gaya yang ditimbulkan oleh pergerakan fluida di dalam pipa. Oleh karena itu,Tegangan ekivalen (*equivalent stress*) diperlukan untuk menentukan batas tegangan yang terjadi pada saat overbend dan sagbend. Nilai dari tegangan ekivalen bisa didapat ketika semua nilai dari komponen penyusunnya telah diketahui kemudian dihitung dengan menggunakan persamaan dibawah. Berdasarkan DNV OS F101 nilai tegangan ekivalen adalah:

$$\sigma_e \leq \sqrt{\sigma_h^2 + \sigma_l^2 - \sigma_h\sigma_l + 3\tau_{hl}^2} \quad \text{.....(2.39)}$$

Dengan,

σ_h = Hoop Stress

σ_l = Longitudinal Stress

τ_{hl} = Tangential Shear Stress

2.15 Allowable Strain Criteria

Menurut DNV OS F101 pada Sec. 13 G 300 *Simplified Laying Criteria*, batasan maksimal regangan yang terjadi pada kondisi *overbend* adalah:

Tabel II-1. *Simplified Laying Criteria* DNV OS F-101

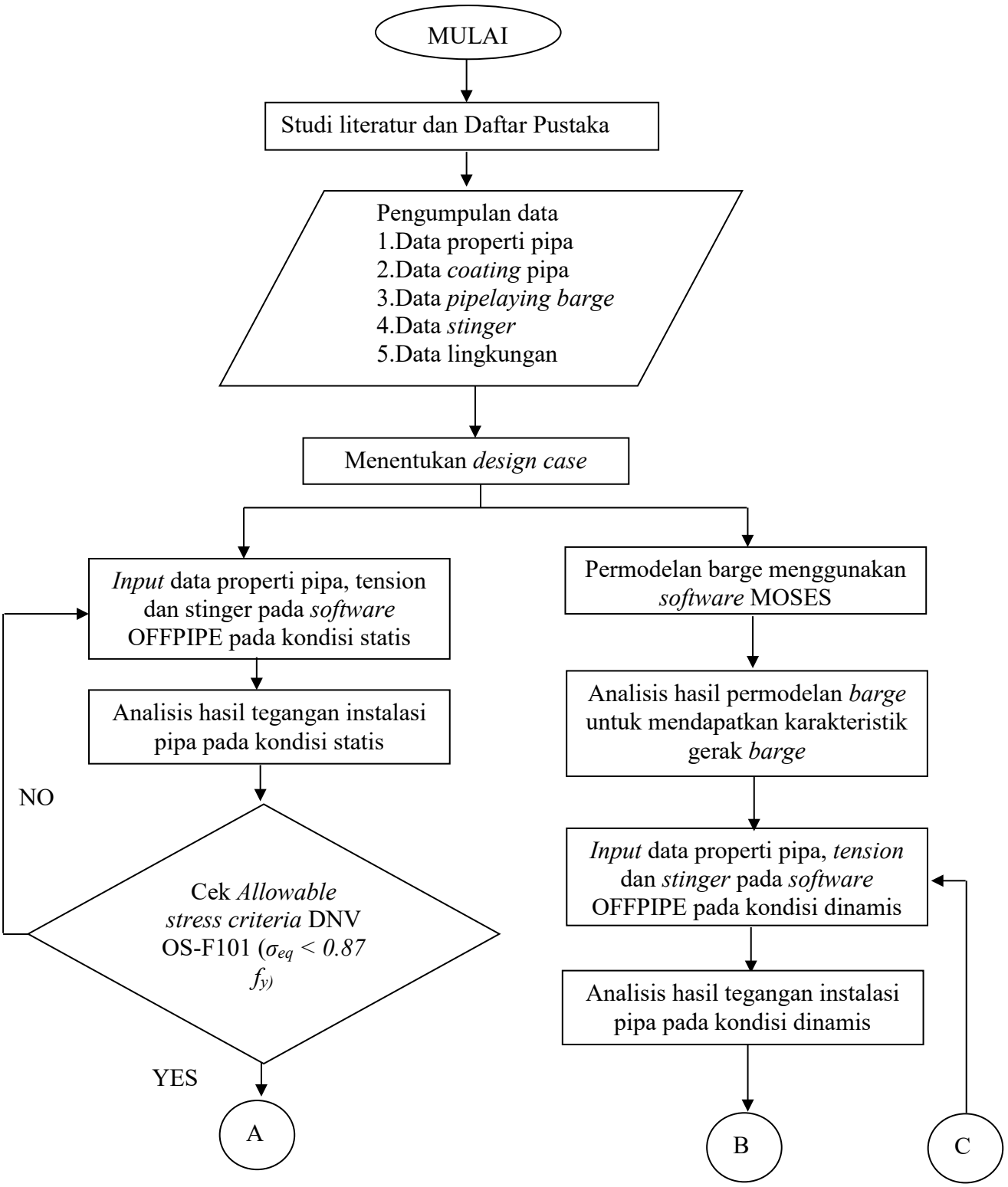
Table 12-5 Simplified criteria, overbend				
Criterion	*X70*	*X65*	*X60*	*X52*
I	0.270%	0.250%	0.230%	0.205%
II	0.325%	0.305%	0.290%	0.260%

Untuk perhitungan beban statis, regangan yang terjadi harus mengikuti *Criterion* I sesuai dengan Tabel dibawah. Regangan yang terjadi harus dipengaruhi efek beban dari bending, gaya aksial, dan roller loads. Efek yang disebabkan oleh variasi kekakuan (*stiffness*) pada *field joint* dan *buckle arrestors* tidak diperhitungkan. Sedangkan untuk perhitungan dengan beban statis dan dinamis harus mengikuti *Criterion* II yang ditunjukkan tabel Regangan yang terjadi harus dipengaruhi oleh semua efek, termasuk variasi kekakuan pada *field joint* dan *buckle arrestors*.

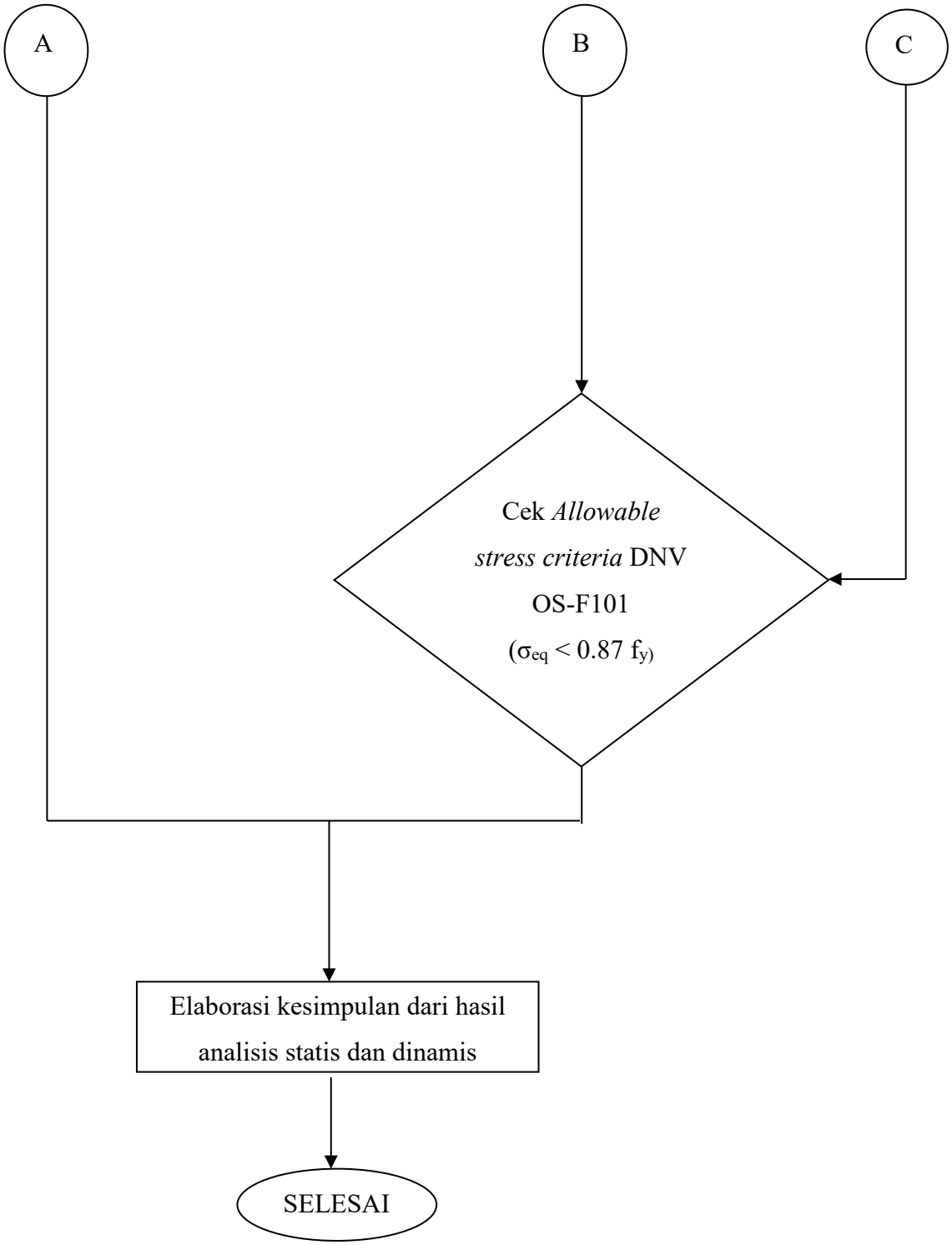
(Halaman ini sengaja dikosongkan)

BAB III
METODOLOGI PENELITIAN

3.1 Skema Diagram Alir



Gambar III.1 Diagram Alir Metode Penelitian



Gambar III.2 Diagram Alir Metode Penelitian (lanjutan)

3.2 Penjelasan Diagram Alir

1. Studi Literatur dan Daftar Pustaka

Pada tahap ini akan dilakukan pengumpulan pengumpulan referensi dari buku, jurnal, codes dan tugas akhir yang berhubungan dengan analisis menghitung tegangan dan regangan yang terjadi pada pipa saat intalasi berlangsung. Salah satu referensi codes yang digunakan penulis untuk mengerjakan tugas akhir ini adalah DNV OS-F101 tentang batas maksimum stress criteria.

2. Pengumpulan Data

Melakukan pengumpulan data yang dibutuhkan guna menganalisa total tegangan pipa pada saat instalasi yang akan di-*input* ke dalam *software*. Data tersebut meliputi properti pipa, data *coating* pipa, besar ukuran *pipe laying barge*, panjang *stinger*. Data lingkungan yang digunakan untuk tugas akhir ini adalah data lingkunga milik PT. PHE WMO

3. Penentuan *design case*

Menentukan kasus-kasus berupa variasi yang akan dianalisa pada tugas akhir ini. Variasi yang akan digunakan pada analisa ini berupa variasi kedalaman dan variasi *tension* pada *tensioner* yang digunakan di *barge*.

4. Input data properti pipa, *tensioner* dan *stinger*

Memasukan semua data yang diperlukan seperti data properti pipa, data *coating* pipa, data *tensioner* dan data *stinger* untuk melakukan *run* pada *software* OFFPIPE sehingga mendapatkan hasil berupa *output* total tegangan dan regangan yang terjadi pada saat instalasi pipa berlangsung.

5. Cek tegangan pada daerah *sagbend* dan *overbend*

Melakukan pemeriksaan terhadap *output* yang dihasilkan. Output yang dikeluarkan akan berupa tegangan dan regangan di setiap *node* pipa. Tegangan dan regangan tersebut akan disesuaikan untuk memenuhi.

6. Permodelan *barge*

Melakukan permodelan barge sesuai *principle dimension* dari data yang sudah didapat. Validasi barge ditujukan untuk melakukan perbandingan hasil permodelan barge pada software dengan ukuran barge di lapangan. Kriteria untuk validasi permodelan barge berupa displacement bernilai 2%. Untuk pengerjaan permodelan barge akan dibantu oleh *software* MOSES.

7. Analisis hasil permodelan *barge*

Setelah melakukan permodelan *barge*, akan dilakukan analisis guna mengetahui karakteristik gerak *barge* dengan beban-beban lingkungan yang sudah ditentukan.

8. Penyusunan kesimpulan

Menyusun kesimpulan yang sesuai dengan permasalahan yang diangkat serta tujuan yang diharapkan.

BAB IV
ANALISA DAN PEMBAHASAN

4.1 Penjelasan Analisis Statis dan Dinamis Instalasi Pipa

Untuk keberhasilan pelaksanaan instalasi pipa, seorang seorang *engineer* harus mengetahui semua istilah dan alat-alat yang digunakan untuk melakukan instalasi. Berikut adalah penjelasan beberapa alat dan istilah untuk instalasi pipa :

1. *Overbend*

   Daerah kritis pipa yang terletak pada ujung *laybarge* dimulai dari *tensioner* hingga ujung *stinger* (*stinger tip*) yang sering terjadi *stress* yang cukup besar.

2. *Sagbend*

   Daerah pipa terhitung mulai dari ujung *stinger* (*stinger tip*) dimana pipa sudah tidak ter-*support* dengan apapun hingga pipa menyentuh *seabed*.

3. *Laybarge*

   Barge yang digunakan khusus untuk instalasi pipa, biasanya *barge* dengan tipe seperti ini mempunyai alat-alat lengkap untuk instalasi pipa seperti *tensioner, roller support* dan *stinger* untuk membantu melakukan instalasi pipa dengan sempurna.

4. *Tensioner*

   Alat berupa 2 *roller conveyor* berat yang diletakan di atas dan bawah untuk menahan pipa pada saat instalasi guna menghindari pipa terlalu tegang ataupun terlalu kendur pada saat instalasi berlangsung.

5. *Stinger*

   Sebuah alat berupa struktur yang digunakan untuk membuat lengkungan pada daerah *overbend* guna mengurangi besar *stress* pada daerah *sagbend*

6. *Stinger hitch*

   Sebuah engsel yang dapat mengatur sudut kemiringan *stinger* yang menyambungkan struktur *stinger* dan *barge.*

7. *Stinger Radius of Curvature*

   Sebuah jarak kelengkungan yang dihitung dari *hitch* hingga *stinger tip.* Variabel ini juga memiliki peran besar dalam menentukan *total stress* yang terjadi pada pipa saat instalasi.

8. *Stinger Departure Angle*

   Sebuah derajat kemiringan pada *stinger* yang merupakan variabel yang

mempengaruhi terjadinya *overstress*.

9. *Touchdown Point*

   Jarak horizontal x pipa yang diukur dari *stinger hitch* pada bagian belakang *barge* (*stern*) hingga pipa menyentuh *seabed*.

4.1.1 Penjelasan Analisis Statis

Pada tugas akhir ini ada 2 analisis utama dipusatkan untuk mengetahui seberapa besar tegangan yang terjadi pada pipa pada saat instalasi. Yang pertama yaitu analisis statis. Analisis Statis adalah analisis untuk mengetahui total tegangan yang terjadi pada saat instalasi pipa dengan kondisi *barge* yang diasumsikan diam (statis). Adapun beberapa variabel yang dimasukan dalam kondisi statis sebagai berikut :

- *Barge* dianggap diam (Statis)
- Tidak ada pengaruh gelombang
- Pengaruh arus terhadap pipa masih ada
- *Friction* tanah termasuk dalam variabel

4.1.2 Penjelasan Analisis Dinamis

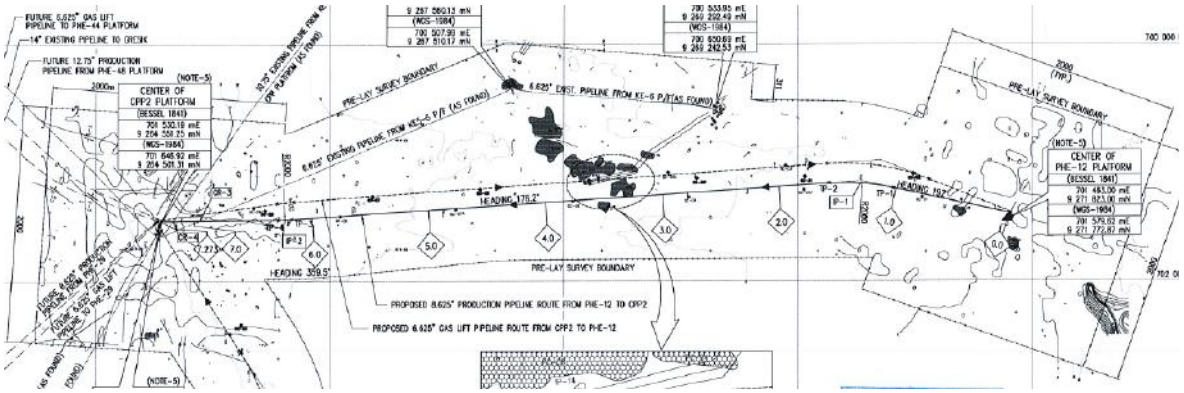
Untuk analisis yang kedua, penulis berpusat menganalisis instalasi pipa pada saat kondisi dinamis yaitu dimana analisis ini akan dilakukan berdasarkan *time series* yang ditentukan oleh penulis, serta memasukan hasil analisis RAO *barge* pada analisis dinamis. Adapun beberapa variabel yang dimasukan dalam kondisi dinamis sebagai berikut :

- *Barge* sudah dianggap memiliki respon terhadap gelombang
- Gelombang berpengaruh pada analisis ini
- Arus dan *friction* tanah berpengaruh pada analisis ini
- Memasukan variabel *time series* untuk mengetahui waktu mulai dan durasi analisis dinamis berlangsung

4.2 Pengumpulan dan Identifikasi Data

Pada pengerjaan tugas akhir ini penulis menggunakan data proyek instalasi pipa bawah laut milik PT. Pertamina Hulu Energi WMO yang terletak disebelah utara selat madura.Pipa tersebut berdiameter 8” yang digunakan untuk jalur transportasi fluida berupa air, minyak dan gas (*three phase hydrocarbon*). Pipe bawah laut ini menghubungkan 2 buah *platform* yaitu dari *platform* PHE-12 ke KE-5 CPP (*Central Processing Platform*) dengan

jarak sepanjang 7.253 km. Gambar peta pipa tersebut bisa dilihat pada gambar lokasi kedua *platform* sebagai berikut



Gambar IV.1. Peta Jalur Lokasi Pipa 8" PHE-12 ke KE-5 CPP

4.2.1 Data Properti Pipa

Tabel IV-1 Data Properti Pipa

Description	*Unit*	*Value*
Outside Diameter	inch	8.625
Wall Thickness	mm	12.7
Material Grade	mm	API 5L Grade X52
SMYS	MPa	360
SMTS	Mpa	455
Modulus of Elasticity	MPa	207000
Poisson's Ratio	-	0.3
Density of Steel Pipe	Kg/m^3	7850

Tabel IV-2 Data Properti Pipa (lanjutan)

Pipe Section Length	m	12
Service	-	Three Phase Hydrocarbon
Route	-	8" PHE-12 to KE-5 CPP

Tabel IV-3 Data *Pressure* dan Temperatur Pipa

Description	*Unit*	*Value*
Design Pressure	Psig	625
Operating Pressure	Psig	502
Hydrotest Pressure	Psig	875
Design Temperature	°F	200
Operating Temperature	°F	140

Tabel IV-4. Data Berat Pipa

Description	*Unit*	*Value*
Dry (empty)	Kg/m	128.484
Submerged (empty)	Kg/m	66.689
Submerged (hydrotest)	Kg/m	96.873
Submerged (operating)	Kg/m	96.261

4.2.2 Data Lapisan *Corrosion Coating* dan *Concrete Coating*

Tabel IV-5. Data Tebal *Coating* Pipa

Description		Unit	*Value*
Anti-Corrosion Coating	*Material*	-	Asphalt Enamel
	Min. *Thickness*	mm	4
	Density	kg/m^3	1281.5
Concrete Coating	Min. *Thickness*	mm	25
	Density	kg/m^3	3044

Tabel IV-6. Data *Sacrificial Anode Pipa*

Description	*Parameter*	*Value*
Sacrificial Bracelet Anode	*Weight*	14.9 kg
	Distance	*Every* 16 *Joints*

4.2.3 Data *Pipelaying Barge*

Tabel IV-7. Ukuran Dimensi Barge

Description	*Value*
Name	Kalinda
Classification	BKI *Pipe Lay Barge*
Flag	Indonesia
LOA	280' (85.344 m)
Breadth	90' (27.432 m)
Depth	18' (5.4864 m)
Draft	1.8 m (in *operation*)
Mooring	8 *Points*

Tabel IV-8. Data *Tensioner pada Barge*

Description	*Value*
Electric Tensioner	30 Tons
Back-up Tensioner	2x7 Tons
A&R Winch	30 Tons

4.2.4 Data *Stinger*

Tabel IV-9. Data *Stinger* yang Digunakan

Description	*Value*
Stinger Type	*Fixed Stinger*
No. of Stinger Sections	2
No. of Rollers on *Stinger*	7
Total Stinger Length	± 40 m

4.2.5 Data *Roller* pada *Barge* dan *Stinger*

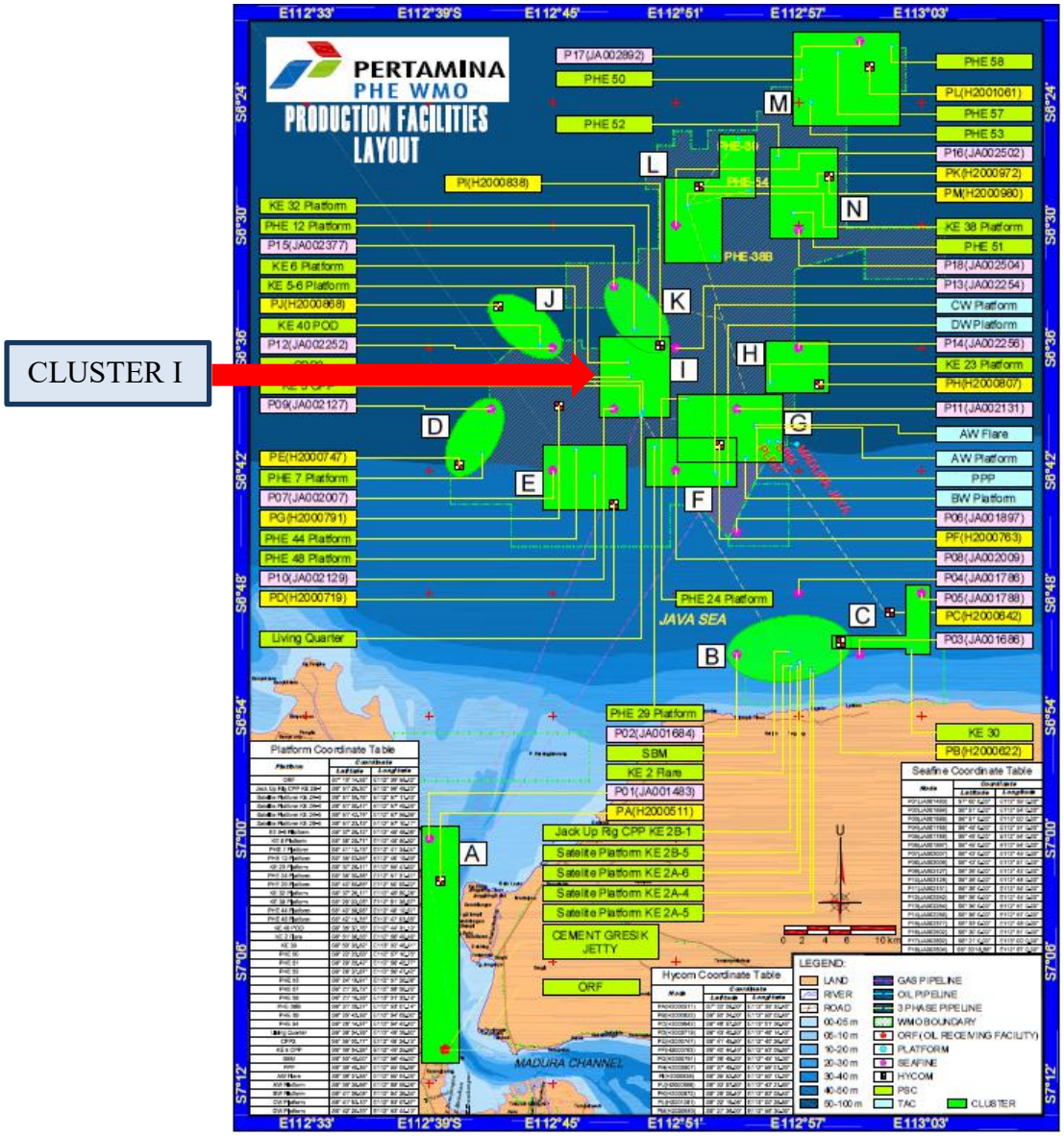
Tabel IV-10. Konfigurasi *Roller Support* pada *Barge*

ID *Roller*	Jarak *Roller* dari Buritan (m)	Jarak *Roller* dari *Main Deck* (m)
Roller 1	77.78	2.56
Roller 2	71.48	2.47
Roller 3	65.37	2.36
Roller 4	59.91	2.27
Roller 5	53.32	2.15
Roller 6	47.32	2.05
Tensioner	38.21	1.89
Roller 7	29.27	1.74
Roller 8	23.13	1.63
Roller 9	17.18	1.49
Roller 10	10.62	1.21

Tabel IV-11. Konfigurasi *Roller Support* pada *Stinger*

ID *Roller*	Jarak *Roller* dari *Hitch* (m)	Jarak *Roller* dari *Main Deck* (m)
Roller 11	0.94	0.35
Roller 12	7.96	0.38
Roller 13	13.96	1.15
Roller 14	20.49	2.13
Roller 15	26.34	3.13
Roller 16	32.16	4.20
Roller 17	38.05	5.50

4.2.6 Data Lingkungan



Gambar IV.2. Peta Wilayah Kerja PT. PHE WMO

Analisis instalasi pipa bawah laut ini berlokasi di *Cluster* I PT. PHE WMO yang bertempat di sebelah utara selat Madura.Data lingkungan yang digunakan berasal dari PHE WMO *Metocean Data Integration*. Di dalam data tersebut terdapat semua data dari semua cluster milik PHE WMO. *Metocean* adalah data numerik maupun keadaan yang digunakan untuk mengetahui kondisi arus, gelombang, pasang surut, angin, *visibility* dan kelembapan. Data tersebut didapatkan dari survei dengan menggunakan instumen pengukuran yang digunakan di atau dekat area proyek dikarenakan setiap proyek tengah laut biasanya membutuhkan data lingkungan yang ekstrim untuk mengetahui mendesain bangunan

maupun fasilitasnya di tengah laut. Data ini biasanya berguna sebagai masukan untuk engineering desain terhadap struktur bangunan apung maupun terpancang yang memasuki daerah eksplorasi. Adapun Peta wilayah kerja PHE WMO dan data lingkungan yang tersedia sebagai berikut :

Tabel IV-12. Data Arus 1 Tahunan pada Cluster I

Layers and Distance from Water Surface, Water Depth(m) = 53.81	*Current Speed* (cm/s) *and direction* (to which)																	
	Depth	Omni	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
Layer 10 - Surface (1.0 D)	0	63.59	15.5	15.5	19.3	34.1	63.6	55.35	16.7	7.88	6.55	6.61	9.58	18.2	51.6	58.3	30	19.3
Layer 9 (0.9 D)	-5.38	62.64	15.2	15.3	19	33.6	62.6	54.52	16.5	7.76	6.45	6.51	9.44	18	50.8	57.4	29.5	19.1
Layer 8 (0.8 D)	-10.8	61.59	15	15	18.7	33	61.6	53.61	16.2	7.63	6.34	6.4	9.28	17.7	50	56.5	29	18.7
Layer 7 (0.7 D)	-16.1	60.43	14.7	14.7	18.3	32.4	60.4	52.6	15.9	7.49	6.22	6.28	9.1	17.3	49	55.4	28.5	18.4
Layer 6 (0.6 D)	-21.5	59.11	14.4	14.4	17.9	31.7	59.1	51.45	15.5	7.33	6.09	6.14	8.91	16.9	47.9	54.2	27.9	18
Layer 5 - Mid Depth (0.5 D)	-26.9	57.59	14	14	17.5	30.9	57.6	50.13	15.1	7.14	5.93	5.99	8.68	16.5	46.7	52.8	27.1	17.5
Layer 4 (0.4 D)	-32.3	55.79	13.6	13.6	16.9	29.9	55.8	48.56	14.7	6.91	5.75	5.8	8.4	16	45.2	51.2	26.3	17
Layer 3 (0.3 D)	-37.7	53.54	13	13.1	16.2	28.7	53.5	46.6	14.1	6.63	5.51	5.57	8.07	15.3	43.4	49.1	25.2	16.3
Layer 2 (0.2D)	-43.1	50.53	12.3	12.3	15.3	27.1	50.5	43.98	13.3	6.26	5.2	5.25	7.61	14.5	41	46.3	23.8	15.4
Layer 1 - Near Bed (0.1 D)	-48.4	45.76	11.1	11.2	13.9	24.5	45.8	39.83	12	5.67	4.71	4.76	6.89	13.1	37.1	42	21.6	13.9
(1m ASB)	-52.8	40.22	9.78	9.8	12.2	21.6	40.2	35.01	10.6	4.98	4.14	4.18	6.06	11.5	32.6	36.9	19	12.2

Tabel IV-13. Data Arus 10 Tahunan pada Cluster I

Layers and Distance from Water Surface, Water Depth(m) = 53.81	*Current Speed* (cm/s) *and direction* (to which)																	
	Depth	Omni	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
Layer 10 - Surface (1.0 D)	0	93.79	20.5	21.6	28.7	42.2	93.8	79.87	34.2	22.3	18.5	17.5	19.7	31.4	63.6	68.1	40.3	26.3
Layer 9 (0.9 D)	-5.38	92.39	20.2	21.3	28.3	41.6	92.4	78.68	33.7	21.9	18.2	17.3	19.5	30.9	62.7	67.1	39.7	25.9
Layer 8 (0.8 D)	-10.8	90.85	19.9	20.9	27.8	40.9	90.9	77.36	33.1	21.6	17.9	17	19.1	30.4	61.6	65.9	39	25.5
Layer 7 (0.7 D)	-16.1	89.13	19.5	20.5	27.3	40.1	89.1	75.9	32.5	21.2	17.6	16.7	18.8	29.8	60.5	64.7	38.3	25
Layer 6 (0.6 D)	-21.5	87.19	19.1	20.1	26.7	39.3	87.2	74.25	31.8	20.7	17.2	16.3	18.4	29.2	59.2	63.3	37.4	24.5
Layer 5 - Mid Depth (0.5 D)	-26.9	84.95	18.6	19.6	26	38.2	85	72.34	31	20.2	16.8	15.9	17.9	28.4	57.6	61.7	36.5	23.8
Layer 4 (0.4 D)	-32.3	82.28	18	19	25.2	37	82.3	70.07	30	19.5	16.2	15.4	17.3	27.5	55.8	59.7	35.3	23.1
Layer 3 (0.3 D)	-37.7	78.97	17.3	18.2	24.2	35.6	79	67.25	28.8	18.8	15.6	14.8	16.6	26.4	53.6	57.3	33.9	22.1
Layer 2 (0.2D)	-43.1	74.53	16.3	17.2	22.8	33.6	74.5	63.46	27.2	17.7	14.7	13.9	15.7	24.9	50.6	54.1	32	20.9
Layer 1 - Near Bed (0.1 D)	-48.4	67.5	14.8	15.6	20.7	30.4	67.5	57.48	24.6	16	13.3	12.6	14.2	22.6	45.8	49	29	18.9
(1m ASB)	-52.8	59.32	13	13.7	18.2	26.7	59.3	50.52	21.6	14.1	11.7	11.1	12.5	19.8	40.2	43.1	25.5	16.6

Tabel IV-14. Data Ketinggian Gelombang Signifikan dan Periode

Return Period	Wave Height (m) and Associated Periods (second) For All Direction (to which)																
Depth = 51.10 - 56.77 m	Omni	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
from MSL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1-Year																	
Hs	1.89	0.21	0.17	0.16	0.34	0.69	1.89	1.08	0.4	0.33	0.3	0.42	0.76	1.48	1.03	0.39	0.21
Tp	6.23	3.04	2.9	2.71	3.08	4.28	6.23	5.08	3.35	3.29	3.07	3.34	4.27	5.73	4.54	3.2	2.75
Tz	4.84	2.36	2.26	2.11	2.4	3.33	4.84	3.95	2.61	2.56	2.39	2.6	3.32	4.46	3.53	2.49	2.14
Hmax	3.78	0.42	0.34	0.32	0.68	1.38	3.78	2.16	0.8	0.66	0.6	0.84	1.52	2.96	2.06	0.78	0.42
Tmax	5.61	2.74	2.61	2.44	2.77	3.85	5.61	4.57	3.02	2.96	2.76	3.01	3.84	5.16	4.09	2.88	2.48
10-Years																	
Hs	3.42	0.81	1	1.07	1.07	1.76	3.42	2.9	0.93	0.95	0.92	1	1.95	2.31	1.5	1.01	0.74
Tp	8.63	3.79	4.09	4.22	4.81	6.27	8.63	8.51	4.75	4.47	4.56	4.67	6.52	6.9	5.78	4.26	3.92
Tz	6.71	2.95	3.18	3.28	3.74	4.88	6.71	6.62	3.69	3.48	3.55	3.63	5.07	5.37	4.49	3.31	3.05
Hmax	6.84	1.62	2	2.14	2.14	3.52	6.84	5.8	1.86	1.9	1.84	2	3.9	4.62	3	2.02	1.48
Tmax	7.77	3.41	3.68	3.8	4.33	5.64	7.77	7.66	4.28	4.02	4.1	4.2	5.87	6.21	5.2	3.83	3.53

Tabel IV-15. Data *Extreme Wave* dan *Ts*

Extreme wave and Ts	Omni	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1 Year Return Period																	
Hmax	3.78	0.42	0.34	0.32	0.68	1.38	3.78	2.16	0.8	0.66	0.6	0.84	1.52	2.96	2.06	0.78	0.42
Ts	5.607	2.736	2.61	2.44	2.77	3.85	5.61	4.572	3.02	2.96	2.763	3.01	3.84	5.16	4.09	2.88	2.48
10 Year Return Period																	
Hmax	6.84	1.62	2	2.14	2.14	3.52	6.84	5.8	1.86	1.9	1.84	2	3.9	4.62	3	2.02	1.48
Ts	7.767	3.411	3.68	3.8	4.33	5.64	7.77	7.659	4.28	4.02	4.104	4.2	5.87	6.21	5.2	3.83	3.53

Tabel IV-16. Data Parameter JONSWAP

Return Period	*Depth* (m)	*Region*	JONSWAP Parameter				*Crest height* H' (m)
			ωp	Tp/√Hs	α	γ	
1 year	56.77	*Deep Water*	1.01	4.53	0.010146	1.71	1
10 year	56.77	*Deep Water*	0.73	4.67	0.009497	1.47	1.81

Tabel IV-17. Data Parameter Air Laut

Description	Satuan	Nilai
Sea water density	kg/m^3	1025

Tabel IV-18. Data Tanah

Description	Unit	*Value*
Jenis Tanah	-	*Very Soft Greenish Grey Clay*
Undrained Shear Strength, Su	kPa	9 - 10

Tabel IV-19. Data Kedalaman per Kilometer Point

Km Point	DEPTH	Km Point	DEPTH
0	57.59	4	56.30
0.5	57.37	4.5	56.43
1	57.34	5	56.16
1.5	57.26	5.5	55.85
2	57.13	6	55.50
2.5	56.83	6.5	55.25
3	56.80	7	55.14
3.5	56.45	7.253	56.07

Dapat dilihat pada tabel IV-19 bahwa kedalaman minimal yang paling dangkal adalah sebesar 55.14 meters sedangkan untuk yang paling dalam adalah sebesar 57.59 meter. Untuk rata rata kedalaman adalah sebesar 56.46 meter. Sehingga pada analisis statis dan dinamis ini akan dibagi menjadi 3 kedalaman yang dimasukan untuk analisis yaitu untuk *worst case* penulis menggunakan 53 meter dan 59 meter dan karena kedalaman rata-ratanya sebesar 56.46 meter maka penulis menggunakan 56 meter untuk kedalaman rata-ratanya.

4.3 Analisis statis S-Lay pada pipa saat instalasi

4.3.1 Design Case Analisis Statis

Untuk menganalisis total stress yang paling kecil pada saat instalasi, design case harus dibuat. Design case adalah tabel yang dibuat sebelum menganalisis sesuatu untuk mendefinisikan variasi pada tiap variable yang dapat diubah. Input data yang dimasukan menggunakan pipa dengan outside diameter 8.625 inch sesuai data properti pipa yang telah diberikan. Pada penelitian ini penulis memvariasikan 3 variabel yaitu kedalaman, *stinger radius of curvature* dan kekuatan tensioner. Sehingga didapatkan sebanyak 18 case untuk analisa statis. Pada analisa statis ini penulis menggunakan beberapa perintah pada OFFPIPE yaitu seperti yang ditunjukan pada tabel dibawah

Tabel IV-20.Design Case Analisis Statis Kedalaman 53 Meter

Case	Outside Diameter	Wall Thickness	Depth	Stinger Radius of Curvature	Tensioner
	Inch	mm	m	m	ton

1	8.625	12.7	53	200	30
2	8.625	12.7		300	
3	8.625	12.7		400	
4	8.625	12.7		200	40
5	8.625	12.7		300	
6	8.625	12.7		400	

Tabel IV-21 Design Case Analisis Statis Kedalaman 56 Meter

Case	Outside Diameter	Wall Thickness	Depth	Stinger Radius of Curvature	Tensioner
	Inch	mm	m	m	ton
1	8.625	12.7	56	200	30
2	8.625	12.7		300	
3	8.625	12.7		400	
4	8.625	12.7		200	40
5	8.625	12.7		300	
6	8.625	12.7		400	

Tabel IV-22 Design Case Analisis Statis Kedalaman 59 Meter

Case	Outside Diameter	Wall Thickness	Depth	Stinger Radius of Curvature	Tensioner
	Inch	mm	m	m	ton
1	8.625	12.7	59	200	30
2	8.625	12.7		300	
3	8.625	12.7		400	
4	8.625	12.7		200	40
5	8.625	12.7		300	
6	8.625	12.7		400	

Tabel IV-23. Variabel yang Digunakan untuk Analisis Statis

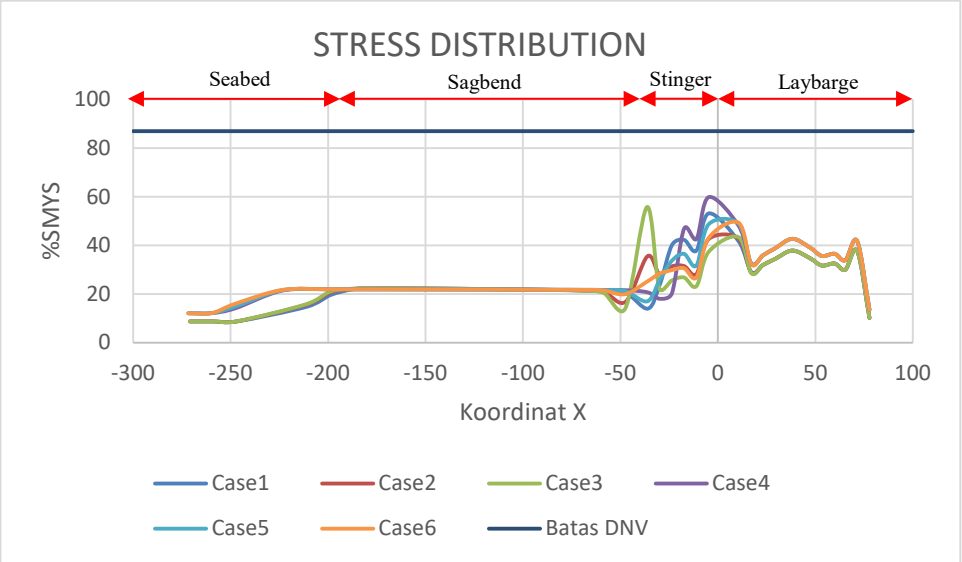
Input/Output/Heading data	*Pipe and* A&R *Cable Data*	*Pipelay Vessel Data*	*Stinger Data*	*Sagbend and Seabed Data*
HEAD	PIPE	TENS	STIN	GEOM
PRIN	COAT	BARG	SUPP	CURR
PROF	CABLE	SUPP	BALL	SOIL
HIST	BUND	DAVI	BUOY	LENG
PLTR	FLUI	DCAB	WEIG	FLOA
DIAG	MOME		SECT	SPAN

4.3.2 Hasil Analisis Statis S-Lay

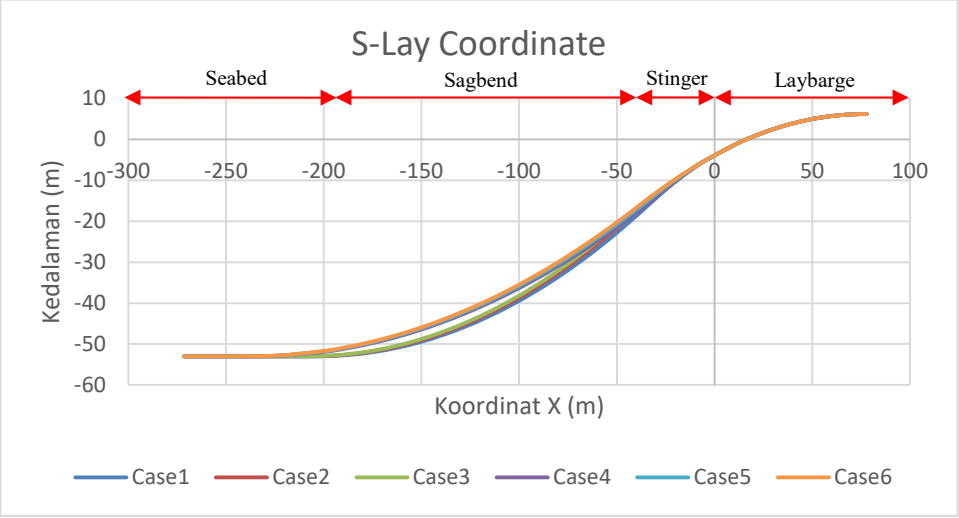
Sebelum melakukan analisis dinamis, analisis statis harus dilakukan untuk mengetahui hasil total tegangan yang terjadi pada pipa saat instalasi S-lay berlangsung. Jika nanti hasil analisis dengan variasi variabel tertentu ada yang tidak memenuhi, maka nilai variasi tersebut tidak bisa dilanjutkan untuk tahap pengerjaan analisis dinamis. Pengerjaan Analisis statis ini dibantu oleh software OFFPIPE dengan menggunakan data properti pipa, barge, stinger, lingkungan, dan roller yang sudah didapat dengan asumsi barge dianggap diam (statis).

Setelah analisa statis dilakukan pada *software* OFFPIPE maka akan didapatkan hasil total tegangan dan %SMYS. Kemudian hasil yang sudah diolah kedalam bentuk tabel dapat

dibandingkan dengan maksimum *stress criteria* yang sudah diatur dalam DNV OS-F101. *Stress criteria* maksimum yang dimaksud adalah sebesar 87% dari SMYS, jika %SMYS tersebut ada yang melebihi dari yang ditentukan maka *case* tersebut dinyatakan mengalami kegagalan atau *overstress*. Sedangkan untuk analisis statis regangannya menggunakan *codes strain criteria* yang terdapat pada DNV OS-F101 sec 13 G300 yaitu sebesar 0.205%. Adapun hasil analisa statis pada kedalaman 53 meter, 56 meter, 59 meter yang sudah dilakukan oleh penulis :



Gambar IV.3. Grafik Total Tegangan pada Kedalaman 53 meter.

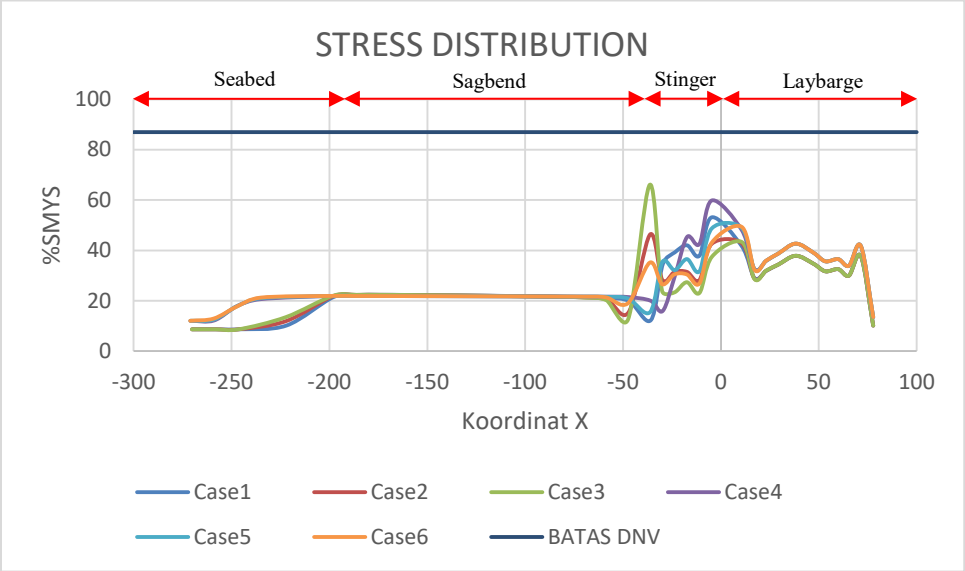


Gambar IV.4. Grafik Kurva S-Lay pada Kedalaman 53 meter.

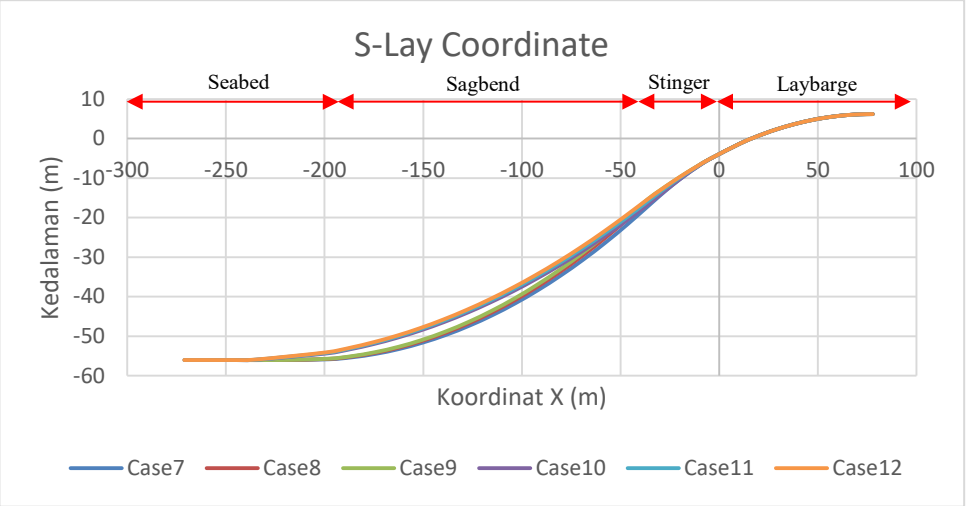
Tabel IV-24. Hasil Total Tegangan daerah *Overbend* pada Kedalaman 53 meter

Case	*Pipe Node*	*Section*	*Coordinate* (m)		*Total Stress* (MPA)	%SMYS
			x	y		
1	24	STINGER	-4.6	-5.1	191.4	53
2	21	LAYBARGE	10.6	-1.2	154.2	43
3	34	STINGER	-36.3	-15.4	200.8	56
4	24	STINGER	-4.6	-5.1	215.5	60
5	21	LAYBARGE	10.6	-1.2	176.1	49
6	21	LAYBARGE	10.6	-1.2	177.6	49

Berdasarkan grafik kurva distribusi total tegangan yang terjadi dan tabel hasil analisis statis pada case 1 sampai dengan case 6 diatas dapat diketahui besar tegangan maksimum yang terjadi pada variasi kedalaman 53 meter yang terletak pada *case* 4 dengan daerah kritis *overbend* adalah sebesar 215.5 Mpa atau sebesar 60% dari SMYS, terjadi di *roller support* bagian *stinger* pada *node* pipa ke-24 dengan koordinat x = -4.6 dan koordinat y = -5.1.



Gambar IV.5. Grafik Total Tegangan pada Kedalaman 56 meter.

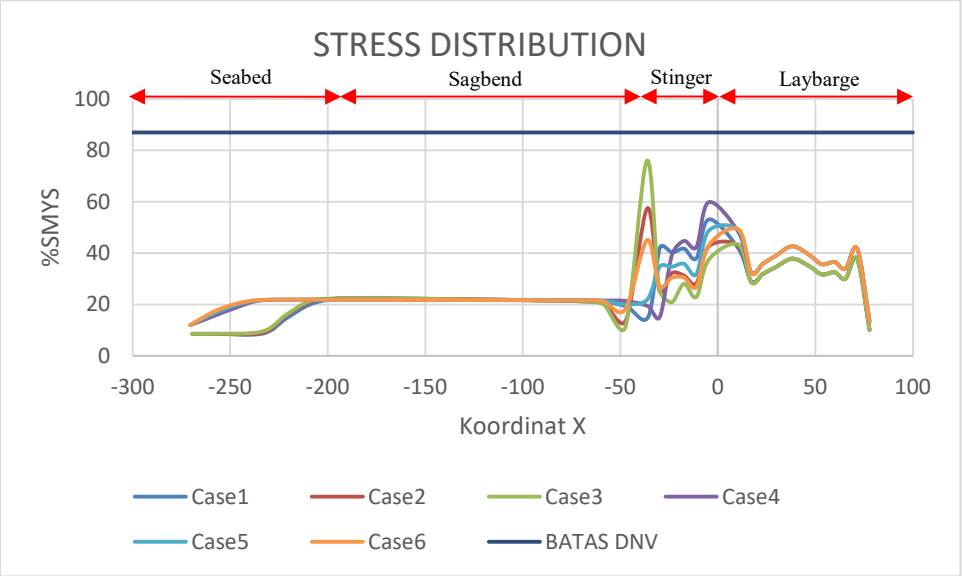


Gambar IV.6. Grafik Kurva S-Lay pada Kedalaman 56 meter.

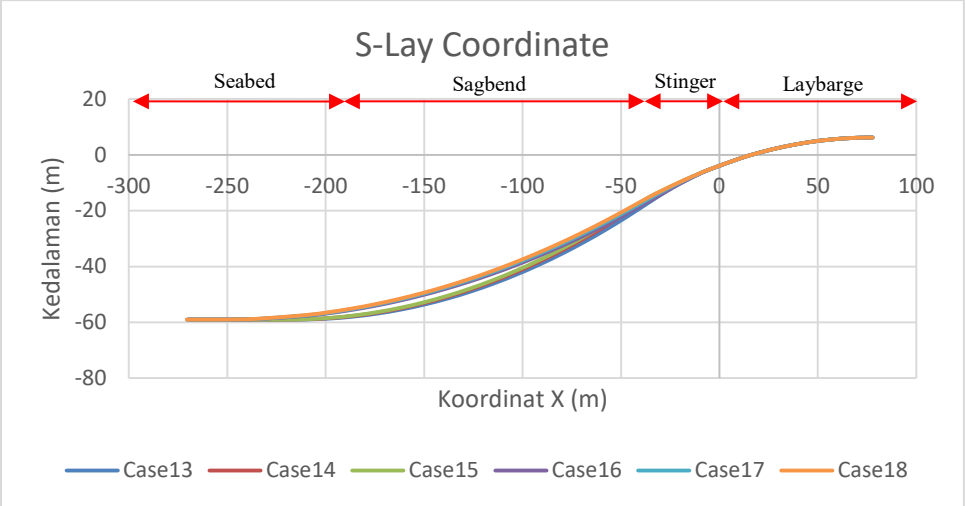
Tabel IV-25. Hasil Total Tegangan daerah *Overbend* pada Kedalaman 56 meter

Case	*Pipe Node*	*Section*	*Coordinate* (m)		*Total Stress* (Mpa)	%SMYS
			x	y		
1	24	STINGER	-4.6	-5.1	191.4	53
2	34	STINGER	-36.1	-15.9	167	46
3	34	STINGER	-36.3	-15.4	238	66
4	24	STINGER	-4.6	-5.1	215.5	60
5	21	LAYBARGE	10.6	-1.2	176.1	49
6	21	LAYBARGE	10.6	-1.2	177.6	49

Berdasarkan grafik kurva distribusi total tegangan yang terjadi dan tabel hasil analisis statis pada *case* 1 sampai dengan *case* 6 diatas dapat diketahui besar tegangan maksimum yang terjadi pada variasi kedalaman 56 meter yang terletak pada *case* 3 dengan daerah kritis *overbend* adalah sebesar 238 Mpa atau sebesar 66% dari SMYS, terjadi di *roller support* bagian *stinger* pada *node* pipa ke-34 dengan koordinat x = -36.3 dan koordinat y = -15.4.



Gambar IV.7. Grafik Total Tegangan pada Kedalaman 59 meter.

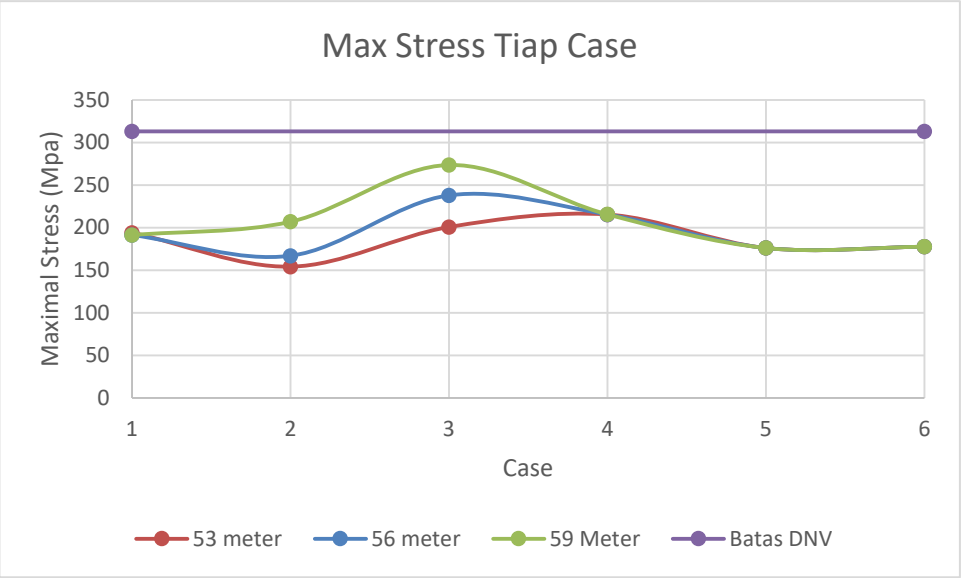


Gambar IV.8. Grafik Kurva S-Lay pada Kedalaman 59 meter.

Tabel IV-26. Hasil Total Tegangan daerah *Overbend* pada Kedalaman 59 meter

Case	*Pipe Node*	*Section*	*Coordinate* (m)		*Total Stress* (MPA)	%SMYS
			x	y		
1	24	STINGER	-4.6	-5.1	191.3	53
2	34	STINGER	-36.1	-15.9	207	58
3	34	STINGER	-36.3	-15.4	273.7	76
4	24	STINGER	-4.6	-5.1	215.6	60
5	21	LAYBARGE	10.6	-1.2	176.1	49
6	21	LAYBARGE	10.6	-1.2	177.6	49

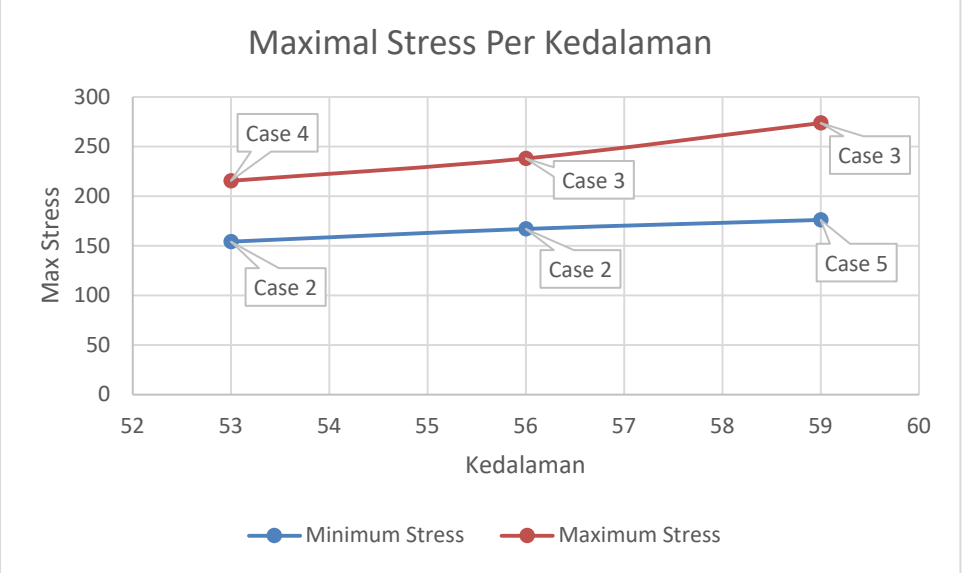
Berdasarkan grafik kurva distribusi total tegangan yang terjadi dan tabel hasil analisis statis pada *case* 1 sampai dengan *case* 6 diatas dapat diketahui besar tegangan maksimum yang terjadi pada variasi kedalaman 59 meter yang terletak pada *case* 3 dengan daerah kritis *overbend* adalah sebesar 273.7 Mpa atau sebesar 76% dari SMYS, terjadi di *roller support* bagian *stinger* pada *node* pipa ke-34 dengan koordinat x = -36.3 dan koordinat y = -15.4.



Gambar IV.9 Grafik Maksimal Tegangan per Case

Grafik diatas menunjukan bahwa nilai maksimum tegangan pada tiap *case* berbeda hingga *case* nomer 4 sampai dengan 6 hampir sama polanya. Untuk *case* yang tertinggi yaitu *case* nomer 3 pada kedalaman 59 meter. Untuk tiap kenaikan kedalaman, total tegangan yang dihasilkan juga semakin besar nilainya. Pada umumnya hasil maksimal tegangan yang

dihasilkan yang terbesar terjadi pada *stinger tip* karena pada daerah tersebut pipa sudah tidak memiliki *support* dan mulai membuat lengkungan *overbend* untuk menyentuh *seabed*. Dapat ditinjau pada tabel terdapat batas DNV OS-F101 untuk semua hasil maksimal total tegangan yang terjadi pada tiap *case* masih memenuhi *stress criteria* yang berlaku.



Gambar IV.10 Grafik Maksimal Stress Per Kedalaman

Dapat dilihat pada Gambar IV.10 bahwa nilai maksimal *stress case* per kedalaman pada daerah *overbend* yang terbesar terjadi pada kedalaman 59 yaitu *case* 3 yaitu sebesar 273.7 Mpa. Penyebab *case* 3 memiliki tegangan maksimum yang paling besar adalah karena *case* 3 memiliki kurvatur stinger yang panjang sehingga *departure angle* yang dihasilkan pun akan semakin kecil, *departure angle* yang kecil mengakibatkan pipa mengalami *stress* berlebih. Untuk pengaruh kedalaman terhadap tegangannya yaitu semakin dalam kedalaman yang digunakan maka stress yang ditimbulkan akan semakin besar. Sedangkan untuk total tegangan minimum yang paling rendah terletak pada *case* 2 yaitu pada kedalaman 53 meter sebesar 152.2 Mpa. Hal itu disebabkan karena *case* 2 memiliki *stinger radius of curvature* yang lebih kecil yaitu 300 meter sehingga *departure angle* yang dihasilkan juga bertambah besar (semakin curam) ditambah lagi dengan variasi kedalaman yang paling rendah sehingga didapatkan nilai total tegangan yang seminimum mungkin.

Tabel IV-27. Ringkasan Hasil Analisis Statis

Case	Depth	Tensioner	Stinger Radius of Curvature	Touchdown Distance	Max Moment	Stinger Departure Angle
	m	ton	m	m	Kn.M	Deg
1	53	30	200	203.54	73.89	23.31
2			300	206.49	56.14	22.05
3			400	208.25	78.75	20.95
4		40	200	234.15	79.57	20.44
5			300	236.01	60.76	20.41
6			400	237.52	61.48	19.87
1	56	30	200	209.46	73.88	24.09
2			300	212.53	62.79	22.38
3			400	214.2	96.33	21.28
4		40	200	241.01	79.54	21.21
5			300	243.05	60.76	21.09
6			400	244.74	61.48	20.21
1	59	30	200	215.01	73.86	24.76
2			300	218.3	81.7	22.61
3			400	219.91	113.24	21.61
4		40	200	247.62	79.58	21.95
5			300	249.88	60.77	21.48
6			400	251.61	61.48	20.53

Tabel diatas menunjukan hasil analisa statis S-Lay yang sudah dilakukan oleh penulis dengan variasi yang sudah ditentukan sesuai dengan *design case*. Tabel hasil diatas menunjukan 4 variabel yang mempengaruhi saat instalasi pipa dengan menggunakan metode S- Lay . Keluaran analisis yang pertama yaitu *touchdown distance* adalah jarak dari titik pipa saat menyentuh *seabed* hingga bagian belakang *pipe laying barge* (*stern*) secara memanjang yang ditentukan dalam koordinat x (meter). Yang kedua yaitu momen maksimum yang terjadi pada pipa dari ujung pipa saat dibarge hingga *sagbend section*. Ketiga yaitu *stinger departure angle* yaitu sudut kemiringan yang dilalui pipa saat berada diujung *stinger* saat instalasi, hal ini berkaitan dengan variabel variasi *stinger radius of curvature* karena semakin besar nilai *stinger radius of curvature* maka sudut pipa yang terbentuk akan semakin kecil (landai) dan hal ini juga berpengaruh pada kedalaman yaitu semakin dangkal kedalaman yang digunakan maka semakin kecil juga *stinger departure angle* yang keluarkan.

Tabel IV-28. Ringkasan Hasil Analisis Tegangan dan Regangan Statis

Case	Total Strain	Allowable Strain Criteria	Total Tegangan				Allowable Stress Criteria	Verify
	Overbend	%	Overbend		Sagbend		%SMYS	
	%		MPa	%SMYS	Mpa	%SMYS		
1	0.106	0.205	194.1	53	80.4	22	87	OK
2	0.085		154.2	43	80.4	22		OK
3	0.111		200.8	56	80.4	22		OK
4	0.118		215.5	60	78.9	22		OK
5	0.096		176.1	49	78.9	22		OK
6	0.097		177.6	49	78.9	22		OK
1	0.106		191.4	53	80.5	22		OK
2	0.091		167	46	80.5	22		OK
3	0.133		238	66	80.5	22		OK
4	0.118		215.5	60	78.9	22		OK
5	0.096		176.1	49	78.9	22		OK
6	0.097		177.6	49	78.9	22		OK
1	0.106		191.3	53	80.6	22		OK
2	0.112		207	58	80.7	22		OK
3	0.153		273.7	76	80.7	22		OK
4	0.118		215.6	60	78.9	22		OK
5	0.096		176.1	49	78.9	22		OK
6	0.097		177.6	49	78.9	22		OK
Max =	0.153		273.7	76	80.7	22		OK

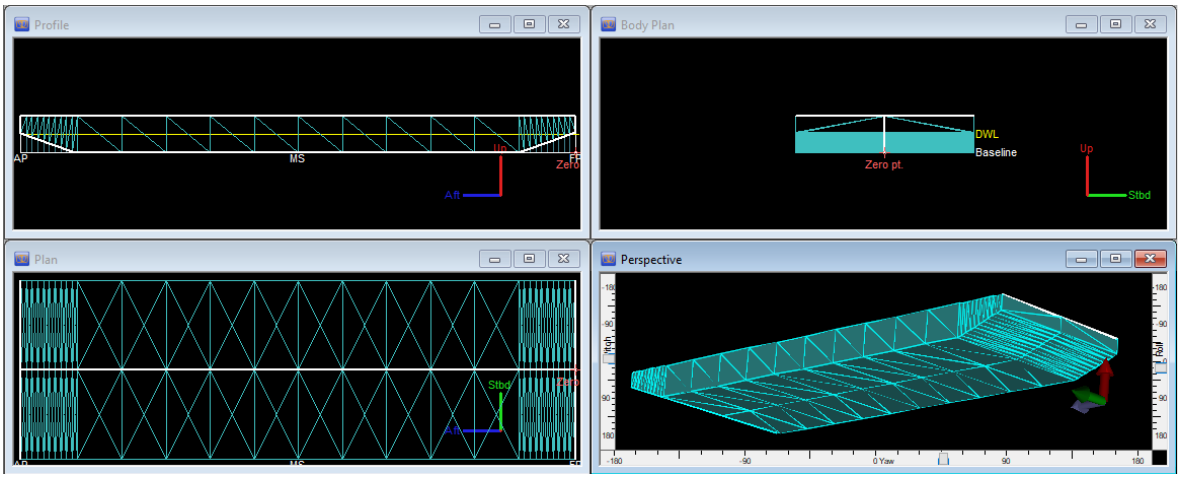
Regangan yang terjadi pada saat instalasi yang paling besar dari semua *case* yang sudah dianalisis adalah pada *case* 3 kedalaman 59 meter yaitu sebesar 0.153% jika dibandingkan dengan *Allowable Strain Criteria* yang tercantum pada DNV OS-F101 hasil tersebut masih memenuhi karena hasil tersebut termasuk kurang dari 0.205%.

Pada tabel diatas dapat dilihat bahwa pada total tegangan yang paling besar terjadi adalah pada *case* 3 dengan besar total tegangan sebesar 273.7 MPa atau sebesar 76% dari SMYS. *Case* 3 tersebut telah dilakukan variasi variabel kedalaman 59 meter, variabel radius kurvatur *stinger* sebesar 400 meter dan variabel *tension* sebesar 30 Ton. Untuk kedalaman 56 meter total tegangan terbesar terjadi pada *case* 9 sebesar 238 MPa atau sebesar 66 % dari SMYS. *Case* 3 kedalaman 56 meter tersebut telah dilakukan dengan variasi variabel radius kurvatur *stinger* sebesar 400 meter dan variabel *tension* sebesar 30 Ton. Untuk kedalaman 53 meter total tegangan terbesar terjadi pada *case* 4 sebesar 215.5 MPa atau sebesar 60 % dari SMYS. *Case* 4 tersebut telah dilakukan dengan variasi variabel radius kurvatur *stinger* sebesar 400 meter dan variabel *tension* sebesar 30 Ton.

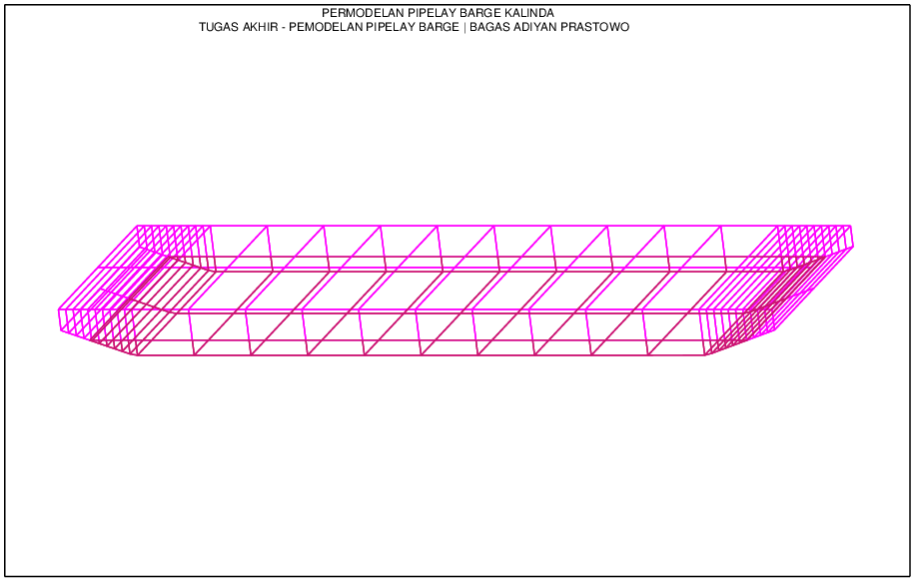
Total tegangan terbesar yang sudah dijelaskan semuanya terjadi pada daerah kritis *overbend* dan mayoritas terjadi pada bagian *stinger section* yaitu pada bagian ujung *stinger* dimana saat proses pipa diluncurkan posisi tersebut sudah meninggalkan *stinger* sehingga pipa tidak tertumpu dengan sempurna (tidak ada *roller support* dibawahnya). Sedangkan pada daerah kritis sagbend total tegangan yang terjadi sangat kecil yaitu sebesar 22% dari SMYS. Total tegangan yang terjadi pada analisa statis di daerah kritis *overbend* maupun *sagbend* yang terjadi, semuanya sudah memenuhi aturan DNV OS-F101 dimana persen SMYS yang terjadi harus kurang dari 87%.

4.4 Permodelan *Pipe Laying Barge*

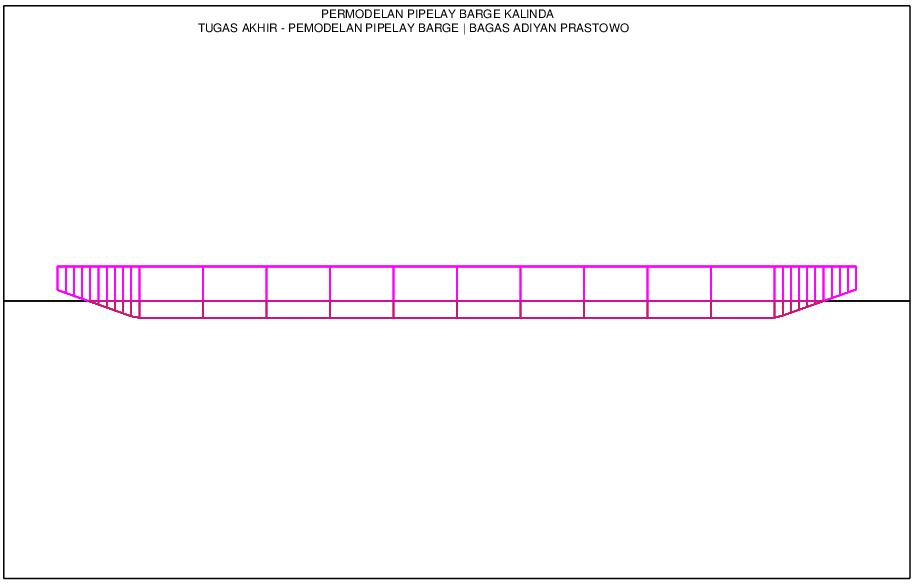
Untuk menganalisis total tegangan pipa yang terjadi pada saat kondisi dinamis, maka dibutuhkan permodelan *barge* yang digunakan untuk menganalisa respon gerak *laybarge* karena respon gerak *laybarge* dapat mempengaruhi besar total stress yang terjadi pada saat instalasi. Untuk permodelan *laybarge*, penulis menggunakan *laybarge* Kalinda sesuai data yang sudah ada pada sub-bab sebelumnya. Software yang digunakan untuk permodelan adalah MOSES. Untuk hasil permodelannya dapat dilihat sebagai berikut :



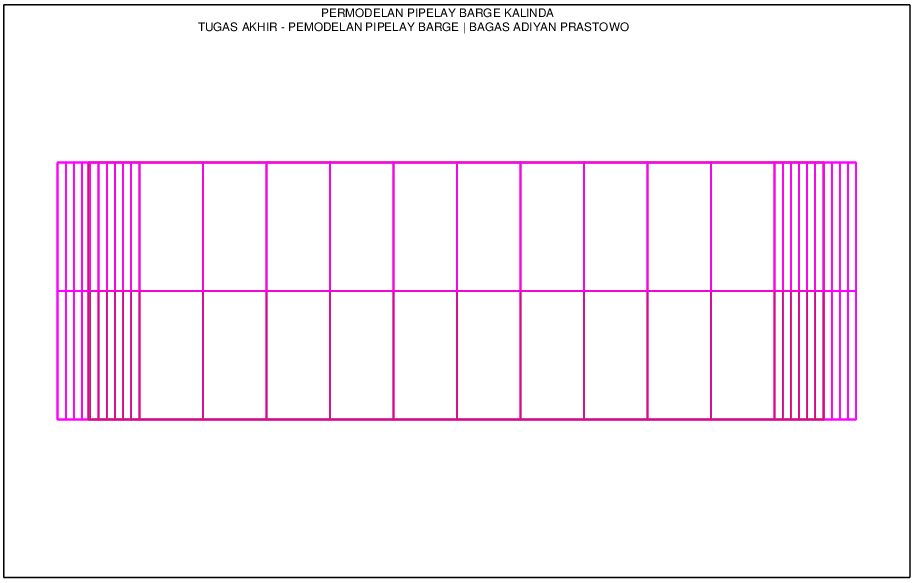
Gambar IV.11 Permodelan *Barge* pada MOSES



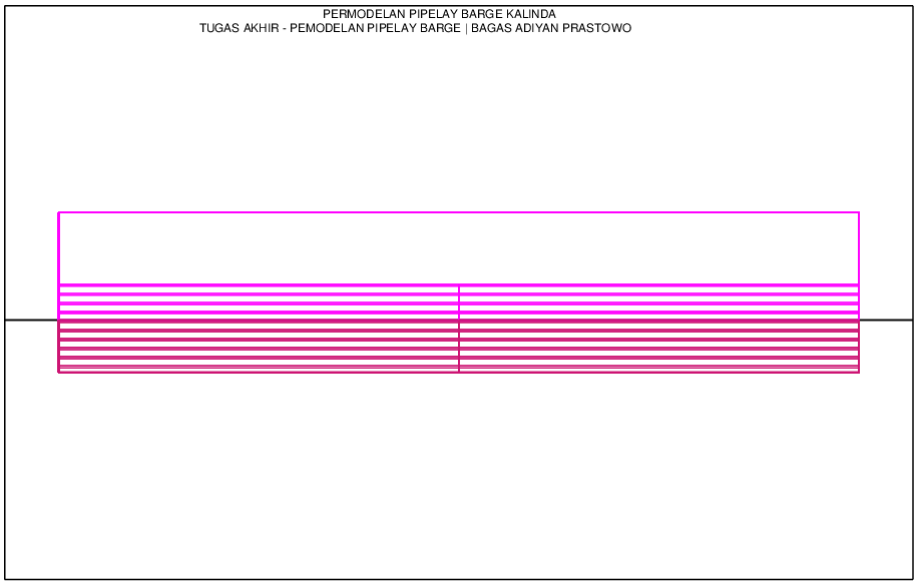
Gambar IV.12 Permodelan *Barge* Tampak *Isometric*



Gambar IV.13 Permodelan *Barge* Tampak Samping

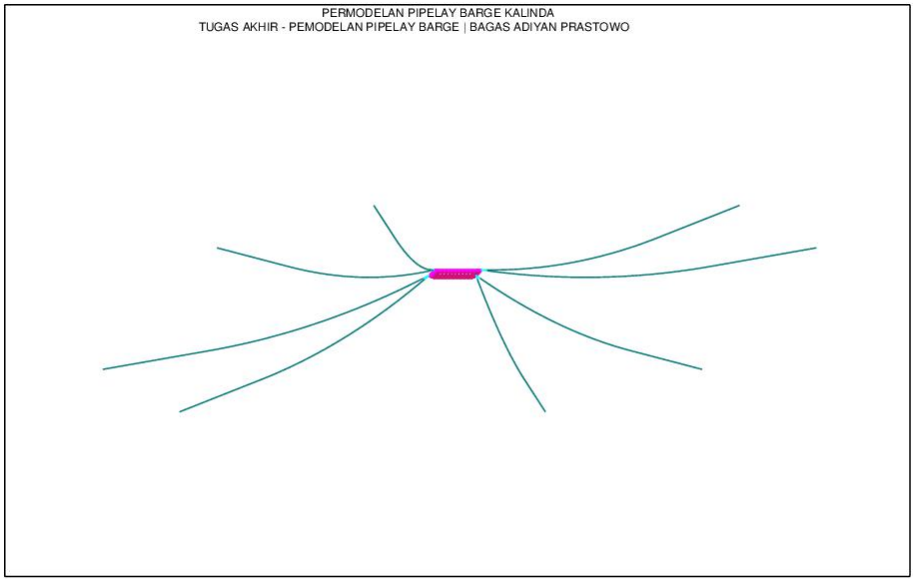


Gambar IV.14 Permodelan *Barge* Tampak Atas

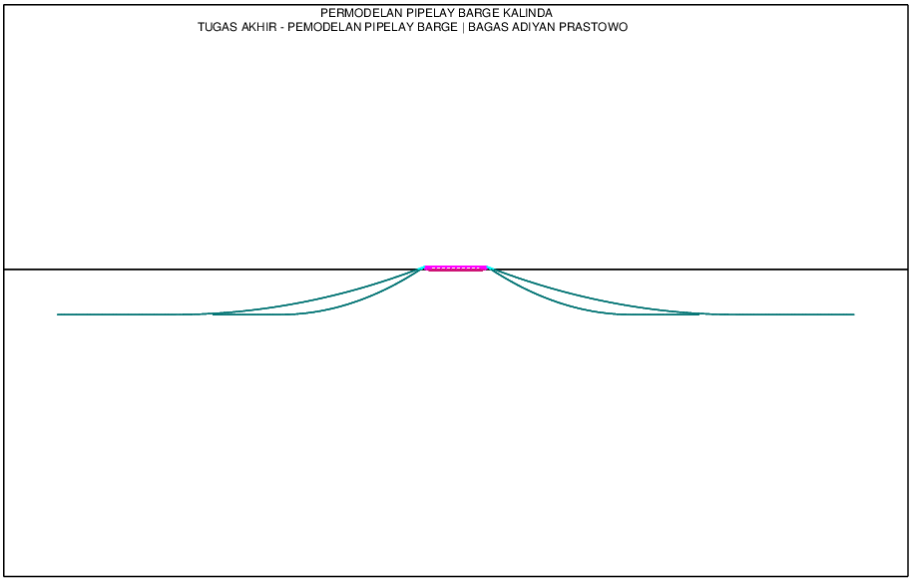


Gambar IV.15 Permodelan *Barge* Tampak *Bow*

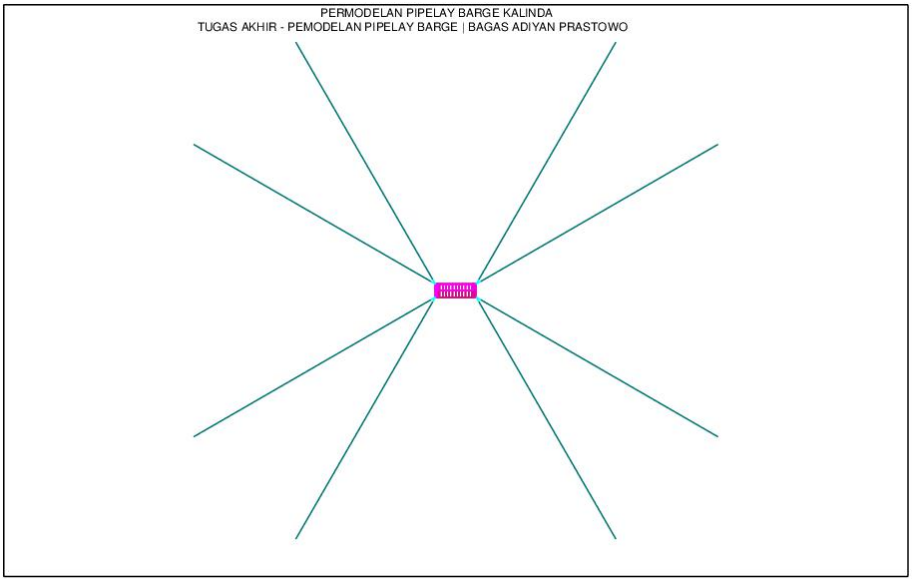
Pada penelitian ini, setelah dilakukan pemodelan struktur *barge* selanjutnya dilakukan pemodelan dari *mooring system* yang digunakan. Hal ini bertujuan agar saat dilakukan proses instalasi pipa S-Lay gerakan dari *pipe laying barge* dapat diredam sehingga proses instalasi pipa dapat dilakukan dengan baik. Pemodelan ini juga dilakukan dengan bantuan *software* MOSES. Berikut adalah hasil model 3 dimensi dari pemodelan *mooring system* pada *barge* yang diperoleh dari data :



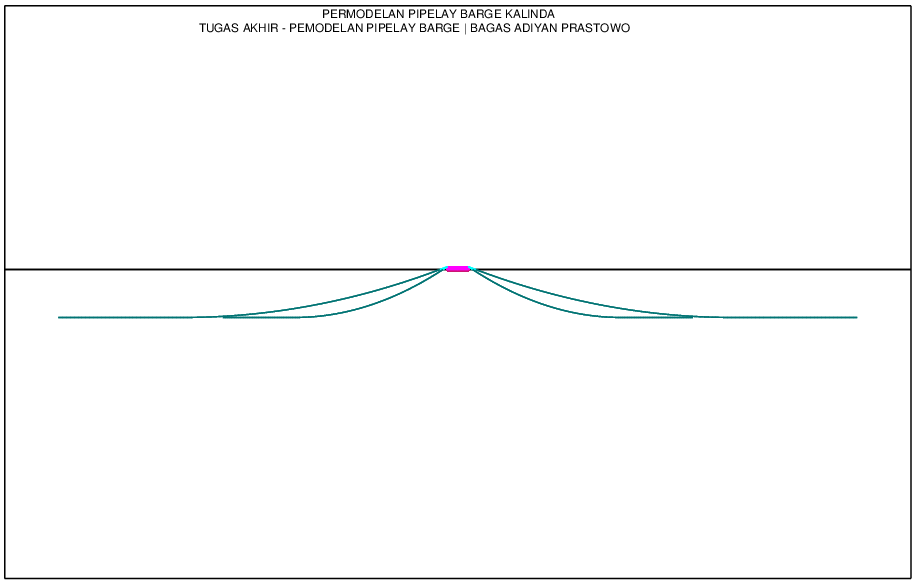
Gambar IV.16 Permodelan *Mooring Barge* Tampak Isometri



Gambar IV.17 Permodelan *Mooring Barge* Tampak Samping



Gambar IV.18 Permodelan *Mooring Barge* Tampak Atas

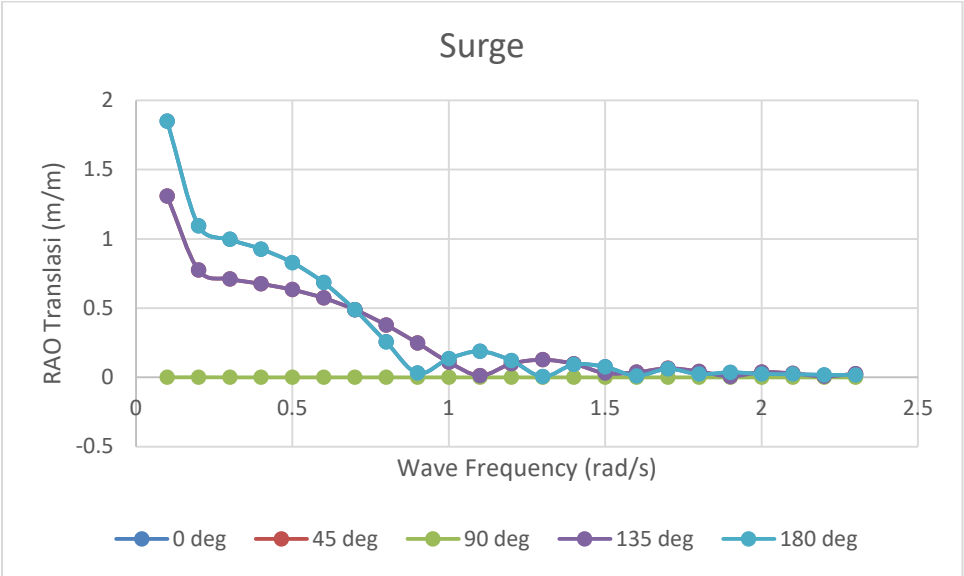


Gambar IV.19 Permodelan *Mooring Barge* Tampak *Bow*

4.5 Analisis *Response Amplitudo Operator* (RAO)

Setelah *pipe laying barge* sudah dimodelkan sesuai data yang telah didapat, selanjutnya dilakukan analisa RAO gerakannya. RAO gerakan barge yang akan dianalisa meliputi gerakan lateral (surge, sway, heave) dan gerakan rotasional (roll, pitch, yaw). Analisa akan dilakukan terhadap arah pembebanan gelombang yang datang dari arah 0, 45, 90, 135, dan 180 derajat. Hasil dari analisa RAO adalah sebagai berikut.

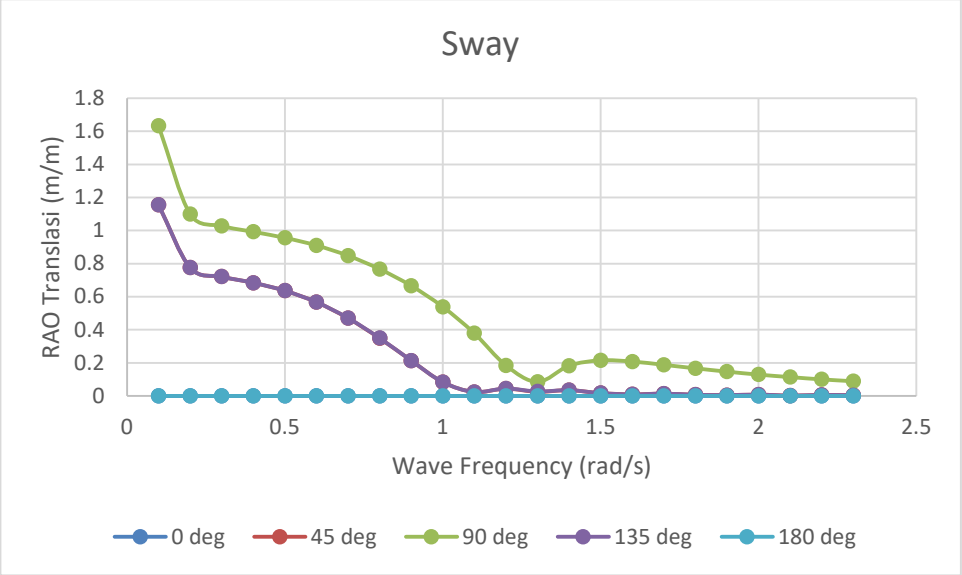
4.5.1 Gerakan *Surge*



Gambar IV.20 Grafik RAO Gerakan Surge

Gerakan *surge* merupakan gerakan lateral yang terjadi pada sumbu –x, pada hasil analisa yang dilakukan gerakan ini memiliki RAO paling besar terhadap arah pembebanan gelombang yang datang dari arah 0 dan 180 derajat dimana nilai RAO terbesar dari masing-masing arah tersebut adalah 1.49 m/m dan 1.513 m/m pada frekuensi 0.1 rad/s. Untuk pembebanan gelombang dari arah 45 dan 135 derajat masing-masing nilai RAO terbesar adalah 1.063 m/m dan 1.072 pada frekuensi 0.1 rad/s. Sedangkan pembebanan gelombang dari arah 90 derajat nilai RAO yang terjadi paling besar adalah 0.038 m/m pada frekuensi 0.1 rad/s.

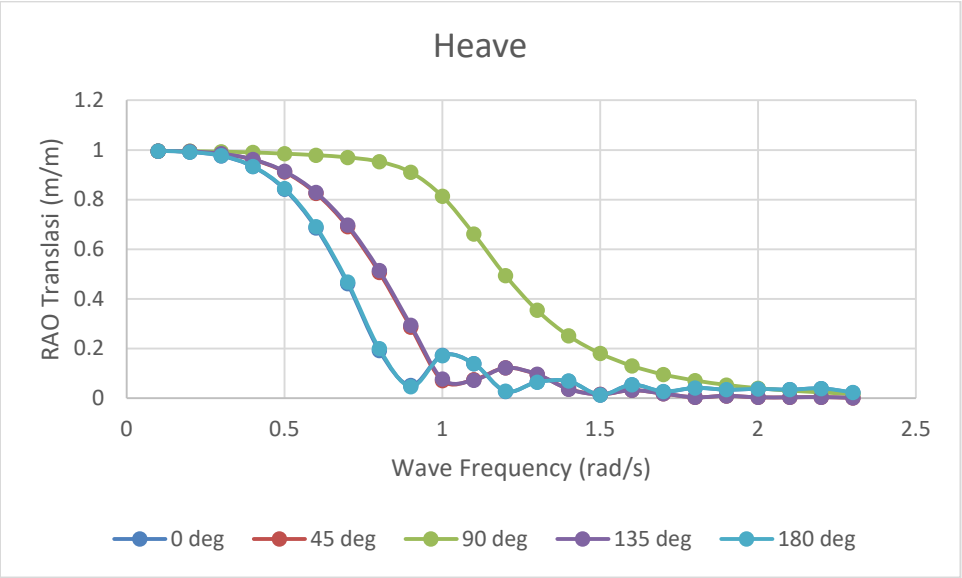
4.5.2 Gerakan *Sway*



Gambar IV.21 Grafik RAO Gerakan Sway

Gerakan *sway* merupakan gerakan lateral yang terjadi pada sumbu –y, pada hasil analisa yang dilakukan gerakan ini memiliki RAO paling besar terhadap arah pembebanan gelombang yang datang dari arah 90 derajat dimana nilai RAO terbesar dari arah tersebut adalah 2.069 m/m pada frekuensi 0.1 rad/s. Untuk pembebanan gelombang dari arah 45 dan 135 derajat masing-masing nilai RAO terbesar adalah 1.762 m/m dan 1.765 pada frekuensi 0.1 rad/s. Sedangkan pembebanan gelombang dari arah 0 dan 180 derajat tidak mempengaruhi gerakan ini.

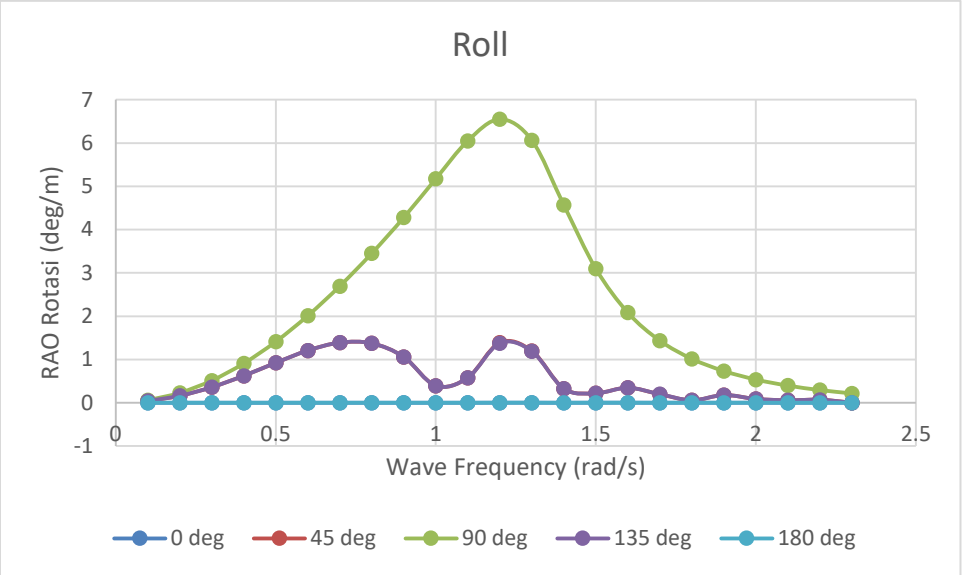
4.5.3 Gerakan *Heave*



Gambar IV.22 Grafik RAO Gerakan Heave

Gerakan *heave* merupakan gerakan lateral yang terjadi pada sumbu –z, pada hasil analisa yang dilakukan gerakan ini memiliki RAO paling besar terhadap arah pembebanan gelombang yang datang dari arah 90 derajat dimana nilai RAO terbesar dari tersebut adalah 0.99 m/m pada frekuensi 0.2 rad/s. Untuk pembebanan gelombang dari arah 45 dan 135 derajat masing-masing nilai RAO terbesar adalah 0.988 m/m dan 0.988 m/m pada frekuensi 0.1 rad/s. Sedangkan pembebanan gelombang dari arah 0 dan 180 derajat masing-masing nilai RAO terbesar adalah 0.991 m/m dan 0. m/m pada frekuensi 0.991 rad/s

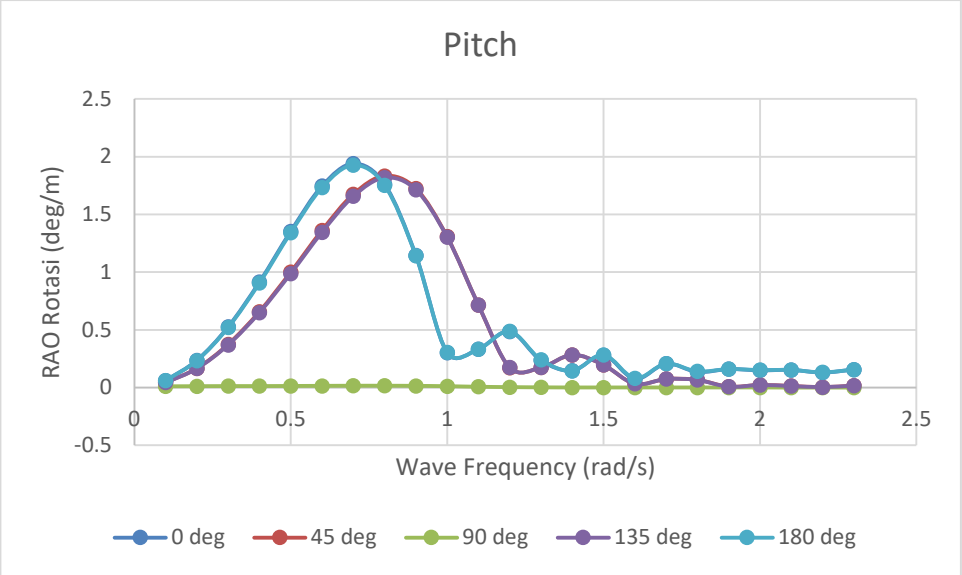
4.5.4 Gerakan *Roll*



Gambar IV.23 Grafik RAO Gerakan Roll

Gerakan *roll* merupakan gerakan rotasional yang terjadi pada sumbu –x, pada hasil analisa yang dilakukan gerakan ini memiliki RAO paling besar terhadap arah pembebanan gelombang yang datang dari arah 90 derajat dimana nilai RAO terbesar dari arah tersebut adalah 6.438 deg/m pada frekuensi 1.2 rad/s. Untuk pembebanan gelombang dari arah 45 dan 135 derajat masing-masing nilai RAO terbesar adalah 1.379 deg/m dan 1.379 deg/m pada frekuensi 0.7 rad/s. Sedangkan pembebanan gelombang dari arah 0 dan 180 derajat tidak mempengaruhi gerakan ini.

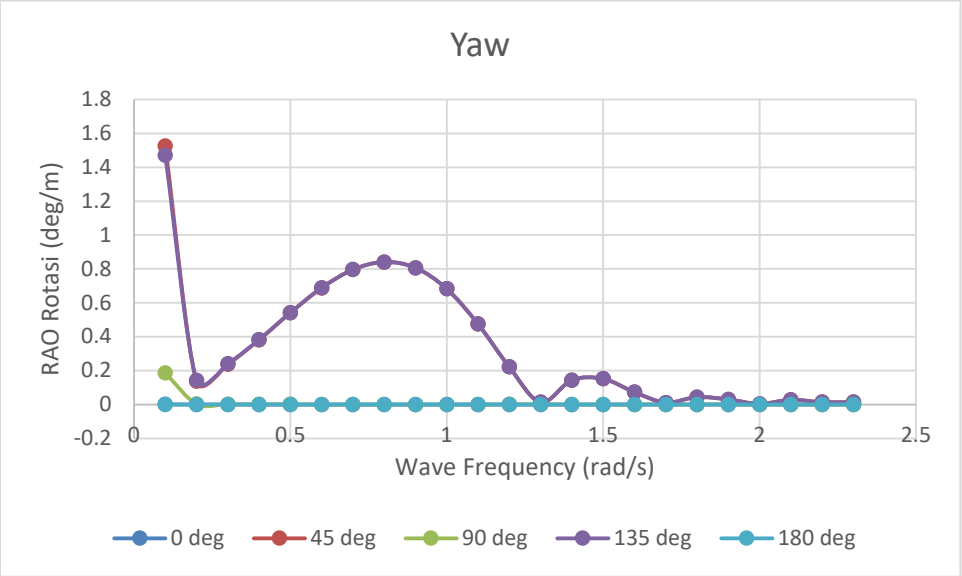
4.5.5 Gerakan *Pitch*



Gambar IV.24 Grafik RAO Gerakan Pitch

Gerakan *pitch* merupakan gerakan lateral yang terjadi pada sumbu –y, pada hasil analisa yang dilakukan gerakan ini memiliki RAO paling besar terhadap arah pembebanan gelombang yang datang dari arah 0 dan 180 derajat dimana nilai RAO terbesar dari masing-masing arah tersebut adalah 1.915 deg/m dan 1.902 deg/m pada frekuensi 0.7 rad/s dan 0.7 rad/s. Untuk pembebanan gelombang dari arah 45 dan 135 derajat masing-masing nilai RAO terbesar adalah 1.819 deg/m dan 1.803 deg/m pada frekuensi 0.8 rad/s dan 0.7 rad/s. Sedangkan pembebanan gelombang dari arah 90 derajat nilai RAO yang terjadi sebesar 0.015 deg/m pada frekuensi 0.8 rad/s.

4.5.6 Gerakan *Yaw*



Gambar IV.25 Grafik RAO Gerakan Yaw

Gerakan *yaw* merupakan gerakan lateral yang terjadi pada sumbu –z, pada hasil analisa yang dilakukan gerakan ini memiliki RAO paling besar terhadap arah pembebanan gelombang yang datang dari arah 45 dan 135 derajat dimana nilai RAO terbesar dari masing-masing arah tersebut adalah 1.526 deg/m dan 1.471 deg/m pada frekuensi 0.1 rad/s dan 0.1 rad/s. Untuk pembebanan gelombang dari arah 90 derajat nilai RAO terbesar adalah 0.186 deg/m frekuensi 0.1 rad/s. Sedangkan pembebanan gelombang dari arah 0 dan 180 derajat tidak mempengaruhi gerakan ini.

4.6 Analisis Dinamis S-Lay pada Pipa saat Instalasi

Untuk mengerjakan Analisis dinamis instalasi pipa dengan metode S-Lay ini dibantu perangkat lunak OFFPIPE versi 3.02, dengan data yang diinputkan pada analisis ini sebagai berikut :

- Data Properti Pipa
- Data kongfigurasi roller, tensioner, barge dan stinger
- Data kedalaman laut, tinggi gelombang dan arus
- Data parameter spektrum gelombang pada *cluster* I
- Data *amplitude operator* (RAO) *pipelaying barge*

Setelah data-data diatas didapatkan maka, analisis dinamis instalasi pipa dengan

menggunakan metode S-Lay dapat dilakukan dengan cara *run program* dengan menggunakan OFFPIPE dengan arah sebanyak 5, yaitu : 0°, 45°, 90°, 135°, 180°. Untuk penjelasan arah acuan dari *software* itu sendiri yaitu arah 0 derajat adalah arah acuan yang searah dengan laju barge (ke depan menuju *bow*) untuk arah 45 derajat yaitu adalah menuju arah bagian kanan barge (ke *starboard side*). Untuk melakukan analisis dinamis, *input* yang dimasukan sama seperti analisis statis tetapi ada penambahan *input* pada bagian *dynamic input*. Tabel yang berwarna biru dibawah menunjukan perintah *input* yang dimasukan untuk analisis dinamis seperti sebagai berikut :

Tabel IV-29 Variabel yang Digunakan untuk Analisis Dinamis

Input & Output	Pipe & Cable	Vessel	Stinger	Sagbend	Dynamic
HEAD	PIPE	BARG	STIN	GEOM	TIME
PRIN	COAT	TENS	SUPP	LENG	WAVE
PROF	CABL	SUPP	SECT	SOIL	SPEC
DNVP	BUND	DAVI	BALL	CURR	RAOS
HIST	MOME	DCAB	BUOY	FLOA	SPTA
APIP	FLUI		WEIG	SPAN	RESP
FATI	OPER				MOTI

Analisis dinamis akan dilakukan *Program* OFFPIPE sesuai dengan frekuensi dan waktu yang kita masukan. Ada 4 variabel waktu yang dimasukan dalam *software* yaitu waktu dimulainya analisis dinamis (*sampling start time*), durasi analisis yang kita inginkan (*solution end time*), banyaknya waktu interval iterasi (*time step length*) dan waktu interval yang digunakan untuk menampilkan hasil dari analisis dinamis (*sampling time step*) dimana nilainya 2 kali dari *time step length*. Untuk memasukan variabel waktu pada analisis, penulis menggunakan durasi analisis instalasi sebanyak 3 jam atau 10800 detik dengan interval tiap 0.4 detik, seperti pada tabel berikut :

Tabel IV-30 Variabel Durasi dan Interval Waktu Analisis Dinamis

Description	Value (sec)
Time Step Length	0.4
Solution End Time	10860
Sampling Time Step	0.8
Sampling Start Time	60

Semakin lama waktu dan semakin banyak *time step* yang dianalaisis, maka hasil dari analisis akan semakin *detail* dan semakin *valid* karena kondisi yang dimasukan semakin mendekati keadaan instalasi sebenarnya. Untuk *design case* yang dilakukan pada analisis

dinamis sama dengan analisis statis guna memperoleh hasil maksimal dan memudahkan untuk menentukan konfigurasi yang paling optimal pada variabel kedalaman, *curvature stinger* dan *tensioner* pipa. Pada analisis dinamis ini penulis menggunakan *Output* dari analisis tersebut adalah berupa total tegangan maksimum yang terjadi pada tiap node pipa sesuai dengan waktu dan beban lingkungan yang diberikan dan juga regangan maksimal total yang terjadi karena ditinjau dari DNV OS-F101 bahwa batas *allowable strain criteria* nilainya pada saat kondisi dinamis lebih tinggi dibandingkan dengan pada saat kondisi statis yaitu sebesar 0.260%.

Untuk hasil analisis dinamis yang akan ditampilkan pada tugas akhir ini dibagi menjadi 3 yaitu berupa grafik persebaran distribusi total tegangan maksimal (*maximum dynamic stress distribution*) yang terjadi pada tiap-tiap *design case* yang sudah ditentukan. Yang kedua berupa koordinat X (koordinat memanjang sejajar dengan *seabed*) dan koordinat Y (ketinggian / kedalaman) dalam satuan meter dimana titik nol dari kedua koordinat tersebut berada pada pusat titik temu dari garis LWL (*length of waterline*) dan garis AP (*After Perpendicular*) dari *pipe laying barge* yang digunakan. *Output* yang ketiga yaitu berupa tabel rangkuman total tegangan pada tiap case yang paling maksimal pada dua titik kritis yaitu *overbend* dan *sagbend*, daerah *overbend* yang dimaksud adalah tegangan pipa yang terjadi diatas semua *support* diatas *barge* hingga *stinger* termasuk *tensioner* juga sedangkan yang dimaksud daerah *overbend* adalah pipa yang sudah tidak memiliki *support* atau menggantung setelah *stinger* hingga menyentuh *seabed* .

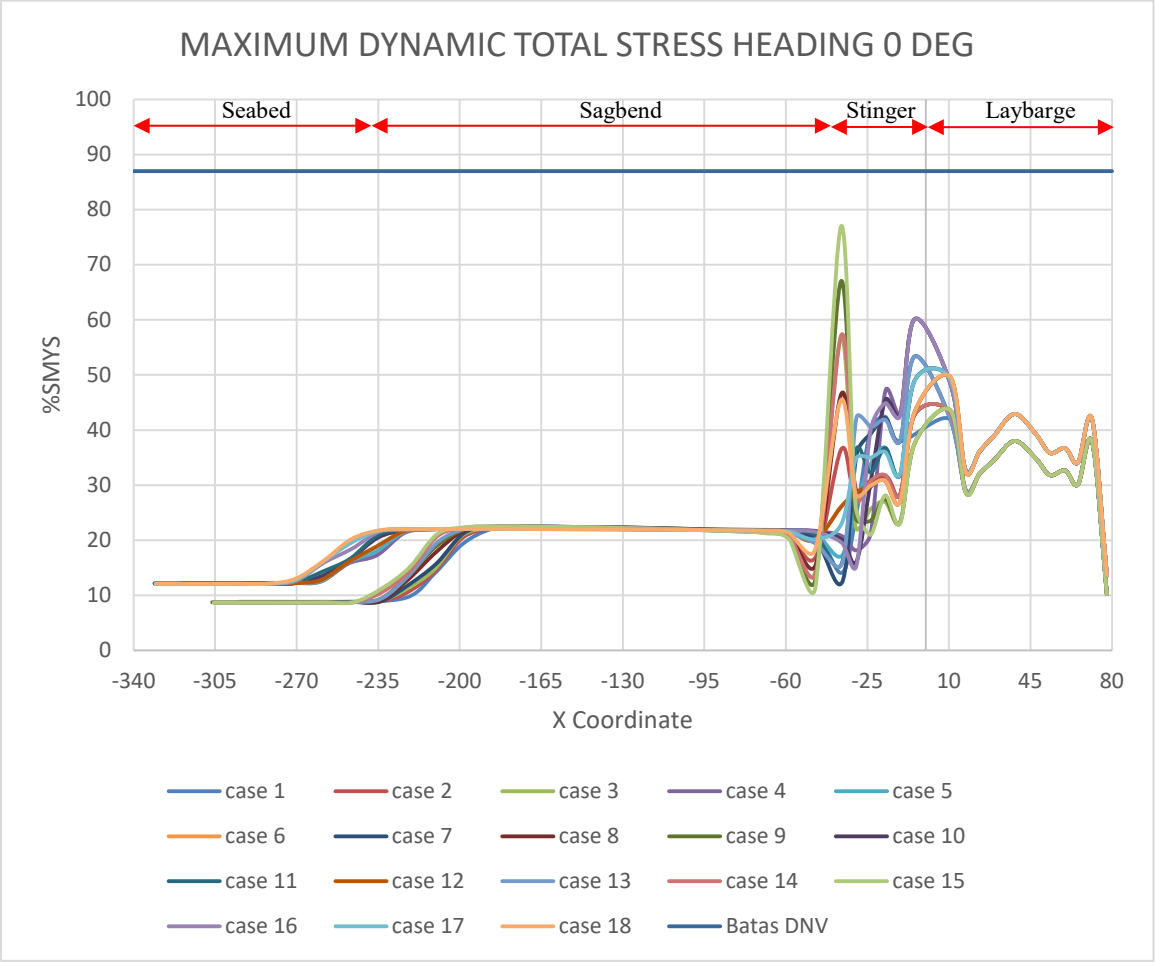
4.6.1 Design Case Analisis Dinamis

Untuk memulai pengerjaan analisis dinamis instalasi pipa bawah laut maka dibutuhkan beberapa *design case* untuk mengetahui variasi apa saja yang akan dilakukan pada analisis dinamis tersebut adalah sebagai berikut :

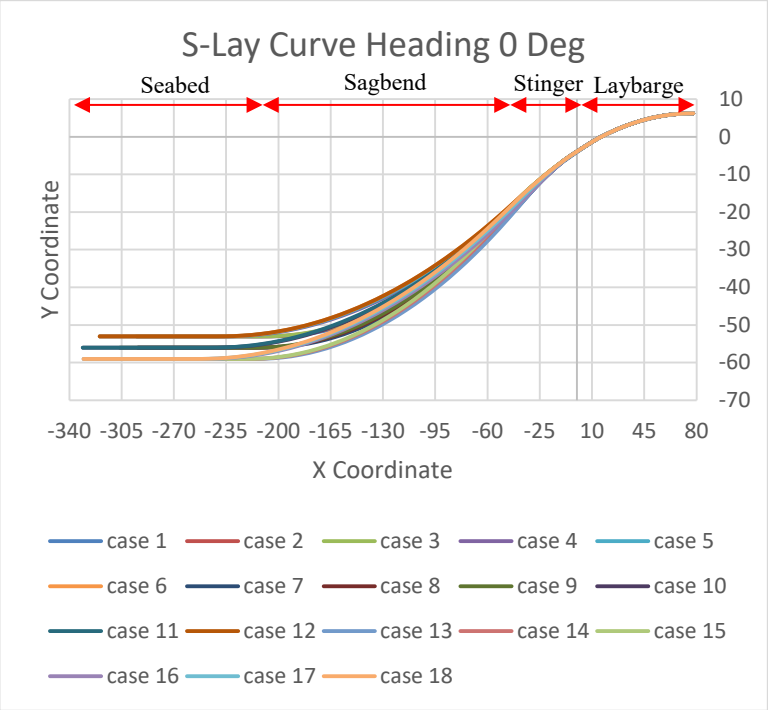
Case	Outside Diameter	Wall Thickness	Depth	Stinger Radius of Curvature	Tensioner
	Inch	mm	m	m	ton
1	8.625	12.7	53	200	30
2	8.625	12.7		300	
3	8.625	12.7		400	
4	8.625	12.7		200	40
5	8.625	12.7		300	
6	8.625	12.7		400	
7	8.625	12.7	56	200	30
8	8.625	12.7		300	
9	8.625	12.7		400	
10	8.625	12.7		200	40
11	8.625	12.7		300	
12	8.625	12.7		400	
13	8.625	12.7	59	200	30
14	8.625	12.7		300	
15	8.625	12.7		400	
16	8.625	12.7		200	40
17	8.625	12.7		300	
18	8.625	12.7		400	

Setiap *design case* tersebut akan dianalisis sebanyak 5 kali sesuai 5 derajat arah pembebanannya yaitu 0°, 45°, 90°, 135°, 180°. Kemudian akan *design case* tersebut akan dianalisis maksimal tegangan tiap derajat arah pembebananannya dan disesuaikan pada *codes* DNV OS-F101. Untuk *stress criteria* yang berlaku pada analisis dinamis sama dengan analisis statis yaitu karena penulis menggunakan pipa dengan API 5L Grade X52 dengan SMYS 360 Mpa maka *stress criteria*-nya adalah 313.2 Mpa atau setara dengan 87% dari SMYS. Untuk *strain criteria* yang berlaku untuk analisis dinamis berbeda dengan analisis statis yaitu sebesar 0.260%.

4.6.2 Hasil Analisis Dinamis Total Tegangan Maksimal Arah 0°



Gambar IV.26. Distribusi Total Tegangan Dinamis Maksimal Arah 0°



Gambar IV.27 Kurva S-Lay Dinamis arah 0°

Tabel IV-31 Hasil Analisis Dinamis Tegangan Arah 0°

Case	Total Tegangan				Allowable Stress Criteria	Verify
	Overbend		Sagbend			
	Mpa	%SMYS	Mpa	%SMYS		
1	152.63	42.39722	80.8	22.44444	87%	OK
2	154.89	43.025	80.72	22.42222		OK
3	204.56	56.82222	80.79	22.44167		OK
4	216.7	60.19444	79.48	22.07778		OK
5	177.15	49.20833	79.5	22.08333		OK
6	178.55	49.59722	79.55	22.09722		OK
7	192.24	53.4	80.87	22.46389		OK
8	167.83	46.61944	80.87	22.46389		OK
9	241.26	67.01667	80.88	22.46667		OK
10	216.6	60.16667	79.42	22.06111		OK
11	177.09	49.19167	79.35	22.04167		OK
12	178.49	49.58056	79.45	22.06944		OK
13	192.15	53.375	81.02	22.50556		OK
14	206.26	57.29444	80.94	22.48333		OK
15	277.1	76.97222	81.01	22.50278		OK
16	216.61	60.16944	79.3	22.02778		OK
17	177.14	49.20556	79.31	22.03056		OK
18	178.64	49.62222	79.34	22.03889		OK
Max	**277.1**	**76.97222**	**81.02**	**22.50556**		**OK**

Dengan melihat grafik dan tabel diatas, dapat diketahui bahwa total tegangan maksimum yang terjadi adalah pada *case* 15 yaitu sebesar 277.1 atau setara dengan 76.9722% dari SMYS pada daerah *overbend* dengan nomer *node* 34 lokasinya adalah saat pipa berada tepat diatas ujung *stinger* dimana setelah itu pipa sudah tidak ter-*support* sempurna. Sedangkan pada daerah *sagbend case* total tegangan dinamis yang paling besar adalah pada *case* 13 yaitu dengan nilai sebesar 81.02 atau setara dengan 22.5055 %SMYS, terjadi pada *node* ke-47. Untuk hasil total tegangan maksimum kondisi dinamis dengan heading 0 derajat semuanya memenuhi kriteria DNV OS F-101 yaitu untuk kondisi dengan beban dinamis pada daerah *sagbend* dan ujung *stinger* harus dibawah 87% dari SMYS pipa yang dipasang.

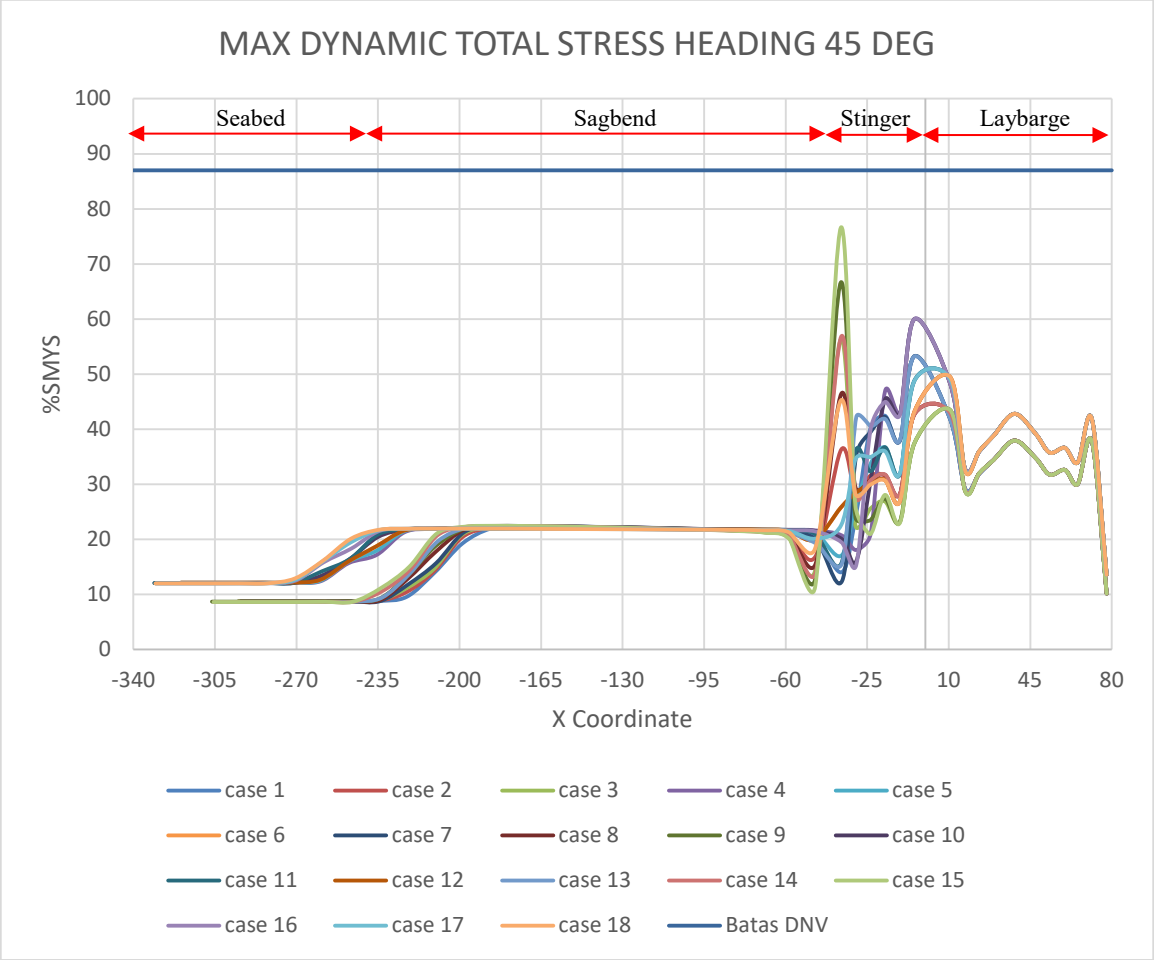
Tabel IV-32 Hasil Analisis Dinamis Regangan Arah 0°

Case	Total Strain	Allowable Strain Criteria	Verify
	Overbend	%	
	%		
1	0.1063	0.260	OK
2	0.085		OK
3	0.1133		OK
4	0.1191		OK
5	0.0966		OK
6	0.0974		OK
7	0.1062		OK
8	0.0925		OK
9	0.1341		OK
10	0.1191		OK
11	0.0965		OK
12	0.0974		OK
13	0.1062		OK
14	0.114		OK
15	0.1544		OK
16	0.1191		OK
17	0.0966		OK
18	0.0974		OK
Max =	0.1544		OK

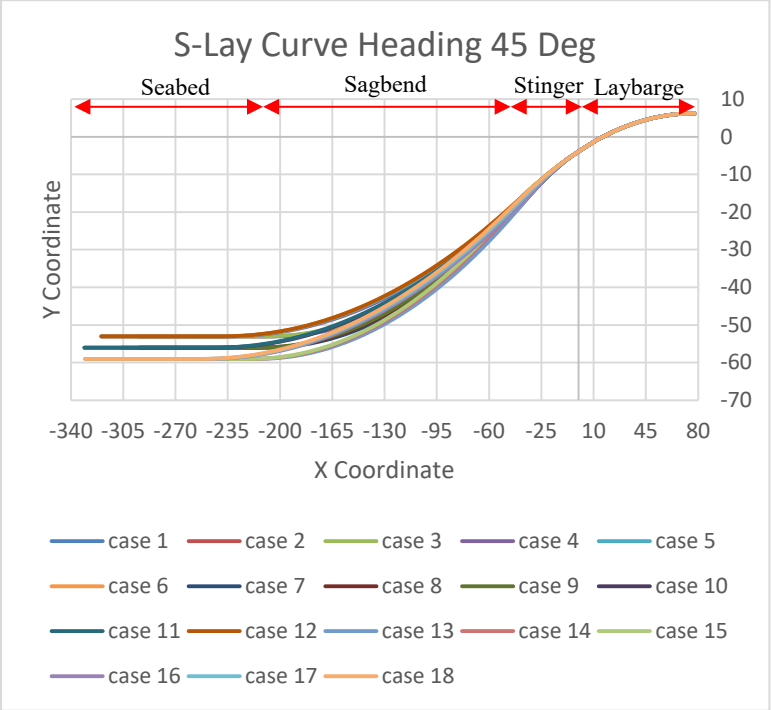
Seperti yang dapat dilihat pada tabel hasil analisis dinamis regangan arah 0° dapat diketahui bahwa tegangan maksimal yang terjadi adalah pada *case* 15 yaitu sebesar 0.1544%. Lokasinya berada pada *node* pipa ke-34 yang letaknya pada *roller support* terakhir diatas *stinger.* Namun demikian, hasil regangan dinamis maksimal tersebut masih memenuhi batas

allowable strain criteria yang tercantum pada DNV OS-F101 yaitu dibawah 0.260%

4.6.3 Hasil Analisis Dinamis Total Tegangan Maksimal Arah 45°



Gambar IV.28 Distribusi Total Tegangan Dinamis Maksimal Arah 45°



Gambar IV.29 Kurva S-Lay Dinamis Arah 45°

Tabel IV-33 Hasil Analisis Dinamis Tegangan Arah 45°

Case	Total Tegangan				Allowable Stress Criteria	Verify
	Overbend		Sagbend			
	Mpa	%SMYS	Mpa	%SMYS		
1	191.79	53.275	80.54	22.37222		OK
2	154.61	42.94722	80.54	22.37222		OK
3	202.86	56.35	80.57	22.38056		OK
4	216.22	60.06111	79.14	21.98333		OK
5	176.64	49.06667	79.17	21.99167		OK
6	178.09	49.46944	79.12	21.97778		OK
7	191.79	53.275	80.68	22.41111		OK
8	167.17	46.43611	80.71	22.41944		OK
9	239.94	66.65	80.7	22.41667		OK
10	216	60	79.09	21.96944	87%	OK
11	176.56	49.04444	79.07	21.96389		OK
12	178.1	49.47222	79.18	21.99444		OK
13	191.72	53.25556	80.77	22.43611		OK
14	204.62	56.83889	80.83	22.45278		OK
15	275.73	76.59167	80.86	22.46111		OK
16	216.08	60.02222	79.1	21.97222		OK
17	176.58	49.05	79.03	21.95278		OK
18	178.08	49.46667	79.05	21.95833		OK
Max	**275.73**	**76.59167**	**80.86**	**22.46111**		**OK**

Berdasarkan grafik dan tabel diatas, dapat diketahui bahwa total tegangan maksimum

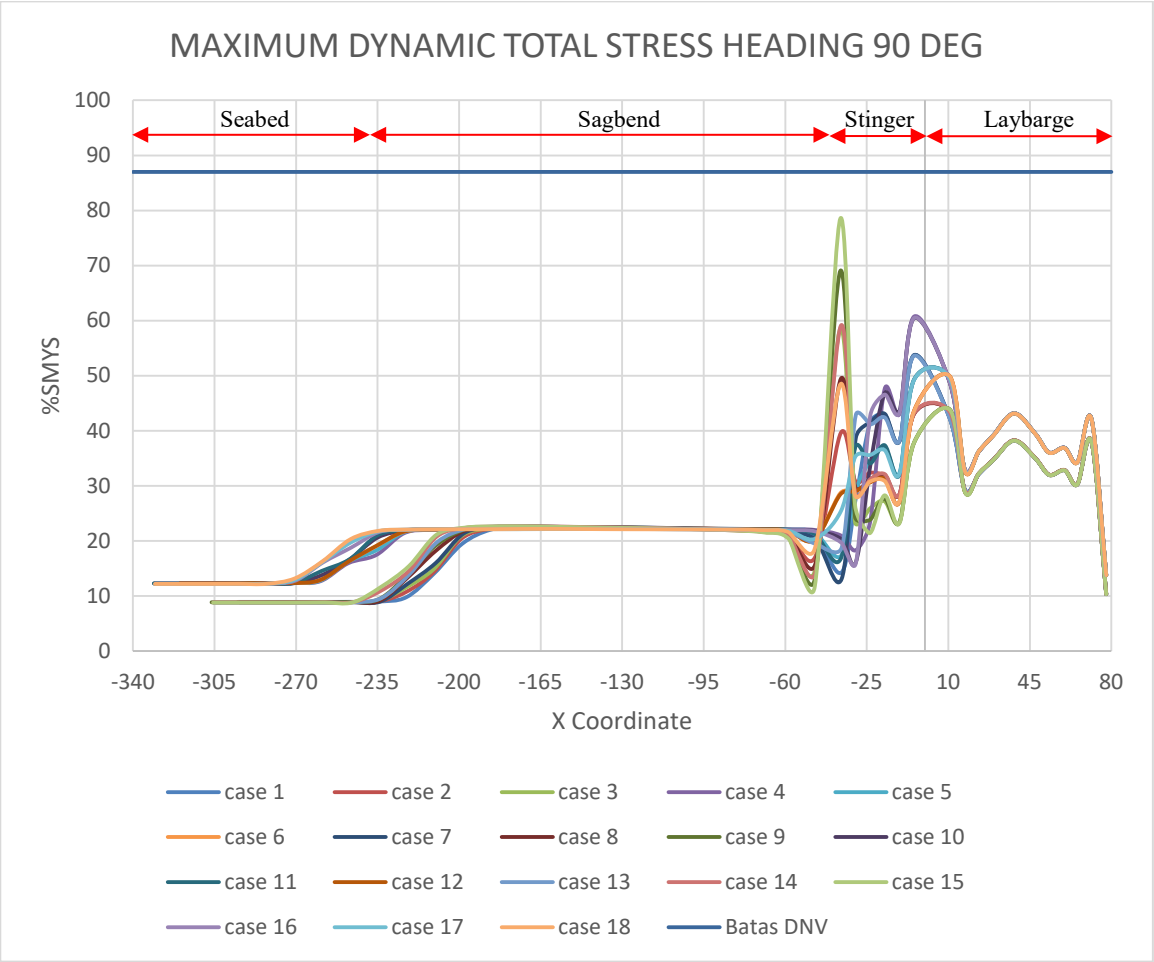
yang terjadi adalah pada *case* 15 yaitu sebesar 275.73 atau setara dengan 76.5916% dari SMYS pada daerah *overbend* dengan nomer *node* 34 lokasinya adalah saat pipa berada tepat diatas ujung *stinger* dimana setelah itu pipa sudah tidak ter-*support* sempurna. Sedangkan pada daerah *sagbend case* total tegangan dinamis yang paling besar adalah pada *case* 15 yaitu dengan nilai sebesar 80.86 atau setara dengan 22.4611 %SMYS, terjadi pada *node* ke-48. Untuk hasil total tegangan maksimum kondisi dinamis dengan *heading* 45 derajat semuanya memenuhi kriteria DNV OS F-101 yaitu untuk kondisi dengan beban dinamis pada daerah *sagbend* dan ujung *stinger* harus dibawah 87% dari SMYS pipa yang dipasang.

Tabel IV-34Hasil Analisis Dinamis Regangan Arah 45°

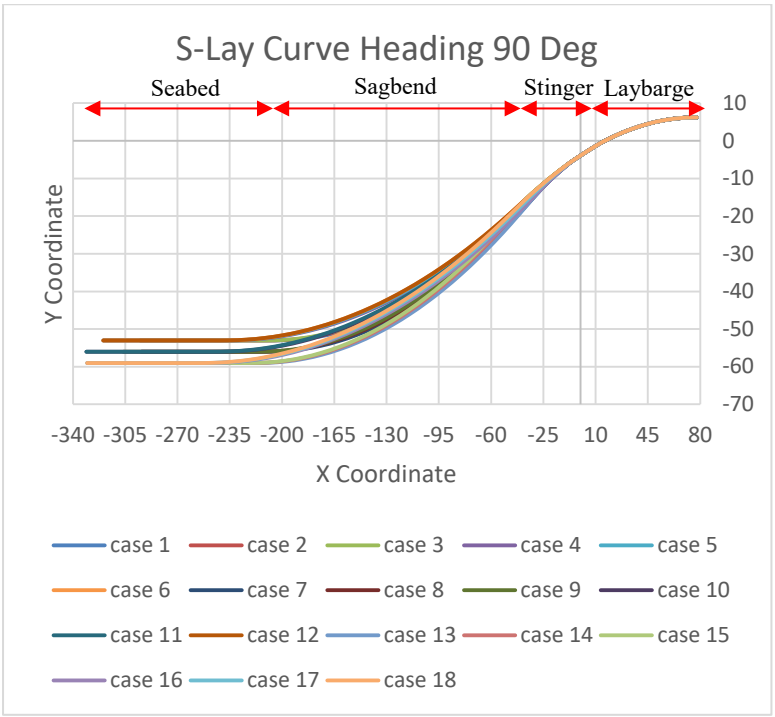
Case	Total Strain	Allowable Strain Criteria	Verify
	Overbend	%	
	%		
1	0.106	0.260	OK
2	0.0848		OK
3	0.1124		OK
4	0.1189		OK
5	0.0963		OK
6	0.0972		OK
7	0.106		OK
8	0.092		OK
9	0.1336		OK
10	0.1187		OK
11	0.0963		OK
12	0.0972		OK
13	0.106		OK
14	0.1133		OK
15	0.1538		OK
16	0.1187		OK
17	0.0963		OK
18	0.0972		OK
Max =	0.1538		OK

Dapat ditinjau dari tabel hasil analisis dinamis regangan arah 45° dapat diketahui bahwa tegangan maksimal yang terjadi adalah pada *case* 15 yaitu sebesar 0.1538%. Lokasinya berada pada *node* pipa ke-34 yang letaknya pada *roller support* terakhir diatas *stinger.* Namun demikian, hasil regangan dinamis maksimal tersebut masih memenuhi batas *allowable strain criteria* yang tercantum pada DNV OS-F101 yaitu dibawah 0.260%

4.6.4 Hasil Analisis Dinamis Total Tegangan Maksimal Arah 90°



Gambar IV.30 Distribusi Total Tegangan Dinamis Maksimal Arah 90°



Gambar IV.31 Kurva S-Lay Dinamis Arah 90°

Tabel IV-35 Hasil Analisis Dinamis Tegangan Arah 90 °

Case	Total Tegangan				Allowable Stress Criteria	Verify
	Overbend		Sagbend			
	Mpa	%SMYS	Mpa	%SMYS		
1	193.54	53.76111	81.07	22.51944		OK
2	155.89	43.30278	81.05	22.51389		OK
3	210.9	58.58333	81.2	22.55556		OK
4	218.73	60.75833	80.18	22.27222		OK
5	178.33	49.53611	80.15	22.26389		OK
6	179.57	49.88056	80.08	22.24444		OK
7	193.49	53.74722	81.32	22.58889		OK
8	178	49.44444	81.28	22.57778		OK
9	248.62	69.06111	81.43	22.61944		OK
10	217.65	60.45833	80	22.22222	87%	OK
11	178.24	49.51111	80	22.22222		OK
12	179.64	49.9	80.07	22.24167		OK
13	193.1	53.63889	81.38	22.60556		OK
14	212.7	59.08333	81.59	22.66389		OK
15	282.82	78.56111	81.53	22.64722		OK
16	217.85	60.51389	79.92	22.2		OK
17	178.21	49.50278	79.85	22.18056		OK
18	179.62	49.89444	79.89	22.19167		OK
Max	**282.82**	**78.56111**	**81.59**	**22.66389**		**OK**

Berdasarkan grafik dan tabel diatas, dapat diketahui bahwa total tegangan maksimum yang terjadi adalah pada *case* 15 yaitu sebesar 282.82 atau setara dengan 78.5611% dari SMYS pada daerah *overbend* dengan nomer *node* 34 lokasinya adalah saat pipa berada tepat diatas ujung *stinger* dimana setelah itu pipa sudah tidak ter-*support* sempurna. Sedangkan pada daerah *sagbend case* total tegangan dinamis yang paling besar adalah pada *case* 14 yaitu dengan nilai sebesar 81.59 atau setara dengan 22.6638% dari SMYS, terjadi pada *node* ke-47. Untuk hasil total tegangan maksimum kondisi dinamis dengan *heading* 90 derajat semuanya memenuhi kriteria DNV OS F-101 yaitu untuk kondisi dengan beban dinamis pada daerah *sagbend* dan ujung *stinger* harus dibawah 87% dari SMYS pipa yang dipasang.

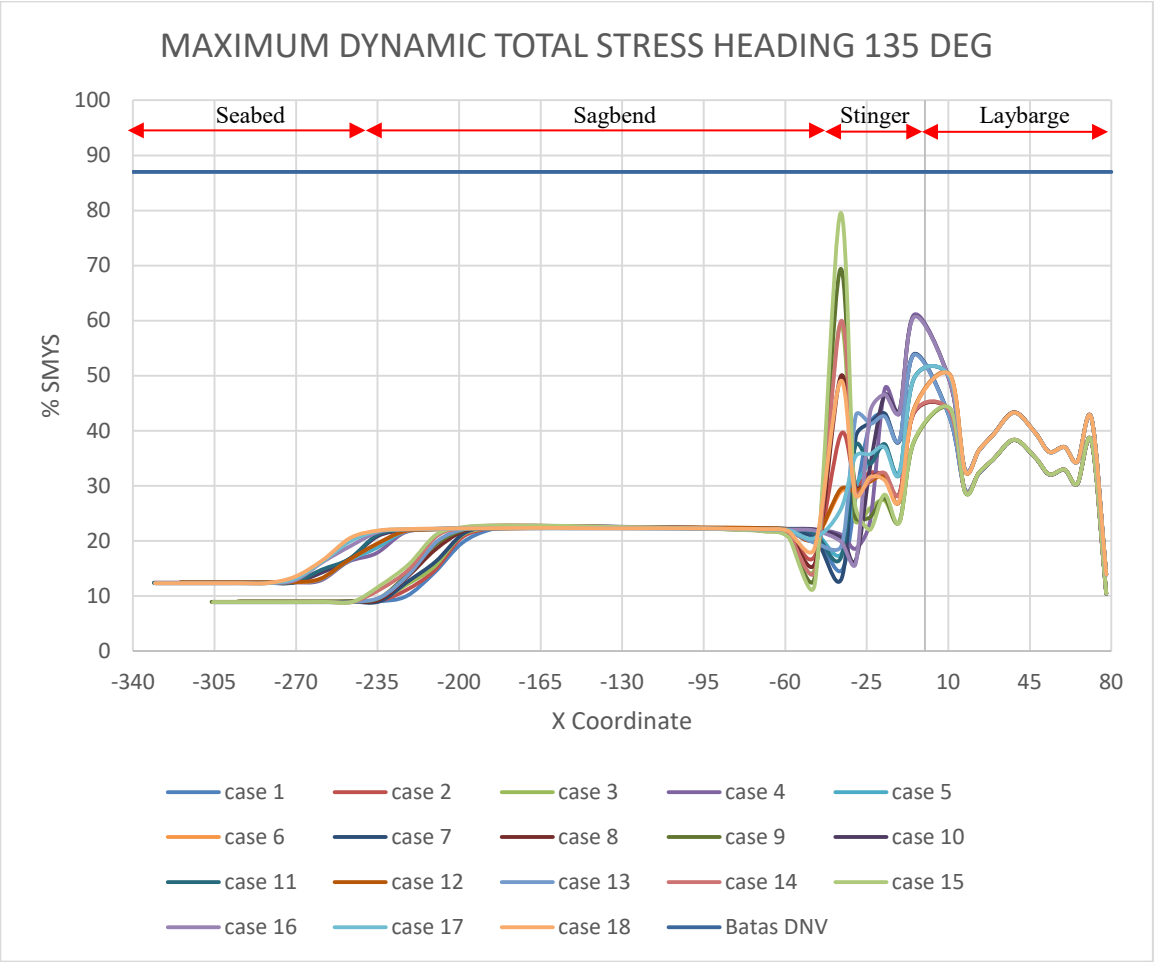
Dapat ditinjau dari tabel hasil analisis dinamis regangan arah 0° dapat diketahui bahwa tegangan maksimal yang terjadi adalah pada *case* 15 yaitu sebesar 0.1538%. Lokasinya berada pada *node* pipa ke-34 yang letaknya pada *roller support* terakhir diatas *stinger.* Namun demikian, hasil regangan dinamis maksimal tersebut masih memenuhi batas *allowable strain criteria* yang tercantum pada DNV OS-F101 yaitu dibawah 0.260%

Tabel IV-36 Hasil Analisis Dinamis Regangan Arah 90°

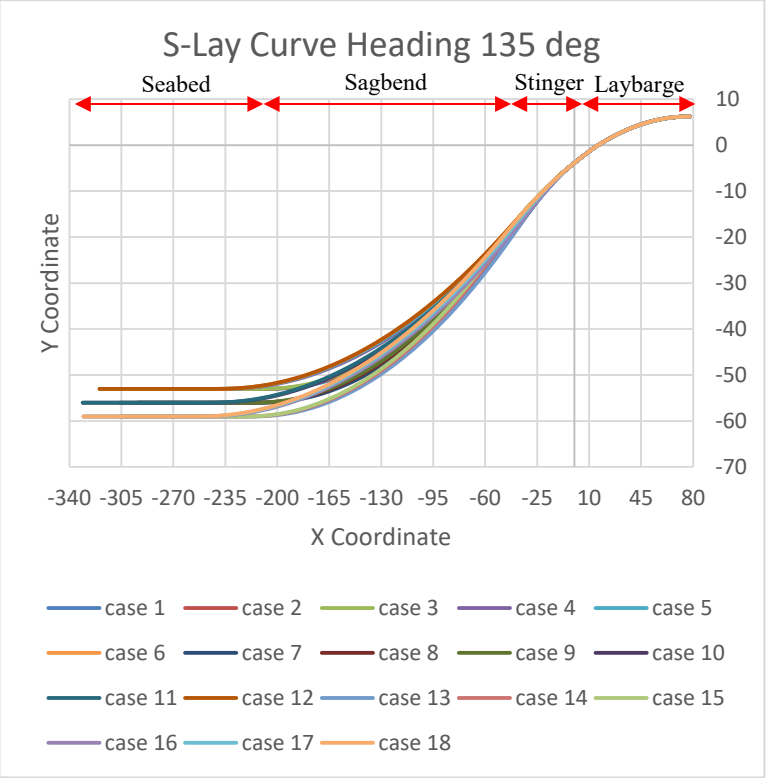
Case	Total Strain	Allowable Strain Criteria	Verify
	Overbend	%	
	%		
1	0.1068	0.260	OK
2	0.0855		OK
3	0.1174		OK
4	0.1199		OK
5	0.0971		OK
6	0.0979		OK
7	0.1068		OK
8	0.0987		OK
9	0.1377		OK
10	0.1197		OK
11	0.0971		OK
12	0.0979		OK
13	0.1068		OK
14	0.1179		OK
15	0.1577		OK
16	0.1197		OK
17	0.0972		OK
18	0.0981		OK
Max =	0.1577		OK

Dapat ditinjau dari tabel hasil analisis dinamis regangan arah 90° dapat diketahui bahwa tegangan maksimal yang terjadi adalah pada *case* 15 yaitu sebesar 0.1577%. Lokasinya berada pada *node* pipa ke-34 yang letaknya pada *roller support* terakhir diatas *stinger.* Namun demikian, hasil regangan dinamis maksimal tersebut masih memenuhi batas *allowable strain criteria* yang tercantum pada DNV OS-F101 yaitu dibawah 0.260%

4.6.5 Hasil Analisis Dinamis Total Tegangan Maksimal Arah 135°



Gambar IV.32 Distribusi Total Tegangan Dinamis Maksimal Arah 135°



Gambar IV.33 Kurva S-Lay Dinamis Arah 135°

Tabel IV-37 Hasil Analisis Dinamis Tegangan Arah 135°

Case	Total Tegangan				Allowable Stress Criteria	Verify
	Overbend		Sagbend			
	Mpa	%SMYS	Mpa	%SMYS		
1	194	53.88889	81.56	22.65556	87%	OK
2	156.63	43.50833	81.64	22.67778		OK
3	213.91	59.41944	81.69	22.69167		OK
4	219.97	61.10278	80.63	22.39722		OK
5	178.98	49.71667	80.69	22.41389		OK
6	180.42	50.11667	80.71	22.41944		OK
7	194.21	53.94722	81.63	22.675		OK
8	179.7	49.91667	81.88	22.74444		OK
9	249.66	69.35	81.83	22.73056		OK
10	218.83	60.78611	80.67	22.40833		OK
11	179.01	49.725	80.43	22.34167		OK
12	180.87	50.24167	80.95	22.48611		OK
13	193.77	53.825	81.78	22.71667		OK
14	215.44	59.84444	82.22	22.83889		OK
15	286.11	79.475	82.1	22.80556		OK
16	218.58	60.71667	80.33	22.31389		OK
17	179.18	49.77222	80.4	22.33333		OK
18	180.67	50.18611	80.52	22.36667		OK
Max	**286.11**	**79.475**	**82.22**	**22.83889**		**OK**

Dengan melithat grafik dan tabel diatas, dapat diketahui bahwa total tegangan maksimum yang terjadi adalah pada *case* 15 yaitu sebesar 286.11 atau setara dengan 79.475% dari SMYS pada daerah *overbend* dengan nomer *node* 34 lokasinya adalah saat pipa berada tepat diatas ujung *stinger* dimana setelah itu pipa sudah tidak ter-*support* sempurna. Sedangkan pada daerah *sagbend case* total tegangan dinamis yang paling besar adalah pada *case* 14 yaitu dengan nilai sebesar 82.22 atau setara dengan 22.8388% dari SMYS, terjadi pada *node* ke-47. Untuk hasil total tegangan maksimum kondisi dinamis dengan *heading* 180 derajat semuanya memenuhi kriteria DNV OS F-101 yaitu untuk kondisi dengan beban dinamis pada daerah *sagbend* dan ujung *stinger* harus dibawah 87% dari SMYS pipa yang dipasang.

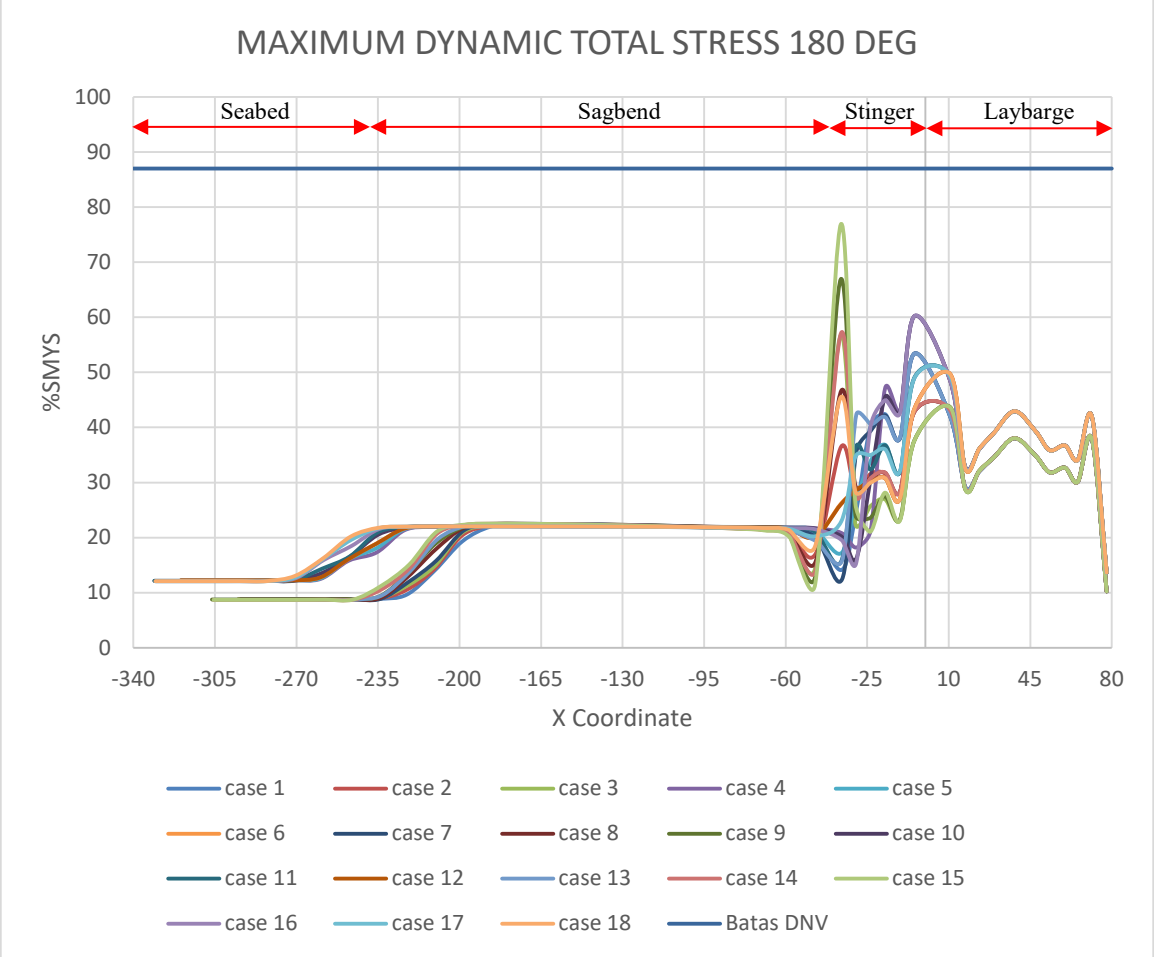
Tabel IV-38 Hasil Analisis Dinamis Regangan Arah 135°

Case	Total Strain	Allowable Strain Criteria	Verify
	Overbend	%	
	%		
1	0.1071	0.260	OK
2	0.0859		OK
3	0.1176		OK
4	0.1209		OK
5	0.0977		OK
6	0.0986		OK
7	0.1073		OK
8	0.0985		OK
9	0.1392		OK
10	0.1201		OK
11	0.0976		OK
12	0.0983		OK
13	0.1072		OK
14	0.1193		OK
15	0.1589		OK
16	0.1201		OK
17	0.0978		OK
18	0.0985		OK
Max =	0.1589		OK

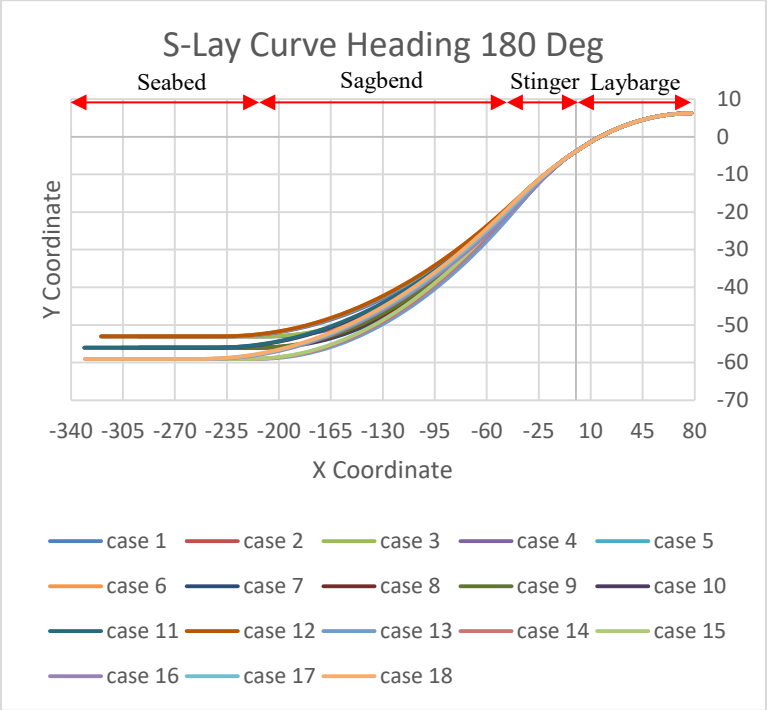
Dengan meninjau tabel hasil analisis dinamis regangan arah 135° dapat diketahui bahwa tegangan maksimal yang terjadi adalah pada *case* 15 yaitu sebesar 0.1589%. Lokasinya berada pada *node* pipa ke-34 yang letaknya pada *roller support* terakhir diatas

stinger. Namun demikian, hasil regangan dinamis maksimal tersebut masih memenuhi batas *allowable strain criteria* yang tercantum pada DNV OS-F101 yaitu dibawah 0.260%

4.6.6 Hasil Analisis Dinamis Total Tegangan Maksimal Arah 180°



Gambar IV.34 Distribusi Total Tegangan Dinamis Maksimal Arah 180°



Gambar IV.35 Kurva S-Lay Dinamis Arah 180°

Tabel IV-39 Hasil Analisis Dinamis Tegangan Arah 180°

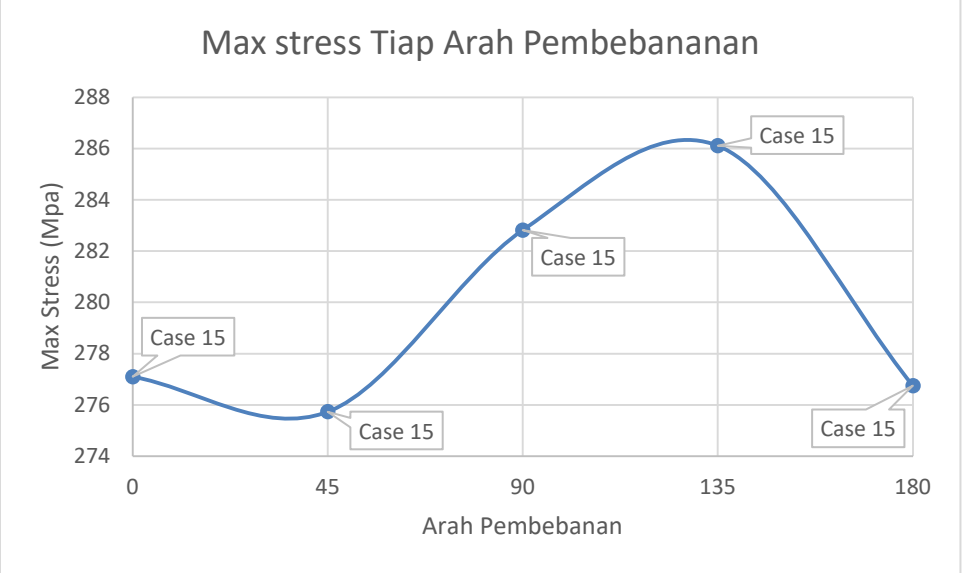
Case	Total Tegangan				Allowable Stress Criteria	Verify
	Overbend		Sagbend			
	Mpa	%SMYS	Mpa	%SMYS		
1	192.37	53.43611	80.82	22.45		OK
2	155.15	43.09722	80.81	22.44722		OK
3	204.41	56.78056	80.84	22.45556		OK
4	216.9	60.25	79.52	22.08889		OK
5	177.3	49.25	79.49	22.08056		OK
6	178.9	49.69444	79.6	22.11111		OK
7	192.38	53.43889	80.94	22.48333		OK
8	168.02	46.67222	80.94	22.48333		OK
9	240.92	66.92222	80.97	22.49167		OK
10	216.78	60.21667	79.47	22.075	87%	OK
11	177.4	49.27778	79.53	22.09167		OK
12	178.85	49.68056	79.49	22.08056		OK
13	192.34	53.42778	81.1	22.52778		OK
14	205.96	57.21111	81.11	22.53056		OK
15	276.75	76.875	81.12	22.53333		OK
16	216.88	60.24444	79.35	22.04167		OK
17	177.31	49.25278	79.34	22.03889		OK
18	178.86	49.68333	79.38	22.05		OK
Max	**276.75**	**76.875**	**81.12**	**22.53333**		**OK**

Berdasarkan grafik dan tabel diatas, dapat diketahui bahwa total tegangan maksimum yang terjadi adalah pada *case* 15 yaitu sebesar 276.75 atau setara dengan 76.875% dari SMYS pada daerah *overbend* dengan nomer *node* 34 lokasinya adalah saat pipa berada tepat diatas ujung *stinger* dimana setelah itu pipa sudah tidak ter-*support* sempurna. Sedangkan pada daerah *sagbend case* total tegangan dinamis yang paling besar adalah pada *case* 15 juga yaitu dengan nilai sebesar 81.12 atau setara dengan 22.5333% dari SMYS, terjadi pada *node* ke-48. Untuk hasil total tegangan maksimum kondisi dinamis dengan *heading* 180 derajat semuanya memenuhi kriteria DNV OS F-101 yaitu untuk kondisi dengan beban dinamis pada daerah *sagbend* dan ujung *stinger* harus dibawah 87% dari SMYS pipa yang dipasang.

Tabel IV-40 Hasil Analisis Dinamis Regangan Arah 180°

Case	Total Strain	Allowable Strain Criteria	Verify
	Overbend	%	
	%		
1	0.1063	0.260	OK
2	0.0851		OK
3	0.1133		OK
4	0.1192		OK
5	0.0968		OK
6	0.0975		OK
7	0.1063		OK
8	0.0924		OK
9	0.1343		OK
10	0.1192		OK
11	0.0966		OK
12	0.0976		OK
13	0.1063		OK
14	0.114		OK
15	0.1545		OK
16	0.1192		OK
17	0.0967		OK
18	0.0976		OK
Max =	0.1545		OK

Seperti yang ditunjukan oleh tabel hasil analisis dinamis regangan arah 180° dapat diketahui bahwa tegangan maksimal yang terjadi adalah pada *case* 15 yaitu sebesar 0.1545%. Lokasinya berada pada *node* pipa ke-34 yang letaknya pada *roller support* terakhir diatas *stinger.* Namun demikian, hasil regangan dinamis maksimal tersebut masih memenuhi batas *allowable strain criteria* yang tercantum pada DNV OS-F101 yaitu dibawah 0.260%



Gambar IV.36 Grafik Maksimal Tegangan tiap Arah Pembebanan

Dengan meninjau grafik diatas dapat dilihat bahwa maksimal total tegangan yang terjadi pada tiap arah pembebanan yang terbesar semuanya terjadi pada *case 15* dengan variasi kedalaman 59 meter, kurvatur 400 meter dan tensioner 30 ton. Maksimal total tegangan yang paling besar terjadi pada *case* 15 dengan arah pembebanan 135° yaitu sebesar 286.11 Mpa, sedangkan untuk nilai maksimal tegangan total yang paling kecil terjadi pada *case* 15 dengan arah pembebanan 45° (quarterseas).

BAB V
PENUTUP

5.1 Kesimpulan

Berdasarkan analisis dan pembahasan yang dilakukan pada bab dan sub-bab sebelumnya, maka dapat diambil kesimpulan mengenai penelitian tugas akhir ini, sebagai berikut :

1. Pada analisis statis intalasi pipa berdiameter 8 inch dengan variasi variabel yang sudah ditentukan, total tegangan terbesar yang terjadi adalah pada *case* 3 dengan variabel variasi kedalaman sedalam 59 meter, *stinger radius of cuvature* sebesar 400 meter, dan kekuatan *tensioner* yang dipakai sebesar 30 ton. Untuk *case* 3 kedalaman 59 meter nilai total tegangan pada daerah *overbend*-nya sebesar 273.7 Mpa atau setara dengan 76% dari SMYS sedangkan pada daerah *sagbend* memiliki nilai total tegangan sebesar 80.7 Mpa atau setara dengan 22% dari SMYS pipa berdiameter 8 inch API 5L grade X52. Untuk hasil regangan statis-nya sendiri, *Case* yang paling besar nilainya masih sama yaitu pada *case* 3 kedalaman 59 meter sebesar 0.153%. nilai tegangan maupun regangan statis yang sudah dianalisa semuanya masih dibawah batas *allowable stress strain criteria* DNV OS-F101
2. Untuk hasil analisis *response amplitude operator* gerakan *surge* terbesar terjadi pada arah pembebanan 0° dan 180° dengan nilai sebesar 1.48 m/m dan 1.513 m/m. Pada gerakan *sway* yang terbesar pada arah pembebanan 90° dengan nilai sebesar 2.069 m/m. Lalu untuk gerakan *heave* nilai terbesar terjadi pada arah pembebanan 90° dengan nilai sebesar 0.99 m/m. Sedangkan pada gerakan rotasi *roll* terbesar terjadi pada arah pembebanan 90° dengan nilai sebesar 6.438 deg/m. Kemudian untuk gerakan *pitch* sebesar 1.803 deg/m dan 1.902 deg/m yang terjadi pada arah pembebanan 135° dan 180°. Terakhir untuk gerakan *yaw* mengalami respon gerakan maksimum pada arah pembebanan 45° dengan nilai sebesar 1.526 deg/m.
3. Berdasarkan hasil analisis dinamis instalasi pipa dengan menggunakan *barge* yang sudah dimodelkan, total tegangan dinamis maksimal yang paling besar masih sama dengan analisis statis yaitu pada *case* 15 tepatnya pada arah pembebanan 90° yaitu sebesar 282.82 Mpa atau setara dengan 78.5611% dari SMYS pipa berdiameter 8 inch. Untuk regangannya sendiri juga tidak jauh

berubah dan untuk regangan dinamis pipanya yang paling besar juga terletak pada *case* 15 tetapi dengan arah pembebanan berbeda yaitu 135° dengan nilai sebesar 0.1589%. Hasil tegangan dan regangan dinamis yang terjadi masih memenuhi batas *allowable stress strain criteria* yang tercantum pada DNV OS-F101.Dapat Disimpulkan bahwa konfigurasi kedalaman, *stinger radius of curvature*, dan kekuatan *tensioner* yang paling optimal mengacu pada analisis statis dan dinamis yang sudah dilakukan adalah *case* 2 dengan konfigurasi variasi kedalaman yang paling dangkal yaitu sedalalam 53 meter, *stinger radius of curvature* sebesar 300 meter dan kekuatan *tensioner* sebesar 30 ton. Konfigurasi tersebut memiliki hasil total tegangan analisis statis dan dinamis yang paling kecil dari hasil variasi lainnya. Untuk nilai tegangan analisis statis *case* 2 sebesar 154.2 Mpa pada daerah *overbend* dan 79.3 Mpa pada daerah *sagbend*. Sedangkan total tegangan dinamis yang paling kecil adalah *case* 1 pada arah pembebanan 0° yaitu sebesar 152.63 Mpa. Tetapi untuk hasil total tegangan dinamis arah pembebanan 45°,90°,135° dan 180° yang paling kecil nilainya terjadi pada *case* 2. Dengan demikian, variabel variasi *case* 2 dapat dianjurkan pada saat melakukan instalasi pipa 8 inch pada keadaan lingkungan yang sudah ditentukan.

5.2 Saran

Adapun saran yang dapat diberikan oleh penulis untuk penelitian selanjutnya yaitu :

1. Diperlukan *mooring analysis* pada saat instalasi berlangsung.
2. Diperlukannya analisis pembebanan angin dan bangunan atas yang terletak pada *barge*.
3. Penelitian ini hanya menggunakan sebanyak *heading* saja dalam analisis dinamisnya, diharapkan dapat menambahkan arah pembebanan sehingga penelitian yang dilakukan semakin detail.
4. Diperlukan permodelan *stinger* lebih lanjut pada *software* MOSES untuk mendapatkan *motion pipe laying barge* yang lebih akurat.

DAFTAR PUSTAKA

Abidin, Zenal. 2008. **Analisis On-Bottom Stability dan Instalasi Pipa Bawah Laut di Daerah Shore Apporach**. Tugas Akhir. Bandung : Program Studi Teknik Kelautan. Fakultas Sipil dan Lingkungan. Institut Teknologi Bandung.

API 5L. 2013. **Specification for Line Pipe**. American Petroleum Institute. Washington D.C.

ASME B31.4. 2016. **Pipeline Transportation Systems for Liquids and Slurries**. American Society of Mechanical Engineer. New York.

Bai, Qiang., Bai, Yong. 2014. **Subsea Pipeline Design, Analysis, and Installation**. Oxford : Elsevier

Djatmiko, Eko Budi.2012. **Perilaku dan Operabilitas Bangunan Laut di Atas Gelombang Acak**. ITS PRESS, Surabaya.

DNV OS-F101. 2013. ***Submarine Pipeline Systems***. Det Norske Veritas AS.Norway.

Fathurozi, Muhammad. 2016. **Analisis Tegangan Pipa saat *Pulling* pada Instalasi *Pipeline* dengan Metode *Push Pull* : *Project* PT. Dwisatu Mustika Bumi (DMB)**. Tugas Akhir. Surabaya : Departemen Teknik Kelautan. Fakultas Teknologi Kelautan. Institut Teknologi Sepuluh Nopember.

Febrianti. 2017. **Analisis Local Buckling Bawah Laut 20 Inch Pada Saat Instalasi dengan Metode S-Lay di Blok DA dan BH, Selat Madura.** Tugas Akhir. Surabaya : Departemen Teknik Kelautan. Fakultas Teknologi Kelautan. Institut Teknologi Sepuluh Nopember.

Ghifari, Bana F. 2019. Analisa tegangan pada **Proses Abandonment and Recoery Pipa Bawah Laut 12" di Subang Jawa Barat Saat Instalasi dengan Metode S-Lay**. Tugas Akhir. Surabaya : Departemen Teknik Kelautan. Fakultas Teknologi Kelautan. Institut Teknologi Sepuluh Nopember.

Guo, Boyun. 2014. **Offshore Pipelines Design, Installation and Maintenance.** Oxford : Elsevier.

Irsyad, Fauzanullah Rafif. 2017. **Analisis *Concrete Crushing* dan *Concrete Sliding* pada *Pipeline* saat Instalasi dengan Metode S-lay.** Tugas Akhir. Surabaya : Departemen Teknik Kelautan. Fakultas Teknologi Kelautan. Institut Teknologi Sepuluh Nopember.

Kenny, J. P. 1993. **Structural Analysis of Pipeline Spans**. Safety Executive, USA.

Lee, Jaeyoung. 2009. **Introduction to Offshore Pipelines and Risers.** Houston, Texas

Malahy, Robert C. 1996. **OFFPIPE User's Guide Version 2.05**. OPIMsoft Technology Co., Ltd.

MOSES, 2013. **An Introduction to MOSES**. Exton, USA. Bentley Systems.

Mouselli, A.H.1981. **Offshore Design, Analysis and Methods**. Penwell Books, Oklahoma.

Panambang, Muhammad A. 2007. **Analisis Tegangan Pada Pipa Bawah Laut Akibat Gerakan Lay-Barge Pada Saat Laying dengan Berdasarkan Ranah Frekuensi**. Tugas Akhir. Surabaya : Departemen Teknik Kelautan. Fakultas Teknologi Kelautan, Institut Teknologi Sepuluh Nopember.

Putri, Juniavi D.K. 2017. **Analisis Konfigurasi Sudut *Stinger* dengan Variasi Kedalaman pada Pipa Diameter 20" saat Instalasi di Banyu Urip, Bojonegoro.** Tugas Akhir. Surabaya : Departemen Teknik Kelautan. Fakultas Teknologi Kelautan. Institut Teknologi Sepuluh Nopember.

Rasyadi, Muhammad Z. 2019.**Analisis Proses *Initiation* dan *Laydown* pada Pipa saat Instalasi dengan Metode S-lay.** Tugas Akhir. Surabaya : Departemen Teknik Kelautan. Fakultas Teknologi Kelautan. Institut Teknologi Sepuluh Nopember.

Romadhoni. 2016. **Analisis Olah Gerak Kapal di Gelombang Reguler Pada Kapal Tipe *Axe Bow***. Tugas Akhir. Riau : Jurusan Teknik Perkapalan, Politeknik Negeri Bengkalis.

LAMPIRAN A
OUTPUT SOFTWARE OFFPIPE
(ANALISIS STATIS)

Output Analisis Statis (Case 1 - 6)

S T A T I C P I P E C O O R D I N A T E S, F O R C E S A N D S T R E S S E S

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	.00	.000	.266	.000	36.43	.00	.00	.00	36.43	10.12
3	LAYBARGE	71.49	6.16	.00	.000	.958	6.300	36.41	.00	-116.82	-.02	135.70	37.70
5	LAYBARGE	65.37	5.98	.00	.000	2.232	12.417	36.39	.00	-84.11	.01	107.89	29.97
7	LAYBARGE	59.91	5.72	.00	.000	3.279	17.887	36.35	.00	-95.08	-.01	117.17	32.55
9	LAYBARGE	53.32	5.27	.00	.000	4.504	24.493	36.28	.00	-91.57	.00	114.11	31.70
11	LAYBARGE	47.32	4.74	.00	.000	5.732	30.515	36.20	.00	-104.33	.00	124.88	34.69
13	LAYBARGE	38.21	3.69	.00	.000	7.424	39.683	36.04	.00	-117.94	-.01	136.29	37.86
15	LAYBARGE	29.27	2.39	.00	.000	9.106	48.722	35.85	.00	-103.42	.02	123.75	34.38
17	LAYBARGE	23.13	1.33	.00	.000	10.366	54.950	35.69	.00	-92.99	-.09	114.73	31.87
19	LAYBARGE	17.18	.19	.00	.002	11.450	61.011	35.52	.00	-81.07	.37	104.43	29.01
21	LAYBARGE	10.63	-1.22	.00	-.014	12.983	67.716	35.33	-.11	-134.98	-4.06	150.16	41.71
24	STINGER	-4.64	-5.13	.00	.014	16.018	83.473	34.82	-.44	-183.81	-4.12	191.31	53.14
26	STINGER	-11.01	-7.10	.00	-.001	18.218	90.140	34.59	-.62	-119.62	.35	136.58	37.94
28	STINGER	-17.30	-9.29	.00	-.009	20.059	96.807	34.31	-.81	-135.86	-3.13	150.22	41.73
30	STINGER	-23.53	-11.68	.00	.040	21.977	103.475	34.01	-1.01	-129.57	7.34	144.83	40.23
32	STINGER	-29.67	-14.27	.01	-.383	23.808	110.142	33.68	-1.24	-123.91	-61.22	151.78	42.16
34	STINGER	-35.74	-17.03	.09	-1.035	24.767	116.809	33.35	-1.48	-13.94	-19.23	54.29	15.08
36	SAGBEND	-46.65	-22.02	.31	-1.156	24.067	128.810	32.72	-1.91	41.27	3.82	68.93	19.15
37	SAGBEND	-57.66	-26.78	.51	-.968	22.660	140.810	32.12	-2.32	49.23	6.50	75.51	20.98
38	SAGBEND	-68.80	-31.26	.68	-.751	21.132	152.810	31.55	-2.71	51.21	6.58	76.83	21.34
39	SAGBEND	-80.05	-35.43	.81	-.541	19.561	164.811	31.03	-3.07	52.38	6.32	77.46	21.52
40	SAGBEND	-91.41	-39.29	.90	-.343	17.957	176.811	30.54	-3.41	53.41	5.97	77.98	21.66
41	SAGBEND	-102.88	-42.82	.95	-.159	16.323	188.812	30.09	-3.71	54.37	5.54	78.47	21.80
42	SAGBEND	-114.44	-46.03	.96	.008	14.661	200.812	29.69	-3.99	55.25	5.04	78.92	21.92
43	SAGBEND	-126.09	-48.90	.94	.157	12.973	212.812	29.33	-4.24	56.06	4.48	79.33	22.04
44	SAGBEND	-137.83	-51.42	.90	.288	11.262	224.813	29.01	-4.46	56.78	3.93	79.71	22.14
45	SAGBEND	-149.63	-53.58	.83	.403	9.530	236.813	28.74	-4.64	57.41	3.62	80.06	22.24
46	SAGBEND	-161.49	-55.39	.73	.513	7.781	248.814	28.51	-4.80	57.94	3.56	80.36	22.32
47	SAGBEND	-173.40	-56.83	.61	.622	6.017	260.814	28.33	-4.93	58.35	3.54	80.59	22.39
48	SAGBEND	-185.35	-57.90	.47	.729	4.245	272.815	28.19	-5.02	58.49	3.40	80.62	22.39
49	SAGBEND	-197.33	-58.61	.31	.821	2.481	284.815	28.10	-5.08	57.38	2.32	79.58	22.11
50	SAGBEND	-209.33	-58.95	.14	.812	.836	296.816	28.06	-5.11	47.94	-5.51	71.77	19.94
51	SEABED	-221.33	-59.01	.01	.247	-.007	308.816	28.06	-5.12	4.52	-24.80	52.23	14.51
52	SEABED	-233.33	-59.01	.00	-.008	.000	320.816	28.06	-5.11	-.29	.19	31.23	8.67
53	SEABED	-245.33	-59.01	.00	.000	.000	332.816	28.06	-5.11	.02	.03	30.96	8.60
54	SEABED	-257.33	-59.01	.00	.000	.000	344.816	28.06	-5.11	.00	.00	30.94	8.59
55	SEABED	-269.33	-59.01	.00	.000	.000	356.816	28.06	-5.11	.00	.00	30.93	8.59
56	SEABED	-281.33	-59.01	.00	.000	.000	368.816	28.06	-5.11	.00	.00	30.93	8.59

S T A T I C P I P E C O O R D I N A T E S, F O R C E S A N D S T R E S S E S

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	SUPPORT REACTION VERT (KN)	SUPPORT REACTION HORIZ (KN)	SUPT SEPARATIONS VERT (M)	SUPT SEPARATIONS HORIZ (M)	PIPE TENSION (KN)	BENDING MOMENTS VERT (KN-M)	BENDING MOMENTS HORIZ (KN-M)	BENDING MOMENTS TOTAL (KN-M)
1	TENSIONR	77.79	6.21	.00	-2.54	-.01	.00	.00	299.98	.00	.00	.00
3	LAYBARGE	71.49	6.16	.00	23.42	.00	.00	.00	299.80	-46.93	-.01	46.93
5	LAYBARGE	65.37	5.98	.00	9.99	.00	.00	.00	299.64	-33.79	.00	33.79
7	LAYBARGE	59.91	5.72	.00	14.49	.00	.00	.00	299.30	-38.20	.00	38.20
9	LAYBARGE	53.32	5.27	.00	13.00	.00	.00	.00	298.75	-36.78	.00	36.78
11	LAYBARGE	47.32	4.74	.00	17.14	.00	.00	.00	298.07	-41.91	.00	41.91
13	LAYBARGE	38.21	3.69	.00	21.40	.00	.00	.00	296.75	-47.38	.00	47.38
15	LAYBARGE	29.27	2.39	.00	16.86	.01	.00	.00	295.17	-41.55	.01	41.55
17	LAYBARGE	23.13	1.33	.00	13.61	-.04	.00	.00	293.88	-37.36	-.04	37.36
19	LAYBARGE	17.18	.19	.00	8.29	.00	.00	.00	292.48	-32.57	.15	32.57
21	LAYBARGE	10.63	-1.22	.00	20.69	-1.36	.00	.00	291.34	-54.22	-1.63	54.25
24	STINGER	-4.64	-5.13	.00	26.62	-1.40	.00	.00	288.63	-73.84	-1.65	73.86
26	STINGER	-11.01	-7.10	.00	8.92	-.18	.00	.00	287.50	-48.06	.14	48.06
28	STINGER	-17.30	-9.29	.00	15.03	-1.50	.00	.00	286.03	-54.58	-1.26	54.59
30	STINGER	-23.53	-11.68	.00	13.32	3.77	.00	.00	284.46	-52.05	2.95	52.14
32	STINGER	-29.67	-14.27	.01	17.93	-10.41	.00	.01	282.73	-49.78	-24.59	55.52
34	STINGER	-35.74	-17.03	.09	1.36	-.80	.05	.09	281.07	-5.60	-7.72	9.54

36	SAGBEND	-46.65	-22.02	.31	.00	.00	.00	.00	277.77	16.58	1.53	16.65
37	SAGBEND	-57.66	-26.78	.51	.00	.00	.00	.00	274.62	19.78	2.61	19.95
38	SAGBEND	-68.80	-31.26	.68	.00	.00	.00	.00	271.67	20.57	2.64	20.74
39	SAGBEND	-80.05	-35.43	.81	.00	.00	.00	.00	268.91	21.04	2.54	21.20
40	SAGBEND	-91.41	-39.29	.90	.00	.00	.00	.00	266.37	21.46	2.40	21.59
41	SAGBEND	-102.88	-42.82	.95	.00	.00	.00	.00	264.03	21.84	2.23	21.95
42	SAGBEND	-114.44	-46.03	.96	.00	.00	.00	.00	261.91	22.20	2.03	22.29
43	SAGBEND	-126.09	-48.90	.94	.00	.00	.00	.00	260.02	22.52	1.80	22.59
44	SAGBEND	-137.83	-51.42	.90	.00	.00	.00	.00	258.36	22.81	1.58	22.87
45	SAGBEND	-149.63	-53.58	.83	.00	.00	.00	.00	256.93	23.06	1.45	23.11
46	SAGBEND	-161.49	-55.39	.73	.00	.00	.00	.00	255.74	23.28	1.43	23.32
47	SAGBEND	-173.40	-56.83	.61	.00	.00	.00	.00	254.79	23.44	1.42	23.48
48	SAGBEND	-185.35	-57.90	.47	.00	.00	.00	.00	254.08	23.50	1.37	23.54
49	SAGBEND	-197.33	-58.61	.31	.00	.00	.00	.00	253.61	23.05	.93	23.07
50	SAGBEND	-209.33	-58.95	.14	.57	-.61	.00	.00	253.40	19.26	-2.21	19.39
51	SEABED	-221.33	-59.01	.01	8.19	-4.33	.00	.00	253.39	1.81	-9.96	10.13
52	SEABED	-233.33	-59.01	.00	8.09	.75	.00	.00	253.39	-.12	.08	.14
53	SEABED	-245.33	-59.01	.00	7.91	.00	.00	.00	253.39	.01	.01	.01
54	SEABED	-257.33	-59.01	.00	7.92	.00	.00	.00	253.39	.00	.00	.00
55	SEABED	-269.33	-59.01	.00	7.92	.00	.00	.00	253.39	.00	.00	.00
56	SEABED	-281.33	-59.01	.00	.00	.00	.00	.00	253.39	.00	.00	.00

S T A T I C S O L U T I O N S U M M A R Y

PIPE PROPERTIES (1)

PIPE SECTION LENGTH ..	12.00 M	ELASTIC MODULUS	207000. MPA
OUTSIDE DIAMETER	21.908 CM	CROSS SECTIONAL AREA .	278.27 CM2
WALL THICKNESS	1.270 CM	MOMENT OF INERTIA	4400.56 CM4
WEIGHT/LENGTH IN AIR .	1235.937 N/M	YIELD STRESS	360.00 MPA
SUBMERGED WGHT/LENG ..	659.899 N/M	STRESS INTENS FACTOR .	1.000
SPECIFIC GRAVITY	2.146	STEEL DENSITY	78500.0 N/M3
WRAP COAT THICKNESS ..	.040 CM	WRAP COAT DENSITY	12815.0 N/M3
CONCRETE THICKNESS ...	.250 CM	CONCRETE DENSITY	30440.0 N/M3

BARGE DATA

TOTAL PIPE TENSION ...	299.98 KN	RADIUS OF CURVATURE ..	300.00 M
NUMBER OF TENSIONERS .	1	BARGE TRIM ANGLE	.000 DEG
NO. OF PIPE SUPPORTS .	10	PIPE ANGLE AT STERN ..	12.983 DEG
BARGE HEADING	.000 DEG	OFFSET FROM R.O.W. ...	.00 M

STINGER DATA

NO. OF PIPE SUPPORTS .	6	STINGER STERN DEPTH ..	-17.03 M
NO. STINGER SECTIONS .	6	PIPE ANGLE AT STERN ..	24.767 DEG
RADIUS OF CURVATURE ..	200.00 M	STINGER LENGTH	43.26 M

SAGBEND DATA

WATER DEPTH	59.00 M	HORIZ PIPE TENSION ...	253.39 KN
TOUCHDOWN X-COORD. ...	-215.01 M	BOTTOM SLOPE ANGLE ...	.000 DEG

SOLUTION SUMMARY

NODE NO.	PIPE SECTION	X COORD	Y COORD	Z COORD	SUPPORT REACT VERT	HORIZ	TOTAL MOMENT	TOTAL STRESS	PCT YLD
1	TENSIONR	77.8	6.2	.0	-2.5	.0	.0	36.4	10.
3	LAYBARGE	71.5	6.2	.0	23.4	.0	46.9	135.7	38.
5	LAYBARGE	65.4	6.0	.0	10.0	.0	33.8	107.9	30.
7	LAYBARGE	59.9	5.7	.0	14.5	.0	38.2	117.2	33.
9	LAYBARGE	53.3	5.3	.0	13.0	.0	36.8	114.1	32.
11	LAYBARGE	47.3	4.7	.0	17.1	.0	41.9	124.9	35.
13	LAYBARGE	38.2	3.7	.0	21.4	.0	47.4	136.3	38.
15	LAYBARGE	29.3	2.4	.0	16.9	.0	41.5	123.8	34.
17	LAYBARGE	23.1	1.3	.0	13.6	.0	37.4	114.7	32.
19	LAYBARGE	17.2	.2	.0	8.3	.0	32.6	104.4	29.
21	LAYBARGE	10.6	-1.2	.0	20.7	-1.4	54.2	150.2	42.
24	STINGER	-4.6	-5.1	.0	26.6	-1.4	73.9	191.3	53.
26	STINGER	-11.0	-7.1	.0	8.9	-.2	48.1	136.6	38.
28	STINGER	-17.3	-9.3	.0	15.0	-1.5	54.6	150.2	42.
30	STINGER	-23.5	-11.7	.0	13.3	3.8	52.1	144.8	40.
32	STINGER	-29.7	-14.3	.0	17.9	-10.4	55.5	151.8	42.

S T A T I C S O L U T I O N S U M M A R Y

34	STINGER	-35.7	-17.0	.1	1.4	-.8	9.5	54.3	15.
48	SAGBEND	-185.4	-57.9	.5	.0	.0	23.5	80.6	22.
51	SEABED	-221.3	-59.0	.0	8.2	-4.3	10.1	52.2	15.

O V E R B E N D P I P E S U P P O R T G E O M E T R Y

STATION NO.	LOCATION	PIPE NODE	SUPT NODE	/----- PIPE COORDINATES ----/ X (M)	Y (M)	ANGLE (DEG)	/--- SUPPORT COORDINATES ---/ X (M)	Y (M)	ANGLE (DEG)	VERTICAL REACTION (KN)	VERTICAL SEPARATION (M)
1	TENSIONR	1	2	77.789	2.560	.27	77.789	2.560	.00	-2.54	.000
2	LAYBARGE	3	4	71.488	2.509	.96	71.489	2.509	1.05	23.42	.000
3	LAYBARGE	5	6	65.375	2.335	2.23	65.375	2.335	2.22	9.99	.000
4	LAYBARGE	7	8	59.911	2.073	3.28	59.911	2.073	3.27	14.49	.000
5	LAYBARGE	9	10	53.320	1.624	4.50	53.321	1.624	4.53	13.00	.000
6	LAYBARGE	11	12	47.323	1.088	5.73	47.323	1.089	5.68	17.14	.000
7	LAYBARGE	13	14	38.214	.042	7.42	38.215	.042	7.43	21.40	.000
8	LAYBARGE	15	16	29.270	-1.261	9.11	29.271	-1.261	9.15	16.86	.000
9	LAYBARGE	17	18	23.132	-2.316	10.37	23.133	-2.316	10.34	13.61	.000
10	LAYBARGE	19	20	17.181	-3.464	11.45	17.182	-3.464	11.50	8.29	.000
11	LAYBARGE	21	22	10.627	-4.875	12.98	10.627	-4.874	12.78	20.69	.000
12	STINGER	24	25	-4.637	-8.781	16.02	-4.636	-8.781	16.25	26.62	.000
13	STINGER	26	27	-11.005	-10.753	18.22	-11.004	-10.753	18.16	8.92	.000
14	STINGER	28	29	-17.304	-12.937	20.06	-17.304	-12.936	20.07	15.03	.000
15	STINGER	30	31	-23.528	-15.329	21.98	-23.527	-15.328	21.98	13.32	.000
16	STINGER	32	33	-29.669	-17.923	23.81	-29.667	-17.927	23.89	17.93	.004
17	STINGER	34	35	-35.738	-20.681	24.77	-35.716	-20.728	25.80	1.36	.051

S T A T I C P I P E C O O R D I N A T E S, F O R C E S A N D S T R E S S E S

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	.00	.000	.266	.000	36.44	.00	.00	.00	36.44	10.12
3	LAYBARGE	71.49	6.16	.00	.000	.958	6.300	36.41	.00	-116.82	-.02	135.71	37.70
5	LAYBARGE	65.37	5.98	.00	.000	2.232	12.417	36.39	.00	-84.11	.01	107.89	29.97
7	LAYBARGE	59.91	5.72	.00	.000	3.279	17.887	36.35	.00	-95.08	-.01	117.17	32.55
9	LAYBARGE	53.32	5.27	.00	.000	4.504	24.493	36.29	.00	-91.57	.00	114.12	31.70
11	LAYBARGE	47.32	4.74	.00	.000	5.732	30.515	36.20	.00	-104.33	.00	124.88	34.69
13	LAYBARGE	38.21	3.69	.00	.000	7.424	39.683	36.04	.00	-117.96	-.01	136.31	37.86
15	LAYBARGE	29.27	2.39	.00	.000	9.106	48.722	35.85	.00	-103.36	.02	123.71	34.36
17	LAYBARGE	23.13	1.33	.00	.000	10.367	54.950	35.69	.00	-93.29	-.09	114.99	31.94
19	LAYBARGE	17.18	.19	.00	.002	11.445	61.011	35.52	.00	-79.86	.38	103.40	28.72
21	LAYBARGE	10.63	-1.22	.00	-.014	13.004	67.716	35.33	-.11	-139.70	-4.08	154.17	42.83
24	STINGER	-4.62	-5.11	.00	.015	15.563	83.451	34.84	-.44	-139.34	-3.97	153.55	42.65
26	STINGER	-11.02	-6.99	.00	-.005	17.118	90.118	34.62	-.61	-78.48	-.39	101.63	28.23
28	STINGER	-17.37	-9.02	.00	.006	18.313	96.785	34.36	-.78	-91.63	-.08	112.63	31.29
30	STINGER	-23.67	-11.19	.00	-.020	19.639	103.452	34.08	-.97	-95.55	-5.01	115.90	32.19
32	STINGER	-29.93	-13.49	.00	.082	20.765	110.119	33.80	-1.17	-65.03	15.94	91.30	25.36
34	STINGER	-36.13	-15.94	.00	-.336	22.616	116.786	33.45	-1.38	-190.87	-70.18	207.00	57.50
36	SAGBEND	-47.10	-20.79	.17	-1.146	24.124	128.786	32.88	-1.80	18.79	-2.60	49.92	13.87
37	SAGBEND	-58.09	-25.60	.39	-1.045	23.003	140.786	32.27	-2.22	46.11	5.75	72.91	20.25
38	SAGBEND	-69.20	-30.15	.57	-.835	21.519	152.786	31.70	-2.61	50.56	6.56	76.37	21.22
39	SAGBEND	-80.42	-34.40	.71	-.624	19.961	164.787	31.16	-2.98	52.07	6.38	77.28	21.47
40	SAGBEND	-91.75	-38.34	.82	-.423	18.366	176.787	30.66	-3.32	53.15	6.06	77.85	21.62
41	SAGBEND	-103.19	-41.96	.88	-.236	16.739	188.787	30.21	-3.64	54.13	5.66	78.35	21.76
42	SAGBEND	-114.73	-45.25	.91	-.064	15.084	200.787	29.79	-3.92	55.03	5.18	78.81	21.89
43	SAGBEND	-126.36	-48.20	.91	.090	13.403	212.787	29.42	-4.18	55.86	4.63	79.23	22.01
44	SAGBEND	-138.08	-50.81	.88	.226	11.698	224.788	29.09	-4.40	56.60	4.07	79.62	22.12
45	SAGBEND	-149.86	-53.07	.82	.345	9.971	236.788	28.80	-4.60	57.26	3.69	79.97	22.21
46	SAGBEND	-161.71	-54.96	.74	.456	8.226	248.789	28.57	-4.76	57.81	3.57	80.29	22.30
47	SAGBEND	-173.61	-56.50	.63	.565	6.466	260.789	28.37	-4.90	58.26	3.55	80.54	22.37
48	SAGBEND	-185.55	-57.67	.50	.672	4.695	272.790	28.22	-5.00	58.50	3.48	80.65	22.40
49	SAGBEND	-197.53	-58.46	.35	.772	2.925	284.790	28.12	-5.07	57.93	2.91	80.08	22.25

50	SAGBEND	-209.52	-58.89	.18	.819	1.225	296.791	28.07	-5.11	52.26	-1.26	75.19	20.88
51	SEABED	-221.52	-59.01	.03	.482	.058	308.791	28.06	-5.12	14.62	-25.72	55.94	15.54
52	SEABED	-233.52	-59.01	.00	-.012	-.002	320.791	28.06	-5.11	-.52	-1.49	32.26	8.96
53	SEABED	-245.52	-59.01	.00	.000	.000	332.791	28.06	-5.11	.02	.13	31.05	8.62
54	SEABED	-257.52	-59.01	.00	.000	.000	344.791	28.06	-5.11	.00	-.01	30.94	8.59
55	SEABED	-269.52	-59.01	.00	.000	.000	356.791	28.06	-5.11	.00	.00	30.93	8.59
56	SEABED	-281.52	-59.01	.00	.000	.000	368.791	28.06	-5.11	.00	.00	30.93	8.59
57	SEABED	-293.52	-59.01	.00	.000	.000	380.791	28.06	-5.11	.00	.00	30.93	8.59

STATIC PIPE COORDINATES, FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	SUPPORT REACTION VERT (KN)	SUPPORT REACTION HORIZ (KN)	SUPT SEPARATIONS VERT (M)	SUPT SEPARATIONS HORIZ (M)	PIPE TENSION (KN)	BENDING MOMENTS VERT (KN-M)	BENDING MOMENTS HORIZ (KN-M)	BENDING MOMENTS TOTAL (KN-M)
1	TENSIONR	77.79	6.21	.00	-2.54	-.01	.00	.00	300.02	.00	.00	.00
3	LAYBARGE	71.49	6.16	.00	23.42	.00	.00	.00	299.84	-46.93	-.01	46.93
5	LAYBARGE	65.37	5.98	.00	9.99	.00	.00	.00	299.68	-33.79	.00	33.79
7	LAYBARGE	59.91	5.72	.00	14.49	.00	.00	.00	299.34	-38.20	.00	38.20
9	LAYBARGE	53.32	5.27	.00	13.00	.00	.00	.00	298.79	-36.79	.00	36.79
11	LAYBARGE	47.32	4.74	.00	17.13	.00	.00	.00	298.10	-41.91	.00	41.91
13	LAYBARGE	38.21	3.69	.00	21.41	.00	.00	.00	296.78	-47.39	.00	47.39
15	LAYBARGE	29.27	2.39	.00	16.83	.01	.00	.00	295.20	-41.52	.01	41.52
17	LAYBARGE	23.13	1.33	.00	13.73	-.04	.00	.00	293.92	-37.48	-.04	37.48
19	LAYBARGE	17.18	.19	.00	7.84	.00	.00	.00	292.52	-32.08	.15	32.08
21	LAYBARGE	10.63	-1.22	.00	21.93	-1.37	.00	.00	291.36	-56.12	-1.64	56.14
24	STINGER	-4.62	-5.11	.00	21.59	-1.34	.00	.00	288.80	-55.98	-1.60	56.00
26	STINGER	-11.02	-6.99	.00	6.14	-.46	.00	.00	287.68	-31.53	-.16	31.53
28	STINGER	-17.37	-9.02	.00	11.10	-.34	.00	.00	286.32	-36.81	-.03	36.81
30	STINGER	-23.67	-11.19	.00	12.55	-2.21	.00	.00	284.88	-38.38	-2.01	38.44
32	STINGER	-29.93	-13.49	.00	.96	5.74	.00	.00	283.40	-26.13	6.41	26.90
34	STINGER	-36.13	-15.94	.00	31.83	-12.35	.00	.00	281.46	-76.68	-28.19	81.70
36	SAGBEND	-47.10	-20.79	.17	.00	.00	.00	.00	278.61	7.55	-1.04	7.62
37	SAGBEND	-58.09	-25.60	.39	.00	.00	.00	.00	275.42	18.53	2.31	18.67
38	SAGBEND	-69.20	-30.15	.57	.00	.00	.00	.00	272.42	20.31	2.63	20.48
39	SAGBEND	-80.42	-34.40	.71	.00	.00	.00	.00	269.61	20.92	2.56	21.07
40	SAGBEND	-91.75	-38.34	.82	.00	.00	.00	.00	267.01	21.35	2.43	21.49
41	SAGBEND	-103.19	-41.96	.88	.00	.00	.00	.00	264.62	21.74	2.27	21.86
42	SAGBEND	-114.73	-45.25	.91	.00	.00	.00	.00	262.45	22.11	2.08	22.20
43	SAGBEND	-126.36	-48.20	.91	.00	.00	.00	.00	260.50	22.44	1.86	22.52
44	SAGBEND	-138.08	-50.81	.88	.00	.00	.00	.00	258.78	22.74	1.64	22.80
45	SAGBEND	-149.86	-53.07	.82	.00	.00	.00	.00	257.29	23.00	1.48	23.05
46	SAGBEND	-161.71	-54.96	.74	.00	.00	.00	.00	256.04	23.23	1.43	23.27
47	SAGBEND	-173.61	-56.50	.63	.00	.00	.00	.00	255.02	23.40	1.43	23.45
48	SAGBEND	-185.55	-57.67	.50	.00	.00	.00	.00	254.25	23.50	1.40	23.54
49	SAGBEND	-197.53	-58.46	.35	.00	.00	.00	.00	253.73	23.27	1.17	23.30
50	SAGBEND	-209.52	-58.89	.18	.05	-.07	.00	.00	253.45	20.99	-.51	21.00
51	SEABED	-221.52	-59.01	.03	6.37	-4.82	.00	.00	253.40	5.87	-10.33	11.88
52	SEABED	-233.52	-59.01	.00	8.41	.41	.00	.00	253.39	-.21	-.60	.63
53	SEABED	-245.52	-59.01	.00	7.90	.06	.00	.00	253.39	.01	.05	.05
54	SEABED	-257.52	-59.01	.00	7.92	.00	.00	.00	253.39	.00	.00	.00
55	SEABED	-269.52	-59.01	.00	7.92	.00	.00	.00	253.39	.00	.00	.00
56	SEABED	-281.52	-59.01	.00	7.92	.00	.00	.00	253.39	.00	.00	.00
57	SEABED	-293.52	-59.01	.00	.00	.00	.00	.00	253.39	.00	.00	.00

STATIC SOLUTION SUMMARY

PIPE PROPERTIES (1)

PIPE SECTION LENGTH ..	12.00 M	ELASTIC MODULUS	207000. MPA
OUTSIDE DIAMETER	21.908 CM	CROSS SECTIONAL AREA .	278.27 CM2
WALL THICKNESS	1.270 CM	MOMENT OF INERTIA	4400.56 CM4
WEIGHT/LENGTH IN AIR .	1235.937 N/M	YIELD STRESS	360.00 MPA
SUBMERGED WGHT/LENG ..	659.899 N/M	STRESS INTENS FACTOR .	1.000
SPECIFIC GRAVITY	2.146	STEEL DENSITY	78500.0 N/M3
WRAP COAT THICKNESS ..	.040 CM	WRAP COAT DENSITY	12815.0 N/M3
CONCRETE THICKNESS ...	.250 CM	CONCRETE DENSITY	30440.0 N/M3

BARGE DATA

TOTAL PIPE TENSION ...	300.02 KN	RADIUS OF CURVATURE ..	300.00 M
NUMBER OF TENSIONERS .	1	BARGE TRIM ANGLE	.000 DEG
NO. OF PIPE SUPPORTS .	10	PIPE ANGLE AT STERN ..	13.004 DEG
BARGE HEADING	.000 DEG	OFFSET FROM R.O.W. ...	.00 M

STINGER DATA

NO. OF PIPE SUPPORTS .	6	STINGER STERN DEPTH ..	-15.94 M
NO. STINGER SECTIONS .	6	PIPE ANGLE AT STERN ..	22.616 DEG
RADIUS OF CURVATURE ..	300.00 M	STINGER LENGTH	43.24 M

SAGBEND DATA

WATER DEPTH	59.00 M	HORIZ PIPE TENSION ...	253.39 KN
TOUCHDOWN X-COORD. ...	-218.30 M	BOTTOM SLOPE ANGLE ...	.000 DEG

SOLUTION SUMMARY

NODE NO.	PIPE SECTION	X COORD	Y COORD	Z COORD	SUPPORT REACT VERT	SUPPORT REACT HORIZ	TOTAL MOMENT	TOTAL STRESS	PCT YLD
1	TENSIONR	77.8	6.2	.0	-2.5	.0	.0	36.4	10.
3	LAYBARGE	71.5	6.2	.0	23.4	.0	46.9	135.7	38.
5	LAYBARGE	65.4	6.0	.0	10.0	.0	33.8	107.9	30.
7	LAYBARGE	59.9	5.7	.0	14.5	.0	38.2	117.2	33.
9	LAYBARGE	53.3	5.3	.0	13.0	.0	36.8	114.1	32.
11	LAYBARGE	47.3	4.7	.0	17.1	.0	41.9	124.9	35.
13	LAYBARGE	38.2	3.7	.0	21.4	.0	47.4	136.3	38.
15	LAYBARGE	29.3	2.4	.0	16.8	.0	41.5	123.7	34.
17	LAYBARGE	23.1	1.3	.0	13.7	.0	37.5	115.0	32.
19	LAYBARGE	17.2	.2	.0	7.8	.0	32.1	103.4	29.
21	LAYBARGE	10.6	-1.2	.0	21.9	-1.4	56.1	154.2	43.
24	STINGER	-4.6	-5.1	.0	21.6	-1.3	56.0	153.5	43.
26	STINGER	-11.0	-7.0	.0	6.1	-.5	31.5	101.6	28.
28	STINGER	-17.4	-9.0	.0	11.1	-.3	36.8	112.6	31.
30	STINGER	-23.7	-11.2	.0	12.6	-2.2	38.4	115.9	32.
32	STINGER	-29.9	-13.5	.0	1.0	5.7	26.9	91.3	25.

S T A T I C S O L U T I O N S U M M A R Y

34	STINGER	-36.1	-15.9	.0	31.8	-12.4	81.7	207.0	58.
48	SAGBEND	-185.6	-57.7	.5	.0	.0	23.5	80.7	22.
51	SEABED	-221.5	-59.0	.0	6.4	-4.8	11.9	55.9	16.

O V E R B E N D P I P E S U P P O R T G E O M E T R Y

STATION NO.	LOCATION	PIPE NODE	SUPT NODE	PIPE COORDINATES X (M)	PIPE COORDINATES Y (M)	PIPE COORDINATES ANGLE (DEG)	SUPPORT COORDINATES X (M)	SUPPORT COORDINATES Y (M)	SUPPORT COORDINATES ANGLE (DEG)	VERTICAL REACTION (KN)	VERTICAL SEPARATION (M)
1	TENSIONR	1	2	77.789	2.560	.27	77.789	2.560	.00	-2.54	.000
2	LAYBARGE	3	4	71.488	2.509	.96	71.489	2.509	1.05	23.42	.000
3	LAYBARGE	5	6	65.375	2.335	2.23	65.375	2.335	2.22	9.99	.000
4	LAYBARGE	7	8	59.911	2.073	3.28	59.911	2.073	3.27	14.49	.000
5	LAYBARGE	9	10	53.320	1.624	4.50	53.321	1.624	4.53	13.00	.000
6	LAYBARGE	11	12	47.323	1.088	5.73	47.323	1.089	5.68	17.13	.000
7	LAYBARGE	13	14	38.214	.042	7.42	38.215	.042	7.43	21.41	.000
8	LAYBARGE	15	16	29.270	-1.261	9.11	29.271	-1.261	9.15	16.83	.000
9	LAYBARGE	17	18	23.132	-2.316	10.37	23.133	-2.316	10.34	13.73	.000
10	LAYBARGE	19	20	17.181	-3.464	11.44	17.182	-3.464	11.50	7.84	.000
11	LAYBARGE	21	22	10.627	-4.875	13.00	10.627	-4.874	12.78	21.93	.000
12	STINGER	24	25	-4.620	-8.757	15.56	-4.620	-8.756	15.79	21.59	.000
13	STINGER	26	27	-11.015	-10.642	17.12	-11.015	-10.641	17.06	6.14	.000
14	STINGER	28	29	-17.367	-12.668	18.31	-17.366	-12.668	18.33	11.10	.000
15	STINGER	30	31	-23.672	-14.836	19.64	-23.671	-14.835	19.61	12.55	.000
16	STINGER	32	33	-29.927	-17.143	20.77	-29.926	-17.142	20.88	.96	.000
17	STINGER	34	35	-36.129	-19.588	22.62	-36.128	-19.588	22.15	31.83	.000

STATIC PIPE COORDINATES, FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	.00	.000	.266	.000	36.44	.00	.00	.00	36.44	10.12
3	LAYBARGE	71.49	6.16	.00	.000	.958	6.300	36.42	.00	-116.82	-.02	135.71	37.70
5	LAYBARGE	65.37	5.98	.00	.000	2.232	12.417	36.40	.00	-84.11	.01	107.89	29.97
7	LAYBARGE	59.91	5.72	.00	.000	3.279	17.887	36.35	.00	-95.08	-.01	117.17	32.55
9	LAYBARGE	53.32	5.27	.00	.000	4.504	24.493	36.29	.00	-91.57	.00	114.12	31.70
11	LAYBARGE	47.32	4.74	.00	.000	5.732	30.515	36.20	.00	-104.32	.00	124.88	34.69
13	LAYBARGE	38.21	3.69	.00	.000	7.424	39.683	36.04	.00	-117.97	-.01	136.32	37.87
15	LAYBARGE	29.27	2.39	.00	.000	9.106	48.722	35.85	.00	-103.33	.02	123.68	34.36
17	LAYBARGE	23.13	1.33	.00	.000	10.368	54.950	35.70	.00	-93.43	-.09	115.11	31.98
19	LAYBARGE	17.18	.19	.00	.002	11.442	61.011	35.53	.00	-79.27	.37	102.91	28.58
21	LAYBARGE	10.63	-1.22	.00	-.014	13.014	67.716	35.33	-.11	-142.00	-4.03	156.13	43.37
24	STINGER	-4.61	-5.09	.00	.013	15.340	83.439	34.85	-.44	-117.52	-4.15	135.03	37.51
26	STINGER	-11.02	-6.94	.00	.000	16.560	90.106	34.63	-.60	-55.91	.65	82.46	22.90
28	STINGER	-17.40	-8.88	.00	-.015	17.479	96.773	34.38	-.77	-77.60	-4.37	100.83	28.01
30	STINGER	-23.74	-10.94	.00	.063	18.323	103.440	34.12	-.95	-45.77	12.41	74.91	20.81
32	STINGER	-30.05	-13.07	-.01	.094	19.101	110.108	33.85	-1.13	-68.81	-10.46	93.59	26.00
34	STINGER	-36.32	-15.36	.00	-.472	21.613	116.775	33.48	-1.33	-274.76	-62.94	273.75	76.04
36	SAGBEND	-47.31	-20.16	.19	-1.179	24.166	128.775	32.96	-1.75	8.15	-1.64	40.93	11.37
37	SAGBEND	-58.29	-24.99	.41	-1.063	23.179	140.775	32.35	-2.17	44.64	5.91	71.73	19.93
38	SAGBEND	-69.38	-29.58	.59	-.851	21.717	152.775	31.77	-2.56	50.25	6.62	76.16	21.16
39	SAGBEND	-80.59	-33.87	.74	-.637	20.166	164.775	31.23	-2.94	51.91	6.42	77.20	21.44
40	SAGBEND	-91.91	-37.85	.84	-.435	18.575	176.775	30.73	-3.28	53.02	6.10	77.78	21.61
41	SAGBEND	-103.33	-41.51	.91	-.245	16.952	188.775	30.26	-3.60	54.00	5.72	78.28	21.75
42	SAGBEND	-114.86	-44.84	.94	-.071	15.300	200.775	29.84	-3.89	54.92	5.25	78.75	21.87
43	SAGBEND	-126.48	-47.84	.94	.085	13.622	212.775	29.47	-4.15	55.75	4.70	79.18	21.99
44	SAGBEND	-138.18	-50.49	.91	.223	11.920	224.776	29.13	-4.38	56.51	4.14	79.57	22.10
45	SAGBEND	-149.96	-52.79	.85	.344	10.196	236.776	28.84	-4.58	57.18	3.72	79.93	22.20
46	SAGBEND	-161.80	-54.74	.77	.456	8.454	248.776	28.59	-4.74	57.75	3.57	80.25	22.29
47	SAGBEND	-173.70	-56.32	.66	.565	6.695	260.777	28.39	-4.88	58.21	3.56	80.52	22.37
48	SAGBEND	-185.63	-57.53	.53	.673	4.925	272.777	28.24	-4.99	58.49	3.51	80.65	22.40
49	SAGBEND	-197.60	-58.38	.38	.775	3.154	284.778	28.13	-5.06	58.12	3.09	80.26	22.29
50	SAGBEND	-209.59	-58.86	.21	.838	1.434	296.779	28.08	-5.10	53.78	.00	76.47	21.24
51	SEABED	-221.59	-59.01	.05	.612	.130	308.780	28.06	-5.11	22.17	-21.57	57.08	15.86
52	SEABED	-233.59	-59.01	.00	-.006	-.004	320.780	28.06	-5.11	-.57	-3.78	34.16	9.49
53	SEABED	-245.59	-59.01	.00	.000	.000	332.780	28.06	-5.11	.01	.23	31.13	8.65
54	SEABED	-257.59	-59.01	.00	.000	.000	344.780	28.06	-5.11	.00	-.01	30.94	8.60
55	SEABED	-269.59	-59.01	.00	.000	.000	356.780	28.06	-5.11	.00	.00	30.93	8.59
56	SEABED	-281.59	-59.01	.00	.000	.000	368.780	28.06	-5.11	.00	.00	30.93	8.59
57	SEABED	-293.59	-59.01	.00	.000	.000	380.780	28.06	-5.11	.00	.00	30.93	8.59

STATIC PIPE COORDINATES, FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	SUPPORT REACTION VERT (KN)	HORIZ (KN)	SUPT SEPARATIONS VERT (M)	HORIZ (M)	PIPE TENSION (KN)	BENDING MOMENTS VERT (KN-M)	HORIZ (KN-M)	TOTAL (KN-M)
1	TENSIONR	77.79	6.21	.00	-2.54	-.01	.00	.00	300.03	.00	.00	.00
3	LAYBARGE	71.49	6.16	.00	23.42	.00	.00	.00	299.85	-46.93	-.01	46.93
5	LAYBARGE	65.37	5.98	.00	9.99	.00	.00	.00	299.69	-33.79	.00	33.79
7	LAYBARGE	59.91	5.72	.00	14.49	.00	.00	.00	299.35	-38.20	.00	38.20
9	LAYBARGE	53.32	5.27	.00	13.00	.00	.00	.00	298.80	-36.79	.00	36.79
11	LAYBARGE	47.32	4.74	.00	17.13	.00	.00	.00	298.12	-41.91	.00	41.91
13	LAYBARGE	38.21	3.69	.00	21.41	.00	.00	.00	296.80	-47.39	.00	47.39
15	LAYBARGE	29.27	2.39	.00	16.82	.01	.00	.00	295.22	-41.51	.01	41.51
17	LAYBARGE	23.13	1.33	.00	13.79	-.04	.00	.00	293.93	-37.53	-.04	37.53
19	LAYBARGE	17.18	.19	.00	7.62	-.01	.00	.00	292.53	-31.84	.15	31.84
21	LAYBARGE	10.63	-1.22	.00	22.54	-1.36	.00	.00	291.37	-57.04	-1.62	57.07
24	STINGER	-4.61	-5.09	.00	19.24	-1.42	.00	.00	288.87	-47.21	-1.67	47.24
26	STINGER	-11.02	-6.94	.00	4.00	-.07	.00	.00	287.75	-22.46	.26	22.46
28	STINGER	-17.40	-8.88	.00	12.20	-1.97	.00	.00	286.44	-31.18	-1.75	31.23
30	STINGER	-23.74	-10.94	.00	4.53	2.26	.00	.00	285.12	-18.39	4.98	19.05
32	STINGER	-30.05	-13.07	-.01	.00	.00	.03	-.01	283.68	-27.65	-4.20	27.96
34	STINGER	-36.32	-15.36	.00	44.72	-9.92	.00	.00	281.52	-110.38	-25.29	113.24
36	SAGBEND	-47.31	-20.16	.19	.00	.00	.00	.00	279.04	3.27	-.66	3.34
37	SAGBEND	-58.29	-24.99	.41	.00	.00	.00	.00	275.83	17.93	2.37	18.09
38	SAGBEND	-69.38	-29.58	.59	.00	.00	.00	.00	272.80	20.19	2.66	20.36
39	SAGBEND	-80.59	-33.87	.74	.00	.00	.00	.00	269.97	20.85	2.58	21.01

40	SAGBEND	-91.91	-37.85	.84	.00	.00	.00	.00	267.34	21.30	2.45	21.44
41	SAGBEND	-103.33	-41.51	.91	.00	.00	.00	.00	264.92	21.69	2.30	21.82
42	SAGBEND	-114.86	-44.84	.94	.00	.00	.00	.00	262.72	22.06	2.11	22.16
43	SAGBEND	-126.48	-47.84	.94	.00	.00	.00	.00	260.74	22.40	1.89	22.48
44	SAGBEND	-138.18	-50.49	.91	.00	.00	.00	.00	258.99	22.70	1.66	22.76
45	SAGBEND	-149.96	-52.79	.85	.00	.00	.00	.00	257.47	22.97	1.50	23.02
46	SAGBEND	-161.80	-54.74	.77	.00	.00	.00	.00	256.19	23.20	1.43	23.24
47	SAGBEND	-173.70	-56.32	.66	.00	.00	.00	.00	255.14	23.38	1.43	23.43
48	SAGBEND	-185.63	-57.53	.53	.00	.00	.00	.00	254.34	23.50	1.41	23.54
49	SAGBEND	-197.60	-58.38	.38	.00	.00	.00	.00	253.79	23.35	1.24	23.38
50	SAGBEND	-209.59	-58.86	.21	.00	-.01	.00	.00	253.47	21.61	.00	21.61
51	SEABED	-221.59	-59.01	.05	5.17	-4.29	.00	.00	253.40	8.91	-8.67	12.43
52	SEABED	-233.59	-59.01	.00	8.63	-.25	.00	.00	253.39	-.23	-1.52	1.54
53	SEABED	-245.59	-59.01	.00	7.90	.14	.00	.00	253.39	.00	.09	.09
54	SEABED	-257.59	-59.01	.00	7.92	-.01	.00	.00	253.39	.00	-.01	.01
55	SEABED	-269.59	-59.01	.00	7.92	.00	.00	.00	253.39	.00	.00	.00
56	SEABED	-281.59	-59.01	.00	7.92	.00	.00	.00	253.39	.00	.00	.00
57	SEABED	-293.59	-59.01	.00	.00	.00	.00	.00	253.39	.00	.00	.00

S T A T I C S O L U T I O N S U M M A R Y

PIPE PROPERTIES (1)

PIPE SECTION LENGTH ..	12.00 M	ELASTIC MODULUS	207000. MPA
OUTSIDE DIAMETER	21.908 CM	CROSS SECTIONAL AREA .	278.27 CM2
WALL THICKNESS	1.270 CM	MOMENT OF INERTIA	4400.56 CM4
WEIGHT/LENGTH IN AIR .	1235.937 N/M	YIELD STRESS	360.00 MPA
SUBMERGED WGHT/LENG ..	659.899 N/M	STRESS INTENS FACTOR .	1.000
SPECIFIC GRAVITY	2.146	STEEL DENSITY	78500.0 N/M3
WRAP COAT THICKNESS ..	.040 CM	WRAP COAT DENSITY	12815.0 N/M3
CONCRETE THICKNESS ...	.250 CM	CONCRETE DENSITY	30440.0 N/M3

BARGE DATA

TOTAL PIPE TENSION ...	300.03 KN	RADIUS OF CURVATURE ..	300.00 M
NUMBER OF TENSIONERS .	1	BARGE TRIM ANGLE	.000 DEG
NO. OF PIPE SUPPORTS .	10	PIPE ANGLE AT STERN ..	13.014 DEG
BARGE HEADING	.000 DEG	OFFSET FROM R.O.W. ...	.00 M

STINGER DATA

NO. OF PIPE SUPPORTS .	6	STINGER STERN DEPTH ..	-15.36 M
NO. STINGER SECTIONS .	6	PIPE ANGLE AT STERN ..	21.613 DEG
RADIUS OF CURVATURE ..	400.00 M	STINGER LENGTH	43.22 M

SAGBEND DATA

WATER DEPTH	59.00 M	HORIZ PIPE TENSION ...	253.39 KN
TOUCHDOWN X-COORD. ...	-219.91 M	BOTTOM SLOPE ANGLE ...	.000 DEG

SOLUTION SUMMARY

NODE NO.	PIPE SECTION	X COORD	Y COORD	Z COORD	SUPPORT REACT VERT	SUPPORT REACT HORIZ	TOTAL MOMENT	TOTAL STRESS	PCT YLD
1	TENSIONR	77.8	6.2	.0	-2.5	.0	.0	36.4	10.
3	LAYBARGE	71.5	6.2	.0	23.4	.0	46.9	135.7	38.
5	LAYBARGE	65.4	6.0	.0	10.0	.0	33.8	107.9	30.
7	LAYBARGE	59.9	5.7	.0	14.5	.0	38.2	117.2	33.
9	LAYBARGE	53.3	5.3	.0	13.0	.0	36.8	114.1	32.
11	LAYBARGE	47.3	4.7	.0	17.1	.0	41.9	124.9	35.
13	LAYBARGE	38.2	3.7	.0	21.4	.0	47.4	136.3	38.
15	LAYBARGE	29.3	2.4	.0	16.8	.0	41.5	123.7	34.
17	LAYBARGE	23.1	1.3	.0	13.8	.0	37.5	115.1	32.
19	LAYBARGE	17.2	.2	.0	7.6	.0	31.8	102.9	29.
21	LAYBARGE	10.6	-1.2	.0	22.5	-1.4	57.1	156.1	43.
24	STINGER	-4.6	-5.1	.0	19.2	-1.4	47.2	135.0	38.
26	STINGER	-11.0	-6.9	.0	4.0	-.1	22.5	82.5	23.
28	STINGER	-17.4	-8.9	.0	12.2	-2.0	31.2	100.8	28.
30	STINGER	-23.7	-10.9	.0	4.5	2.3	19.1	74.9	21.
32	STINGER	-30.1	-13.1	.0	.0	.0	28.0	93.6	26.

S T A T I C S O L U T I O N S U M M A R Y

34	STINGER	-36.3	-15.4	.0	44.7	-9.9	113.2	273.7	76.
48	SAGBEND	-185.6	-57.5	.5	.0	.0	23.5	80.7	22.
51	SEABED	-221.6	-59.0	.0	5.2	-4.3	12.4	57.1	16.

OVERBEND PIPE SUPPORT GEOMETRY

STATION NO.	LOCATION	PIPE NODE	SUPT NODE	/----- PIPE COORDINATES ----/ X (M)	Y (M)	ANGLE (DEG)	/--- SUPPORT COORDINATES ---/ X (M)	Y (M)	ANGLE (DEG)	VERTICAL REACTION (KN)	VERTICAL SEPARATION (M)
1	TENSIONR	1	2	77.789	2.560	.27	77.789	2.560	.00	-2.54	.000
2	LAYBARGE	3	4	71.488	2.509	.96	71.489	2.509	1.05	23.42	.000
3	LAYBARGE	5	6	65.375	2.335	2.23	65.375	2.335	2.22	9.99	.000
4	LAYBARGE	7	8	59.911	2.073	3.28	59.911	2.073	3.27	14.49	.000
5	LAYBARGE	9	10	53.320	1.624	4.50	53.321	1.624	4.53	13.00	.000
6	LAYBARGE	11	12	47.323	1.088	5.73	47.323	1.089	5.68	17.13	.000
7	LAYBARGE	13	14	38.214	.042	7.42	38.215	.042	7.43	21.41	.000
8	LAYBARGE	15	16	29.270	-1.261	9.11	29.271	-1.261	9.15	16.82	.000
9	LAYBARGE	17	18	23.132	-2.316	10.37	23.133	-2.316	10.34	13.79	.000
10	LAYBARGE	19	20	17.181	-3.464	11.44	17.182	-3.464	11.50	7.62	.000
11	LAYBARGE	21	22	10.627	-4.875	13.01	10.627	-4.874	12.78	22.54	.000
12	STINGER	24	25	-4.612	-8.744	15.34	-4.611	-8.744	15.56	19.24	.000
13	STINGER	26	27	-11.020	-10.586	16.56	-11.019	-10.586	16.51	4.00	.000
14	STINGER	28	29	-17.396	-12.534	17.48	-17.395	-12.534	17.47	12.20	.000
15	STINGER	30	31	-23.739	-14.588	18.32	-23.738	-14.588	18.42	4.53	.000
16	STINGER	32	33	-30.054	-16.723	19.10	-30.045	-16.747	19.38	.00	.026
17	STINGER	34	35	-36.316	-19.012	21.61	-36.316	-19.012	20.33	44.72	.000

STATIC PIPE COORDINATES, FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	.00	.000	.270	.000	48.58	.00	.00	.00	48.58	13.49
3	LAYBARGE	71.49	6.16	.00	.000	.960	6.300	48.55	.00	-119.64	-.02	150.25	41.74
5	LAYBARGE	65.37	5.98	.00	.000	2.230	12.417	48.54	.00	-86.42	.01	122.00	33.89
7	LAYBARGE	59.91	5.72	.00	.000	3.282	17.887	48.49	.00	-97.67	-.01	131.52	36.53
9	LAYBARGE	53.32	5.27	.00	.000	4.501	24.493	48.43	.00	-94.09	.00	128.41	35.67
11	LAYBARGE	47.32	4.74	.00	.000	5.739	30.515	48.34	.00	-108.57	.00	140.63	39.06
13	LAYBARGE	38.21	3.69	.00	.000	7.423	39.683	48.18	.00	-124.12	-.01	153.69	42.69
15	LAYBARGE	29.27	2.39	.00	.000	9.100	48.722	47.99	.00	-107.62	.02	139.47	38.74
17	LAYBARGE	23.13	1.33	.00	.000	10.368	54.950	47.84	.00	-95.65	-.07	129.14	35.87
19	LAYBARGE	17.18	.19	.00	.001	11.443	61.011	47.67	.00	-81.86	.30	117.25	32.57
21	LAYBARGE	10.63	-1.22	.00	-.013	13.021	67.716	47.47	-.11	-147.80	-3.86	173.19	48.11
24	STINGER	-4.64	-5.13	.00	.009	15.976	83.473	46.96	-.44	-198.04	-4.59	215.56	59.88
26	STINGER	-11.01	-7.10	.00	.014	18.234	90.140	46.73	-.62	-123.93	3.42	152.42	42.34
28	STINGER	-17.30	-9.29	.00	-.071	20.024	96.807	46.46	-.81	-133.49	-16.52	161.19	44.78
30	STINGER	-23.53	-11.66	.03	-.599	21.628	103.475	46.16	-1.01	-97.95	-53.25	141.44	39.29
32	STINGER	-29.71	-14.17	.13	-1.077	22.246	110.142	45.86	-1.23	1.92	-9.48	54.70	15.20
34	STINGER	-35.89	-16.68	.25	-1.125	21.950	116.809	45.54	-1.45	27.54	1.62	69.73	19.37
36	SAGBEND	-47.05	-21.07	.46	-.994	20.936	128.810	44.99	-1.83	36.08	4.97	76.87	21.35
37	SAGBEND	-58.30	-25.25	.64	-.828	19.818	140.810	44.46	-2.19	37.37	5.14	77.64	21.57
38	SAGBEND	-69.63	-29.21	.78	-.665	18.676	152.811	43.96	-2.53	37.97	4.98	77.81	21.61
39	SAGBEND	-81.04	-32.93	.90	-.509	17.516	164.811	43.49	-2.85	38.49	4.76	77.92	21.64
40	SAGBEND	-92.51	-36.43	.99	-.361	16.342	176.812	43.05	-3.16	38.98	4.56	78.03	21.68
41	SAGBEND	-104.06	-39.69	1.04	-.220	15.153	188.812	42.64	-3.44	39.44	4.32	78.14	21.71
42	SAGBEND	-115.68	-42.70	1.08	-.089	13.951	200.813	42.26	-3.70	39.87	4.05	78.24	21.73
43	SAGBEND	-127.36	-45.47	1.08	.033	12.735	212.813	41.91	-3.94	40.28	3.73	78.34	21.76
44	SAGBEND	-139.09	-47.99	1.06	.143	11.508	224.813	41.59	-4.16	40.65	3.38	78.43	21.78
45	SAGBEND	-150.87	-50.26	1.02	.242	10.271	236.814	41.30	-4.36	40.99	3.02	78.51	21.81
46	SAGBEND	-162.70	-52.27	.96	.330	9.023	248.814	41.05	-4.53	41.29	2.70	78.59	21.83
47	SAGBEND	-174.57	-54.02	.89	.410	7.767	260.814	40.83	-4.68	41.56	2.56	78.67	21.85
48	SAGBEND	-186.48	-55.51	.79	.488	6.503	272.814	40.64	-4.81	41.79	2.56	78.75	21.87
49	SAGBEND	-198.42	-56.74	.68	.567	5.233	284.815	40.49	-4.92	41.98	2.56	78.81	21.89
50	SAGBEND	-210.38	-57.70	.56	.644	3.957	296.815	40.37	-5.00	42.12	2.56	78.85	21.90
51	SAGBEND	-222.36	-58.39	.41	.721	2.680	308.815	40.28	-5.06	42.10	2.45	78.78	21.88
52	SAGBEND	-234.35	-58.82	.26	.786	1.414	320.815	40.22	-5.10	40.90	1.38	77.68	21.58
53	SAGBEND	-246.35	-58.99	.09	.728	.290	332.815	40.20	-5.11	28.30	-9.32	68.23	18.95

54	SEABED	-258.34	-59.01	.00	.094	-.007	344.815	40.20	-5.12	.22	-15.14	55.81	15.50
55	SEABED	-270.34	-59.01	.00	-.003	.000	356.815	40.20	-5.11	-.05	.25	43.21	12.00
56	SEABED	-282.34	-59.01	.00	.000	.000	368.815	40.20	-5.11	.00	.00	42.99	11.94
57	SEABED	-294.34	-59.01	.00	.000	.000	380.815	40.20	-5.11	.00	.00	42.99	11.94
58	SEABED	-306.34	-59.01	.00	.000	.000	392.815	40.20	-5.11	.00	.00	42.99	11.94
59	SEABED	-318.34	-59.01	.00	.000	.000	404.815	40.20	-5.11	.00	.00	42.99	11.94
60	SEABED	-330.34	-59.01	.00	.000	.000	416.815	40.20	-5.11	.00	.00	42.99	11.94

STATIC PIPE COORDINATES, FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	SUPPORT REACTION VERT (KN)	SUPPORT REACTION HORIZ (KN)	SUPT SEPARATIONS VERT (M)	SUPT SEPARATIONS HORIZ (M)	PIPE TENSION (KN)	BENDING MOMENTS VERT (KN-M)	BENDING MOMENTS HORIZ (KN-M)	BENDING MOMENTS TOTAL (KN-M)
1	TENSIONR	77.79	6.21	.00	-2.40	-.01	.00	.00	399.99	.00	.00	.00
3	LAYBARGE	71.49	6.16	.00	25.69	.00	.00	.00	399.80	-48.06	-.01	48.06
5	LAYBARGE	65.37	5.98	.00	11.87	.00	.00	.00	399.65	-34.72	.01	34.72
7	LAYBARGE	59.91	5.72	.00	16.53	.00	.00	.00	399.30	-39.24	.00	39.24
9	LAYBARGE	53.32	5.27	.00	14.99	.00	.00	.00	398.76	-37.80	.00	37.80
11	LAYBARGE	47.32	4.74	.00	19.70	.00	.00	.00	398.07	-43.62	.00	43.62
13	LAYBARGE	38.21	3.69	.00	24.61	.00	.00	.00	396.74	-49.86	.00	49.86
15	LAYBARGE	29.27	2.39	.00	19.42	.01	.00	.00	395.17	-43.24	.01	43.24
17	LAYBARGE	23.13	1.33	.00	15.68	-.03	.00	.00	393.88	-38.42	-.03	38.42
19	LAYBARGE	17.18	.19	.00	9.58	-.03	.00	.00	392.49	-32.89	.12	32.89
21	LAYBARGE	10.63	-1.22	.00	25.24	-1.33	.00	.00	391.32	-59.38	-1.55	59.40
24	STINGER	-4.64	-5.13	.00	32.22	-1.63	.00	.00	388.60	-79.56	-1.84	79.58
26	STINGER	-11.01	-7.10	.00	12.06	1.01	.00	.00	387.51	-49.79	1.38	49.80
28	STINGER	-17.30	-9.29	.00	18.69	-1.42	.00	.00	386.04	-53.63	-6.64	54.04
30	STINGER	-23.53	-11.66	.03	16.03	-9.34	.02	.03	384.52	-39.35	-21.39	44.79
32	STINGER	-29.71	-14.17	.13	.00	.00	.12	.13	382.98	.77	-3.81	3.88
34	STINGER	-35.89	-16.68	.25	.00	.00	.43	.25	381.32	11.07	.65	11.08
36	SAGBEND	-47.05	-21.07	.46	.00	.00	.00	.00	378.41	14.49	2.00	14.63
37	SAGBEND	-58.30	-25.25	.64	.00	.00	.00	.00	375.65	15.01	2.06	15.15
38	SAGBEND	-69.63	-29.21	.78	.00	.00	.00	.00	373.04	15.25	2.00	15.38
39	SAGBEND	-81.04	-32.93	.90	.00	.00	.00	.00	370.58	15.46	1.91	15.58
40	SAGBEND	-92.51	-36.43	.99	.00	.00	.00	.00	368.28	15.66	1.83	15.76
41	SAGBEND	-104.06	-39.69	1.04	.00	.00	.00	.00	366.13	15.84	1.74	15.94
42	SAGBEND	-115.68	-42.70	1.08	.00	.00	.00	.00	364.14	16.02	1.63	16.10
43	SAGBEND	-127.36	-45.47	1.08	.00	.00	.00	.00	362.31	16.18	1.50	16.25
44	SAGBEND	-139.09	-47.99	1.06	.00	.00	.00	.00	360.65	16.33	1.36	16.39
45	SAGBEND	-150.87	-50.26	1.02	.00	.00	.00	.00	359.15	16.47	1.21	16.51
46	SAGBEND	-162.70	-52.27	.96	.00	.00	.00	.00	357.82	16.59	1.09	16.62
47	SAGBEND	-174.57	-54.02	.89	.00	.00	.00	.00	356.67	16.70	1.03	16.73
48	SAGBEND	-186.48	-55.51	.79	.00	.00	.00	.00	355.68	16.79	1.03	16.82
49	SAGBEND	-198.42	-56.74	.68	.00	.00	.00	.00	354.87	16.87	1.03	16.90
50	SAGBEND	-210.38	-57.70	.56	.00	.00	.00	.00	354.24	16.92	1.03	16.95
51	SAGBEND	-222.36	-58.39	.41	.00	.00	.00	.00	353.78	16.91	.99	16.94
52	SAGBEND	-234.35	-58.82	.26	.00	.00	.00	.00	353.50	16.43	.55	16.44
53	SAGBEND	-246.35	-58.99	.09	2.58	-2.42	.00	.00	353.39	11.37	-3.75	11.97
54	SEABED	-258.34	-59.01	.00	8.59	-3.45	.00	.00	353.39	.09	-6.08	6.08
55	SEABED	-270.34	-59.01	.00	7.94	.46	.00	.00	353.39	-.02	.10	.10
56	SEABED	-282.34	-59.01	.00	7.92	-.01	.00	.00	353.39	.00	.00	.00
57	SEABED	-294.34	-59.01	.00	7.92	.00	.00	.00	353.39	.00	.00	.00
58	SEABED	-306.34	-59.01	.00	7.92	.00	.00	.00	353.39	.00	.00	.00
59	SEABED	-318.34	-59.01	.00	7.92	.00	.00	.00	353.39	.00	.00	.00
60	SEABED	-330.34	-59.01	.00	.00	.00	.00	.00	353.39	.00	.00	.00

STATIC SOLUTION SUMMARY

PIPE PROPERTIES (1)

PIPE SECTION LENGTH ..	12.00 M	ELASTIC MODULUS	207000. MPA
OUTSIDE DIAMETER	21.908 CM	CROSS SECTIONAL AREA .	278.27 CM2
WALL THICKNESS	1.270 CM	MOMENT OF INERTIA	4400.56 CM4
WEIGHT/LENGTH IN AIR .	1235.937 N/M	YIELD STRESS	360.00 MPA
SUBMERGED WGHT/LENG ..	659.899 N/M	STRESS INTENS FACTOR .	1.000
SPECIFIC GRAVITY	2.146	STEEL DENSITY	78500.0 N/M3
WRAP COAT THICKNESS ..	.040 CM	WRAP COAT DENSITY	12815.0 N/M3
CONCRETE THICKNESS ...	.250 CM	CONCRETE DENSITY	30440.0 N/M3

BARGE DATA

TOTAL PIPE TENSION ...	399.99 KN	RADIUS OF CURVATURE ..	300.00 M
NUMBER OF TENSIONERS .	1	BARGE TRIM ANGLE	.000 DEG
NO. OF PIPE SUPPORTS .	10	PIPE ANGLE AT STERN ..	13.021 DEG
BARGE HEADING	.000 DEG	OFFSET FROM R.O.W. ...	.00 M

STINGER DATA

NO. OF PIPE SUPPORTS .	6	STINGER STERN DEPTH ..	-16.68 M
NO. STINGER SECTIONS .	6	PIPE ANGLE AT STERN ..	21.950 DEG
RADIUS OF CURVATURE ..	200.00 M	STINGER LENGTH	43.26 M

SAGBEND DATA

WATER DEPTH	59.00 M	HORIZ PIPE TENSION ...	353.39 KN
TOUCHDOWN X-COORD. ...	-247.62 M	BOTTOM SLOPE ANGLE ...	.000 DEG

SOLUTION SUMMARY

NODE NO.	PIPE SECTION	X COORD	Y COORD	Z COORD	SUPPORT REACT VERT	SUPPORT REACT HORIZ	TOTAL MOMENT	TOTAL STRESS	PCT YLD
1	TENSIONR	77.8	6.2	.0	-2.4	.0	.0	48.6	13.
3	LAYBARGE	71.5	6.2	.0	25.7	.0	48.1	150.2	42.
5	LAYBARGE	65.4	6.0	.0	11.9	.0	34.7	122.0	34.
7	LAYBARGE	59.9	5.7	.0	16.5	.0	39.2	131.5	37.
9	LAYBARGE	53.3	5.3	.0	15.0	.0	37.8	128.4	36.
11	LAYBARGE	47.3	4.7	.0	19.7	.0	43.6	140.6	39.
13	LAYBARGE	38.2	3.7	.0	24.6	.0	49.9	153.7	43.
15	LAYBARGE	29.3	2.4	.0	19.4	.0	43.2	139.5	39.
17	LAYBARGE	23.1	1.3	.0	15.7	.0	38.4	129.1	36.
19	LAYBARGE	17.2	.2	.0	9.6	.0	32.9	117.3	33.
21	LAYBARGE	10.6	-1.2	.0	25.2	-1.3	59.4	173.2	48.
24	STINGER	-4.6	-5.1	.0	32.2	-1.6	79.6	215.6	60.
26	STINGER	-11.0	-7.1	.0	12.1	1.0	49.8	152.4	42.
28	STINGER	-17.3	-9.3	.0	18.7	-1.4	54.0	161.2	45.
30	STINGER	-23.5	-11.7	.0	16.0	-9.3	44.8	141.4	39.
32	STINGER	-29.7	-14.2	.1	.0	.0	3.9	54.7	15.

S T A T I C S O L U T I O N S U M M A R Y

34	STINGER	-35.9	-16.7	.2	.0	.0	11.1	69.7	19.
50	SAGBEND	-210.4	-57.7	.6	.0	.0	17.0	78.9	22.
54	SEABED	-258.3	-59.0	.0	8.6	-3.5	6.1	55.8	16.

O V E R B E N D P I P E S U P P O R T G E O M E T R Y

STATION NO.	LOCATION	PIPE NODE	SUPT NODE	/----- PIPE COORDINATES ----/ X (M)	Y (M)	ANGLE (DEG)	/--- SUPPORT COORDINATES ---/ X (M)	Y (M)	ANGLE (DEG)	VERTICAL REACTION (KN)	VERTICAL SEPARATION (M)
1	TENSIONR	1	2	77.788	2.560	.27	77.789	2.560	.00	-2.40	.000
2	LAYBARGE	3	4	71.488	2.509	.96	71.489	2.509	1.05	25.69	.000
3	LAYBARGE	5	6	65.374	2.335	2.23	65.375	2.335	2.22	11.87	.000
4	LAYBARGE	7	8	59.910	2.073	3.28	59.911	2.073	3.27	16.53	.000
5	LAYBARGE	9	10	53.320	1.624	4.50	53.321	1.624	4.53	14.99	.000
6	LAYBARGE	11	12	47.322	1.088	5.74	47.323	1.089	5.68	19.70	.000
7	LAYBARGE	13	14	38.214	.042	7.42	38.215	.042	7.43	24.61	.000
8	LAYBARGE	15	16	29.270	-1.261	9.10	29.271	-1.261	9.15	19.42	.000
9	LAYBARGE	17	18	23.132	-2.316	10.37	23.133	-2.316	10.34	15.68	.000
10	LAYBARGE	19	20	17.181	-3.464	11.44	17.182	-3.464	11.50	9.58	.000
11	LAYBARGE	21	22	10.626	-4.875	13.02	10.627	-4.874	12.78	25.24	.000
12	STINGER	24	25	-4.637	-8.781	15.98	-4.636	-8.781	16.25	32.22	.000
13	STINGER	26	27	-11.005	-10.753	18.23	-11.004	-10.753	18.16	12.06	.000
14	STINGER	28	29	-17.305	-12.937	20.02	-17.304	-12.936	20.07	18.69	.000
15	STINGER	30	31	-23.534	-15.312	21.63	-23.527	-15.328	21.98	16.03	.018
16	STINGER	32	33	-29.712	-17.818	22.25	-29.667	-17.927	23.89	.00	.118
17	STINGER	34	35	-35.887	-20.330	21.95	-35.716	-20.728	25.80	.00	.434

STATIC PIPE COORDINATES, FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	.00	.000	.270	.000	48.58	.00	.00	.00	48.58	13.49
3	LAYBARGE	71.49	6.16	.00	.000	.960	6.300	48.55	.00	-119.64	-.02	150.25	41.74
5	LAYBARGE	65.37	5.98	.00	.000	2.230	12.417	48.53	.00	-86.42	.01	122.00	33.89
7	LAYBARGE	59.91	5.72	.00	.000	3.282	17.887	48.49	.00	-97.67	-.01	131.52	36.53
9	LAYBARGE	53.32	5.27	.00	.000	4.501	24.493	48.43	.00	-94.09	.00	128.41	35.67
11	LAYBARGE	47.32	4.74	.00	.000	5.739	30.515	48.34	.00	-108.57	.00	140.62	39.06
13	LAYBARGE	38.21	3.69	.00	.000	7.423	39.683	48.18	.00	-124.13	-.01	153.70	42.69
15	LAYBARGE	29.27	2.39	.00	.000	9.100	48.722	47.99	.00	-107.58	.02	139.43	38.73
17	LAYBARGE	23.13	1.33	.00	.000	10.369	54.950	47.83	.00	-95.85	-.08	129.31	35.92
19	LAYBARGE	17.18	.19	.00	.001	11.440	61.011	47.67	.00	-81.01	.33	116.53	32.37
21	LAYBARGE	10.63	-1.22	.00	-.013	13.036	67.716	47.47	-.11	-151.22	-3.97	176.10	48.92
24	STINGER	-4.62	-5.11	.00	.013	15.531	83.451	46.98	-.44	-150.89	-3.97	175.50	48.75
26	STINGER	-11.02	-6.99	.00	-.002	17.122	90.118	46.76	-.61	-79.44	.05	114.59	31.83
28	STINGER	-17.37	-9.02	.00	-.004	18.320	96.785	46.50	-.78	-96.69	-2.08	129.10	35.86
30	STINGER	-23.67	-11.19	.00	.019	19.609	103.452	46.22	-.97	-91.82	3.25	124.81	34.67
32	STINGER	-29.93	-13.49	.01	-.282	20.782	110.119	45.93	-1.17	-80.48	-44.02	124.50	34.58
34	STINGER	-36.14	-15.90	.07	-.823	21.486	116.786	45.64	-1.38	-27.37	-27.06	79.05	21.96
36	SAGBEND	-47.31	-20.28	.26	-1.031	21.080	128.786	45.08	-1.76	30.88	2.33	72.30	20.08
37	SAGBEND	-58.55	-24.50	.45	-.896	20.022	140.787	44.55	-2.12	36.79	4.91	77.19	21.44
38	SAGBEND	-69.86	-28.49	.62	-.734	18.887	152.787	44.05	-2.47	37.83	4.99	77.75	21.60
39	SAGBEND	-81.25	-32.26	.75	-.577	17.731	164.787	43.57	-2.80	38.39	4.80	77.90	21.64
40	SAGBEND	-92.72	-35.80	.85	-.428	16.560	176.787	43.13	-3.10	38.89	4.60	78.01	21.67
41	SAGBEND	-104.26	-39.10	.92	-.286	15.373	188.787	42.71	-3.39	39.36	4.37	78.12	21.70
42	SAGBEND	-115.86	-42.16	.96	-.152	14.173	200.788	42.32	-3.65	39.80	4.10	78.22	21.73
43	SAGBEND	-127.52	-44.98	.98	-.029	12.960	212.788	41.97	-3.90	40.21	3.79	78.32	21.75
44	SAGBEND	-139.25	-47.55	.97	.084	11.735	224.788	41.65	-4.12	40.59	3.45	78.41	21.78
45	SAGBEND	-151.02	-49.86	.95	.185	10.499	236.788	41.35	-4.32	40.93	3.09	78.49	21.80
46	SAGBEND	-162.84	-51.92	.90	.275	9.254	248.789	41.09	-4.50	41.24	2.74	78.57	21.83
47	SAGBEND	-174.71	-53.72	.83	.355	7.999	260.789	40.87	-4.66	41.52	2.57	78.65	21.85
48	SAGBEND	-186.61	-55.26	.75	.434	6.736	272.789	40.67	-4.79	41.75	2.56	78.73	21.87
49	SAGBEND	-198.54	-56.53	.65	.512	5.467	284.789	40.51	-4.90	41.95	2.56	78.80	21.89
50	SAGBEND	-210.50	-57.54	.54	.590	4.192	296.790	40.38	-4.99	42.10	2.56	78.85	21.90
51	SAGBEND	-222.47	-58.29	.41	.667	2.915	308.790	40.29	-5.05	42.13	2.48	78.81	21.89
52	SAGBEND	-234.46	-58.76	.26	.735	1.644	320.790	40.23	-5.09	41.38	1.70	78.10	21.70
53	SAGBEND	-246.46	-58.98	.10	.714	.465	332.790	40.20	-5.11	33.16	-6.16	71.57	19.88
54	SEABED	-258.46	-59.01	.00	.144	-.008	344.790	40.20	-5.12	1.34	-19.32	59.39	16.50
55	SEABED	-270.46	-59.01	.00	-.004	.000	356.790	40.20	-5.11	-.11	.20	43.18	12.00
56	SEABED	-282.46	-59.01	.00	.000	.000	368.790	40.20	-5.11	.01	.01	43.00	11.94
57	SEABED	-294.46	-59.01	.00	.000	.000	380.790	40.20	-5.11	.00	.00	42.99	11.94
58	SEABED	-306.46	-59.01	.00	.000	.000	392.790	40.20	-5.11	.00	.00	42.99	11.94
59	SEABED	-318.46	-59.01	.00	.000	.000	404.790	40.20	-5.11	.00	.00	42.99	11.94
60	SEABED	-330.46	-59.01	.00	.000	.000	416.790	40.20	-5.11	.00	.00	42.99	11.94

STATIC PIPE COORDINATES, FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	SUPPORT REACTION VERT (KN)	SUPPORT REACTION HORIZ (KN)	SUPT SEPARATIONS VERT (M)	SUPT SEPARATIONS HORIZ (M)	PIPE TENSION (KN)	BENDING MOMENTS VERT (KN-M)	BENDING MOMENTS HORIZ (KN-M)	BENDING MOMENTS TOTAL (KN-M)
1	TENSIONR	77.79	6.21	.00	-2.40	-.01	.00	.00	399.99	.00	.00	.00
3	LAYBARGE	71.49	6.16	.00	25.69	.00	.00	.00	399.80	-48.06	-.01	48.06
5	LAYBARGE	65.37	5.98	.00	11.87	.00	.00	.00	399.65	-34.72	.01	34.72
7	LAYBARGE	59.91	5.72	.00	16.53	.00	.00	.00	399.30	-39.24	.00	39.24
9	LAYBARGE	53.32	5.27	.00	14.99	.00	.00	.00	398.75	-37.80	.00	37.80
11	LAYBARGE	47.32	4.74	.00	19.70	.00	.00	.00	398.07	-43.61	.00	43.61
13	LAYBARGE	38.21	3.69	.00	24.61	.00	.00	.00	396.74	-49.87	.00	49.87
15	LAYBARGE	29.27	2.39	.00	19.40	.01	.00	.00	395.16	-43.22	.01	43.22
17	LAYBARGE	23.13	1.33	.00	15.77	-.03	.00	.00	393.88	-38.51	-.03	38.51
19	LAYBARGE	17.18	.19	.00	9.25	-.02	.00	.00	392.49	-32.54	.13	32.54
21	LAYBARGE	10.63	-1.22	.00	26.29	-1.36	.00	.00	391.31	-60.75	-1.59	60.77
24	STINGER	-4.62	-5.11	.00	25.96	-1.37	.00	.00	388.74	-60.62	-1.59	60.64
26	STINGER	-11.02	-6.99	.00	7.48	-.29	.00	.00	387.65	-31.91	.02	31.91
28	STINGER	-17.37	-9.02	.00	14.09	-1.11	.00	.00	386.28	-38.85	-.83	38.85
30	STINGER	-23.67	-11.19	.00	12.85	2.12	.00	.00	384.86	-36.89	1.31	36.91
32	STINGER	-29.93	-13.49	.01	13.30	-7.71	.00	.01	383.34	-32.33	-17.69	36.85
34	STINGER	-36.14	-15.90	.07	5.90	-3.45	.04	.07	381.81	-11.00	-10.87	15.46

36	SAGBEND	-47.31	-20.28	.26	.00	.00	.00	.00	378.92	12.40	.93	12.44
37	SAGBEND	-58.55	-24.50	.45	.00	.00	.00	.00	376.14	14.78	1.97	14.91
38	SAGBEND	-69.86	-28.49	.62	.00	.00	.00	.00	373.50	15.20	2.01	15.33
39	SAGBEND	-81.25	-32.26	.75	.00	.00	.00	.00	371.01	15.42	1.93	15.54
40	SAGBEND	-92.72	-35.80	.85	.00	.00	.00	.00	368.68	15.62	1.85	15.73
41	SAGBEND	-104.26	-39.10	.92	.00	.00	.00	.00	366.50	15.81	1.76	15.91
42	SAGBEND	-115.86	-42.16	.96	.00	.00	.00	.00	364.48	15.99	1.65	16.07
43	SAGBEND	-127.52	-44.98	.98	.00	.00	.00	.00	362.62	16.15	1.52	16.22
44	SAGBEND	-139.25	-47.55	.97	.00	.00	.00	.00	360.93	16.30	1.39	16.36
45	SAGBEND	-151.02	-49.86	.95	.00	.00	.00	.00	359.40	16.44	1.24	16.49
46	SAGBEND	-162.84	-51.92	.90	.00	.00	.00	.00	358.04	16.57	1.10	16.60
47	SAGBEND	-174.71	-53.72	.83	.00	.00	.00	.00	356.85	16.68	1.03	16.71
48	SAGBEND	-186.61	-55.26	.75	.00	.00	.00	.00	355.84	16.77	1.03	16.81
49	SAGBEND	-198.54	-56.53	.65	.00	.00	.00	.00	354.99	16.85	1.03	16.88
50	SAGBEND	-210.50	-57.54	.54	.00	.00	.00	.00	354.33	16.91	1.03	16.94
51	SAGBEND	-222.47	-58.29	.41	.00	.00	.00	.00	353.84	16.93	1.00	16.96
52	SAGBEND	-234.46	-58.76	.26	.00	.00	.00	.00	353.52	16.62	.68	16.64
53	SAGBEND	-246.46	-58.98	.10	1.33	-1.43	.00	.00	353.38	13.32	-2.48	13.55
54	SEABED	-258.46	-59.01	.00	8.33	-4.21	.00	.00	353.39	.54	-7.76	7.78
55	SEABED	-270.46	-59.01	.00	7.98	.56	.00	.00	353.39	-.04	.08	.09
56	SEABED	-282.46	-59.01	.00	7.91	.00	.00	.00	353.39	.00	.00	.00
57	SEABED	-294.46	-59.01	.00	7.92	.00	.00	.00	353.39	.00	.00	.00
58	SEABED	-306.46	-59.01	.00	7.92	.00	.00	.00	353.39	.00	.00	.00
59	SEABED	-318.46	-59.01	.00	7.92	.00	.00	.00	353.39	.00	.00	.00
60	SEABED	-330.46	-59.01	.00	.00	.00	.00	.00	353.39	.00	.00	.00

S T A T I C S O L U T I O N S U M M A R Y

PIPE PROPERTIES (1)

PIPE SECTION LENGTH ..	12.00 M	ELASTIC MODULUS	207000. MPA
OUTSIDE DIAMETER	21.908 CM	CROSS SECTIONAL AREA .	278.27 CM2
WALL THICKNESS	1.270 CM	MOMENT OF INERTIA	4400.56 CM4
WEIGHT/LENGTH IN AIR .	1235.937 N/M	YIELD STRESS	360.00 MPA
SUBMERGED WGHT/LENG ..	659.899 N/M	STRESS INTENS FACTOR .	1.000
SPECIFIC GRAVITY	2.146	STEEL DENSITY	78500.0 N/M3
WRAP COAT THICKNESS ..	.040 CM	WRAP COAT DENSITY	12815.0 N/M3
CONCRETE THICKNESS ...	.250 CM	CONCRETE DENSITY	30440.0 N/M3

BARGE DATA

TOTAL PIPE TENSION ...	399.99 KN	RADIUS OF CURVATURE ..	300.00 M
NUMBER OF TENSIONERS .	1	BARGE TRIM ANGLE	.000 DEG
NO. OF PIPE SUPPORTS .	10	PIPE ANGLE AT STERN ..	13.036 DEG
BARGE HEADING	.000 DEG	OFFSET FROM R.O.W. ...	.00 M

STINGER DATA

NO. OF PIPE SUPPORTS .	6	STINGER STERN DEPTH ..	-15.90 M
NO. STINGER SECTIONS .	6	PIPE ANGLE AT STERN ..	21.486 DEG
RADIUS OF CURVATURE ..	300.00 M	STINGER LENGTH	43.24 M

SAGBEND DATA

WATER DEPTH	59.00 M	HORIZ PIPE TENSION ...	353.39 KN
TOUCHDOWN X-COORD. ...	-249.88 M	BOTTOM SLOPE ANGLE ...	.000 DEG

SOLUTION SUMMARY

NODE NO.	PIPE SECTION	X COORD	Y COORD	Z COORD	SUPPORT REACT VERT	HORIZ	TOTAL MOMENT	TOTAL STRESS	PCT YLD
1	TENSIONR	77.8	6.2	.0	-2.4	.0	.0	48.6	13.
3	LAYBARGE	71.5	6.2	.0	25.7	.0	48.1	150.2	42.
5	LAYBARGE	65.4	6.0	.0	11.9	.0	34.7	122.0	34.
7	LAYBARGE	59.9	5.7	.0	16.5	.0	39.2	131.5	37.
9	LAYBARGE	53.3	5.3	.0	15.0	.0	37.8	128.4	36.
11	LAYBARGE	47.3	4.7	.0	19.7	.0	43.6	140.6	39.
13	LAYBARGE	38.2	3.7	.0	24.6	.0	49.9	153.7	43.
15	LAYBARGE	29.3	2.4	.0	19.4	.0	43.2	139.4	39.
17	LAYBARGE	23.1	1.3	.0	15.8	.0	38.5	129.3	36.
19	LAYBARGE	17.2	.2	.0	9.3	.0	32.5	116.5	32.
21	LAYBARGE	10.6	-1.2	.0	26.3	-1.4	60.8	176.1	49.
24	STINGER	-4.6	-5.1	.0	26.0	-1.4	60.6	175.5	49.
26	STINGER	-11.0	-7.0	.0	7.5	-.3	31.9	114.6	32.
28	STINGER	-17.4	-9.0	.0	14.1	-1.1	38.9	129.1	36.
30	STINGER	-23.7	-11.2	.0	12.9	2.1	36.9	124.8	35.
32	STINGER	-29.9	-13.5	.0	13.3	-7.7	36.9	124.5	35.

S T A T I C S O L U T I O N S U M M A R Y

34	STINGER	-36.1	-15.9	.1	5.9	-3.4	15.5	79.1	22.
50	SAGBEND	-210.5	-57.5	.5	.0	.0	16.9	78.8	22.
54	SEABED	-258.5	-59.0	.0	8.3	-4.2	7.8	59.4	16.

O V E R B E N D P I P E S U P P O R T G E O M E T R Y

STATION NO.	LOCATION	PIPE NODE	SUPT NODE	/----- PIPE COORDINATES ----/ X (M)	Y (M)	ANGLE (DEG)	/--- SUPPORT COORDINATES ---/ X (M)	Y (M)	ANGLE (DEG)	VERTICAL REACTION (KN)	VERTICAL SEPARATION (M)
1	TENSIONR	1	2	77.788	2.560	.27	77.789	2.560	.00	-2.40	.000
2	LAYBARGE	3	4	71.488	2.509	.96	71.489	2.509	1.05	25.69	.000
3	LAYBARGE	5	6	65.374	2.335	2.23	65.375	2.335	2.22	11.87	.000
4	LAYBARGE	7	8	59.910	2.073	3.28	59.911	2.073	3.27	16.53	.000
5	LAYBARGE	9	10	53.320	1.624	4.50	53.321	1.624	4.53	14.99	.000
6	LAYBARGE	11	12	47.322	1.088	5.74	47.323	1.089	5.68	19.70	.000
7	LAYBARGE	13	14	38.214	.042	7.42	38.215	.042	7.43	24.61	.000
8	LAYBARGE	15	16	29.270	-1.261	9.10	29.271	-1.261	9.15	19.40	.000
9	LAYBARGE	17	18	23.132	-2.316	10.37	23.133	-2.316	10.34	15.77	.000
10	LAYBARGE	19	20	17.181	-3.464	11.44	17.182	-3.464	11.50	9.25	.000
11	LAYBARGE	21	22	10.626	-4.875	13.04	10.627	-4.874	12.78	26.29	.000
12	STINGER	24	25	-4.621	-8.757	15.53	-4.620	-8.756	15.79	25.96	.000
13	STINGER	26	27	-11.016	-10.642	17.12	-11.015	-10.641	17.06	7.48	.000
14	STINGER	28	29	-17.367	-12.668	18.32	-17.366	-12.668	18.33	14.09	.000
15	STINGER	30	31	-23.672	-14.836	19.61	-23.671	-14.835	19.61	12.85	.000
16	STINGER	32	33	-29.928	-17.139	20.78	-29.926	-17.142	20.88	13.30	.004
17	STINGER	34	35	-36.144	-19.551	21.49	-36.128	-19.588	22.15	5.90	.040

S T A T I C P I P E C O O R D I N A T E S, F O R C E S A N D S T R E S S E S

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	.00	.000	.270	.000	48.58	.00	.00	.00	48.58	13.49
3	LAYBARGE	71.49	6.16	.00	.000	.960	6.300	48.56	.00	-119.64	-.02	150.25	41.74
5	LAYBARGE	65.37	5.98	.00	.000	2.230	12.417	48.54	.00	-86.42	.01	122.00	33.89
7	LAYBARGE	59.91	5.72	.00	.000	3.282	17.887	48.50	.00	-97.67	-.01	131.52	36.53
9	LAYBARGE	53.32	5.27	.00	.000	4.501	24.493	48.43	.00	-94.09	.00	128.41	35.67
11	LAYBARGE	47.32	4.74	.00	.000	5.739	30.515	48.35	.00	-108.57	.00	140.63	39.06
13	LAYBARGE	38.21	3.69	.00	.000	7.423	39.683	48.18	.00	-124.14	-.01	153.70	42.70
15	LAYBARGE	29.27	2.39	.00	.000	9.100	48.722	47.99	.00	-107.56	.02	139.42	38.73
17	LAYBARGE	23.13	1.33	.00	.000	10.369	54.950	47.84	.00	-95.96	-.08	129.40	35.95
19	LAYBARGE	17.18	.19	.00	.001	11.438	61.011	47.67	.00	-80.57	.33	116.15	32.26
21	LAYBARGE	10.63	-1.22	.00	-.013	13.044	67.716	47.47	-.11	-152.99	-3.98	177.61	49.34
24	STINGER	-4.61	-5.09	.00	.014	15.309	83.439	46.99	-.44	-127.20	-3.88	155.38	43.16
26	STINGER	-11.02	-6.94	.00	-.004	16.572	90.106	46.77	-.60	-58.21	-.39	96.55	26.82
28	STINGER	-17.40	-8.88	.00	.005	17.449	96.773	46.52	-.77	-73.93	-.23	109.75	30.49
30	STINGER	-23.74	-10.94	.00	-.017	18.438	103.440	46.26	-.95	-73.47	-4.43	109.30	30.36
32	STINGER	-30.05	-13.10	.00	.070	19.322	110.108	45.99	-1.14	-59.37	13.97	98.41	27.34
34	STINGER	-36.32	-15.36	.00	-.333	20.535	116.775	45.69	-1.33	-118.10	-68.26	162.30	45.08
36	SAGBEND	-47.51	-19.69	.17	-1.026	21.131	128.775	45.16	-1.71	22.39	-1.50	65.10	18.08
37	SAGBEND	-58.73	-23.93	.36	-.936	20.168	140.775	44.63	-2.07	35.93	4.57	76.47	21.24
38	SAGBEND	-70.03	-27.96	.53	-.778	19.044	152.775	44.12	-2.42	37.68	4.98	77.66	21.57
39	SAGBEND	-81.42	-31.76	.67	-.620	17.891	164.775	43.64	-2.75	38.31	4.83	77.87	21.63
40	SAGBEND	-92.87	-35.33	.78	-.469	16.722	176.775	43.19	-3.06	38.82	4.62	77.99	21.66
41	SAGBEND	-104.40	-38.66	.86	-.326	15.538	188.775	42.77	-3.35	39.29	4.40	78.10	21.70
42	SAGBEND	-115.99	-41.76	.91	-.192	14.340	200.775	42.38	-3.62	39.74	4.15	78.21	21.72
43	SAGBEND	-127.65	-44.61	.94	-.067	13.128	212.776	42.02	-3.87	40.15	3.84	78.31	21.75
44	SAGBEND	-139.36	-47.21	.94	.048	11.905	224.776	41.69	-4.09	40.53	3.50	78.40	21.78
45	SAGBEND	-151.13	-49.56	.92	.151	10.671	236.776	41.39	-4.30	40.88	3.14	78.48	21.80

46	SAGBEND	-162.95	-51.65	.88	.242	9.426	248.776	41.13	-4.48	41.20	2.78	78.56	21.82
47	SAGBEND	-174.81	-53.49	.82	.323	8.172	260.776	40.90	-4.64	41.48	2.59	78.64	21.85
48	SAGBEND	-186.70	-55.06	.74	.402	6.911	272.777	40.70	-4.77	41.72	2.56	78.72	21.87
49	SAGBEND	-198.63	-56.37	.65	.480	5.642	284.777	40.53	-4.89	41.93	2.56	78.79	21.89
50	SAGBEND	-210.58	-57.42	.54	.558	4.369	296.777	40.40	-4.98	42.08	2.56	78.84	21.90
51	SAGBEND	-222.56	-58.20	.42	.636	3.091	308.777	40.30	-5.04	42.14	2.51	78.83	21.90
52	SAGBEND	-234.55	-58.71	.28	.707	1.818	320.778	40.24	-5.09	41.62	1.95	78.32	21.76
53	SAGBEND	-246.54	-58.96	.13	.714	.611	332.778	40.21	-5.11	35.64	-3.64	73.34	20.37
54	SEABED	-258.54	-59.01	.01	.248	-.003	344.778	40.20	-5.12	3.12	-22.11	61.90	17.19
55	SEABED	-270.54	-59.01	.00	-.006	.000	356.778	40.20	-5.11	-.17	-.18	43.20	12.00
56	SEABED	-282.54	-59.01	.00	.000	.000	368.778	40.20	-5.11	.01	.04	43.02	11.95
57	SEABED	-294.54	-59.01	.00	.000	.000	380.778	40.20	-5.11	.00	.00	42.99	11.94
58	SEABED	-306.54	-59.01	.00	.000	.000	392.778	40.20	-5.11	.00	.00	42.99	11.94
59	SEABED	-318.54	-59.01	.00	.000	.000	404.778	40.20	-5.11	.00	.00	42.99	11.94
60	SEABED	-330.54	-59.01	.00	.000	.000	416.778	40.20	-5.11	.00	.00	42.99	11.94

S T A T I C P I P E C O O R D I N A T E S, F O R C E S A N D S T R E S S E S

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	SUPPORT REACTION VERT (KN)	SUPPORT REACTION HORIZ (KN)	SUPT SEPARATIONS VERT (M)	SUPT SEPARATIONS HORIZ (M)	PIPE TENSION (KN)	BENDING MOMENTS VERT (KN-M)	BENDING MOMENTS HORIZ (KN-M)	BENDING MOMENTS TOTAL (KN-M)
1	TENSIONR	77.79	6.21	.00	-2.40	-.01	.00	.00	400.01	.00	.00	.00
3	LAYBARGE	71.49	6.16	.00	25.69	.00	.00	.00	399.82	-48.06	-.01	48.06
5	LAYBARGE	65.37	5.98	.00	11.87	.00	.00	.00	399.66	-34.72	.01	34.72
7	LAYBARGE	59.91	5.72	.00	16.53	.00	.00	.00	399.32	-39.24	.00	39.24
9	LAYBARGE	53.32	5.27	.00	14.99	.00	.00	.00	398.77	-37.80	.00	37.80
11	LAYBARGE	47.32	4.74	.00	19.70	.00	.00	.00	398.08	-43.61	.00	43.61
13	LAYBARGE	38.21	3.69	.00	24.62	.00	.00	.00	396.76	-49.87	.00	49.87
15	LAYBARGE	29.27	2.39	.00	19.39	.01	.00	.00	395.18	-43.21	.01	43.21
17	LAYBARGE	23.13	1.33	.00	15.81	-.03	.00	.00	393.90	-38.55	-.03	38.55
19	LAYBARGE	17.18	.19	.00	9.08	-.01	.00	.00	392.50	-32.37	.13	32.37
21	LAYBARGE	10.63	-1.22	.00	26.83	-1.36	.00	.00	391.32	-61.46	-1.60	61.48
24	STINGER	-4.61	-5.09	.00	22.77	-1.33	.00	.00	388.82	-51.10	-1.56	51.12
26	STINGER	-11.02	-6.94	.00	5.58	-.46	.00	.00	387.72	-23.39	-.16	23.39
28	STINGER	-17.40	-8.88	.00	11.61	-.39	.00	.00	386.42	-29.70	-.09	29.70
30	STINGER	-23.74	-10.94	.00	11.41	-2.01	.00	.00	385.06	-29.52	-1.78	29.57
32	STINGER	-30.05	-13.10	.00	6.09	5.31	.00	.00	383.65	-23.85	5.61	24.50
34	STINGER	-36.32	-15.36	.00	22.74	-13.19	.00	.00	382.03	-47.45	-27.42	54.80
36	SAGBEND	-47.51	-19.69	.17	.00	.00	.00	.00	379.32	8.99	-.60	9.01
37	SAGBEND	-58.73	-23.93	.36	.00	.00	.00	.00	376.52	14.43	1.84	14.55
38	SAGBEND	-70.03	-27.96	.53	.00	.00	.00	.00	373.86	15.14	2.00	15.27
39	SAGBEND	-81.42	-31.76	.67	.00	.00	.00	.00	371.35	15.39	1.94	15.51
40	SAGBEND	-92.87	-35.33	.78	.00	.00	.00	.00	368.99	15.60	1.86	15.71
41	SAGBEND	-104.40	-38.66	.86	.00	.00	.00	.00	366.79	15.78	1.77	15.88
42	SAGBEND	-115.99	-41.76	.91	.00	.00	.00	.00	364.75	15.96	1.67	16.05
43	SAGBEND	-127.65	-44.61	.94	.00	.00	.00	.00	362.87	16.13	1.54	16.20
44	SAGBEND	-139.36	-47.21	.94	.00	.00	.00	.00	361.16	16.28	1.41	16.34
45	SAGBEND	-151.13	-49.56	.92	.00	.00	.00	.00	359.60	16.42	1.26	16.47
46	SAGBEND	-162.95	-51.65	.88	.00	.00	.00	.00	358.22	16.55	1.12	16.59
47	SAGBEND	-174.81	-53.49	.82	.00	.00	.00	.00	357.01	16.66	1.04	16.70
48	SAGBEND	-186.70	-55.06	.74	.00	.00	.00	.00	355.97	16.76	1.03	16.79
49	SAGBEND	-198.63	-56.37	.65	.00	.00	.00	.00	355.11	16.84	1.03	16.87
50	SAGBEND	-210.58	-57.42	.54	.00	.00	.00	.00	354.41	16.91	1.03	16.94
51	SAGBEND	-222.56	-58.20	.42	.00	.00	.00	.00	353.90	16.93	1.01	16.96
52	SAGBEND	-234.55	-58.71	.28	.00	.00	.00	.00	353.56	16.72	.78	16.74
53	SAGBEND	-246.54	-58.96	.13	.67	-.63	.00	.00	353.40	14.32	-1.46	14.39
54	SEABED	-258.54	-59.01	.01	7.84	-4.81	.00	.00	353.39	1.25	-8.88	8.97
55	SEABED	-270.54	-59.01	.00	8.05	.53	.00	.00	353.39	-.07	-.07	.10
56	SEABED	-282.54	-59.01	.00	7.91	.01	.00	.00	353.39	.00	.02	.02
57	SEABED	-294.54	-59.01	.00	7.92	.00	.00	.00	353.39	.00	.00	.00
58	SEABED	-306.54	-59.01	.00	7.92	.00	.00	.00	353.39	.00	.00	.00
59	SEABED	-318.54	-59.01	.00	7.92	.00	.00	.00	353.39	.00	.00	.00
60	SEABED	-330.54	-59.01	.00	.00	.00	.00	.00	353.39	.00	.00	.00

S T A T I C S O L U T I O N S U M M A R Y

PIPE PROPERTIES (1)

PIPE SECTION LENGTH ..	12.00 M	ELASTIC MODULUS	207000. MPA
OUTSIDE DIAMETER	21.908 CM	CROSS SECTIONAL AREA .	278.27 CM2
WALL THICKNESS	1.270 CM	MOMENT OF INERTIA	4400.56 CM4
WEIGHT/LENGTH IN AIR .	1235.937 N/M	YIELD STRESS	360.00 MPA
SUBMERGED WGHT/LENG ..	659.899 N/M	STRESS INTENS FACTOR .	1.000
SPECIFIC GRAVITY	2.146	STEEL DENSITY	78500.0 N/M3
WRAP COAT THICKNESS ..	.040 CM	WRAP COAT DENSITY	12815.0 N/M3
CONCRETE THICKNESS ...	.250 CM	CONCRETE DENSITY	30440.0 N/M3

BARGE DATA

TOTAL PIPE TENSION ...	400.01 KN	RADIUS OF CURVATURE ..	300.00 M
NUMBER OF TENSIONERS .	1	BARGE TRIM ANGLE	.000 DEG
NO. OF PIPE SUPPORTS .	10	PIPE ANGLE AT STERN ..	13.044 DEG
BARGE HEADING	.000 DEG	OFFSET FROM R.O.W. ...	.00 M

STINGER DATA

NO. OF PIPE SUPPORTS .	6	STINGER STERN DEPTH ..	-15.36 M
NO. STINGER SECTIONS .	6	PIPE ANGLE AT STERN ..	20.535 DEG
RADIUS OF CURVATURE ..	400.00 M	STINGER LENGTH	43.22 M

SAGBEND DATA

WATER DEPTH	59.00 M	HORIZ PIPE TENSION ...	353.39 KN
TOUCHDOWN X-COORD. ...	-251.61 M	BOTTOM SLOPE ANGLE ...	.000 DEG

SOLUTION SUMMARY

NODE NO.	PIPE SECTION	X COORD	Y COORD	Z COORD	SUPPORT REACT VERT	SUPPORT REACT HORIZ	TOTAL MOMENT	TOTAL STRESS	PCT YLD
1	TENSIONR	77.8	6.2	.0	-2.4	.0	.0	48.6	13.
3	LAYBARGE	71.5	6.2	.0	25.7	.0	48.1	150.2	42.
5	LAYBARGE	65.4	6.0	.0	11.9	.0	34.7	122.0	34.
7	LAYBARGE	59.9	5.7	.0	16.5	.0	39.2	131.5	37.
9	LAYBARGE	53.3	5.3	.0	15.0	.0	37.8	128.4	36.
11	LAYBARGE	47.3	4.7	.0	19.7	.0	43.6	140.6	39.
13	LAYBARGE	38.2	3.7	.0	24.6	.0	49.9	153.7	43.
15	LAYBARGE	29.3	2.4	.0	19.4	.0	43.2	139.4	39.
17	LAYBARGE	23.1	1.3	.0	15.8	.0	38.5	129.4	36.
19	LAYBARGE	17.2	.2	.0	9.1	.0	32.4	116.2	32.
21	LAYBARGE	10.6	-1.2	.0	26.8	-1.4	61.5	177.6	49.
24	STINGER	-4.6	-5.1	.0	22.8	-1.3	51.1	155.4	43.
26	STINGER	-11.0	-6.9	.0	5.6	-.5	23.4	96.5	27.
28	STINGER	-17.4	-8.9	.0	11.6	-.4	29.7	109.7	30.
30	STINGER	-23.7	-10.9	.0	11.4	-2.0	29.6	109.3	30.
32	STINGER	-30.0	-13.1	.0	6.1	5.3	24.5	98.4	27.

S T A T I C S O L U T I O N S U M M A R Y

34	STINGER	-36.3	-15.4	.0	22.7	-13.2	54.8	162.3	45.
50	SAGBEND	-210.6	-57.4	.5	.0	.0	16.9	78.8	22.
54	SEABED	-258.5	-59.0	.0	7.8	-4.8	9.0	61.9	17.

O V E R B E N D P I P E S U P P O R T G E O M E T R Y

STATION NO.	LOCATION	PIPE NODE	SUPT NODE	PIPE COORDINATES X (M)	PIPE COORDINATES Y (M)	PIPE COORDINATES ANGLE (DEG)	SUPPORT COORDINATES X (M)	SUPPORT COORDINATES Y (M)	SUPPORT COORDINATES ANGLE (DEG)	VERTICAL REACTION (KN)	VERTICAL SEPARATION (M)
1	TENSIONR	1	2	77.788	2.560	.27	77.789	2.560	.00	-2.40	.000
2	LAYBARGE	3	4	71.488	2.509	.96	71.489	2.509	1.05	25.69	.000
3	LAYBARGE	5	6	65.374	2.335	2.23	65.375	2.335	2.22	11.87	.000
4	LAYBARGE	7	8	59.910	2.073	3.28	59.911	2.073	3.27	16.53	.000
5	LAYBARGE	9	10	53.320	1.624	4.50	53.321	1.624	4.53	14.99	.000
6	LAYBARGE	11	12	47.322	1.088	5.74	47.323	1.089	5.68	19.70	.000
7	LAYBARGE	13	14	38.214	.042	7.42	38.215	.042	7.43	24.62	.000
8	LAYBARGE	15	16	29.270	-1.261	9.10	29.271	-1.261	9.15	19.39	.000
9	LAYBARGE	17	18	23.132	-2.316	10.37	23.133	-2.316	10.34	15.81	.000
10	LAYBARGE	19	20	17.181	-3.464	11.44	17.182	-3.464	11.50	9.08	.000
11	LAYBARGE	21	22	10.626	-4.875	13.04	10.627	-4.874	12.78	26.83	.000
12	STINGER	24	25	-4.612	-8.744	15.31	-4.611	-8.744	15.56	22.77	.000

13	STINGER	26	27	-11.020	-10.586	16.57	-11.019	-10.586	16.51	5.58	.000
14	STINGER	28	29	-17.396	-12.534	17.45	-17.395	-12.534	17.47	11.61	.000
15	STINGER	30	31	-23.739	-14.588	18.44	-23.738	-14.588	18.42	11.41	.000
16	STINGER	32	33	-30.046	-16.748	19.32	-30.045	-16.747	19.38	6.09	.000
17	STINGER	34	35	-36.317	-19.011	20.53	-36.316	-19.012	20.33	22.74	.001

Output Analisis Statis (Case 7 – 12)

S T A T I C P I P E C O O R D I N A T E S, F O R C E S A N D S T R E S S E S

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	.00	.000	.266	.000	36.43	.00	.00	.00	36.43	10.12
3	LAYBARGE	71.49	6.16	.00	.000	.958	6.300	36.41	.00	-116.82	-.02	135.71	37.70
5	LAYBARGE	65.37	5.98	.00	.000	2.232	12.417	36.39	.00	-84.11	.01	107.89	29.97
7	LAYBARGE	59.91	5.72	.00	.000	3.279	17.887	36.35	.00	-95.08	-.01	117.17	32.55
9	LAYBARGE	53.32	5.27	.00	.000	4.504	24.493	36.28	.00	-91.57	.00	114.12	31.70
11	LAYBARGE	47.32	4.74	.00	.000	5.732	30.515	36.20	.00	-104.33	.00	124.88	34.69
13	LAYBARGE	38.21	3.69	.00	.000	7.424	39.683	36.04	.00	-117.94	-.01	136.29	37.86
15	LAYBARGE	29.27	2.39	.00	.000	9.106	48.722	35.85	.00	-103.42	.02	123.76	34.38
17	LAYBARGE	23.13	1.33	.00	.000	10.366	54.950	35.69	.00	-92.99	-.10	114.73	31.87
19	LAYBARGE	17.18	.19	.00	.002	11.450	61.011	35.52	.00	-81.07	.39	104.43	29.01
21	LAYBARGE	10.63	-1.22	.00	-.014	12.982	67.716	35.33	-.11	-134.97	-4.12	150.16	41.71
24	STINGER	-4.64	-5.13	.00	.016	16.018	83.473	34.82	-.44	-183.87	-3.85	191.36	53.16
26	STINGER	-11.01	-7.10	.00	-.009	18.217	90.140	34.59	-.62	-119.32	-1.11	136.33	37.87
28	STINGER	-17.30	-9.29	.00	.020	20.065	96.807	34.31	-.81	-137.12	2.91	151.29	42.03
30	STINGER	-23.53	-11.68	.00	-.080	21.953	103.475	34.01	-1.01	-124.44	-17.35	141.32	39.25
32	STINGER	-29.67	-14.26	.03	-.629	23.510	110.142	33.69	-1.24	-92.74	-51.75	124.59	34.61
34	STINGER	-35.77	-16.96	.13	-1.133	24.092	116.809	33.36	-1.47	4.71	-11.06	44.33	12.31
36	SAGBEND	-46.75	-21.79	.36	-1.142	23.154	128.810	32.75	-1.89	43.91	4.86	71.27	19.80
37	SAGBEND	-57.84	-26.37	.56	-.940	21.708	140.810	32.17	-2.29	49.81	6.66	76.06	21.13
38	SAGBEND	-69.05	-30.66	.72	-.721	20.169	152.811	31.63	-2.66	51.49	6.64	77.13	21.42
39	SAGBEND	-80.37	-34.64	.84	-.511	18.590	164.811	31.13	-3.00	52.59	6.38	77.71	21.59
40	SAGBEND	-91.79	-38.31	.93	-.312	16.980	176.812	30.67	-3.32	53.57	6.07	78.20	21.72
41	SAGBEND	-103.32	-41.65	.97	-.125	15.342	188.812	30.25	-3.61	54.47	5.72	78.66	21.85
42	SAGBEND	-114.94	-44.66	.98	.049	13.678	200.813	29.87	-3.87	55.29	5.29	79.09	21.97
43	SAGBEND	-126.64	-47.32	.95	.206	11.990	212.813	29.53	-4.10	56.04	4.82	79.47	22.08
44	SAGBEND	-138.41	-49.64	.89	.348	10.280	224.814	29.24	-4.30	56.70	4.34	79.82	22.17
45	SAGBEND	-150.25	-51.60	.81	.475	8.552	236.814	28.99	-4.47	57.27	3.88	80.11	22.25
46	SAGBEND	-162.14	-53.21	.70	.588	6.808	248.815	28.79	-4.61	57.73	3.61	80.36	22.32
47	SAGBEND	-174.08	-54.45	.56	.697	5.052	260.815	28.63	-4.72	58.03	3.50	80.51	22.36
48	SAGBEND	-186.04	-55.32	.41	.799	3.293	272.815	28.52	-4.80	57.79	3.12	80.22	22.28
49	SAGBEND	-198.03	-55.83	.23	.867	1.576	284.816	28.46	-4.84	54.27	.42	77.12	21.42
50	SEABED	-210.03	-56.00	.06	.681	.199	296.816	28.44	-4.85	27.71	-19.24	59.69	16.58
51	SEABED	-222.03	-56.01	.00	.008	-.007	308.816	28.44	-4.85	-.51	-6.31	36.48	10.13
52	SEABED	-234.03	-56.01	.00	.000	.000	320.816	28.44	-4.85	-.01	.30	31.41	8.72
53	SEABED	-246.03	-56.01	.00	.000	.000	332.816	28.44	-4.85	.00	-.01	31.16	8.66
54	SEABED	-258.03	-56.01	.00	.000	.000	344.816	28.44	-4.85	.00	.00	31.15	8.65
55	SEABED	-270.03	-56.01	.00	.000	.000	356.816	28.44	-4.85	.00	.00	31.15	8.65
56	SEABED	-282.03	-56.01	.00	.000	.000	368.816	28.44	-4.85	.00	.00	31.15	8.65

S T A T I C P I P E C O O R D I N A T E S, F O R C E S A N D S T R E S S E S

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	SUPPORT REACTION VERT (KN)	SUPPORT REACTION HORIZ (KN)	SUPT SEPARATIONS VERT (M)	SUPT SEPARATIONS HORIZ (M)	PIPE TENSION (KN)	BENDING MOMENTS VERT (KN-M)	BENDING MOMENTS HORIZ (KN-M)	BENDING MOMENTS TOTAL (KN-M)
1	TENSIONR	77.79	6.21	.00	-2.54	-.01	.00	.00	300.01	.00	.00	.00
3	LAYBARGE	71.49	6.16	.00	23.42	.00	.00	.00	299.83	-46.93	-.01	46.93
5	LAYBARGE	65.37	5.98	.00	9.99	.00	.00	.00	299.67	-33.79	.00	33.79
7	LAYBARGE	59.91	5.72	.00	14.49	.00	.00	.00	299.33	-38.20	.00	38.20
9	LAYBARGE	53.32	5.27	.00	13.00	.00	.00	.00	298.78	-36.79	.00	36.79
11	LAYBARGE	47.32	4.74	.00	17.14	.00	.00	.00	298.09	-41.91	.00	41.91
13	LAYBARGE	38.21	3.69	.00	21.40	.00	.00	.00	296.77	-47.38	.00	47.38
15	LAYBARGE	29.27	2.39	.00	16.86	.01	.00	.00	295.19	-41.55	.01	41.55
17	LAYBARGE	23.13	1.33	.00	13.61	-.04	.00	.00	293.91	-37.36	-.04	37.36
19	LAYBARGE	17.18	.19	.00	8.29	.00	.00	.00	292.50	-32.57	.16	32.57
21	LAYBARGE	10.63	-1.22	.00	20.69	-1.38	.00	.00	291.36	-54.22	-1.65	54.25

24	STINGER	-4.64	-5.13	.00	26.64	-1.29	.00	.00	288.66	-73.86	-1.55	73.88
26	STINGER	-11.01	-7.10	.00	8.80	-.74	.00	.00	287.53	-47.93	-.45	47.94
28	STINGER	-17.30	-9.29	.00	15.50	.79	.00	.00	286.05	-55.08	1.17	55.10
30	STINGER	-23.53	-11.68	.00	13.90	-1.19	.00	.00	284.50	-49.99	-6.97	50.47
32	STINGER	-29.67	-14.26	.03	13.74	-8.01	.02	.03	282.83	-37.26	-20.79	42.67
34	STINGER	-35.77	-16.96	.13	.00	.00	.12	.13	281.15	1.89	-4.44	4.83
36	SAGBEND	-46.75	-21.79	.36	.00	.00	.00	.00	277.94	17.64	1.95	17.75
37	SAGBEND	-57.84	-26.37	.56	.00	.00	.00	.00	274.92	20.01	2.68	20.19
38	SAGBEND	-69.05	-30.66	.72	.00	.00	.00	.00	272.08	20.69	2.67	20.86
39	SAGBEND	-80.37	-34.64	.84	.00	.00	.00	.00	269.46	21.13	2.56	21.28
40	SAGBEND	-91.79	-38.31	.93	.00	.00	.00	.00	267.04	21.52	2.44	21.66
41	SAGBEND	-103.32	-41.65	.97	.00	.00	.00	.00	264.83	21.88	2.30	22.00
42	SAGBEND	-114.94	-44.66	.98	.00	.00	.00	.00	262.85	22.21	2.13	22.31
43	SAGBEND	-126.64	-47.32	.95	.00	.00	.00	.00	261.09	22.51	1.94	22.60
44	SAGBEND	-138.41	-49.64	.89	.00	.00	.00	.00	259.56	22.78	1.74	22.85
45	SAGBEND	-150.25	-51.60	.81	.00	.00	.00	.00	258.26	23.01	1.56	23.06
46	SAGBEND	-162.14	-53.21	.70	.00	.00	.00	.00	257.20	23.19	1.45	23.24
47	SAGBEND	-174.08	-54.45	.56	.00	.00	.00	.00	256.38	23.31	1.41	23.35
48	SAGBEND	-186.04	-55.32	.41	.00	.00	.00	.00	255.81	23.21	1.26	23.25
49	SAGBEND	-198.03	-55.83	.23	.00	.00	.00	.00	255.47	21.80	.17	21.80
50	SEABED	-210.03	-56.00	.06	4.28	-3.89	.00	.00	255.38	11.13	-7.73	13.55
51	SEABED	-222.03	-56.01	.00	8.78	-.88	.00	.00	255.37	-.21	-2.53	2.54
52	SEABED	-234.03	-56.01	.00	7.90	.22	.00	.00	255.37	.00	.12	.12
53	SEABED	-246.03	-56.01	.00	7.92	-.01	.00	.00	255.37	.00	-.01	.01
54	SEABED	-258.03	-56.01	.00	7.92	.00	.00	.00	255.37	.00	.00	.00
55	SEABED	-270.03	-56.01	.00	7.92	.00	.00	.00	255.37	.00	.00	.00
56	SEABED	-282.03	-56.01	.00	.00	.00	.00	.00	255.37	.00	.00	.00

S T A T I C S O L U T I O N S U M M A R Y

PIPE PROPERTIES (1)

PIPE SECTION LENGTH ..	12.00 M	ELASTIC MODULUS	207000. MPA
OUTSIDE DIAMETER	21.908 CM	CROSS SECTIONAL AREA .	278.27 CM2
WALL THICKNESS	1.270 CM	MOMENT OF INERTIA	4400.56 CM4
WEIGHT/LENGTH IN AIR .	1235.937 N/M	YIELD STRESS	360.00 MPA
SUBMERGED WGHT/LENG ..	659.899 N/M	STRESS INTENS FACTOR .	1.000
SPECIFIC GRAVITY	2.146	STEEL DENSITY	78500.0 N/M3
WRAP COAT THICKNESS ..	.040 CM	WRAP COAT DENSITY	12815.0 N/M3
CONCRETE THICKNESS ...	.250 CM	CONCRETE DENSITY	30440.0 N/M3

BARGE DATA

TOTAL PIPE TENSION ...	300.01 KN	RADIUS OF CURVATURE ..	300.00 M
NUMBER OF TENSIONERS .	1	BARGE TRIM ANGLE	.000 DEG
NO. OF PIPE SUPPORTS .	10	PIPE ANGLE AT STERN ..	12.982 DEG
BARGE HEADING	.000 DEG	OFFSET FROM R.O.W. ...	.00 M

STINGER DATA

NO. OF PIPE SUPPORTS .	6	STINGER STERN DEPTH ..	-16.96 M
NO. STINGER SECTIONS .	6	PIPE ANGLE AT STERN ..	24.092 DEG
RADIUS OF CURVATURE ..	200.00 M	STINGER LENGTH	43.26 M

SAGBEND DATA

WATER DEPTH	56.00 M	HORIZ PIPE TENSION ...	255.37 KN
TOUCHDOWN X-COORD. ...	-209.46 M	BOTTOM SLOPE ANGLE ...	.000 DEG

SOLUTION SUMMARY

NODE NO.	PIPE SECTION	X COORD	Y COORD	Z COORD	SUPPORT REACT VERT	SUPPORT REACT HORIZ	TOTAL MOMENT	TOTAL STRESS	PCT YLD
1	TENSIONR	77.8	6.2	.0	-2.5	.0	.0	36.4	10.
3	LAYBARGE	71.5	6.2	.0	23.4	.0	46.9	135.7	38.
5	LAYBARGE	65.4	6.0	.0	10.0	.0	33.8	107.9	30.
7	LAYBARGE	59.9	5.7	.0	14.5	.0	38.2	117.2	33.
9	LAYBARGE	53.3	5.3	.0	13.0	.0	36.8	114.1	32.
11	LAYBARGE	47.3	4.7	.0	17.1	.0	41.9	124.9	35.
13	LAYBARGE	38.2	3.7	.0	21.4	.0	47.4	136.3	38.
15	LAYBARGE	29.3	2.4	.0	16.9	.0	41.5	123.8	34.
17	LAYBARGE	23.1	1.3	.0	13.6	.0	37.4	114.7	32.
19	LAYBARGE	17.2	.2	.0	8.3	.0	32.6	104.4	29.
21	LAYBARGE	10.6	-1.2	.0	20.7	-1.4	54.2	150.2	42.
24	STINGER	-4.6	-5.1	.0	26.6	-1.3	73.9	191.4	53.
26	STINGER	-11.0	-7.1	.0	8.8	-.7	47.9	136.3	38.
28	STINGER	-17.3	-9.3	.0	15.5	.8	55.1	151.3	42.

30	STINGER	-23.5	-11.7	.0	13.9	-1.2	50.5	141.3	39.
32	STINGER	-29.7	-14.3	.0	13.7	-8.0	42.7	124.6	35.

S T A T I C S O L U T I O N S U M M A R Y

34	STINGER	-35.8	-17.0	.1	.0	.0	4.8	44.3	12.
47	SAGBEND	-174.1	-54.4	.6	.0	.0	23.4	80.5	22.
50	SEABED	-210.0	-56.0	.1	4.3	-3.9	13.6	59.7	17.

O V E R B E N D P I P E S U P P O R T G E O M E T R Y

STATION NO.	LOCATION	PIPE NODE	SUPT NODE	/----- PIPE COORDINATES ----/ X (M)	Y (M)	ANGLE (DEG)	/--- SUPPORT COORDINATES ---/ X (M)	Y (M)	ANGLE (DEG)	VERTICAL REACTION (KN)	VERTICAL SEPARATION (M)
1	TENSIONR	1	2	77.789	2.560	.27	77.789	2.560	.00	-2.54	.000
2	LAYBARGE	3	4	71.488	2.509	.96	71.489	2.509	1.05	23.42	.000
3	LAYBARGE	5	6	65.375	2.335	2.23	65.375	2.335	2.22	9.99	.000
4	LAYBARGE	7	8	59.911	2.073	3.28	59.911	2.073	3.27	14.49	.000
5	LAYBARGE	9	10	53.320	1.624	4.50	53.321	1.624	4.53	13.00	.000
6	LAYBARGE	11	12	47.323	1.088	5.73	47.323	1.089	5.68	17.14	.000
7	LAYBARGE	13	14	38.214	.042	7.42	38.215	.042	7.43	21.40	.000
8	LAYBARGE	15	16	29.270	-1.261	9.11	29.271	-1.261	9.15	16.86	.000
9	LAYBARGE	17	18	23.132	-2.316	10.37	23.133	-2.316	10.34	13.61	.000
10	LAYBARGE	19	20	17.181	-3.464	11.45	17.182	-3.464	11.50	8.29	.000
11	LAYBARGE	21	22	10.627	-4.875	12.98	10.627	-4.874	12.78	20.69	.000
12	STINGER	24	25	-4.637	-8.781	16.02	-4.636	-8.781	16.25	26.64	.000
13	STINGER	26	27	-11.005	-10.753	18.22	-11.004	-10.753	18.16	8.80	.000
14	STINGER	28	29	-17.304	-12.937	20.06	-17.304	-12.936	20.07	15.50	.000
15	STINGER	30	31	-23.528	-15.329	21.95	-23.527	-15.328	21.98	13.90	.000
16	STINGER	32	33	-29.675	-17.910	23.51	-29.667	-17.927	23.89	13.74	.019
17	STINGER	34	35	-35.768	-20.615	24.09	-35.716	-20.728	25.80	.00	.124

S T A T I C P I P E C O O R D I N A T E S, F O R C E S A N D S T R E S S E S

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	.00	.000	.266	.000	36.43	.00	.00	.00	36.43	10.12
3	LAYBARGE	71.49	6.16	.00	.000	.958	6.300	36.41	.00	-116.82	-.02	135.71	37.70
5	LAYBARGE	65.37	5.98	.00	.000	2.232	12.417	36.39	.00	-84.11	.01	107.89	29.97
7	LAYBARGE	59.91	5.72	.00	.000	3.279	17.887	36.35	.00	-95.08	-.01	117.17	32.55
9	LAYBARGE	53.32	5.27	.00	.000	4.504	24.493	36.28	.00	-91.57	.00	114.12	31.70
11	LAYBARGE	47.32	4.74	.00	.000	5.732	30.515	36.20	.00	-104.33	.00	124.88	34.69
13	LAYBARGE	38.21	3.69	.00	.000	7.424	39.683	36.04	.00	-117.96	-.01	136.31	37.86
15	LAYBARGE	29.27	2.39	.00	.000	9.106	48.722	35.85	.00	-103.36	.02	123.70	34.36
17	LAYBARGE	23.13	1.33	.00	.000	10.367	54.950	35.69	.00	-93.29	-.09	114.99	31.94
19	LAYBARGE	17.18	.19	.00	.002	11.445	61.011	35.52	.00	-79.86	.38	103.40	28.72
21	LAYBARGE	10.63	-1.22	.00	-.014	13.004	67.716	35.33	-.11	-139.69	-4.08	154.17	42.82
24	STINGER	-4.62	-5.11	.00	.015	15.564	83.451	34.84	-.44	-139.37	-3.97	153.57	42.66
26	STINGER	-11.02	-6.99	.00	-.005	17.117	90.118	34.61	-.61	-78.29	-.39	101.46	28.18
28	STINGER	-17.37	-9.02	.00	.006	18.317	96.785	34.36	-.78	-92.39	-.08	113.28	31.47
30	STINGER	-23.67	-11.19	.00	-.020	19.625	103.452	34.08	-.97	-92.44	-4.97	113.25	31.46
32	STINGER	-29.93	-13.49	.00	.082	20.823	110.119	33.79	-1.17	-77.61	15.82	101.71	28.25
34	STINGER	-36.13	-15.94	.00	-.333	22.385	116.786	33.47	-1.38	-140.08	-69.35	167.02	46.39
36	SAGBEND	-47.16	-20.67	.17	-1.130	23.254	128.786	32.89	-1.79	25.48	-2.47	55.57	15.44
37	SAGBEND	-58.22	-25.30	.39	-1.026	22.043	140.786	32.31	-2.19	47.24	5.79	73.89	20.52
38	SAGBEND	-69.40	-29.66	.57	-.817	20.540	152.787	31.76	-2.57	50.94	6.60	76.74	21.32
39	SAGBEND	-80.70	-33.71	.71	-.606	18.973	164.787	31.25	-2.92	52.31	6.43	77.55	21.54
40	SAGBEND	-92.10	-37.46	.81	-.404	17.371	176.787	30.77	-3.25	53.34	6.15	78.08	21.69
41	SAGBEND	-103.60	-40.88	.87	-.214	15.739	188.787	30.34	-3.54	54.26	5.81	78.56	21.82
42	SAGBEND	-115.19	-43.96	.89	-.037	14.081	200.788	29.95	-3.81	55.10	5.39	78.99	21.94

43	SAGBEND	-126.88	-46.71	.88	.124	12.399	212.788	29.61	-4.05	55.87	4.93	79.38	22.05
44	SAGBEND	-138.63	-49.11	.84	.270	10.694	224.788	29.30	-4.26	56.56	4.45	79.74	22.15
45	SAGBEND	-150.46	-51.16	.77	.399	8.970	236.789	29.04	-4.44	57.15	3.98	80.05	22.23
46	SAGBEND	-162.34	-52.86	.68	.516	7.229	248.789	28.83	-4.58	57.64	3.66	80.31	22.31
47	SAGBEND	-174.26	-54.18	.56	.625	5.476	260.790	28.66	-4.70	57.99	3.52	80.49	22.36
48	SAGBEND	-186.22	-55.14	.42	.730	3.716	272.790	28.54	-4.78	57.96	3.29	80.38	22.33
49	SAGBEND	-198.21	-55.74	.26	.813	1.978	284.791	28.47	-4.83	55.86	1.60	78.49	21.80
50	SAGBEND	-210.20	-55.99	.09	.737	.450	296.791	28.44	-4.85	39.41	-10.64	65.70	18.25
51	SEABED	-222.20	-56.01	.00	.070	-.013	308.791	28.44	-4.86	.31	-13.84	42.84	11.90
52	SEABED	-234.20	-56.01	.00	-.003	.000	320.791	28.44	-4.85	-.09	.42	31.51	8.75
53	SEABED	-246.20	-56.01	.00	.000	.000	332.791	28.44	-4.85	.01	-.01	31.16	8.66
54	SEABED	-258.20	-56.01	.00	.000	.000	344.791	28.44	-4.85	.00	.00	31.15	8.65
55	SEABED	-270.20	-56.01	.00	.000	.000	356.791	28.44	-4.85	.00	.00	31.15	8.65
56	SEABED	-282.20	-56.01	.00	.000	.000	368.791	28.44	-4.85	.00	.00	31.15	8.65

STATIC PIPE COORDINATES, FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	SUPPORT REACTION VERT (KN)	SUPPORT REACTION HORIZ (KN)	SUPT SEPARATIONS VERT (M)	SUPT SEPARATIONS HORIZ (M)	PIPE TENSION (KN)	BENDING MOMENTS VERT (KN-M)	BENDING MOMENTS HORIZ (KN-M)	BENDING MOMENTS TOTAL (KN-M)
1	TENSIONR	77.79	6.21	.00	-2.54	-.01	.00	.00	300.01	.00	.00	.00
3	LAYBARGE	71.49	6.16	.00	23.42	.00	.00	.00	299.82	-46.93	-.01	46.93
5	LAYBARGE	65.37	5.98	.00	9.99	.00	.00	.00	299.67	-33.79	.00	33.79
7	LAYBARGE	59.91	5.72	.00	14.49	.00	.00	.00	299.32	-38.20	.00	38.20
9	LAYBARGE	53.32	5.27	.00	13.00	.00	.00	.00	298.78	-36.79	.00	36.79
11	LAYBARGE	47.32	4.74	.00	17.13	.00	.00	.00	298.09	-41.91	.00	41.91
13	LAYBARGE	38.21	3.69	.00	21.41	.00	.00	.00	296.77	-47.39	.00	47.39
15	LAYBARGE	29.27	2.39	.00	16.83	.01	.00	.00	295.19	-41.52	.01	41.52
17	LAYBARGE	23.13	1.33	.00	13.73	-.04	.00	.00	293.90	-37.48	-.04	37.48
19	LAYBARGE	17.18	.19	.00	7.84	.00	.00	.00	292.50	-32.08	.15	32.08
21	LAYBARGE	10.63	-1.22	.00	21.93	-1.37	.00	.00	291.35	-56.12	-1.64	56.14
24	STINGER	-4.62	-5.11	.00	21.61	-1.34	.00	.00	288.79	-55.99	-1.60	56.01
26	STINGER	-11.02	-6.99	.00	6.07	-.46	.00	.00	287.66	-31.45	-.16	31.45
28	STINGER	-17.37	-9.02	.00	11.39	-.34	.00	.00	286.30	-37.12	-.03	37.12
30	STINGER	-23.67	-11.19	.00	11.37	-2.20	.00	.00	284.87	-37.13	-2.00	37.19
32	STINGER	-29.93	-13.49	.00	5.72	5.70	.00	.00	283.37	-31.18	6.36	31.82
34	STINGER	-36.13	-15.94	.00	23.33	-12.25	.00	.00	281.60	-56.28	-27.86	62.79
36	SAGBEND	-47.16	-20.67	.17	.00	.00	.00	.00	278.68	10.24	-.99	10.29
37	SAGBEND	-58.22	-25.30	.39	.00	.00	.00	.00	275.61	18.98	2.32	19.12
38	SAGBEND	-69.40	-29.66	.57	.00	.00	.00	.00	272.73	20.47	2.65	20.64
39	SAGBEND	-80.70	-33.71	.71	.00	.00	.00	.00	270.05	21.02	2.58	21.17
40	SAGBEND	-92.10	-37.46	.81	.00	.00	.00	.00	267.58	21.43	2.47	21.57
41	SAGBEND	-103.60	-40.88	.87	.00	.00	.00	.00	265.33	21.80	2.33	21.92
42	SAGBEND	-115.19	-43.96	.89	.00	.00	.00	.00	263.29	22.14	2.17	22.24
43	SAGBEND	-126.88	-46.71	.88	.00	.00	.00	.00	261.47	22.45	1.98	22.53
44	SAGBEND	-138.63	-49.11	.84	.00	.00	.00	.00	259.89	22.72	1.79	22.79
45	SAGBEND	-150.46	-51.16	.77	.00	.00	.00	.00	258.53	22.96	1.60	23.01
46	SAGBEND	-162.34	-52.86	.68	.00	.00	.00	.00	257.42	23.15	1.47	23.20
47	SAGBEND	-174.26	-54.18	.56	.00	.00	.00	.00	256.54	23.29	1.42	23.34
48	SAGBEND	-186.22	-55.14	.42	.00	.00	.00	.00	255.91	23.28	1.32	23.32
49	SAGBEND	-198.21	-55.74	.26	.00	.00	.00	.00	255.52	22.44	.64	22.45
50	SAGBEND	-210.20	-55.99	.09	2.18	-2.14	.00	.00	255.37	15.83	-4.28	16.40
51	SEABED	-222.20	-56.01	.00	8.95	-2.54	.00	.00	255.37	.13	-5.56	5.56
52	SEABED	-234.20	-56.01	.00	7.94	.45	.00	.00	255.37	-.03	.17	.17
53	SEABED	-246.20	-56.01	.00	7.91	-.01	.00	.00	255.37	.00	.00	.01
54	SEABED	-258.20	-56.01	.00	7.92	.00	.00	.00	255.37	.00	.00	.00
55	SEABED	-270.20	-56.01	.00	7.92	.00	.00	.00	255.37	.00	.00	.00
56	SEABED	-282.20	-56.01	.00	.00	.00	.00	.00	255.37	.00	.00	.00

STATIC SOLUTION SUMMARY

PIPE PROPERTIES (1)

PIPE SECTION LENGTH ..	12.00 M	ELASTIC MODULUS	207000. MPA
OUTSIDE DIAMETER	21.908 CM	CROSS SECTIONAL AREA .	278.27 CM2
WALL THICKNESS	1.270 CM	MOMENT OF INERTIA	4400.56 CM4
WEIGHT/LENGTH IN AIR .	1235.937 N/M	YIELD STRESS	360.00 MPA
SUBMERGED WGHT/LENG ..	659.899 N/M	STRESS INTENS FACTOR .	1.000

SPECIFIC GRAVITY	2.146	STEEL DENSITY	78500.0 N/M3
WRAP COAT THICKNESS ..	.040 CM	WRAP COAT DENSITY	12815.0 N/M3
CONCRETE THICKNESS ...	.250 CM	CONCRETE DENSITY	30440.0 N/M3

BARGE DATA

TOTAL PIPE TENSION ...	300.01 KN	RADIUS OF CURVATURE ..	300.00 M
NUMBER OF TENSIONERS .	1	BARGE TRIM ANGLE	.000 DEG
NO. OF PIPE SUPPORTS .	10	PIPE ANGLE AT STERN ..	13.004 DEG
BARGE HEADING	.000 DEG	OFFSET FROM R.O.W. ...	.00 M

STINGER DATA

NO. OF PIPE SUPPORTS .	6	STINGER STERN DEPTH ..	-15.94 M
NO. STINGER SECTIONS .	6	PIPE ANGLE AT STERN ..	22.385 DEG
RADIUS OF CURVATURE ..	300.00 M	STINGER LENGTH	43.24 M

SAGBEND DATA

WATER DEPTH	56.00 M	HORIZ PIPE TENSION ...	255.37 KN
TOUCHDOWN X-COORD. ...	-212.53 M	BOTTOM SLOPE ANGLE ...	.000 DEG

SOLUTION SUMMARY

NODE NO.	PIPE SECTION	X COORD	Y COORD	Z COORD	SUPPORT REACT VERT	HORIZ	TOTAL MOMENT	TOTAL STRESS	PCT YLD
1	TENSIONR	77.8	6.2	.0	-2.5	.0	.0	36.4	10.
3	LAYBARGE	71.5	6.2	.0	23.4	.0	46.9	135.7	38.
5	LAYBARGE	65.4	6.0	.0	10.0	.0	33.8	107.9	30.
7	LAYBARGE	59.9	5.7	.0	14.5	.0	38.2	117.2	33.
9	LAYBARGE	53.3	5.3	.0	13.0	.0	36.8	114.1	32.
11	LAYBARGE	47.3	4.7	.0	17.1	.0	41.9	124.9	35.
13	LAYBARGE	38.2	3.7	.0	21.4	.0	47.4	136.3	38.
15	LAYBARGE	29.3	2.4	.0	16.8	.0	41.5	123.7	34.
17	LAYBARGE	23.1	1.3	.0	13.7	.0	37.5	115.0	32.
19	LAYBARGE	17.2	.2	.0	7.8	.0	32.1	103.4	29.
21	LAYBARGE	10.6	-1.2	.0	21.9	-1.4	56.1	154.2	43.
24	STINGER	-4.6	-5.1	.0	21.6	-1.3	56.0	153.6	43.
26	STINGER	-11.0	-7.0	.0	6.1	-.5	31.5	101.5	28.
28	STINGER	-17.4	-9.0	.0	11.4	-.3	37.1	113.3	31.
30	STINGER	-23.7	-11.2	.0	11.4	-2.2	37.2	113.3	31.
32	STINGER	-29.9	-13.5	.0	5.7	5.7	31.8	101.7	28.

S T A T I C S O L U T I O N S U M M A R Y

34	STINGER	-36.1	-15.9	.0	23.3	-12.3	62.8	167.0	46.
47	SAGBEND	-174.3	-54.2	.6	.0	.0	23.3	80.5	22.
51	SEABED	-222.2	-56.0	.0	8.9	-2.5	5.6	42.8	12.

O V E R B E N D P I P E S U P P O R T G E O M E T R Y

STATION NO.	LOCATION	PIPE NODE	SUPT NODE	/----- PIPE COORDINATES ----/ X (M)	Y (M)	ANGLE (DEG)	/--- SUPPORT COORDINATES ---/ X (M)	Y (M)	ANGLE (DEG)	VERTICAL REACTION (KN)	VERTICAL SEPARATION (M)
1	TENSIONR	1	2	77.789	2.560	.27	77.789	2.560	.00	-2.54	.000
2	LAYBARGE	3	4	71.488	2.509	.96	71.489	2.509	1.05	23.42	.000
3	LAYBARGE	5	6	65.375	2.335	2.23	65.375	2.335	2.22	9.99	.000
4	LAYBARGE	7	8	59.911	2.073	3.28	59.911	2.073	3.27	14.49	.000
5	LAYBARGE	9	10	53.320	1.624	4.50	53.321	1.624	4.53	13.00	.000
6	LAYBARGE	11	12	47.323	1.088	5.73	47.323	1.089	5.68	17.13	.000
7	LAYBARGE	13	14	38.214	.042	7.42	38.215	.042	7.43	21.41	.000
8	LAYBARGE	15	16	29.270	-1.261	9.11	29.271	-1.261	9.15	16.83	.000
9	LAYBARGE	17	18	23.132	-2.316	10.37	23.133	-2.316	10.34	13.73	.000
10	LAYBARGE	19	20	17.181	-3.464	11.44	17.182	-3.464	11.50	7.84	.000
11	LAYBARGE	21	22	10.627	-4.875	13.00	10.627	-4.874	12.78	21.93	.000
12	STINGER	24	25	-4.620	-8.757	15.56	-4.620	-8.756	15.79	21.61	.000
13	STINGER	26	27	-11.015	-10.642	17.12	-11.015	-10.641	17.06	6.07	.000
14	STINGER	28	29	-17.367	-12.668	18.32	-17.366	-12.668	18.33	11.39	.000
15	STINGER	30	31	-23.672	-14.836	19.62	-23.671	-14.835	19.61	11.37	.000
16	STINGER	32	33	-29.927	-17.143	20.82	-29.926	-17.142	20.88	5.72	.000
17	STINGER	34	35	-36.129	-19.588	22.38	-36.128	-19.588	22.15	23.33	.000

S T A T I C P I P E C O O R D I N A T E S, F O R C E S A N D S T R E S S E S

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	.00	.000	.266	.000	36.44	.00	.00	.00	36.44	10.12
3	LAYBARGE	71.49	6.16	.00	.000	.958	6.300	36.41	.00	-116.82	-.02	135.71	37.70
5	LAYBARGE	65.37	5.98	.00	.000	2.232	12.417	36.39	.00	-84.11	.01	107.89	29.97
7	LAYBARGE	59.91	5.72	.00	.000	3.279	17.887	36.35	.00	-95.08	-.01	117.17	32.55
9	LAYBARGE	53.32	5.27	.00	.000	4.504	24.493	36.29	.00	-91.57	.00	114.12	31.70
11	LAYBARGE	47.32	4.74	.00	.000	5.732	30.515	36.20	.00	-104.32	.00	124.88	34.69
13	LAYBARGE	38.21	3.69	.00	.000	7.424	39.683	36.04	.00	-117.97	-.01	136.31	37.87
15	LAYBARGE	29.27	2.39	.00	.000	9.106	48.722	35.85	.00	-103.33	.02	123.68	34.36
17	LAYBARGE	23.13	1.33	.00	.000	10.368	54.950	35.69	.00	-93.43	-.09	115.11	31.98
19	LAYBARGE	17.18	.19	.00	.002	11.442	61.011	35.53	.00	-79.26	.37	102.90	28.58
21	LAYBARGE	10.63	-1.22	.00	-.014	13.015	67.716	35.33	-.11	-142.02	-4.03	156.15	43.37
24	STINGER	-4.61	-5.09	.00	.013	15.339	83.439	34.85	-.44	-117.40	-4.15	134.92	37.48
26	STINGER	-11.02	-6.94	.00	.000	16.563	90.106	34.63	-.60	-56.58	.64	83.02	23.06
28	STINGER	-17.40	-8.88	.00	-.015	17.466	96.773	34.38	-.77	-74.88	-4.33	98.51	27.37
30	STINGER	-23.74	-10.94	.00	.063	18.373	103.440	34.12	-.95	-56.81	12.27	84.00	23.33
32	STINGER	-30.05	-13.08	-.01	.093	19.166	110.108	33.85	-1.13	-59.75	-10.34	85.97	23.88
34	STINGER	-36.32	-15.36	.00	-.467	21.283	116.775	33.50	-1.33	-231.62	-62.09	238.00	66.11
36	SAGBEND	-47.37	-20.02	.19	-1.160	23.293	128.775	32.98	-1.74	13.88	-1.52	45.73	12.70
37	SAGBEND	-58.43	-24.68	.40	-1.043	22.229	140.775	32.39	-2.14	45.64	5.94	72.60	20.17
38	SAGBEND	-69.59	-29.08	.59	-.830	20.750	152.775	31.83	-2.52	50.61	6.66	76.52	21.25
39	SAGBEND	-80.87	-33.18	.73	-.617	19.189	164.775	31.31	-2.88	52.15	6.48	77.46	21.52
40	SAGBEND	-92.25	-36.96	.83	-.413	17.591	176.775	30.84	-3.20	53.20	6.19	78.01	21.67
41	SAGBEND	-103.74	-40.43	.89	-.222	15.964	188.775	30.40	-3.50	54.14	5.85	78.49	21.80
42	SAGBEND	-115.33	-43.56	.92	-.043	14.309	200.775	30.00	-3.78	54.99	5.45	78.93	21.93
43	SAGBEND	-127.00	-46.36	.91	.120	12.630	212.776	29.65	-4.02	55.77	4.99	79.33	22.04
44	SAGBEND	-138.74	-48.81	.87	.268	10.928	224.776	29.34	-4.23	56.47	4.51	79.69	22.14
45	SAGBEND	-150.56	-50.91	.80	.400	9.206	236.776	29.08	-4.41	57.07	4.04	80.01	22.22
46	SAGBEND	-162.43	-52.65	.71	.518	7.468	248.777	28.86	-4.56	57.57	3.69	80.28	22.30
47	SAGBEND	-174.35	-54.02	.59	.628	5.716	260.777	28.68	-4.68	57.95	3.53	80.48	22.35
48	SAGBEND	-186.31	-55.04	.45	.733	3.956	272.778	28.56	-4.77	58.01	3.34	80.44	22.34
49	SAGBEND	-198.29	-55.68	.28	.821	2.211	284.779	28.47	-4.83	56.47	1.98	79.02	21.95
50	SAGBEND	-210.29	-55.97	.11	.780	.625	296.779	28.44	-4.85	43.95	-7.93	68.95	19.15
51	SEABED	-222.28	-56.01	.00	.139	-.014	308.780	28.44	-4.86	1.66	-20.52	48.54	13.48
52	SEABED	-234.28	-56.01	.00	-.005	.000	320.780	28.44	-4.85	-.17	.46	31.56	8.77
53	SEABED	-246.28	-56.01	.00	.000	.000	332.780	28.44	-4.85	.01	.00	31.16	8.66
54	SEABED	-258.28	-56.01	.00	.000	.000	344.780	28.44	-4.85	.00	.00	31.15	8.65
55	SEABED	-270.28	-56.01	.00	.000	.000	356.780	28.44	-4.85	.00	.00	31.15	8.65
56	SEABED	-282.28	-56.01	.00	.000	.000	368.780	28.44	-4.85	.00	.00	31.15	8.65

S T A T I C P I P E C O O R D I N A T E S, F O R C E S A N D S T R E S S E S

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	SUPPORT REACTION VERT (KN)	HORIZ (KN)	SUPT SEPARATIONS VERT (M)	HORIZ (M)	PIPE TENSION (KN)	BENDING MOMENTS VERT (KN-M)	HORIZ (KN-M)	TOTAL (KN-M)
1	TENSIONR	77.79	6.21	.00	-2.54	-.01	.00	.00	300.02	.00	.00	.00
3	LAYBARGE	71.49	6.16	.00	23.42	.00	.00	.00	299.84	-46.93	-.01	46.93
5	LAYBARGE	65.37	5.98	.00	9.99	.00	.00	.00	299.68	-33.79	.00	33.79
7	LAYBARGE	59.91	5.72	.00	14.49	.00	.00	.00	299.34	-38.20	.00	38.20
9	LAYBARGE	53.32	5.27	.00	13.00	.00	.00	.00	298.79	-36.79	.00	36.79
11	LAYBARGE	47.32	4.74	.00	17.13	.00	.00	.00	298.11	-41.91	.00	41.91
13	LAYBARGE	38.21	3.69	.00	21.41	.00	.00	.00	296.79	-47.39	.00	47.39
15	LAYBARGE	29.27	2.39	.00	16.82	.01	.00	.00	295.20	-41.51	.01	41.51
17	LAYBARGE	23.13	1.33	.00	13.79	-.04	.00	.00	293.92	-37.54	-.04	37.54
19	LAYBARGE	17.18	.19	.00	7.61	-.01	.00	.00	292.52	-31.84	.15	31.84
21	LAYBARGE	10.63	-1.22	.00	22.54	-1.36	.00	.00	291.36	-57.05	-1.62	57.08
24	STINGER	-4.61	-5.09	.00	19.19	-1.42	.00	.00	288.86	-47.16	-1.67	47.19
26	STINGER	-11.02	-6.94	.00	4.25	-.07	.00	.00	287.74	-22.73	.26	22.73
28	STINGER	-17.40	-8.88	.00	11.16	-1.95	.00	.00	286.43	-30.08	-1.74	30.13
30	STINGER	-23.74	-10.94	.00	7.00	2.23	.00	.00	285.10	-22.82	4.93	23.35
32	STINGER	-30.05	-13.08	-.01	.00	.00	.02	-.01	283.68	-24.00	-4.15	24.36
34	STINGER	-36.32	-15.36	.00	38.47	-9.83	.00	.00	281.70	-93.05	-24.94	96.33

36	SAGBEND	-47.37	-20.02	.19	.00	.00	.00	.00	279.12	5.57	-.61	5.61
37	SAGBEND	-58.43	-24.68	.40	.00	.00	.00	.00	276.03	18.34	2.39	18.49
38	SAGBEND	-69.59	-29.08	.59	.00	.00	.00	.00	273.12	20.33	2.67	20.51
39	SAGBEND	-80.87	-33.18	.73	.00	.00	.00	.00	270.41	20.95	2.60	21.11
40	SAGBEND	-92.25	-36.96	.83	.00	.00	.00	.00	267.91	21.37	2.49	21.52
41	SAGBEND	-103.74	-40.43	.89	.00	.00	.00	.00	265.63	21.75	2.35	21.87
42	SAGBEND	-115.33	-43.56	.92	.00	.00	.00	.00	263.56	22.09	2.19	22.20
43	SAGBEND	-127.00	-46.36	.91	.00	.00	.00	.00	261.71	22.41	2.01	22.49
44	SAGBEND	-138.74	-48.81	.87	.00	.00	.00	.00	260.10	22.68	1.81	22.76
45	SAGBEND	-150.56	-50.91	.80	.00	.00	.00	.00	258.71	22.93	1.62	22.98
46	SAGBEND	-162.43	-52.65	.71	.00	.00	.00	.00	257.56	23.13	1.48	23.18
47	SAGBEND	-174.35	-54.02	.59	.00	.00	.00	.00	256.65	23.28	1.42	23.32
48	SAGBEND	-186.31	-55.04	.45	.00	.00	.00	.00	255.99	23.30	1.34	23.34
49	SAGBEND	-198.29	-55.68	.28	.00	.00	.00	.00	255.56	22.68	.79	22.70
50	SAGBEND	-210.29	-55.97	.11	1.26	-1.27	.00	.00	255.38	17.65	-3.19	17.94
51	SEABED	-222.28	-56.01	.00	8.74	-3.61	.00	.00	255.37	.67	-8.24	8.27
52	SEABED	-234.28	-56.01	.00	7.99	.66	.00	.00	255.37	-.07	.18	.20
53	SEABED	-246.28	-56.01	.00	7.91	-.01	.00	.00	255.37	.00	.00	.00
54	SEABED	-258.28	-56.01	.00	7.92	.00	.00	.00	255.37	.00	.00	.00
55	SEABED	-270.28	-56.01	.00	7.92	.00	.00	.00	255.37	.00	.00	.00
56	SEABED	-282.28	-56.01	.00	.00	.00	.00	.00	255.37	.00	.00	.00

S T A T I C S O L U T I O N S U M M A R Y

PIPE PROPERTIES (1)

PIPE SECTION LENGTH ..	12.00 M	ELASTIC MODULUS	207000. MPA
OUTSIDE DIAMETER	21.908 CM	CROSS SECTIONAL AREA .	278.27 CM2
WALL THICKNESS	1.270 CM	MOMENT OF INERTIA	4400.56 CM4
WEIGHT/LENGTH IN AIR .	1235.937 N/M	YIELD STRESS	360.00 MPA
SUBMERGED WGHT/LENG ..	659.899 N/M	STRESS INTENS FACTOR .	1.000
SPECIFIC GRAVITY	2.146	STEEL DENSITY	78500.0 N/M3
WRAP COAT THICKNESS ..	.040 CM	WRAP COAT DENSITY	12815.0 N/M3
CONCRETE THICKNESS ...	.250 CM	CONCRETE DENSITY	30440.0 N/M3

BARGE DATA

TOTAL PIPE TENSION ...	300.02 KN	RADIUS OF CURVATURE ..	300.00 M
NUMBER OF TENSIONERS .	1	BARGE TRIM ANGLE	.000 DEG
NO. OF PIPE SUPPORTS .	10	PIPE ANGLE AT STERN ..	13.015 DEG
BARGE HEADING	.000 DEG	OFFSET FROM R.O.W. ...	.00 M

STINGER DATA

NO. OF PIPE SUPPORTS .	6	STINGER STERN DEPTH ..	-15.36 M
NO. STINGER SECTIONS .	6	PIPE ANGLE AT STERN ..	21.283 DEG
RADIUS OF CURVATURE ..	400.00 M	STINGER LENGTH	43.22 M

SAGBEND DATA

WATER DEPTH	56.00 M	HORIZ PIPE TENSION ...	255.37 KN
TOUCHDOWN X-COORD. ...	-214.20 M	BOTTOM SLOPE ANGLE ...	.000 DEG

SOLUTION SUMMARY

NODE NO.	PIPE SECTION	X COORD	Y COORD	Z COORD	SUPPORT REACT VERT	SUPPORT REACT HORIZ	TOTAL MOMENT	TOTAL STRESS	PCT YLD
1	TENSIONR	77.8	6.2	.0	-2.5	.0	.0	36.4	10.
3	LAYBARGE	71.5	6.2	.0	23.4	.0	46.9	135.7	38.
5	LAYBARGE	65.4	6.0	.0	10.0	.0	33.8	107.9	30.
7	LAYBARGE	59.9	5.7	.0	14.5	.0	38.2	117.2	33.
9	LAYBARGE	53.3	5.3	.0	13.0	.0	36.8	114.1	32.
11	LAYBARGE	47.3	4.7	.0	17.1	.0	41.9	124.9	35.
13	LAYBARGE	38.2	3.7	.0	21.4	.0	47.4	136.3	38.
15	LAYBARGE	29.3	2.4	.0	16.8	.0	41.5	123.7	34.
17	LAYBARGE	23.1	1.3	.0	13.8	.0	37.5	115.1	32.
19	LAYBARGE	17.2	.2	.0	7.6	.0	31.8	102.9	29.
21	LAYBARGE	10.6	-1.2	.0	22.5	-1.4	57.1	156.1	43.
24	STINGER	-4.6	-5.1	.0	19.2	-1.4	47.2	134.9	37.
26	STINGER	-11.0	-6.9	.0	4.2	-.1	22.7	83.0	23.
28	STINGER	-17.4	-8.9	.0	11.2	-2.0	30.1	98.5	27.
30	STINGER	-23.7	-10.9	.0	7.0	2.2	23.4	84.0	23.
32	STINGER	-30.1	-13.1	.0	.0	.0	24.4	86.0	24.

S T A T I C S O L U T I O N S U M M A R Y

34	STINGER	-36.3	-15.4	.0	38.5	-9.8	96.3	238.0	66.
47	SAGBEND	-174.4	-54.0	.6	.0	.0	23.3	80.5	22.
51	SEABED	-222.3	-56.0	.0	8.7	-3.6	8.3	48.5	13.

O V E R B E N D P I P E S U P P O R T G E O M E T R Y

STATION NO.	LOCATION	PIPE NODE	SUPT NODE	/----- PIPE COORDINATES ----/ X (M)	Y (M)	ANGLE (DEG)	/--- SUPPORT COORDINATES ---/ X (M)	Y (M)	ANGLE (DEG)	VERTICAL REACTION (KN)	VERTICAL SEPARATION (M)
1	TENSIONR	1	2	77.789	2.560	.27	77.789	2.560	.00	-2.54	.000
2	LAYBARGE	3	4	71.488	2.509	.96	71.489	2.509	1.05	23.42	.000
3	LAYBARGE	5	6	65.375	2.335	2.23	65.375	2.335	2.22	9.99	.000
4	LAYBARGE	7	8	59.911	2.073	3.28	59.911	2.073	3.27	14.49	.000
5	LAYBARGE	9	10	53.320	1.624	4.50	53.321	1.624	4.53	13.00	.000
6	LAYBARGE	11	12	47.323	1.088	5.73	47.323	1.089	5.68	17.13	.000
7	LAYBARGE	13	14	38.214	.042	7.42	38.215	.042	7.43	21.41	.000
8	LAYBARGE	15	16	29.270	-1.261	9.11	29.271	-1.261	9.15	16.82	.000
9	LAYBARGE	17	18	23.132	-2.316	10.37	23.133	-2.316	10.34	13.79	.000
10	LAYBARGE	19	20	17.181	-3.464	11.44	17.182	-3.464	11.50	7.61	.000
11	LAYBARGE	21	22	10.627	-4.875	13.01	10.627	-4.874	12.78	22.54	.000
12	STINGER	24	25	-4.612	-8.744	15.34	-4.611	-8.744	15.56	19.19	.000
13	STINGER	26	27	-11.020	-10.586	16.56	-11.019	-10.586	16.51	4.25	.000
14	STINGER	28	29	-17.396	-12.534	17.47	-17.395	-12.534	17.47	11.16	.000
15	STINGER	30	31	-23.739	-14.588	18.37	-23.738	-14.588	18.42	7.00	.000
16	STINGER	32	33	-30.051	-16.733	19.17	-30.045	-16.747	19.38	.00	.016
17	STINGER	34	35	-36.316	-19.012	21.28	-36.316	-19.012	20.33	38.47	.000

S T A T I C P I P E C O O R D I N A T E S, F O R C E S A N D S T R E S S E S

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	.00	.000	.270	.000	48.58	.00	.00	.00	48.58	13.49
3	LAYBARGE	71.49	6.16	.00	.000	.960	6.300	48.55	.00	-119.64	-.02	150.25	41.73
5	LAYBARGE	65.37	5.98	.00	.000	2.230	12.417	48.53	.00	-86.42	.01	121.99	33.89
7	LAYBARGE	59.91	5.72	.00	.000	3.282	17.887	48.49	.00	-97.67	-.01	131.52	36.53
9	LAYBARGE	53.32	5.27	.00	.000	4.501	24.493	48.43	.00	-94.09	.00	128.41	35.67
11	LAYBARGE	47.32	4.74	.00	.000	5.739	30.515	48.34	.00	-108.57	.00	140.63	39.06
13	LAYBARGE	38.21	3.69	.00	.000	7.423	39.683	48.18	.00	-124.12	.00	153.69	42.69
15	LAYBARGE	29.27	2.39	.00	.000	9.100	48.722	47.99	.00	-107.62	.01	139.47	38.74
17	LAYBARGE	23.13	1.33	.00	.000	10.368	54.950	47.83	.00	-95.65	-.06	129.14	35.87
19	LAYBARGE	17.18	.19	.00	.001	11.443	61.011	47.66	.00	-81.86	.25	117.24	32.57
21	LAYBARGE	10.63	-1.22	.00	-.012	13.021	67.716	47.47	-.11	-147.82	-3.66	173.20	48.11
24	STINGER	-4.64	-5.13	.00	.001	15.976	83.473	46.96	-.44	-197.92	-5.60	215.48	59.86
26	STINGER	-11.01	-7.10	.00	.041	18.237	90.140	46.73	-.62	-124.55	9.07	153.19	42.55
28	STINGER	-17.30	-9.29	.00	-.185	20.013	96.807	46.45	-.81	-130.77	-40.52	163.22	45.34
30	STINGER	-23.54	-11.65	.05	-.780	21.323	103.475	46.17	-1.01	-60.48	-37.91	107.35	29.82
32	STINGER	-29.74	-14.10	.16	-1.106	21.597	110.142	45.87	-1.22	11.61	-5.53	57.42	15.95
34	STINGER	-35.94	-16.54	.28	-1.115	21.210	116.809	45.56	-1.43	30.18	2.64	72.04	20.01
36	SAGBEND	-47.17	-20.78	.49	-.972	20.164	128.810	45.02	-1.80	36.47	5.08	77.24	21.46
37	SAGBEND	-58.47	-24.80	.66	-.805	19.039	140.810	44.52	-2.15	37.54	5.16	77.82	21.62
38	SAGBEND	-69.85	-28.61	.81	-.642	17.892	152.811	44.04	-2.48	38.11	5.01	77.97	21.66
39	SAGBEND	-81.31	-32.18	.92	-.485	16.729	164.812	43.58	-2.79	38.60	4.81	78.08	21.69
40	SAGBEND	-92.84	-35.51	1.00	-.336	15.551	176.812	43.16	-3.08	39.07	4.62	78.19	21.72
41	SAGBEND	-104.43	-38.61	1.05	-.194	14.360	188.813	42.77	-3.35	39.51	4.41	78.29	21.75
42	SAGBEND	-116.09	-41.46	1.08	-.060	13.156	200.813	42.41	-3.59	39.92	4.18	78.39	21.77
43	SAGBEND	-127.80	-44.07	1.08	.067	11.939	212.814	42.08	-3.82	40.30	3.91	78.48	21.80
44	SAGBEND	-139.57	-46.43	1.05	.183	10.712	224.814	41.79	-4.02	40.65	3.61	78.56	21.82
45	SAGBEND	-151.38	-48.53	1.00	.290	9.475	236.814	41.52	-4.21	40.96	3.31	78.64	21.84
46	SAGBEND	-163.24	-50.38	.93	.386	8.228	248.815	41.29	-4.37	41.24	2.99	78.71	21.86
47	SAGBEND	-175.13	-51.97	.85	.474	6.974	260.815	41.09	-4.50	41.48	2.72	78.77	21.88
48	SAGBEND	-187.06	-53.29	.74	.554	5.713	272.815	40.92	-4.62	41.68	2.58	78.83	21.90
49	SAGBEND	-199.01	-54.35	.61	.632	4.447	284.815	40.79	-4.71	41.84	2.55	78.88	21.91
50	SAGBEND	-210.98	-55.15	.47	.709	3.177	296.815	40.69	-4.78	41.91	2.50	78.88	21.91

51	SAGBEND	-222.97	-55.68	.32	.780	1.909	308.816	40.62	-4.83	41.50	1.98	78.46	21.79
52	SAGBEND	-234.96	-55.95	.15	.791	.696	320.816	40.59	-4.85	36.55	-3.29	74.32	20.65
53	SEABED	-246.96	-56.01	.02	.341	.004	332.816	40.58	-4.86	4.71	-24.95	64.73	17.98
54	SEABED	-258.96	-56.01	.00	-.007	.000	344.816	40.58	-4.85	-.21	-.62	43.77	12.16
55	SEABED	-270.96	-56.01	.00	.000	.000	356.816	40.58	-4.85	.01	.07	43.27	12.02
56	SEABED	-282.96	-56.01	.00	.000	.000	368.816	40.58	-4.85	.00	.00	43.22	12.00
57	SEABED	-294.96	-56.01	.00	.000	.000	380.816	40.58	-4.85	.00	.00	43.21	12.00
58	SEABED	-306.96	-56.01	.00	.000	.000	392.816	40.58	-4.85	.00	.00	43.21	12.00
59	SEABED	-318.96	-56.01	.00	.000	.000	404.816	40.58	-4.85	.00	.00	43.21	12.00

S T A T I C P I P E C O O R D I N A T E S, F O R C E S A N D S T R E S S E S

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	SUPPORT REACTION VERT (KN)	SUPPORT REACTION HORIZ (KN)	SUPT SEPARATIONS VERT (M)	SUPT SEPARATIONS HORIZ (M)	PIPE TENSION (KN)	BENDING MOMENTS VERT (KN-M)	BENDING MOMENTS HORIZ (KN-M)	BENDING MOMENTS TOTAL (KN-M)
1	TENSIONR	77.79	6.21	.00	-2.40	-.01	.00	.00	399.98	.00	.00	.00
3	LAYBARGE	71.49	6.16	.00	25.69	.00	.00	.00	399.80	-48.06	-.01	48.06
5	LAYBARGE	65.37	5.98	.00	11.87	.00	.00	.00	399.64	-34.72	.01	34.72
7	LAYBARGE	59.91	5.72	.00	16.53	.00	.00	.00	399.30	-39.24	.00	39.24
9	LAYBARGE	53.32	5.27	.00	14.99	.00	.00	.00	398.75	-37.80	.00	37.80
11	LAYBARGE	47.32	4.74	.00	19.70	.00	.00	.00	398.06	-43.62	.00	43.62
13	LAYBARGE	38.21	3.69	.00	24.61	.00	.00	.00	396.74	-49.86	.00	49.86
15	LAYBARGE	29.27	2.39	.00	19.42	.01	.00	.00	395.16	-43.24	.01	43.24
17	LAYBARGE	23.13	1.33	.00	15.68	-.03	.00	.00	393.88	-38.43	-.02	38.43
19	LAYBARGE	17.18	.19	.00	9.57	-.04	.00	.00	392.48	-32.89	.10	32.89
21	LAYBARGE	10.63	-1.22	.00	25.25	-1.28	.00	.00	391.31	-59.38	-1.47	59.40
24	STINGER	-4.64	-5.13	.00	32.18	-2.06	.00	.00	388.59	-79.51	-2.25	79.54
26	STINGER	-11.01	-7.10	.00	12.30	3.19	.00	.00	387.50	-50.04	3.64	50.17
28	STINGER	-17.30	-9.29	.00	19.84	-6.85	.00	.00	386.03	-52.53	-16.28	55.00
30	STINGER	-23.54	-11.65	.05	9.55	-5.58	.03	.05	384.59	-24.30	-15.23	28.68
32	STINGER	-29.74	-14.10	.16	.00	.00	.19	.16	383.02	4.67	-2.22	5.17
34	STINGER	-35.94	-16.54	.28	.00	.00	.59	.28	381.40	12.12	1.06	12.17
36	SAGBEND	-47.17	-20.78	.49	.00	.00	.00	.00	378.60	14.65	2.04	14.79
37	SAGBEND	-58.47	-24.80	.66	.00	.00	.00	.00	375.94	15.08	2.07	15.22
38	SAGBEND	-69.85	-28.61	.81	.00	.00	.00	.00	373.43	15.31	2.01	15.44
39	SAGBEND	-81.31	-32.18	.92	.00	.00	.00	.00	371.08	15.51	1.93	15.63
40	SAGBEND	-92.84	-35.51	1.00	.00	.00	.00	.00	368.88	15.69	1.85	15.80
41	SAGBEND	-104.43	-38.61	1.05	.00	.00	.00	.00	366.83	15.87	1.77	15.97
42	SAGBEND	-116.09	-41.46	1.08	.00	.00	.00	.00	364.95	16.04	1.68	16.12
43	SAGBEND	-127.80	-44.07	1.08	.00	.00	.00	.00	363.23	16.19	1.57	16.26
44	SAGBEND	-139.57	-46.43	1.05	.00	.00	.00	.00	361.67	16.33	1.45	16.39
45	SAGBEND	-151.38	-48.53	1.00	.00	.00	.00	.00	360.28	16.45	1.33	16.51
46	SAGBEND	-163.24	-50.38	.93	.00	.00	.00	.00	359.07	16.57	1.20	16.61
47	SAGBEND	-175.13	-51.97	.85	.00	.00	.00	.00	358.02	16.66	1.09	16.70
48	SAGBEND	-187.06	-53.29	.74	.00	.00	.00	.00	357.14	16.74	1.04	16.78
49	SAGBEND	-199.01	-54.35	.61	.00	.00	.00	.00	356.44	16.81	1.02	16.84
50	SAGBEND	-210.98	-55.15	.47	.00	.00	.00	.00	355.91	16.84	1.00	16.87
51	SAGBEND	-222.97	-55.68	.32	.00	.00	.00	.00	355.56	16.67	.79	16.69
52	SAGBEND	-234.96	-55.95	.15	.40	-.46	.00	.00	355.39	14.68	-1.32	14.74
53	SEABED	-246.96	-56.01	.02	7.42	-5.41	.00	.00	355.37	1.89	-10.03	10.20
54	SEABED	-258.96	-56.01	.00	8.10	.47	.00	.00	355.37	-.08	-.25	.26
55	SEABED	-270.96	-56.01	.00	7.91	.03	.00	.00	355.37	.00	.03	.03
56	SEABED	-282.96	-56.01	.00	7.92	.00	.00	.00	355.37	.00	.00	.00
57	SEABED	-294.96	-56.01	.00	7.92	.00	.00	.00	355.37	.00	.00	.00
58	SEABED	-306.96	-56.01	.00	7.92	.00	.00	.00	355.37	.00	.00	.00
59	SEABED	-318.96	-56.01	.00	.00	.00	.00	.00	355.37	.00	.00	.00

S T A T I C S O L U T I O N S U M M A R Y

PIPE PROPERTIES (1)

PIPE SECTION LENGTH ..	12.00 M	ELASTIC MODULUS	207000. MPA
OUTSIDE DIAMETER	21.908 CM	CROSS SECTIONAL AREA .	278.27 CM2
WALL THICKNESS	1.270 CM	MOMENT OF INERTIA	4400.56 CM4
WEIGHT/LENGTH IN AIR .	1235.937 N/M	YIELD STRESS	360.00 MPA
SUBMERGED WGHT/LENG ..	659.899 N/M	STRESS INTENS FACTOR .	1.000
SPECIFIC GRAVITY	2.146	STEEL DENSITY	78500.0 N/M3
WRAP COAT THICKNESS ..	.040 CM	WRAP COAT DENSITY	12815.0 N/M3

CONCRETE THICKNESS ... .250 CM CONCRETE DENSITY 30440.0 N/M3

BARGE DATA

TOTAL PIPE TENSION ... 399.98 KN RADIUS OF CURVATURE .. 300.00 M
NUMBER OF TENSIONERS . 1 BARGE TRIM ANGLE ..... .000 DEG
NO. OF PIPE SUPPORTS . 10 PIPE ANGLE AT STERN .. 13.021 DEG
BARGE HEADING ..... .000 DEG OFFSET FROM R.O.W. ... .00 M

STINGER DATA

NO. OF PIPE SUPPORTS . 6 STINGER STERN DEPTH .. -16.54 M
NO. STINGER SECTIONS . 6 PIPE ANGLE AT STERN .. 21.210 DEG
RADIUS OF CURVATURE .. 200.00 M STINGER LENGTH ..... 43.26 M

SAGBEND DATA

WATER DEPTH ..... 56.00 M HORIZ PIPE TENSION ... 355.37 KN
TOUCHDOWN X-COORD. ... -241.01 M BOTTOM SLOPE ANGLE ... .000 DEG

SOLUTION SUMMARY

NODE NO.	PIPE SECTION	X COORD	Y COORD	Z COORD	SUPPORT REACT VERT	HORIZ	TOTAL MOMENT	TOTAL STRESS	PCT YLD
1	TENSIONR	77.8	6.2	.0	-2.4	.0	.0	48.6	13.
3	LAYBARGE	71.5	6.2	.0	25.7	.0	48.1	150.2	42.
5	LAYBARGE	65.4	6.0	.0	11.9	.0	34.7	122.0	34.
7	LAYBARGE	59.9	5.7	.0	16.5	.0	39.2	131.5	37.
9	LAYBARGE	53.3	5.3	.0	15.0	.0	37.8	128.4	36.
11	LAYBARGE	47.3	4.7	.0	19.7	.0	43.6	140.6	39.
13	LAYBARGE	38.2	3.7	.0	24.6	.0	49.9	153.7	43.
15	LAYBARGE	29.3	2.4	.0	19.4	.0	43.2	139.5	39.
17	LAYBARGE	23.1	1.3	.0	15.7	.0	38.4	129.1	36.
19	LAYBARGE	17.2	.2	.0	9.6	.0	32.9	117.2	33.
21	LAYBARGE	10.6	-1.2	.0	25.2	-1.3	59.4	173.2	48.
24	STINGER	-4.6	-5.1	.0	32.2	-2.1	79.5	215.5	60.
26	STINGER	-11.0	-7.1	.0	12.3	3.2	50.2	153.2	43.
28	STINGER	-17.3	-9.3	.0	19.8	-6.8	55.0	163.2	45.
30	STINGER	-23.5	-11.7	.1	9.6	-5.6	28.7	107.4	30.
32	STINGER	-29.7	-14.1	.2	.0	.0	5.2	57.4	16.

S T A T I C S O L U T I O N S U M M A R Y

34	STINGER	-35.9	-16.5	.3	.0	.0	12.2	72.0	20.
49	SAGBEND	-199.0	-54.4	.6	.0	.0	16.8	78.9	22.
53	SEABED	-247.0	-56.0	.0	7.4	-5.4	10.2	64.7	18.

O V E R B E N D P I P E S U P P O R T G E O M E T R Y

STATION NO.	LOCATION	PIPE NODE	SUPT NODE	/----- PIPE COORDINATES ----/ X (M)	Y (M)	ANGLE (DEG)	/--- SUPPORT COORDINATES ---/ X (M)	Y (M)	ANGLE (DEG)	VERTICAL REACTION (KN)	VERTICAL SEPARATION (M)
1	TENSIONR	1	2	77.788	2.560	.27	77.789	2.560	.00	-2.40	.000
2	LAYBARGE	3	4	71.488	2.509	.96	71.489	2.509	1.05	25.69	.000
3	LAYBARGE	5	6	65.374	2.335	2.23	65.375	2.335	2.22	11.87	.000
4	LAYBARGE	7	8	59.910	2.073	3.28	59.911	2.073	3.27	16.53	.000
5	LAYBARGE	9	10	53.320	1.624	4.50	53.321	1.624	4.53	14.99	.000
6	LAYBARGE	11	12	47.322	1.088	5.74	47.323	1.089	5.68	19.70	.000
7	LAYBARGE	13	14	38.214	.042	7.42	38.215	.042	7.43	24.61	.000
8	LAYBARGE	15	16	29.270	-1.261	9.10	29.271	-1.261	9.15	19.42	.000
9	LAYBARGE	17	18	23.132	-2.316	10.37	23.133	-2.316	10.34	15.68	.000
10	LAYBARGE	19	20	17.181	-3.464	11.44	17.182	-3.464	11.50	9.57	.000
11	LAYBARGE	21	22	10.626	-4.875	13.02	10.627	-4.874	12.78	25.25	.000
12	STINGER	24	25	-4.637	-8.781	15.98	-4.636	-8.781	16.25	32.18	.000
13	STINGER	26	27	-11.005	-10.753	18.24	-11.004	-10.753	18.16	12.30	.000
14	STINGER	28	29	-17.305	-12.937	20.01	-17.304	-12.936	20.07	19.84	.000
15	STINGER	30	31	-23.539	-15.300	21.32	-23.527	-15.328	21.98	9.55	.030
16	STINGER	32	33	-29.739	-17.750	21.60	-29.667	-17.927	23.89	.00	.191
17	STINGER	34	35	-35.944	-20.186	21.21	-35.716	-20.728	25.80	.00	.589

S T A T I C P I P E C O O R D I N A T E S, F O R C E S A N D S T R E S S E S

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	.00	.000	.270	.000	48.58	.00	.00	.00	48.58	13.49
3	LAYBARGE	71.49	6.16	.00	.000	.960	6.300	48.56	.00	-119.64	-.02	150.25	41.74
5	LAYBARGE	65.37	5.98	.00	.000	2.230	12.417	48.54	.00	-86.42	.01	122.00	33.89
7	LAYBARGE	59.91	5.72	.00	.000	3.282	17.887	48.50	.00	-97.67	-.01	131.52	36.53
9	LAYBARGE	53.32	5.27	.00	.000	4.501	24.493	48.43	.00	-94.09	.00	128.41	35.67
11	LAYBARGE	47.32	4.74	.00	.000	5.739	30.515	48.35	.00	-108.57	.00	140.63	39.06
13	LAYBARGE	38.21	3.69	.00	.000	7.423	39.683	48.19	.00	-124.13	-.01	153.70	42.69
15	LAYBARGE	29.27	2.39	.00	.000	9.100	48.722	47.99	.00	-107.58	.02	139.44	38.73
17	LAYBARGE	23.13	1.33	.00	.000	10.369	54.950	47.84	.00	-95.85	-.08	129.31	35.92
19	LAYBARGE	17.18	.19	.00	.001	11.440	61.011	47.67	.00	-81.02	.34	116.53	32.37
21	LAYBARGE	10.63	-1.22	.00	-.014	13.036	67.716	47.47	-.11	-151.20	-4.00	176.08	48.91
24	STINGER	-4.62	-5.11	.00	.015	15.532	83.451	46.98	-.44	-151.01	-3.77	175.60	48.78
26	STINGER	-11.02	-6.99	.00	-.007	17.119	90.118	46.76	-.61	-78.76	-1.03	114.01	31.67
28	STINGER	-17.37	-9.02	.00	.018	18.333	96.785	46.50	-.78	-99.59	2.52	131.57	36.55
30	STINGER	-23.67	-11.19	.00	-.071	19.555	103.452	46.23	-.97	-79.75	-16.00	115.86	32.18
32	STINGER	-29.93	-13.48	.03	-.575	20.640	110.119	45.94	-1.17	-80.50	-50.98	127.52	35.42
34	STINGER	-36.16	-15.86	.12	-1.030	21.098	116.786	45.65	-1.38	6.44	-9.06	55.80	15.50
36	SAGBEND	-47.38	-20.12	.33	-1.025	20.315	128.786	45.11	-1.74	34.19	4.01	75.25	20.90
37	SAGBEND	-58.67	-24.18	.52	-.870	19.217	140.787	44.60	-2.10	37.25	5.08	77.62	21.56
38	SAGBEND	-70.04	-28.02	.67	-.707	18.075	152.787	44.11	-2.43	38.00	5.03	77.94	21.65
39	SAGBEND	-81.48	-31.62	.80	-.549	16.914	164.787	43.66	-2.74	38.52	4.84	78.06	21.68
40	SAGBEND	-93.00	-35.00	.89	-.399	15.739	176.787	43.23	-3.03	38.99	4.64	78.17	21.71
41	SAGBEND	-104.58	-38.13	.96	-.256	14.550	188.788	42.84	-3.31	39.44	4.44	78.27	21.74
42	SAGBEND	-116.22	-41.03	1.00	-.120	13.348	200.788	42.47	-3.56	39.85	4.21	78.37	21.77
43	SAGBEND	-127.93	-43.67	1.01	.007	12.134	212.788	42.14	-3.79	40.24	3.95	78.46	21.80
44	SAGBEND	-139.69	-46.07	1.00	.125	10.908	224.788	41.83	-3.99	40.59	3.65	78.55	21.82
45	SAGBEND	-151.49	-48.21	.96	.233	9.672	236.789	41.56	-4.18	40.91	3.35	78.63	21.84
46	SAGBEND	-163.34	-50.10	.90	.332	8.427	248.789	41.33	-4.34	41.19	3.04	78.70	21.86
47	SAGBEND	-175.23	-51.73	.82	.420	7.174	260.789	41.12	-4.48	41.44	2.76	78.76	21.88
48	SAGBEND	-187.15	-53.10	.73	.502	5.915	272.789	40.95	-4.60	41.65	2.60	78.82	21.89
49	SAGBEND	-199.10	-54.20	.61	.580	4.649	284.790	40.81	-4.70	41.82	2.55	78.87	21.91
50	SAGBEND	-211.07	-55.04	.48	.657	3.379	296.790	40.70	-4.77	41.91	2.52	78.89	21.91
51	SAGBEND	-223.06	-55.62	.34	.731	2.110	308.790	40.63	-4.82	41.65	2.24	78.61	21.84
52	SAGBEND	-235.05	-55.93	.18	.773	.879	320.790	40.59	-4.85	38.21	-.60	75.61	21.00
53	SEABED	-247.05	-56.01	.04	.495	.036	332.790	40.58	-4.85	9.47	-23.07	64.35	17.87
54	SEABED	-259.05	-56.01	.00	-.006	-.001	344.790	40.58	-4.85	-.27	-2.24	45.12	12.53
55	SEABED	-271.05	-56.01	.00	.000	.000	356.790	40.58	-4.85	.01	.14	43.33	12.04
56	SEABED	-283.05	-56.01	.00	.000	.000	368.790	40.58	-4.85	.00	-.01	43.22	12.01
57	SEABED	-295.05	-56.01	.00	.000	.000	380.790	40.58	-4.85	.00	.00	43.21	12.00
58	SEABED	-307.05	-56.01	.00	.000	.000	392.790	40.58	-4.85	.00	.00	43.21	12.00
59	SEABED	-319.05	-56.01	.00	.000	.000	404.790	40.58	-4.85	.00	.00	43.21	12.00
60	SEABED	-331.05	-56.01	.00	.000	.000	416.790	40.58	-4.85	.00	.00	43.21	12.00

S T A T I C P I P E C O O R D I N A T E S, F O R C E S A N D S T R E S S E S

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	SUPPORT REACTION VERT (KN)	HORIZ (KN)	SUPT SEPARATIONS VERT (M)	HORIZ (M)	PIPE TENSION (KN)	BENDING MOMENTS VERT (KN-M)	HORIZ (KN-M)	TOTAL (KN-M)
1	TENSIONR	77.79	6.21	.00	-2.40	-.01	.00	.00	400.01	.00	.00	.00
3	LAYBARGE	71.49	6.16	.00	25.69	.00	.00	.00	399.82	-48.06	-.01	48.06
5	LAYBARGE	65.37	5.98	.00	11.87	.00	.00	.00	399.67	-34.72	.01	34.72
7	LAYBARGE	59.91	5.72	.00	16.53	.00	.00	.00	399.33	-39.24	.00	39.24
9	LAYBARGE	53.32	5.27	.00	14.99	.00	.00	.00	398.78	-37.80	.00	37.80
11	LAYBARGE	47.32	4.74	.00	19.70	.00	.00	.00	398.09	-43.61	.00	43.61
13	LAYBARGE	38.21	3.69	.00	24.61	.00	.00	.00	396.77	-49.87	.00	49.87
15	LAYBARGE	29.27	2.39	.00	19.40	.01	.00	.00	395.19	-43.22	.01	43.22
17	LAYBARGE	23.13	1.33	.00	15.77	-.03	.00	.00	393.91	-38.51	-.03	38.51
19	LAYBARGE	17.18	.19	.00	9.25	-.01	.00	.00	392.51	-32.55	.14	32.55
21	LAYBARGE	10.63	-1.22	.00	26.28	-1.36	.00	.00	391.33	-60.74	-1.61	60.76
24	STINGER	-4.62	-5.11	.00	26.02	-1.29	.00	.00	388.77	-60.67	-1.52	60.69
26	STINGER	-11.02	-6.99	.00	7.21	-.71	.00	.00	387.67	-31.64	-.42	31.64
28	STINGER	-17.37	-9.02	.00	15.21	.67	.00	.00	386.30	-40.01	1.01	40.02
30	STINGER	-23.67	-11.19	.00	10.46	-1.38	.00	.00	384.90	-32.04	-6.43	32.68
32	STINGER	-29.93	-13.48	.03	15.37	-8.95	.02	.03	383.37	-32.34	-20.48	38.28

34	STINGER	-36.16	-15.86	.12	.00	.00	.08	.12	381.87	2.59	-3.64	4.47
36	SAGBEND	-47.38	-20.12	.33	.00	.00	.00	.00	379.05	13.73	1.61	13.83
37	SAGBEND	-58.67	-24.18	.52	.00	.00	.00	.00	376.37	14.96	2.04	15.10
38	SAGBEND	-70.04	-28.02	.67	.00	.00	.00	.00	373.84	15.27	2.02	15.40
39	SAGBEND	-81.48	-31.62	.80	.00	.00	.00	.00	371.46	15.47	1.94	15.60
40	SAGBEND	-93.00	-35.00	.89	.00	.00	.00	.00	369.23	15.66	1.87	15.78
41	SAGBEND	-104.58	-38.13	.96	.00	.00	.00	.00	367.16	15.84	1.78	15.94
42	SAGBEND	-116.22	-41.03	1.00	.00	.00	.00	.00	365.25	16.01	1.69	16.10
43	SAGBEND	-127.93	-43.67	1.01	.00	.00	.00	.00	363.51	16.16	1.59	16.24
44	SAGBEND	-139.69	-46.07	1.00	.00	.00	.00	.00	361.92	16.31	1.47	16.37
45	SAGBEND	-151.49	-48.21	.96	.00	.00	.00	.00	360.51	16.43	1.35	16.49
46	SAGBEND	-163.34	-50.10	.90	.00	.00	.00	.00	359.26	16.55	1.22	16.59
47	SAGBEND	-175.23	-51.73	.82	.00	.00	.00	.00	358.19	16.65	1.11	16.69
48	SAGBEND	-187.15	-53.10	.73	.00	.00	.00	.00	357.29	16.73	1.04	16.76
49	SAGBEND	-199.10	-54.20	.61	.00	.00	.00	.00	356.56	16.80	1.03	16.83
50	SAGBEND	-211.07	-55.04	.48	.00	.00	.00	.00	356.00	16.84	1.01	16.87
51	SAGBEND	-223.06	-55.62	.34	.00	.00	.00	.00	355.62	16.73	.90	16.76
52	SAGBEND	-235.05	-55.93	.18	.10	-.07	.00	.00	355.42	15.35	-.24	15.35
53	SEABED	-247.05	-56.01	.04	6.32	-5.40	.00	.00	355.38	3.80	-9.27	10.02
54	SEABED	-259.05	-56.01	.00	8.24	-.14	.00	.00	355.37	-.11	-.90	.90
55	SEABED	-271.05	-56.01	.00	7.91	.09	.00	.00	355.37	.00	.05	.06
56	SEABED	-283.05	-56.01	.00	7.92	-.01	.00	.00	355.37	.00	.00	.00
57	SEABED	-295.05	-56.01	.00	7.92	.00	.00	.00	355.37	.00	.00	.00
58	SEABED	-307.05	-56.01	.00	7.92	.00	.00	.00	355.37	.00	.00	.00
59	SEABED	-319.05	-56.01	.00	7.92	.00	.00	.00	355.37	.00	.00	.00
60	SEABED	-331.05	-56.01	.00	.00	.00	.00	.00	355.37	.00	.00	.00

S T A T I C S O L U T I O N S U M M A R Y

PIPE PROPERTIES (1)

PIPE SECTION LENGTH ..	12.00 M	ELASTIC MODULUS	207000. MPA
OUTSIDE DIAMETER	21.908 CM	CROSS SECTIONAL AREA .	278.27 CM2
WALL THICKNESS	1.270 CM	MOMENT OF INERTIA	4400.56 CM4
WEIGHT/LENGTH IN AIR .	1235.937 N/M	YIELD STRESS	360.00 MPA
SUBMERGED WGHT/LENG ..	659.899 N/M	STRESS INTENS FACTOR .	1.000
SPECIFIC GRAVITY	2.146	STEEL DENSITY	78500.0 N/M3
WRAP COAT THICKNESS ..	.040 CM	WRAP COAT DENSITY	12815.0 N/M3
CONCRETE THICKNESS ...	.250 CM	CONCRETE DENSITY	30440.0 N/M3

BARGE DATA

TOTAL PIPE TENSION ...	400.01 KN	RADIUS OF CURVATURE ..	300.00 M
NUMBER OF TENSIONERS .	1	BARGE TRIM ANGLE	.000 DEG
NO. OF PIPE SUPPORTS .	10	PIPE ANGLE AT STERN ..	13.036 DEG
BARGE HEADING	.000 DEG	OFFSET FROM R.O.W. ...	.00 M

STINGER DATA

NO. OF PIPE SUPPORTS .	6	STINGER STERN DEPTH ..	-15.86 M
NO. STINGER SECTIONS .	6	PIPE ANGLE AT STERN ..	21.098 DEG
RADIUS OF CURVATURE ..	300.00 M	STINGER LENGTH	43.24 M

SAGBEND DATA

WATER DEPTH	56.00 M	HORIZ PIPE TENSION ...	355.37 KN
TOUCHDOWN X-COORD. ...	-243.05 M	BOTTOM SLOPE ANGLE ...	.000 DEG

SOLUTION SUMMARY

NODE NO.	PIPE SECTION	X COORD	Y COORD	Z COORD	SUPPORT REACT VERT	HORIZ	TOTAL MOMENT	TOTAL STRESS	PCT YLD
1	TENSIONR	77.8	6.2	.0	-2.4	.0	.0	48.6	13.
3	LAYBARGE	71.5	6.2	.0	25.7	.0	48.1	150.2	42.
5	LAYBARGE	65.4	6.0	.0	11.9	.0	34.7	122.0	34.
7	LAYBARGE	59.9	5.7	.0	16.5	.0	39.2	131.5	37.
9	LAYBARGE	53.3	5.3	.0	15.0	.0	37.8	128.4	36.
11	LAYBARGE	47.3	4.7	.0	19.7	.0	43.6	140.6	39.
13	LAYBARGE	38.2	3.7	.0	24.6	.0	49.9	153.7	43.
15	LAYBARGE	29.3	2.4	.0	19.4	.0	43.2	139.4	39.
17	LAYBARGE	23.1	1.3	.0	15.8	.0	38.5	129.3	36.
19	LAYBARGE	17.2	.2	.0	9.3	.0	32.5	116.5	32.
21	LAYBARGE	10.6	-1.2	.0	26.3	-1.4	60.8	176.1	49.
24	STINGER	-4.6	-5.1	.0	26.0	-1.3	60.7	175.6	49.
26	STINGER	-11.0	-7.0	.0	7.2	-.7	31.6	114.0	32.
28	STINGER	-17.4	-9.0	.0	15.2	.7	40.0	131.6	37.
30	STINGER	-23.7	-11.2	.0	10.5	-1.4	32.7	115.9	32.
32	STINGER	-29.9	-13.5	.0	15.4	-8.9	38.3	127.5	35.

S T A T I C S O L U T I O N S U M M A R Y

34	STINGER	-36.2	-15.9	.1	.0	.0	4.5	55.8	15.
50	SAGBEND	-211.1	-55.0	.5	.0	.0	16.9	78.9	22.
53	SEABED	-247.1	-56.0	.0	6.3	-5.4	10.0	64.3	18.

O V E R B E N D P I P E S U P P O R T G E O M E T R Y

STATION NO.	LOCATION	PIPE NODE	SUPT NODE	/----- PIPE COORDINATES ----/ X (M)	Y (M)	ANGLE (DEG)	/--- SUPPORT COORDINATES ---/ X (M)	Y (M)	ANGLE (DEG)	VERTICAL REACTION (KN)	VERTICAL SEPARATION (M)
1	TENSIONR	1	2	77.788	2.560	.27	77.789	2.560	.00	-2.40	.000
2	LAYBARGE	3	4	71.488	2.509	.96	71.489	2.509	1.05	25.69	.000
3	LAYBARGE	5	6	65.374	2.335	2.23	65.375	2.335	2.22	11.87	.000
4	LAYBARGE	7	8	59.910	2.073	3.28	59.911	2.073	3.27	16.53	.000
5	LAYBARGE	9	10	53.320	1.624	4.50	53.321	1.624	4.53	14.99	.000
6	LAYBARGE	11	12	47.322	1.088	5.74	47.323	1.089	5.68	19.70	.000
7	LAYBARGE	13	14	38.214	.042	7.42	38.215	.042	7.43	24.61	.000
8	LAYBARGE	15	16	29.270	-1.261	9.10	29.271	-1.261	9.15	19.40	.000
9	LAYBARGE	17	18	23.132	-2.316	10.37	23.133	-2.316	10.34	15.77	.000
10	LAYBARGE	19	20	17.181	-3.464	11.44	17.182	-3.464	11.50	9.25	.000
11	LAYBARGE	21	22	10.626	-4.875	13.04	10.627	-4.874	12.78	26.28	.000
12	STINGER	24	25	-4.621	-8.757	15.53	-4.620	-8.756	15.79	26.02	.000
13	STINGER	26	27	-11.016	-10.642	17.12	-11.015	-10.641	17.06	7.21	.000
14	STINGER	28	29	-17.367	-12.668	18.33	-17.366	-12.668	18.33	15.21	.000
15	STINGER	30	31	-23.672	-14.836	19.55	-23.671	-14.835	19.61	10.46	.000
16	STINGER	32	33	-29.933	-17.127	20.64	-29.926	-17.142	20.88	15.37	.017
17	STINGER	34	35	-36.157	-19.514	21.10	-36.128	-19.588	22.15	.00	.079

S T A T I C P I P E C O O R D I N A T E S, F O R C E S A N D S T R E S S E S

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	.00	.000	.270	.000	48.58	.00	.00	.00	48.58	13.49
3	LAYBARGE	71.49	6.16	.00	.000	.960	6.300	48.56	.00	-119.64	-.02	150.25	41.74
5	LAYBARGE	65.37	5.98	.00	.000	2.230	12.417	48.54	.00	-86.42	.01	122.00	33.89
7	LAYBARGE	59.91	5.72	.00	.000	3.282	17.887	48.50	.00	-97.68	-.01	131.52	36.53
9	LAYBARGE	53.32	5.27	.00	.000	4.501	24.493	48.43	.00	-94.09	.00	128.41	35.67
11	LAYBARGE	47.32	4.74	.00	.000	5.739	30.515	48.35	.00	-108.57	.00	140.63	39.06
13	LAYBARGE	38.21	3.69	.00	.000	7.423	39.683	48.19	.00	-124.14	-.01	153.70	42.70
15	LAYBARGE	29.27	2.39	.00	.000	9.100	48.722	47.99	.00	-107.56	.02	139.42	38.73
17	LAYBARGE	23.13	1.33	.00	.000	10.369	54.950	47.84	.00	-95.96	-.08	129.40	35.95
19	LAYBARGE	17.18	.19	.00	.001	11.438	61.011	47.67	.00	-80.57	.33	116.15	32.26
21	LAYBARGE	10.63	-1.22	.00	-.013	13.044	67.716	47.47	-.11	-152.99	-3.97	177.61	49.34
24	STINGER	-4.61	-5.09	.00	.014	15.309	83.439	46.99	-.44	-127.20	-3.95	155.38	43.16
26	STINGER	-11.02	-6.94	.00	-.003	16.573	90.106	46.77	-.60	-58.25	-.05	96.58	26.83
28	STINGER	-17.40	-8.88	.00	-.002	17.449	96.773	46.52	-.77	-73.77	-1.67	109.63	30.45
30	STINGER	-23.74	-10.94	.00	.011	18.441	103.440	46.26	-.95	-74.13	1.58	109.76	30.49
32	STINGER	-30.05	-13.10	.00	-.048	19.310	110.108	45.99	-1.14	-56.64	-11.12	95.62	26.56
34	STINGER	-36.32	-15.35	.02	-.522	20.214	116.775	45.70	-1.33	-78.66	-52.17	126.60	35.17
36	SAGBEND	-47.56	-19.56	.20	-1.024	20.371	128.775	45.18	-1.70	26.22	.01	68.33	18.98
37	SAGBEND	-58.84	-23.64	.39	-.916	19.363	140.775	44.66	-2.05	36.44	4.72	76.94	21.37
38	SAGBEND	-70.20	-27.51	.56	-.756	18.231	152.775	44.18	-2.38	37.86	5.02	77.86	21.63
39	SAGBEND	-81.63	-31.15	.70	-.598	17.073	164.775	43.72	-2.70	38.45	4.86	78.04	21.68
40	SAGBEND	-93.14	-34.55	.80	-.447	15.900	176.775	43.29	-3.00	38.93	4.67	78.15	21.71
41	SAGBEND	-104.71	-37.72	.88	-.303	14.713	188.775	42.89	-3.27	39.38	4.47	78.26	21.74
42	SAGBEND	-116.35	-40.65	.92	-.166	13.512	200.776	42.52	-3.52	39.80	4.24	78.36	21.77
43	SAGBEND	-128.05	-43.33	.94	-.038	12.300	212.776	42.18	-3.76	40.19	3.98	78.45	21.79
44	SAGBEND	-139.80	-45.76	.94	.081	11.076	224.776	41.87	-3.97	40.54	3.69	78.54	21.82

45	SAGBEND	-151.60	-47.94	.91	.191	9.841	236.776	41.60	-4.16	40.87	3.40	78.62	21.84
46	SAGBEND	-163.44	-49.86	.86	.291	8.597	248.776	41.36	-4.32	41.16	3.09	78.69	21.86
47	SAGBEND	-175.33	-51.52	.79	.381	7.346	260.777	41.15	-4.47	41.41	2.80	78.75	21.88
48	SAGBEND	-187.25	-52.93	.70	.463	6.087	272.777	40.97	-4.59	41.62	2.61	78.81	21.89
49	SAGBEND	-199.19	-54.07	.60	.541	4.822	284.777	40.82	-4.69	41.80	2.55	78.87	21.91
50	SAGBEND	-211.16	-54.94	.48	.618	3.552	296.777	40.71	-4.76	41.91	2.53	78.89	21.91
51	SAGBEND	-223.14	-55.55	.34	.693	2.282	308.778	40.64	-4.82	41.75	2.31	78.69	21.86
52	SAGBEND	-235.14	-55.90	.19	.743	1.039	320.778	40.59	-4.85	39.24	.11	76.49	21.25
53	SEABED	-247.13	-56.01	.04	.545	.086	332.778	40.58	-4.85	15.11	-19.21	63.92	17.76
54	SEABED	-259.13	-56.01	.00	.003	-.002	344.778	40.58	-4.85	-.27	-3.91	46.53	12.92
55	SEABED	-271.13	-56.01	.00	.000	.000	356.778	40.58	-4.85	.00	.17	43.36	12.04
56	SEABED	-283.13	-56.01	.00	.000	.000	368.778	40.58	-4.85	.00	-.01	43.22	12.01
57	SEABED	-295.13	-56.01	.00	.000	.000	380.778	40.58	-4.85	.00	.00	43.21	12.00
58	SEABED	-307.13	-56.01	.00	.000	.000	392.778	40.58	-4.85	.00	.00	43.21	12.00
59	SEABED	-319.13	-56.01	.00	.000	.000	404.778	40.58	-4.85	.00	.00	43.21	12.00
60	SEABED	-331.13	-56.01	.00	.000	.000	416.778	40.58	-4.85	.00	.00	43.21	12.00

S T A T I C P I P E C O O R D I N A T E S, F O R C E S A N D S T R E S S E S

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	SUPPORT REACTION VERT (KN)	SUPPORT REACTION HORIZ (KN)	SUPT SEPARATIONS VERT (M)	SUPT SEPARATIONS HORIZ (M)	PIPE TENSION (KN)	BENDING MOMENTS VERT (KN-M)	BENDING MOMENTS HORIZ (KN-M)	BENDING MOMENTS TOTAL (KN-M)
1	TENSIONR	77.79	6.21	.00	-2.40	-.01	.00	.00	400.02	.00	.00	.00
3	LAYBARGE	71.49	6.16	.00	25.69	.00	.00	.00	399.83	-48.06	-.01	48.06
5	LAYBARGE	65.37	5.98	.00	11.87	.00	.00	.00	399.67	-34.72	.01	34.72
7	LAYBARGE	59.91	5.72	.00	16.53	.00	.00	.00	399.33	-39.24	.00	39.24
9	LAYBARGE	53.32	5.27	.00	14.99	.00	.00	.00	398.78	-37.80	.00	37.80
11	LAYBARGE	47.32	4.74	.00	19.70	.00	.00	.00	398.10	-43.61	.00	43.61
13	LAYBARGE	38.21	3.69	.00	24.62	.00	.00	.00	396.77	-49.87	.00	49.87
15	LAYBARGE	29.27	2.39	.00	19.39	.01	.00	.00	395.19	-43.21	.01	43.21
17	LAYBARGE	23.13	1.33	.00	15.81	-.03	.00	.00	393.91	-38.55	-.03	38.55
19	LAYBARGE	17.18	.19	.00	9.08	-.02	.00	.00	392.52	-32.37	.13	32.37
21	LAYBARGE	10.63	-1.22	.00	26.83	-1.36	.00	.00	391.33	-61.46	-1.59	61.48
24	STINGER	-4.61	-5.09	.00	22.76	-1.36	.00	.00	388.83	-51.10	-1.59	51.12
26	STINGER	-11.02	-6.94	.00	5.59	-.33	.00	.00	387.73	-23.40	-.02	23.40
28	STINGER	-17.40	-8.88	.00	11.55	-.95	.00	.00	386.43	-29.64	-.67	29.65
30	STINGER	-23.74	-10.94	.00	11.67	.31	.00	.00	385.07	-29.78	.64	29.79
32	STINGER	-30.05	-13.10	.00	7.33	-.37	.00	.00	383.67	-22.75	-4.47	23.19
34	STINGER	-36.32	-15.35	.02	15.98	-9.29	.01	.02	382.13	-31.60	-20.96	37.92
36	SAGBEND	-47.56	-19.56	.20	.00	.00	.00	.00	379.42	10.53	.00	10.53
37	SAGBEND	-58.84	-23.64	.39	.00	.00	.00	.00	376.72	14.64	1.90	14.76
38	SAGBEND	-70.20	-27.51	.56	.00	.00	.00	.00	374.17	15.21	2.02	15.34
39	SAGBEND	-81.63	-31.15	.70	.00	.00	.00	.00	371.77	15.45	1.95	15.57
40	SAGBEND	-93.14	-34.55	.80	.00	.00	.00	.00	369.52	15.64	1.88	15.75
41	SAGBEND	-104.71	-37.72	.88	.00	.00	.00	.00	367.43	15.82	1.80	15.92
42	SAGBEND	-116.35	-40.65	.92	.00	.00	.00	.00	365.50	15.99	1.71	16.08
43	SAGBEND	-128.05	-43.33	.94	.00	.00	.00	.00	363.73	16.14	1.60	16.22
44	SAGBEND	-139.80	-45.76	.94	.00	.00	.00	.00	362.13	16.29	1.48	16.36
45	SAGBEND	-151.60	-47.94	.91	.00	.00	.00	.00	360.69	16.42	1.37	16.47
46	SAGBEND	-163.44	-49.86	.86	.00	.00	.00	.00	359.42	16.53	1.24	16.58
47	SAGBEND	-175.33	-51.52	.79	.00	.00	.00	.00	358.32	16.64	1.12	16.67
48	SAGBEND	-187.25	-52.93	.70	.00	.00	.00	.00	357.40	16.72	1.05	16.75
49	SAGBEND	-199.19	-54.07	.60	.00	.00	.00	.00	356.64	16.79	1.03	16.82
50	SAGBEND	-211.16	-54.94	.48	.00	.00	.00	.00	356.06	16.84	1.02	16.87
51	SAGBEND	-223.14	-55.55	.34	.00	.00	.00	.00	355.66	16.77	.93	16.80
52	SAGBEND	-235.14	-55.90	.19	.02	-.03	.00	.00	355.43	15.76	.05	15.76
53	SEABED	-247.13	-56.01	.04	5.18	-4.68	.00	.00	355.38	6.07	-7.72	9.82
54	SEABED	-259.13	-56.01	.00	8.39	-.71	.00	.00	355.37	-.11	-1.57	1.57
55	SEABED	-271.13	-56.01	.00	7.91	.15	.00	.00	355.37	.00	.07	.07
56	SEABED	-283.13	-56.01	.00	7.92	-.01	.00	.00	355.37	.00	.00	.00
57	SEABED	-295.13	-56.01	.00	7.92	.00	.00	.00	355.37	.00	.00	.00
58	SEABED	-307.13	-56.01	.00	7.92	.00	.00	.00	355.37	.00	.00	.00
59	SEABED	-319.13	-56.01	.00	7.92	.00	.00	.00	355.37	.00	.00	.00
60	SEABED	-331.13	-56.01	.00	.00	.00	.00	.00	355.37	.00	.00	.00

S T A T I C S O L U T I O N S U M M A R Y

PIPE PROPERTIES (1)

PIPE SECTION LENGTH ..	12.00 M	ELASTIC MODULUS	207000. MPA
OUTSIDE DIAMETER	21.908 CM	CROSS SECTIONAL AREA .	278.27 CM2
WALL THICKNESS	1.270 CM	MOMENT OF INERTIA	4400.56 CM4
WEIGHT/LENGTH IN AIR .	1235.937 N/M	YIELD STRESS	360.00 MPA
SUBMERGED WGHT/LENG ..	659.899 N/M	STRESS INTENS FACTOR .	1.000
SPECIFIC GRAVITY	2.146	STEEL DENSITY	78500.0 N/M3
WRAP COAT THICKNESS ..	.040 CM	WRAP COAT DENSITY	12815.0 N/M3
CONCRETE THICKNESS ...	.250 CM	CONCRETE DENSITY	30440.0 N/M3

BARGE DATA

TOTAL PIPE TENSION ...	400.02 KN	RADIUS OF CURVATURE ..	300.00 M
NUMBER OF TENSIONERS .	1	BARGE TRIM ANGLE	.000 DEG
NO. OF PIPE SUPPORTS .	10	PIPE ANGLE AT STERN ..	13.044 DEG
BARGE HEADING	.000 DEG	OFFSET FROM R.O.W. ...	.00 M

STINGER DATA

NO. OF PIPE SUPPORTS .	6	STINGER STERN DEPTH ..	-15.35 M
NO. STINGER SECTIONS .	6	PIPE ANGLE AT STERN ..	20.214 DEG
RADIUS OF CURVATURE ..	400.00 M	STINGER LENGTH	43.22 M

SAGBEND DATA

WATER DEPTH	56.00 M	HORIZ PIPE TENSION ...	355.37 KN
TOUCHDOWN X-COORD. ...	-244.74 M	BOTTOM SLOPE ANGLE ...	.000 DEG

SOLUTION SUMMARY

NODE NO.	PIPE SECTION	X COORD	Y COORD	Z COORD	SUPPORT REACT VERT	HORIZ	TOTAL MOMENT	TOTAL STRESS	PCT YLD
1	TENSIONR	77.8	6.2	.0	-2.4	.0	.0	48.6	13.
3	LAYBARGE	71.5	6.2	.0	25.7	.0	48.1	150.3	42.
5	LAYBARGE	65.4	6.0	.0	11.9	.0	34.7	122.0	34.
7	LAYBARGE	59.9	5.7	.0	16.5	.0	39.2	131.5	37.
9	LAYBARGE	53.3	5.3	.0	15.0	.0	37.8	128.4	36.
11	LAYBARGE	47.3	4.7	.0	19.7	.0	43.6	140.6	39.
13	LAYBARGE	38.2	3.7	.0	24.6	.0	49.9	153.7	43.
15	LAYBARGE	29.3	2.4	.0	19.4	.0	43.2	139.4	39.
17	LAYBARGE	23.1	1.3	.0	15.8	.0	38.5	129.4	36.
19	LAYBARGE	17.2	.2	.0	9.1	.0	32.4	116.2	32.
21	LAYBARGE	10.6	-1.2	.0	26.8	-1.4	61.5	177.6	49.
24	STINGER	-4.6	-5.1	.0	22.8	-1.4	51.1	155.4	43.
26	STINGER	-11.0	-6.9	.0	5.6	-.3	23.4	96.6	27.
28	STINGER	-17.4	-8.9	.0	11.6	-1.0	29.6	109.6	30.
30	STINGER	-23.7	-10.9	.0	11.7	.3	29.8	109.8	30.
32	STINGER	-30.0	-13.1	.0	7.3	-.4	23.2	95.6	27.

S T A T I C S O L U T I O N S U M M A R Y

34	STINGER	-36.3	-15.3	.0	16.0	-9.3	37.9	126.6	35.
50	SAGBEND	-211.2	-54.9	.5	.0	.0	16.9	78.9	22.
53	SEABED	-247.1	-56.0	.0	5.2	-4.7	9.8	63.9	18.

O V E R B E N D P I P E S U P P O R T G E O M E T R Y

STATION NO.	LOCATION	PIPE NODE	SUPT NODE	/----- PIPE COORDINATES ----/ X (M)	Y (M)	ANGLE (DEG)	/--- SUPPORT COORDINATES ---/ X (M)	Y (M)	ANGLE (DEG)	VERTICAL REACTION (KN)	VERTICAL SEPARATION (M)
1	TENSIONR	1	2	77.788	2.560	.27	77.789	2.560	.00	-2.40	.000
2	LAYBARGE	3	4	71.488	2.509	.96	71.489	2.509	1.05	25.69	.000
3	LAYBARGE	5	6	65.374	2.335	2.23	65.375	2.335	2.22	11.87	.000
4	LAYBARGE	7	8	59.910	2.073	3.28	59.911	2.073	3.27	16.53	.000
5	LAYBARGE	9	10	53.320	1.624	4.50	53.321	1.624	4.53	14.99	.000
6	LAYBARGE	11	12	47.322	1.088	5.74	47.323	1.089	5.68	19.70	.000
7	LAYBARGE	13	14	38.214	.042	7.42	38.215	.042	7.43	24.62	.000
8	LAYBARGE	15	16	29.270	-1.261	9.10	29.271	-1.261	9.15	19.39	.000
9	LAYBARGE	17	18	23.132	-2.316	10.37	23.133	-2.316	10.34	15.81	.000
10	LAYBARGE	19	20	17.181	-3.464	11.44	17.182	-3.464	11.50	9.08	.000
11	LAYBARGE	21	22	10.626	-4.875	13.04	10.627	-4.874	12.78	26.83	.000

12	STINGER	24	25	-4.612	-8.744	15.31	-4.611	-8.744	15.56	22.76	.000
13	STINGER	26	27	-11.020	-10.586	16.57	-11.019	-10.586	16.51	5.59	.000
14	STINGER	28	29	-17.396	-12.534	17.45	-17.395	-12.534	17.47	11.55	.000
15	STINGER	30	31	-23.739	-14.588	18.44	-23.738	-14.588	18.42	11.67	.000
16	STINGER	32	33	-30.046	-16.748	19.31	-30.045	-16.747	19.38	7.33	.000
17	STINGER	34	35	-36.322	-18.999	20.21	-36.316	-19.012	20.33	15.98	.014

Output Analisis Statis (Case 13 – 18)

S T A T I C P I P E C O O R D I N A T E S, F O R C E S A N D S T R E S S E S

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	.00	.000	.266	.000	36.43	.00	.00	.00	36.43	10.12
3	LAYBARGE	71.49	6.16	.00	.000	.958	6.300	36.41	.00	-116.82	-.02	135.70	37.70
5	LAYBARGE	65.37	5.98	.00	.000	2.232	12.417	36.39	.00	-84.11	.01	107.89	29.97
7	LAYBARGE	59.91	5.72	.00	.000	3.279	17.887	36.35	.00	-95.08	-.01	117.17	32.55
9	LAYBARGE	53.32	5.27	.00	.000	4.504	24.493	36.28	.00	-91.57	.00	114.11	31.70
11	LAYBARGE	47.32	4.74	.00	.000	5.732	30.515	36.20	.00	-104.33	.00	124.88	34.69
13	LAYBARGE	38.21	3.69	.00	.000	7.424	39.683	36.04	.00	-117.94	-.01	136.29	37.86
15	LAYBARGE	29.27	2.39	.00	.000	9.106	48.722	35.85	.00	-103.42	.02	123.75	34.38
17	LAYBARGE	23.13	1.33	.00	.000	10.366	54.950	35.69	.00	-92.99	-.09	114.73	31.87
19	LAYBARGE	17.18	.19	.00	.002	11.450	61.011	35.52	.00	-81.07	.37	104.43	29.01
21	LAYBARGE	10.63	-1.22	.00	-.014	12.983	67.716	35.33	-.11	-134.98	-4.06	150.16	41.71
24	STINGER	-4.64	-5.13	.00	.014	16.018	83.473	34.82	-.44	-183.81	-4.12	191.31	53.14
26	STINGER	-11.01	-7.10	.00	-.001	18.218	90.140	34.59	-.62	-119.62	.35	136.58	37.94
28	STINGER	-17.30	-9.29	.00	-.009	20.059	96.807	34.31	-.81	-135.86	-3.13	150.22	41.73
30	STINGER	-23.53	-11.68	.00	.040	21.977	103.475	34.01	-1.01	-129.57	7.34	144.83	40.23
32	STINGER	-29.67	-14.27	.01	-.383	23.808	110.142	33.68	-1.24	-123.91	-61.22	151.78	42.16
34	STINGER	-35.74	-17.03	.09	-1.035	24.767	116.809	33.35	-1.48	-13.94	-19.23	54.29	15.08
36	SAGBEND	-46.65	-22.02	.31	-1.156	24.067	128.810	32.72	-1.91	41.27	3.82	68.93	19.15
37	SAGBEND	-57.66	-26.78	.51	-.968	22.660	140.810	32.12	-2.32	49.23	6.50	75.51	20.98
38	SAGBEND	-68.80	-31.26	.68	-.751	21.132	152.810	31.55	-2.71	51.21	6.58	76.83	21.34
39	SAGBEND	-80.05	-35.43	.81	-.541	19.561	164.811	31.03	-3.07	52.38	6.32	77.46	21.52
40	SAGBEND	-91.41	-39.29	.90	-.343	17.957	176.811	30.54	-3.41	53.41	5.97	77.98	21.66
41	SAGBEND	-102.88	-42.82	.95	-.159	16.323	188.812	30.09	-3.71	54.37	5.54	78.47	21.80
42	SAGBEND	-114.44	-46.03	.96	.008	14.661	200.812	29.69	-3.99	55.25	5.04	78.92	21.92
43	SAGBEND	-126.09	-48.90	.94	.157	12.973	212.812	29.33	-4.24	56.06	4.48	79.33	22.04
44	SAGBEND	-137.83	-51.42	.90	.288	11.262	224.813	29.01	-4.46	56.78	3.93	79.71	22.14
45	SAGBEND	-149.63	-53.58	.83	.403	9.530	236.813	28.74	-4.64	57.41	3.62	80.06	22.24
46	SAGBEND	-161.49	-55.39	.73	.513	7.781	248.814	28.51	-4.80	57.94	3.56	80.36	22.32
47	SAGBEND	-173.40	-56.83	.61	.622	6.017	260.814	28.33	-4.93	58.35	3.54	80.59	22.39
48	SAGBEND	-185.35	-57.90	.47	.729	4.245	272.815	28.19	-5.02	58.49	3.40	80.62	22.39
49	SAGBEND	-197.33	-58.61	.31	.821	2.481	284.815	28.10	-5.08	57.38	2.32	79.58	22.11
50	SAGBEND	-209.33	-58.95	.14	.812	.836	296.816	28.06	-5.11	47.94	-5.51	71.77	19.94
51	SEABED	-221.33	-59.01	.01	.247	-.007	308.816	28.06	-5.12	4.52	-24.80	52.23	14.51
52	SEABED	-233.33	-59.01	.00	-.008	.000	320.816	28.06	-5.11	-.29	.19	31.23	8.67
53	SEABED	-245.33	-59.01	.00	.000	.000	332.816	28.06	-5.11	.02	.03	30.96	8.60
54	SEABED	-257.33	-59.01	.00	.000	.000	344.816	28.06	-5.11	.00	.00	30.94	8.59
55	SEABED	-269.33	-59.01	.00	.000	.000	356.816	28.06	-5.11	.00	.00	30.93	8.59
56	SEABED	-281.33	-59.01	.00	.000	.000	368.816	28.06	-5.11	.00	.00	30.93	8.59

S T A T I C P I P E C O O R D I N A T E S, F O R C E S A N D S T R E S S E S

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	SUPPORT REACTION VERT (KN)	HORIZ (KN)	SUPT SEPARATIONS VERT (M)	HORIZ (M)	PIPE TENSION (KN)	BENDING MOMENTS VERT (KN-M)	HORIZ (KN-M)	TOTAL (KN-M)
1	TENSIONR	77.79	6.21	.00	-2.54	-.01	.00	.00	299.98	.00	.00	.00
3	LAYBARGE	71.49	6.16	.00	23.42	.00	.00	.00	299.80	-46.93	-.01	46.93
5	LAYBARGE	65.37	5.98	.00	9.99	.00	.00	.00	299.64	-33.79	.00	33.79
7	LAYBARGE	59.91	5.72	.00	14.49	.00	.00	.00	299.30	-38.20	.00	38.20
9	LAYBARGE	53.32	5.27	.00	13.00	.00	.00	.00	298.75	-36.78	.00	36.78
11	LAYBARGE	47.32	4.74	.00	17.14	.00	.00	.00	298.07	-41.91	.00	41.91
13	LAYBARGE	38.21	3.69	.00	21.40	.00	.00	.00	296.75	-47.38	.00	47.38
15	LAYBARGE	29.27	2.39	.00	16.86	.01	.00	.00	295.17	-41.55	.01	41.55
17	LAYBARGE	23.13	1.33	.00	13.61	-.04	.00	.00	293.88	-37.36	-.04	37.36
19	LAYBARGE	17.18	.19	.00	8.29	.00	.00	.00	292.48	-32.57	.15	32.57
21	LAYBARGE	10.63	-1.22	.00	20.69	-1.36	.00	.00	291.34	-54.22	-1.63	54.25

24	STINGER	-4.64	-5.13	.00	26.62	-1.40	.00	.00	288.63	-73.84	-1.65	73.86
26	STINGER	-11.01	-7.10	.00	8.92	-.18	.00	.00	287.50	-48.06	.14	48.06
28	STINGER	-17.30	-9.29	.00	15.03	-1.50	.00	.00	286.03	-54.58	-1.26	54.59
30	STINGER	-23.53	-11.68	.00	13.32	3.77	.00	.00	284.46	-52.05	2.95	52.14
32	STINGER	-29.67	-14.27	.01	17.93	-10.41	.00	.01	282.73	-49.78	-24.59	55.52
34	STINGER	-35.74	-17.03	.09	1.36	-.80	.05	.09	281.07	-5.60	-7.72	9.54
36	SAGBEND	-46.65	-22.02	.31	.00	.00	.00	.00	277.77	16.58	1.53	16.65
37	SAGBEND	-57.66	-26.78	.51	.00	.00	.00	.00	274.62	19.78	2.61	19.95
38	SAGBEND	-68.80	-31.26	.68	.00	.00	.00	.00	271.67	20.57	2.64	20.74
39	SAGBEND	-80.05	-35.43	.81	.00	.00	.00	.00	268.91	21.04	2.54	21.20
40	SAGBEND	-91.41	-39.29	.90	.00	.00	.00	.00	266.37	21.46	2.40	21.59
41	SAGBEND	-102.88	-42.82	.95	.00	.00	.00	.00	264.03	21.84	2.23	21.95
42	SAGBEND	-114.44	-46.03	.96	.00	.00	.00	.00	261.91	22.20	2.03	22.29
43	SAGBEND	-126.09	-48.90	.94	.00	.00	.00	.00	260.02	22.52	1.80	22.59
44	SAGBEND	-137.83	-51.42	.90	.00	.00	.00	.00	258.36	22.81	1.58	22.87
45	SAGBEND	-149.63	-53.58	.83	.00	.00	.00	.00	256.93	23.06	1.45	23.11
46	SAGBEND	-161.49	-55.39	.73	.00	.00	.00	.00	255.74	23.28	1.43	23.32
47	SAGBEND	-173.40	-56.83	.61	.00	.00	.00	.00	254.79	23.44	1.42	23.48
48	SAGBEND	-185.35	-57.90	.47	.00	.00	.00	.00	254.08	23.50	1.37	23.54
49	SAGBEND	-197.33	-58.61	.31	.00	.00	.00	.00	253.61	23.05	.93	23.07
50	SAGBEND	-209.33	-58.95	.14	.57	-.61	.00	.00	253.40	19.26	-2.21	19.39
51	SEABED	-221.33	-59.01	.01	8.19	-4.33	.00	.00	253.39	1.81	-9.96	10.13
52	SEABED	-233.33	-59.01	.00	8.09	.75	.00	.00	253.39	-.12	.08	.14
53	SEABED	-245.33	-59.01	.00	7.91	.00	.00	.00	253.39	.01	.01	.01
54	SEABED	-257.33	-59.01	.00	7.92	.00	.00	.00	253.39	.00	.00	.00
55	SEABED	-269.33	-59.01	.00	7.92	.00	.00	.00	253.39	.00	.00	.00
56	SEABED	-281.33	-59.01	.00	.00	.00	.00	.00	253.39	.00	.00	.00

S T A T I C S O L U T I O N S U M M A R Y

PIPE PROPERTIES (1)

PIPE SECTION LENGTH ..	12.00 M	ELASTIC MODULUS	207000. MPA
OUTSIDE DIAMETER	21.908 CM	CROSS SECTIONAL AREA .	278.27 CM2
WALL THICKNESS	1.270 CM	MOMENT OF INERTIA	4400.56 CM4
WEIGHT/LENGTH IN AIR .	1235.937 N/M	YIELD STRESS	360.00 MPA
SUBMERGED WGHT/LENG ..	659.899 N/M	STRESS INTENS FACTOR .	1.000
SPECIFIC GRAVITY	2.146	STEEL DENSITY	78500.0 N/M3
WRAP COAT THICKNESS ..	.040 CM	WRAP COAT DENSITY	12815.0 N/M3
CONCRETE THICKNESS ...	.250 CM	CONCRETE DENSITY	30440.0 N/M3

BARGE DATA

TOTAL PIPE TENSION ...	299.98 KN	RADIUS OF CURVATURE ..	300.00 M
NUMBER OF TENSIONERS .	1	BARGE TRIM ANGLE	.000 DEG
NO. OF PIPE SUPPORTS .	10	PIPE ANGLE AT STERN ..	12.983 DEG
BARGE HEADING	.000 DEG	OFFSET FROM R.O.W. ...	.00 M

STINGER DATA

NO. OF PIPE SUPPORTS .	6	STINGER STERN DEPTH ..	-17.03 M
NO. STINGER SECTIONS .	6	PIPE ANGLE AT STERN ..	24.767 DEG
RADIUS OF CURVATURE ..	200.00 M	STINGER LENGTH	43.26 M

SAGBEND DATA

WATER DEPTH	59.00 M	HORIZ PIPE TENSION ...	253.39 KN
TOUCHDOWN X-COORD. ...	-215.01 M	BOTTOM SLOPE ANGLE ...	.000 DEG

SOLUTION SUMMARY

NODE NO.	PIPE SECTION	X COORD	Y COORD	Z COORD	SUPPORT REACT VERT	HORIZ	TOTAL MOMENT	TOTAL STRESS	PCT YLD
1	TENSIONR	77.8	6.2	.0	-2.5	.0	.0	36.4	10.
3	LAYBARGE	71.5	6.2	.0	23.4	.0	46.9	135.7	38.
5	LAYBARGE	65.4	6.0	.0	10.0	.0	33.8	107.9	30.
7	LAYBARGE	59.9	5.7	.0	14.5	.0	38.2	117.2	33.
9	LAYBARGE	53.3	5.3	.0	13.0	.0	36.8	114.1	32.
11	LAYBARGE	47.3	4.7	.0	17.1	.0	41.9	124.9	35.
13	LAYBARGE	38.2	3.7	.0	21.4	.0	47.4	136.3	38.
15	LAYBARGE	29.3	2.4	.0	16.9	.0	41.5	123.8	34.
17	LAYBARGE	23.1	1.3	.0	13.6	.0	37.4	114.7	32.
19	LAYBARGE	17.2	.2	.0	8.3	.0	32.6	104.4	29.
21	LAYBARGE	10.6	-1.2	.0	20.7	-1.4	54.2	150.2	42.
24	STINGER	-4.6	-5.1	.0	26.6	-1.4	73.9	191.3	53.
26	STINGER	-11.0	-7.1	.0	8.9	-.2	48.1	136.6	38.
28	STINGER	-17.3	-9.3	.0	15.0	-1.5	54.6	150.2	42.
30	STINGER	-23.5	-11.7	.0	13.3	3.8	52.1	144.8	40.

32	STINGER	-29.7	-14.3	.0	17.9	-10.4	55.5	151.8	42.

S T A T I C S O L U T I O N S U M M A R Y

34	STINGER	-35.7	-17.0	.1	1.4	-.8	9.5	54.3	15.
48	SAGBEND	-185.4	-57.9	.5	.0	.0	23.5	80.6	22.
51	SEABED	-221.3	-59.0	.0	8.2	-4.3	10.1	52.2	15.

O V E R B E N D P I P E S U P P O R T G E O M E T R Y

STATION NO.	LOCATION	PIPE NODE	SUPT NODE	/----- PIPE COORDINATES ----/ X (M)	Y (M)	ANGLE (DEG)	/--- SUPPORT COORDINATES ---/ X (M)	Y (M)	ANGLE (DEG)	VERTICAL REACTION (KN)	VERTICAL SEPARATION (M)
1	TENSIONR	1	2	77.789	2.560	.27	77.789	2.560	.00	-2.54	.000
2	LAYBARGE	3	4	71.488	2.509	.96	71.489	2.509	1.05	23.42	.000
3	LAYBARGE	5	6	65.375	2.335	2.23	65.375	2.335	2.22	9.99	.000
4	LAYBARGE	7	8	59.911	2.073	3.28	59.911	2.073	3.27	14.49	.000
5	LAYBARGE	9	10	53.320	1.624	4.50	53.321	1.624	4.53	13.00	.000
6	LAYBARGE	11	12	47.323	1.088	5.73	47.323	1.089	5.68	17.14	.000
7	LAYBARGE	13	14	38.214	.042	7.42	38.215	.042	7.43	21.40	.000
8	LAYBARGE	15	16	29.270	-1.261	9.11	29.271	-1.261	9.15	16.86	.000
9	LAYBARGE	17	18	23.132	-2.316	10.37	23.133	-2.316	10.34	13.61	.000
10	LAYBARGE	19	20	17.181	-3.464	11.45	17.182	-3.464	11.50	8.29	.000
11	LAYBARGE	21	22	10.627	-4.875	12.98	10.627	-4.874	12.78	20.69	.000
12	STINGER	24	25	-4.637	-8.781	16.02	-4.636	-8.781	16.25	26.62	.000
13	STINGER	26	27	-11.005	-10.753	18.22	-11.004	-10.753	18.16	8.92	.000
14	STINGER	28	29	-17.304	-12.937	20.06	-17.304	-12.936	20.07	15.03	.000
15	STINGER	30	31	-23.528	-15.329	21.98	-23.527	-15.328	21.98	13.32	.000
16	STINGER	32	33	-29.669	-17.923	23.81	-29.667	-17.927	23.89	17.93	.004
17	STINGER	34	35	-35.738	-20.681	24.77	-35.716	-20.728	25.80	1.36	.051

S T A T I C P I P E C O O R D I N A T E S, F O R C E S A N D S T R E S S E S

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	.00	.000	.266	.000	36.44	.00	.00	.00	36.44	10.12
3	LAYBARGE	71.49	6.16	.00	.000	.958	6.300	36.41	.00	-116.82	-.02	135.71	37.70
5	LAYBARGE	65.37	5.98	.00	.000	2.232	12.417	36.39	.00	-84.11	.01	107.89	29.97
7	LAYBARGE	59.91	5.72	.00	.000	3.279	17.887	36.35	.00	-95.08	-.01	117.17	32.55
9	LAYBARGE	53.32	5.27	.00	.000	4.504	24.493	36.29	.00	-91.57	.00	114.12	31.70
11	LAYBARGE	47.32	4.74	.00	.000	5.732	30.515	36.20	.00	-104.33	.00	124.88	34.69
13	LAYBARGE	38.21	3.69	.00	.000	7.424	39.683	36.04	.00	-117.96	-.01	136.31	37.86
15	LAYBARGE	29.27	2.39	.00	.000	9.106	48.722	35.85	.00	-103.36	.02	123.71	34.36
17	LAYBARGE	23.13	1.33	.00	.000	10.367	54.950	35.69	.00	-93.29	-.09	114.99	31.94
19	LAYBARGE	17.18	.19	.00	.002	11.445	61.011	35.52	.00	-79.86	.38	103.40	28.72
21	LAYBARGE	10.63	-1.22	.00	-.014	13.004	67.716	35.33	-.11	-139.70	-4.08	154.17	42.83
24	STINGER	-4.62	-5.11	.00	.015	15.563	83.451	34.84	-.44	-139.34	-3.97	153.55	42.65
26	STINGER	-11.02	-6.99	.00	-.005	17.118	90.118	34.62	-.61	-78.48	-.39	101.63	28.23
28	STINGER	-17.37	-9.02	.00	.006	18.313	96.785	34.36	-.78	-91.63	-.08	112.63	31.29
30	STINGER	-23.67	-11.19	.00	-.020	19.639	103.452	34.08	-.97	-95.55	-5.01	115.90	32.19
32	STINGER	-29.93	-13.49	.00	.082	20.765	110.119	33.80	-1.17	-65.03	15.94	91.30	25.36
34	STINGER	-36.13	-15.94	.00	-.336	22.616	116.786	33.45	-1.38	-190.87	-70.18	207.00	57.50
36	SAGBEND	-47.10	-20.79	.17	-1.146	24.124	128.786	32.88	-1.80	18.79	-2.60	49.92	13.87
37	SAGBEND	-58.09	-25.60	.39	-1.045	23.003	140.786	32.27	-2.22	46.11	5.75	72.91	20.25
38	SAGBEND	-69.20	-30.15	.57	-.835	21.519	152.786	31.70	-2.61	50.56	6.56	76.37	21.22
39	SAGBEND	-80.42	-34.40	.71	-.624	19.961	164.787	31.16	-2.98	52.07	6.38	77.28	21.47
40	SAGBEND	-91.75	-38.34	.82	-.423	18.366	176.787	30.66	-3.32	53.15	6.06	77.85	21.62
41	SAGBEND	-103.19	-41.96	.88	-.236	16.739	188.787	30.21	-3.64	54.13	5.66	78.35	21.76
42	SAGBEND	-114.73	-45.25	.91	-.064	15.084	200.787	29.79	-3.92	55.03	5.18	78.81	21.89
43	SAGBEND	-126.36	-48.20	.91	.090	13.403	212.787	29.42	-4.18	55.86	4.63	79.23	22.01

44	SAGBEND	-138.08	-50.81	.88	.226	11.698	224.788	29.09	-4.40	56.60	4.07	79.62	22.12
45	SAGBEND	-149.86	-53.07	.82	.345	9.971	236.788	28.80	-4.60	57.26	3.69	79.97	22.21
46	SAGBEND	-161.71	-54.96	.74	.456	8.226	248.789	28.57	-4.76	57.81	3.57	80.29	22.30
47	SAGBEND	-173.61	-56.50	.63	.565	6.466	260.789	28.37	-4.90	58.26	3.55	80.54	22.37
48	SAGBEND	-185.55	-57.67	.50	.672	4.695	272.790	28.22	-5.00	58.50	3.48	80.65	22.40
49	SAGBEND	-197.53	-58.46	.35	.772	2.925	284.790	28.12	-5.07	57.93	2.91	80.08	22.25
50	SAGBEND	-209.52	-58.89	.18	.819	1.225	296.791	28.07	-5.11	52.26	-1.26	75.19	20.88
51	SEABED	-221.52	-59.01	.03	.482	.058	308.791	28.06	-5.12	14.62	-25.72	55.94	15.54
52	SEABED	-233.52	-59.01	.00	-.012	-.002	320.791	28.06	-5.11	-.52	-1.49	32.26	8.96
53	SEABED	-245.52	-59.01	.00	.000	.000	332.791	28.06	-5.11	.02	.13	31.05	8.62
54	SEABED	-257.52	-59.01	.00	.000	.000	344.791	28.06	-5.11	.00	-.01	30.94	8.59
55	SEABED	-269.52	-59.01	.00	.000	.000	356.791	28.06	-5.11	.00	.00	30.93	8.59
56	SEABED	-281.52	-59.01	.00	.000	.000	368.791	28.06	-5.11	.00	.00	30.93	8.59
57	SEABED	-293.52	-59.01	.00	.000	.000	380.791	28.06	-5.11	.00	.00	30.93	8.59

STATIC PIPE COORDINATES, FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	SUPPORT REACTION VERT (KN)	SUPPORT REACTION HORIZ (KN)	SUPT SEPARATIONS VERT (M)	SUPT SEPARATIONS HORIZ (M)	PIPE TENSION (KN)	BENDING MOMENTS VERT (KN-M)	BENDING MOMENTS HORIZ (KN-M)	BENDING MOMENTS TOTAL (KN-M)
1	TENSIONR	77.79	6.21	.00	-2.54	-.01	.00	.00	300.02	.00	.00	.00
3	LAYBARGE	71.49	6.16	.00	23.42	.00	.00	.00	299.84	-46.93	-.01	46.93
5	LAYBARGE	65.37	5.98	.00	9.99	.00	.00	.00	299.68	-33.79	.00	33.79
7	LAYBARGE	59.91	5.72	.00	14.49	.00	.00	.00	299.34	-38.20	.00	38.20
9	LAYBARGE	53.32	5.27	.00	13.00	.00	.00	.00	298.79	-36.79	.00	36.79
11	LAYBARGE	47.32	4.74	.00	17.13	.00	.00	.00	298.10	-41.91	.00	41.91
13	LAYBARGE	38.21	3.69	.00	21.41	.00	.00	.00	296.78	-47.39	.00	47.39
15	LAYBARGE	29.27	2.39	.00	16.83	.01	.00	.00	295.20	-41.52	.01	41.52
17	LAYBARGE	23.13	1.33	.00	13.73	-.04	.00	.00	293.92	-37.48	-.04	37.48
19	LAYBARGE	17.18	.19	.00	7.84	.00	.00	.00	292.52	-32.08	.15	32.08
21	LAYBARGE	10.63	-1.22	.00	21.93	-1.37	.00	.00	291.36	-56.12	-1.64	56.14
24	STINGER	-4.62	-5.11	.00	21.59	-1.34	.00	.00	288.80	-55.98	-1.60	56.00
26	STINGER	-11.02	-6.99	.00	6.14	-.46	.00	.00	287.68	-31.53	-.16	31.53
28	STINGER	-17.37	-9.02	.00	11.10	-.34	.00	.00	286.32	-36.81	-.03	36.81
30	STINGER	-23.67	-11.19	.00	12.55	-2.21	.00	.00	284.88	-38.38	-2.01	38.44
32	STINGER	-29.93	-13.49	.00	.96	5.74	.00	.00	283.40	-26.13	6.41	26.90
34	STINGER	-36.13	-15.94	.00	31.83	-12.35	.00	.00	281.46	-76.68	-28.19	81.70
36	SAGBEND	-47.10	-20.79	.17	.00	.00	.00	.00	278.61	7.55	-1.04	7.62
37	SAGBEND	-58.09	-25.60	.39	.00	.00	.00	.00	275.42	18.53	2.31	18.67
38	SAGBEND	-69.20	-30.15	.57	.00	.00	.00	.00	272.42	20.31	2.63	20.48
39	SAGBEND	-80.42	-34.40	.71	.00	.00	.00	.00	269.61	20.92	2.56	21.07
40	SAGBEND	-91.75	-38.34	.82	.00	.00	.00	.00	267.01	21.35	2.43	21.49
41	SAGBEND	-103.19	-41.96	.88	.00	.00	.00	.00	264.62	21.74	2.27	21.86
42	SAGBEND	-114.73	-45.25	.91	.00	.00	.00	.00	262.45	22.11	2.08	22.20
43	SAGBEND	-126.36	-48.20	.91	.00	.00	.00	.00	260.50	22.44	1.86	22.52
44	SAGBEND	-138.08	-50.81	.88	.00	.00	.00	.00	258.78	22.74	1.64	22.80
45	SAGBEND	-149.86	-53.07	.82	.00	.00	.00	.00	257.29	23.00	1.48	23.05
46	SAGBEND	-161.71	-54.96	.74	.00	.00	.00	.00	256.04	23.23	1.43	23.27
47	SAGBEND	-173.61	-56.50	.63	.00	.00	.00	.00	255.02	23.40	1.43	23.45
48	SAGBEND	-185.55	-57.67	.50	.00	.00	.00	.00	254.25	23.50	1.40	23.54
49	SAGBEND	-197.53	-58.46	.35	.00	.00	.00	.00	253.73	23.27	1.17	23.30
50	SAGBEND	-209.52	-58.89	.18	.05	-.07	.00	.00	253.45	20.99	-.51	21.00
51	SEABED	-221.52	-59.01	.03	6.37	-4.82	.00	.00	253.40	5.87	-10.33	11.88
52	SEABED	-233.52	-59.01	.00	8.41	.41	.00	.00	253.39	-.21	-.60	.63
53	SEABED	-245.52	-59.01	.00	7.90	.06	.00	.00	253.39	.01	.05	.05
54	SEABED	-257.52	-59.01	.00	7.92	.00	.00	.00	253.39	.00	.00	.00
55	SEABED	-269.52	-59.01	.00	7.92	.00	.00	.00	253.39	.00	.00	.00
56	SEABED	-281.52	-59.01	.00	7.92	.00	.00	.00	253.39	.00	.00	.00
57	SEABED	-293.52	-59.01	.00	.00	.00	.00	.00	253.39	.00	.00	.00

STATIC SOLUTION SUMMARY

PIPE PROPERTIES (1)

PIPE SECTION LENGTH ..	12.00 M	ELASTIC MODULUS	207000. MPA
OUTSIDE DIAMETER	21.908 CM	CROSS SECTIONAL AREA .	278.27 CM2
WALL THICKNESS	1.270 CM	MOMENT OF INERTIA	4400.56 CM4
WEIGHT/LENGTH IN AIR .	1235.937 N/M	YIELD STRESS	360.00 MPA

SUBMERGED WGHT/LENG ..	659.899 N/M	STRESS INTENS FACTOR .	1.000
SPECIFIC GRAVITY	2.146	STEEL DENSITY	78500.0 N/M3
WRAP COAT THICKNESS ..	.040 CM	WRAP COAT DENSITY	12815.0 N/M3
CONCRETE THICKNESS ...	.250 CM	CONCRETE DENSITY	30440.0 N/M3

BARGE DATA

TOTAL PIPE TENSION ...	300.02 KN	RADIUS OF CURVATURE ..	300.00 M
NUMBER OF TENSIONERS .	1	BARGE TRIM ANGLE	.000 DEG
NO. OF PIPE SUPPORTS .	10	PIPE ANGLE AT STERN ..	13.004 DEG
BARGE HEADING	.000 DEG	OFFSET FROM R.O.W. ...	.00 M

STINGER DATA

NO. OF PIPE SUPPORTS .	6	STINGER STERN DEPTH ..	-15.94 M
NO. STINGER SECTIONS .	6	PIPE ANGLE AT STERN ..	22.616 DEG
RADIUS OF CURVATURE ..	300.00 M	STINGER LENGTH	43.24 M

SAGBEND DATA

WATER DEPTH	59.00 M	HORIZ PIPE TENSION ...	253.39 KN
TOUCHDOWN X-COORD. ...	-218.30 M	BOTTOM SLOPE ANGLE ...	.000 DEG

SOLUTION SUMMARY

NODE NO.	PIPE SECTION	X COORD	Y COORD	Z COORD	SUPPORT REACT VERT	SUPPORT REACT HORIZ	TOTAL MOMENT	TOTAL STRESS	PCT YLD
1	TENSIONR	77.8	6.2	.0	-2.5	.0	.0	36.4	10.
3	LAYBARGE	71.5	6.2	.0	23.4	.0	46.9	135.7	38.
5	LAYBARGE	65.4	6.0	.0	10.0	.0	33.8	107.9	30.
7	LAYBARGE	59.9	5.7	.0	14.5	.0	38.2	117.2	33.
9	LAYBARGE	53.3	5.3	.0	13.0	.0	36.8	114.1	32.
11	LAYBARGE	47.3	4.7	.0	17.1	.0	41.9	124.9	35.
13	LAYBARGE	38.2	3.7	.0	21.4	.0	47.4	136.3	38.
15	LAYBARGE	29.3	2.4	.0	16.8	.0	41.5	123.7	34.
17	LAYBARGE	23.1	1.3	.0	13.7	.0	37.5	115.0	32.
19	LAYBARGE	17.2	.2	.0	7.8	.0	32.1	103.4	29.
21	LAYBARGE	10.6	-1.2	.0	21.9	-1.4	56.1	154.2	43.
24	STINGER	-4.6	-5.1	.0	21.6	-1.3	56.0	153.5	43.
26	STINGER	-11.0	-7.0	.0	6.1	-.5	31.5	101.6	28.
28	STINGER	-17.4	-9.0	.0	11.1	-.3	36.8	112.6	31.
30	STINGER	-23.7	-11.2	.0	12.6	-2.2	38.4	115.9	32.
32	STINGER	-29.9	-13.5	.0	1.0	5.7	26.9	91.3	25.

S T A T I C S O L U T I O N S U M M A R Y

34	STINGER	-36.1	-15.9	.0	31.8	-12.4	81.7	207.0	58.
48	SAGBEND	-185.6	-57.7	.5	.0	.0	23.5	80.7	22.
51	SEABED	-221.5	-59.0	.0	6.4	-4.8	11.9	55.9	16.

O V E R B E N D P I P E S U P P O R T G E O M E T R Y

STATION NO.	LOCATION	PIPE NODE	SUPT NODE	PIPE COORDINATES X (M)	PIPE COORDINATES Y (M)	PIPE COORDINATES ANGLE (DEG)	SUPPORT COORDINATES X (M)	SUPPORT COORDINATES Y (M)	SUPPORT COORDINATES ANGLE (DEG)	VERTICAL REACTION (KN)	VERTICAL SEPARATION (M)
1	TENSIONR	1	2	77.789	2.560	.27	77.789	2.560	.00	-2.54	.000
2	LAYBARGE	3	4	71.488	2.509	.96	71.489	2.509	1.05	23.42	.000
3	LAYBARGE	5	6	65.375	2.335	2.23	65.375	2.335	2.22	9.99	.000
4	LAYBARGE	7	8	59.911	2.073	3.28	59.911	2.073	3.27	14.49	.000
5	LAYBARGE	9	10	53.320	1.624	4.50	53.321	1.624	4.53	13.00	.000
6	LAYBARGE	11	12	47.323	1.088	5.73	47.323	1.089	5.68	17.13	.000
7	LAYBARGE	13	14	38.214	.042	7.42	38.215	.042	7.43	21.41	.000
8	LAYBARGE	15	16	29.270	-1.261	9.11	29.271	-1.261	9.15	16.83	.000
9	LAYBARGE	17	18	23.132	-2.316	10.37	23.133	-2.316	10.34	13.73	.000
10	LAYBARGE	19	20	17.181	-3.464	11.44	17.182	-3.464	11.50	7.84	.000
11	LAYBARGE	21	22	10.627	-4.875	13.00	10.627	-4.874	12.78	21.93	.000
12	STINGER	24	25	-4.620	-8.757	15.56	-4.620	-8.756	15.79	21.59	.000
13	STINGER	26	27	-11.015	-10.642	17.12	-11.015	-10.641	17.06	6.14	.000
14	STINGER	28	29	-17.367	-12.668	18.31	-17.366	-12.668	18.33	11.10	.000
15	STINGER	30	31	-23.672	-14.836	19.64	-23.671	-14.835	19.61	12.55	.000
16	STINGER	32	33	-29.927	-17.143	20.77	-29.926	-17.142	20.88	.96	.000

17	STINGER	34	35	-36.129	-19.588	22.62	-36.128	-19.588	22.15	31.83	.000

STATIC PIPE COORDINATES, FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	.00	.000	.266	.000	36.44	.00	.00	.00	36.44	10.12
3	LAYBARGE	71.49	6.16	.00	.000	.958	6.300	36.42	.00	-116.82	-.02	135.71	37.70
5	LAYBARGE	65.37	5.98	.00	.000	2.232	12.417	36.40	.00	-84.11	.01	107.89	29.97
7	LAYBARGE	59.91	5.72	.00	.000	3.279	17.887	36.35	.00	-95.08	-.01	117.17	32.55
9	LAYBARGE	53.32	5.27	.00	.000	4.504	24.493	36.29	.00	-91.57	.00	114.12	31.70
11	LAYBARGE	47.32	4.74	.00	.000	5.732	30.515	36.20	.00	-104.32	.00	124.88	34.69
13	LAYBARGE	38.21	3.69	.00	.000	7.424	39.683	36.04	.00	-117.97	-.01	136.32	37.87
15	LAYBARGE	29.27	2.39	.00	.000	9.106	48.722	35.85	.00	-103.33	.02	123.68	34.36
17	LAYBARGE	23.13	1.33	.00	.000	10.368	54.950	35.70	.00	-93.43	-.09	115.11	31.98
19	LAYBARGE	17.18	.19	.00	.002	11.442	61.011	35.53	.00	-79.27	.37	102.91	28.58
21	LAYBARGE	10.63	-1.22	.00	-.014	13.014	67.716	35.33	-.11	-142.00	-4.03	156.13	43.37
24	STINGER	-4.61	-5.09	.00	.013	15.340	83.439	34.85	-.44	-117.52	-4.15	135.03	37.51
26	STINGER	-11.02	-6.94	.00	.000	16.560	90.106	34.63	-.60	-55.91	.65	82.46	22.90
28	STINGER	-17.40	-8.88	.00	-.015	17.479	96.773	34.38	-.77	-77.60	-4.37	100.83	28.01
30	STINGER	-23.74	-10.94	.00	.063	18.323	103.440	34.12	-.95	-45.77	12.41	74.91	20.81
32	STINGER	-30.05	-13.07	-.01	.094	19.101	110.108	33.85	-1.13	-68.81	-10.46	93.59	26.00
34	STINGER	-36.32	-15.36	.00	-.472	21.613	116.775	33.48	-1.33	-274.76	-62.94	273.75	76.04
36	SAGBEND	-47.31	-20.16	.19	-1.179	24.166	128.775	32.96	-1.75	8.15	-1.64	40.93	11.37
37	SAGBEND	-58.29	-24.99	.41	-1.063	23.179	140.775	32.35	-2.17	44.64	5.91	71.73	19.93
38	SAGBEND	-69.38	-29.58	.59	-.851	21.717	152.775	31.77	-2.56	50.25	6.62	76.16	21.16
39	SAGBEND	-80.59	-33.87	.74	-.637	20.166	164.775	31.23	-2.94	51.91	6.42	77.20	21.44
40	SAGBEND	-91.91	-37.85	.84	-.435	18.575	176.775	30.73	-3.28	53.02	6.10	77.78	21.61
41	SAGBEND	-103.33	-41.51	.91	-.245	16.952	188.775	30.26	-3.60	54.00	5.72	78.28	21.75
42	SAGBEND	-114.86	-44.84	.94	-.071	15.300	200.775	29.84	-3.89	54.92	5.25	78.75	21.87
43	SAGBEND	-126.48	-47.84	.94	.085	13.622	212.775	29.47	-4.15	55.75	4.70	79.18	21.99
44	SAGBEND	-138.18	-50.49	.91	.223	11.920	224.776	29.13	-4.38	56.51	4.14	79.57	22.10
45	SAGBEND	-149.96	-52.79	.85	.344	10.196	236.776	28.84	-4.58	57.18	3.72	79.93	22.20
46	SAGBEND	-161.80	-54.74	.77	.456	8.454	248.776	28.59	-4.74	57.75	3.57	80.25	22.29
47	SAGBEND	-173.70	-56.32	.66	.565	6.695	260.777	28.39	-4.88	58.21	3.56	80.52	22.37
48	SAGBEND	-185.63	-57.53	.53	.673	4.925	272.777	28.24	-4.99	58.49	3.51	80.65	22.40
49	SAGBEND	-197.60	-58.38	.38	.775	3.154	284.778	28.13	-5.06	58.12	3.09	80.26	22.29
50	SAGBEND	-209.59	-58.86	.21	.838	1.434	296.779	28.08	-5.10	53.78	.00	76.47	21.24
51	SEABED	-221.59	-59.01	.05	.612	.130	308.780	28.06	-5.11	22.17	-21.57	57.08	15.86
52	SEABED	-233.59	-59.01	.00	-.006	-.004	320.780	28.06	-5.11	-.57	-3.78	34.16	9.49
53	SEABED	-245.59	-59.01	.00	.000	.000	332.780	28.06	-5.11	.01	.23	31.13	8.65
54	SEABED	-257.59	-59.01	.00	.000	.000	344.780	28.06	-5.11	.00	-.01	30.94	8.60
55	SEABED	-269.59	-59.01	.00	.000	.000	356.780	28.06	-5.11	.00	.00	30.93	8.59
56	SEABED	-281.59	-59.01	.00	.000	.000	368.780	28.06	-5.11	.00	.00	30.93	8.59
57	SEABED	-293.59	-59.01	.00	.000	.000	380.780	28.06	-5.11	.00	.00	30.93	8.59

STATIC PIPE COORDINATES, FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	SUPPORT REACTION VERT (KN)	SUPPORT REACTION HORIZ (KN)	SUPT SEPARATIONS VERT (M)	SUPT SEPARATIONS HORIZ (M)	PIPE TENSION (KN)	BENDING MOMENTS VERT (KN-M)	BENDING MOMENTS HORIZ (KN-M)	BENDING MOMENTS TOTAL (KN-M)
1	TENSIONR	77.79	6.21	.00	-2.54	-.01	.00	.00	300.03	.00	.00	.00
3	LAYBARGE	71.49	6.16	.00	23.42	.00	.00	.00	299.85	-46.93	-.01	46.93
5	LAYBARGE	65.37	5.98	.00	9.99	.00	.00	.00	299.69	-33.79	.00	33.79
7	LAYBARGE	59.91	5.72	.00	14.49	.00	.00	.00	299.35	-38.20	.00	38.20
9	LAYBARGE	53.32	5.27	.00	13.00	.00	.00	.00	298.80	-36.79	.00	36.79
11	LAYBARGE	47.32	4.74	.00	17.13	.00	.00	.00	298.12	-41.91	.00	41.91
13	LAYBARGE	38.21	3.69	.00	21.41	.00	.00	.00	296.80	-47.39	.00	47.39
15	LAYBARGE	29.27	2.39	.00	16.82	.01	.00	.00	295.22	-41.51	.01	41.51
17	LAYBARGE	23.13	1.33	.00	13.79	-.04	.00	.00	293.93	-37.53	-.04	37.53
19	LAYBARGE	17.18	.19	.00	7.62	-.01	.00	.00	292.53	-31.84	.15	31.84
21	LAYBARGE	10.63	-1.22	.00	22.54	-1.36	.00	.00	291.37	-57.04	-1.62	57.07
24	STINGER	-4.61	-5.09	.00	19.24	-1.42	.00	.00	288.87	-47.21	-1.67	47.24
26	STINGER	-11.02	-6.94	.00	4.00	-.07	.00	.00	287.75	-22.46	.26	22.46
28	STINGER	-17.40	-8.88	.00	12.20	-1.97	.00	.00	286.44	-31.18	-1.75	31.23
30	STINGER	-23.74	-10.94	.00	4.53	2.26	.00	.00	285.12	-18.39	4.98	19.05
32	STINGER	-30.05	-13.07	-.01	.00	.00	.03	-.01	283.68	-27.65	-4.20	27.96

34	STINGER	-36.32	-15.36	.00	44.72	-9.92	.00	.00	281.52	-110.38	-25.29	113.24
36	SAGBEND	-47.31	-20.16	.19	.00	.00	.00	.00	279.04	3.27	-.66	3.34
37	SAGBEND	-58.29	-24.99	.41	.00	.00	.00	.00	275.83	17.93	2.37	18.09
38	SAGBEND	-69.38	-29.58	.59	.00	.00	.00	.00	272.80	20.19	2.66	20.36
39	SAGBEND	-80.59	-33.87	.74	.00	.00	.00	.00	269.97	20.85	2.58	21.01
40	SAGBEND	-91.91	-37.85	.84	.00	.00	.00	.00	267.34	21.30	2.45	21.44
41	SAGBEND	-103.33	-41.51	.91	.00	.00	.00	.00	264.92	21.69	2.30	21.82
42	SAGBEND	-114.86	-44.84	.94	.00	.00	.00	.00	262.72	22.06	2.11	22.16
43	SAGBEND	-126.48	-47.84	.94	.00	.00	.00	.00	260.74	22.40	1.89	22.48
44	SAGBEND	-138.18	-50.49	.91	.00	.00	.00	.00	258.99	22.70	1.66	22.76
45	SAGBEND	-149.96	-52.79	.85	.00	.00	.00	.00	257.47	22.97	1.50	23.02
46	SAGBEND	-161.80	-54.74	.77	.00	.00	.00	.00	256.19	23.20	1.43	23.24
47	SAGBEND	-173.70	-56.32	.66	.00	.00	.00	.00	255.14	23.38	1.43	23.43
48	SAGBEND	-185.63	-57.53	.53	.00	.00	.00	.00	254.34	23.50	1.41	23.54
49	SAGBEND	-197.60	-58.38	.38	.00	.00	.00	.00	253.79	23.35	1.24	23.38
50	SAGBEND	-209.59	-58.86	.21	.00	-.01	.00	.00	253.47	21.61	.00	21.61
51	SEABED	-221.59	-59.01	.05	5.17	-4.29	.00	.00	253.40	8.91	-8.67	12.43
52	SEABED	-233.59	-59.01	.00	8.63	-.25	.00	.00	253.39	-.23	-1.52	1.54
53	SEABED	-245.59	-59.01	.00	7.90	.14	.00	.00	253.39	.00	.09	.09
54	SEABED	-257.59	-59.01	.00	7.92	-.01	.00	.00	253.39	.00	-.01	.01
55	SEABED	-269.59	-59.01	.00	7.92	.00	.00	.00	253.39	.00	.00	.00
56	SEABED	-281.59	-59.01	.00	7.92	.00	.00	.00	253.39	.00	.00	.00
57	SEABED	-293.59	-59.01	.00	.00	.00	.00	.00	253.39	.00	.00	.00

S T A T I C S O L U T I O N S U M M A R Y

PIPE PROPERTIES (1)

PIPE SECTION LENGTH ..	12.00 M	ELASTIC MODULUS	207000. MPA
OUTSIDE DIAMETER	21.908 CM	CROSS SECTIONAL AREA .	278.27 CM2
WALL THICKNESS	1.270 CM	MOMENT OF INERTIA	4400.56 CM4
WEIGHT/LENGTH IN AIR .	1235.937 N/M	YIELD STRESS	360.00 MPA
SUBMERGED WGHT/LENG ..	659.899 N/M	STRESS INTENS FACTOR .	1.000
SPECIFIC GRAVITY	2.146	STEEL DENSITY	78500.0 N/M3
WRAP COAT THICKNESS ..	.040 CM	WRAP COAT DENSITY	12815.0 N/M3
CONCRETE THICKNESS ...	.250 CM	CONCRETE DENSITY	30440.0 N/M3

BARGE DATA

TOTAL PIPE TENSION ...	300.03 KN	RADIUS OF CURVATURE ..	300.00 M
NUMBER OF TENSIONERS .	1	BARGE TRIM ANGLE	.000 DEG
NO. OF PIPE SUPPORTS .	10	PIPE ANGLE AT STERN ..	13.014 DEG
BARGE HEADING	.000 DEG	OFFSET FROM R.O.W. ...	.00 M

STINGER DATA

NO. OF PIPE SUPPORTS .	6	STINGER STERN DEPTH ..	-15.36 M
NO. STINGER SECTIONS .	6	PIPE ANGLE AT STERN ..	21.613 DEG
RADIUS OF CURVATURE ..	400.00 M	STINGER LENGTH	43.22 M

SAGBEND DATA

WATER DEPTH	59.00 M	HORIZ PIPE TENSION ...	253.39 KN
TOUCHDOWN X-COORD. ...	-219.91 M	BOTTOM SLOPE ANGLE ...	.000 DEG

SOLUTION SUMMARY

NODE NO.	PIPE SECTION	X COORD	Y COORD	Z COORD	SUPPORT REACT VERT	HORIZ	TOTAL MOMENT	TOTAL STRESS	PCT YLD
1	TENSIONR	77.8	6.2	.0	-2.5	.0	.0	36.4	10.
3	LAYBARGE	71.5	6.2	.0	23.4	.0	46.9	135.7	38.
5	LAYBARGE	65.4	6.0	.0	10.0	.0	33.8	107.9	30.
7	LAYBARGE	59.9	5.7	.0	14.5	.0	38.2	117.2	33.
9	LAYBARGE	53.3	5.3	.0	13.0	.0	36.8	114.1	32.
11	LAYBARGE	47.3	4.7	.0	17.1	.0	41.9	124.9	35.
13	LAYBARGE	38.2	3.7	.0	21.4	.0	47.4	136.3	38.
15	LAYBARGE	29.3	2.4	.0	16.8	.0	41.5	123.7	34.
17	LAYBARGE	23.1	1.3	.0	13.8	.0	37.5	115.1	32.
19	LAYBARGE	17.2	.2	.0	7.6	.0	31.8	102.9	29.
21	LAYBARGE	10.6	-1.2	.0	22.5	-1.4	57.1	156.1	43.
24	STINGER	-4.6	-5.1	.0	19.2	-1.4	47.2	135.0	38.
26	STINGER	-11.0	-6.9	.0	4.0	-.1	22.5	82.5	23.
28	STINGER	-17.4	-8.9	.0	12.2	-2.0	31.2	100.8	28.
30	STINGER	-23.7	-10.9	.0	4.5	2.3	19.1	74.9	21.
32	STINGER	-30.1	-13.1	.0	.0	.0	28.0	93.6	26.

S T A T I C S O L U T I O N S U M M A R Y

34	STINGER	-36.3	-15.4	.0	44.7	-9.9	113.2	273.7	76.
48	SAGBEND	-185.6	-57.5	.5	.0	.0	23.5	80.7	22.
51	SEABED	-221.6	-59.0	.0	5.2	-4.3	12.4	57.1	16.

O V E R B E N D P I P E S U P P O R T G E O M E T R Y

STATION NO.	LOCATION	PIPE NODE	SUPT NODE	/----- PIPE COORDINATES ----/ X (M)	Y (M)	ANGLE (DEG)	/--- SUPPORT COORDINATES ---/ X (M)	Y (M)	ANGLE (DEG)	VERTICAL REACTION (KN)	VERTICAL SEPARATION (M)
1	TENSIONR	1	2	77.789	2.560	.27	77.789	2.560	.00	-2.54	.000
2	LAYBARGE	3	4	71.488	2.509	.96	71.489	2.509	1.05	23.42	.000
3	LAYBARGE	5	6	65.375	2.335	2.23	65.375	2.335	2.22	9.99	.000
4	LAYBARGE	7	8	59.911	2.073	3.28	59.911	2.073	3.27	14.49	.000
5	LAYBARGE	9	10	53.320	1.624	4.50	53.321	1.624	4.53	13.00	.000
6	LAYBARGE	11	12	47.323	1.088	5.73	47.323	1.089	5.68	17.13	.000
7	LAYBARGE	13	14	38.214	.042	7.42	38.215	.042	7.43	21.41	.000
8	LAYBARGE	15	16	29.270	-1.261	9.11	29.271	-1.261	9.15	16.82	.000
9	LAYBARGE	17	18	23.132	-2.316	10.37	23.133	-2.316	10.34	13.79	.000
10	LAYBARGE	19	20	17.181	-3.464	11.44	17.182	-3.464	11.50	7.62	.000
11	LAYBARGE	21	22	10.627	-4.875	13.01	10.627	-4.874	12.78	22.54	.000
12	STINGER	24	25	-4.612	-8.744	15.34	-4.611	-8.744	15.56	19.24	.000
13	STINGER	26	27	-11.020	-10.586	16.56	-11.019	-10.586	16.51	4.00	.000
14	STINGER	28	29	-17.396	-12.534	17.48	-17.395	-12.534	17.47	12.20	.000
15	STINGER	30	31	-23.739	-14.588	18.32	-23.738	-14.588	18.42	4.53	.000
16	STINGER	32	33	-30.054	-16.723	19.10	-30.045	-16.747	19.38	.00	.026
17	STINGER	34	35	-36.316	-19.012	21.61	-36.316	-19.012	20.33	44.72	.000

S T A T I C P I P E C O O R D I N A T E S, F O R C E S A N D S T R E S S E S

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	.00	.000	.270	.000	48.58	.00	.00	.00	48.58	13.49
3	LAYBARGE	71.49	6.16	.00	.000	.960	6.300	48.55	.00	-119.64	-.02	150.25	41.74
5	LAYBARGE	65.37	5.98	.00	.000	2.230	12.417	48.54	.00	-86.42	.01	122.00	33.89
7	LAYBARGE	59.91	5.72	.00	.000	3.282	17.887	48.49	.00	-97.67	-.01	131.52	36.53
9	LAYBARGE	53.32	5.27	.00	.000	4.501	24.493	48.43	.00	-94.09	.00	128.41	35.67
11	LAYBARGE	47.32	4.74	.00	.000	5.739	30.515	48.34	.00	-108.57	.00	140.63	39.06
13	LAYBARGE	38.21	3.69	.00	.000	7.423	39.683	48.18	.00	-124.12	-.01	153.69	42.69
15	LAYBARGE	29.27	2.39	.00	.000	9.100	48.722	47.99	.00	-107.62	.02	139.47	38.74
17	LAYBARGE	23.13	1.33	.00	.000	10.368	54.950	47.84	.00	-95.65	-.07	129.14	35.87
19	LAYBARGE	17.18	.19	.00	.001	11.443	61.011	47.67	.00	-81.86	.30	117.25	32.57
21	LAYBARGE	10.63	-1.22	.00	-.013	13.021	67.716	47.47	-.11	-147.80	-3.86	173.19	48.11
24	STINGER	-4.64	-5.13	.00	.009	15.976	83.473	46.96	-.44	-198.04	-4.59	215.56	59.88
26	STINGER	-11.01	-7.10	.00	.014	18.234	90.140	46.73	-.62	-123.93	3.42	152.42	42.34
28	STINGER	-17.30	-9.29	.00	-.071	20.024	96.807	46.46	-.81	-133.49	-16.52	161.19	44.78
30	STINGER	-23.53	-11.66	.03	-.599	21.628	103.475	46.16	-1.01	-97.95	-53.25	141.44	39.29
32	STINGER	-29.71	-14.17	.13	-1.077	22.246	110.142	45.86	-1.23	1.92	-9.48	54.70	15.20
34	STINGER	-35.89	-16.68	.25	-1.125	21.950	116.809	45.54	-1.45	27.54	1.62	69.73	19.37
36	SAGBEND	-47.05	-21.07	.46	-.994	20.936	128.810	44.99	-1.83	36.08	4.97	76.87	21.35
37	SAGBEND	-58.30	-25.25	.64	-.828	19.818	140.810	44.46	-2.19	37.37	5.14	77.64	21.57
38	SAGBEND	-69.63	-29.21	.78	-.665	18.676	152.811	43.96	-2.53	37.97	4.98	77.81	21.61
39	SAGBEND	-81.04	-32.93	.90	-.509	17.516	164.811	43.49	-2.85	38.49	4.76	77.92	21.64
40	SAGBEND	-92.51	-36.43	.99	-.361	16.342	176.812	43.05	-3.16	38.98	4.56	78.03	21.68
41	SAGBEND	-104.06	-39.69	1.04	-.220	15.153	188.812	42.64	-3.44	39.44	4.32	78.14	21.71
42	SAGBEND	-115.68	-42.70	1.08	-.089	13.951	200.813	42.26	-3.70	39.87	4.05	78.24	21.73
43	SAGBEND	-127.36	-45.47	1.08	.033	12.735	212.813	41.91	-3.94	40.28	3.73	78.34	21.76
44	SAGBEND	-139.09	-47.99	1.06	.143	11.508	224.813	41.59	-4.16	40.65	3.38	78.43	21.78
45	SAGBEND	-150.87	-50.26	1.02	.242	10.271	236.814	41.30	-4.36	40.99	3.02	78.51	21.81
46	SAGBEND	-162.70	-52.27	.96	.330	9.023	248.814	41.05	-4.53	41.29	2.70	78.59	21.83
47	SAGBEND	-174.57	-54.02	.89	.410	7.767	260.814	40.83	-4.68	41.56	2.56	78.67	21.85

48	SAGBEND	-186.48	-55.51	.79	.488	6.503	272.814	40.64	-4.81	41.79	2.56	78.75	21.87
49	SAGBEND	-198.42	-56.74	.68	.567	5.233	284.815	40.49	-4.92	41.98	2.56	78.81	21.89
50	SAGBEND	-210.38	-57.70	.56	.644	3.957	296.815	40.37	-5.00	42.12	2.56	78.85	21.90
51	SAGBEND	-222.36	-58.39	.41	.721	2.680	308.815	40.28	-5.06	42.10	2.45	78.78	21.88
52	SAGBEND	-234.35	-58.82	.26	.786	1.414	320.815	40.22	-5.10	40.90	1.38	77.68	21.58
53	SAGBEND	-246.35	-58.99	.09	.728	.290	332.815	40.20	-5.11	28.30	-9.32	68.23	18.95
54	SEABED	-258.34	-59.01	.00	.094	-.007	344.815	40.20	-5.12	.22	-15.14	55.81	15.50
55	SEABED	-270.34	-59.01	.00	-.003	.000	356.815	40.20	-5.11	-.05	.25	43.21	12.00
56	SEABED	-282.34	-59.01	.00	.000	.000	368.815	40.20	-5.11	.00	.00	42.99	11.94
57	SEABED	-294.34	-59.01	.00	.000	.000	380.815	40.20	-5.11	.00	.00	42.99	11.94
58	SEABED	-306.34	-59.01	.00	.000	.000	392.815	40.20	-5.11	.00	.00	42.99	11.94
59	SEABED	-318.34	-59.01	.00	.000	.000	404.815	40.20	-5.11	.00	.00	42.99	11.94
60	SEABED	-330.34	-59.01	.00	.000	.000	416.815	40.20	-5.11	.00	.00	42.99	11.94

STATIC PIPE COORDINATES, FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	SUPPORT REACTION VERT (KN)	SUPPORT REACTION HORIZ (KN)	SUPT SEPARATIONS VERT (M)	SUPT SEPARATIONS HORIZ (M)	PIPE TENSION (KN)	BENDING MOMENTS VERT (KN-M)	BENDING MOMENTS HORIZ (KN-M)	BENDING MOMENTS TOTAL (KN-M)
1	TENSIONR	77.79	6.21	.00	-2.40	-.01	.00	.00	399.99	.00	.00	.00
3	LAYBARGE	71.49	6.16	.00	25.69	.00	.00	.00	399.80	-48.06	-.01	48.06
5	LAYBARGE	65.37	5.98	.00	11.87	.00	.00	.00	399.65	-34.72	.01	34.72
7	LAYBARGE	59.91	5.72	.00	16.53	.00	.00	.00	399.30	-39.24	.00	39.24
9	LAYBARGE	53.32	5.27	.00	14.99	.00	.00	.00	398.76	-37.80	.00	37.80
11	LAYBARGE	47.32	4.74	.00	19.70	.00	.00	.00	398.07	-43.62	.00	43.62
13	LAYBARGE	38.21	3.69	.00	24.61	.00	.00	.00	396.74	-49.86	.00	49.86
15	LAYBARGE	29.27	2.39	.00	19.42	.01	.00	.00	395.17	-43.24	.01	43.24
17	LAYBARGE	23.13	1.33	.00	15.68	-.03	.00	.00	393.88	-38.42	-.03	38.42
19	LAYBARGE	17.18	.19	.00	9.58	-.03	.00	.00	392.49	-32.89	.12	32.89
21	LAYBARGE	10.63	-1.22	.00	25.24	-1.33	.00	.00	391.32	-59.38	-1.55	59.40
24	STINGER	-4.64	-5.13	.00	32.22	-1.63	.00	.00	388.60	-79.56	-1.84	79.58
26	STINGER	-11.01	-7.10	.00	12.06	1.01	.00	.00	387.51	-49.79	1.38	49.80
28	STINGER	-17.30	-9.29	.00	18.69	-1.42	.00	.00	386.04	-53.63	-6.64	54.04
30	STINGER	-23.53	-11.66	.03	16.03	-9.34	.02	.03	384.52	-39.35	-21.39	44.79
32	STINGER	-29.71	-14.17	.13	.00	.00	.12	.13	382.98	.77	-3.81	3.88
34	STINGER	-35.89	-16.68	.25	.00	.00	.43	.25	381.32	11.07	.65	11.08
36	SAGBEND	-47.05	-21.07	.46	.00	.00	.00	.00	378.41	14.49	2.00	14.63
37	SAGBEND	-58.30	-25.25	.64	.00	.00	.00	.00	375.65	15.01	2.06	15.15
38	SAGBEND	-69.63	-29.21	.78	.00	.00	.00	.00	373.04	15.25	2.00	15.38
39	SAGBEND	-81.04	-32.93	.90	.00	.00	.00	.00	370.58	15.46	1.91	15.58
40	SAGBEND	-92.51	-36.43	.99	.00	.00	.00	.00	368.28	15.66	1.83	15.76
41	SAGBEND	-104.06	-39.69	1.04	.00	.00	.00	.00	366.13	15.84	1.74	15.94
42	SAGBEND	-115.68	-42.70	1.08	.00	.00	.00	.00	364.14	16.02	1.63	16.10
43	SAGBEND	-127.36	-45.47	1.08	.00	.00	.00	.00	362.31	16.18	1.50	16.25
44	SAGBEND	-139.09	-47.99	1.06	.00	.00	.00	.00	360.65	16.33	1.36	16.39
45	SAGBEND	-150.87	-50.26	1.02	.00	.00	.00	.00	359.15	16.47	1.21	16.51
46	SAGBEND	-162.70	-52.27	.96	.00	.00	.00	.00	357.82	16.59	1.09	16.62
47	SAGBEND	-174.57	-54.02	.89	.00	.00	.00	.00	356.67	16.70	1.03	16.73
48	SAGBEND	-186.48	-55.51	.79	.00	.00	.00	.00	355.68	16.79	1.03	16.82
49	SAGBEND	-198.42	-56.74	.68	.00	.00	.00	.00	354.87	16.87	1.03	16.90
50	SAGBEND	-210.38	-57.70	.56	.00	.00	.00	.00	354.24	16.92	1.03	16.95
51	SAGBEND	-222.36	-58.39	.41	.00	.00	.00	.00	353.78	16.91	.99	16.94
52	SAGBEND	-234.35	-58.82	.26	.00	.00	.00	.00	353.50	16.43	.55	16.44
53	SAGBEND	-246.35	-58.99	.09	2.58	-2.42	.00	.00	353.39	11.37	-3.75	11.97
54	SEABED	-258.34	-59.01	.00	8.59	-3.45	.00	.00	353.39	.09	-6.08	6.08
55	SEABED	-270.34	-59.01	.00	7.94	.46	.00	.00	353.39	-.02	.10	.10
56	SEABED	-282.34	-59.01	.00	7.92	-.01	.00	.00	353.39	.00	.00	.00
57	SEABED	-294.34	-59.01	.00	7.92	.00	.00	.00	353.39	.00	.00	.00
58	SEABED	-306.34	-59.01	.00	7.92	.00	.00	.00	353.39	.00	.00	.00
59	SEABED	-318.34	-59.01	.00	7.92	.00	.00	.00	353.39	.00	.00	.00
60	SEABED	-330.34	-59.01	.00	.00	.00	.00	.00	353.39	.00	.00	.00

STATIC SOLUTION SUMMARY

PIPE PROPERTIES (1)

PIPE SECTION LENGTH ..	12.00 M	ELASTIC MODULUS	207000. MPA
OUTSIDE DIAMETER	21.908 CM	CROSS SECTIONAL AREA .	278.27 CM2

WALL THICKNESS	1.270 CM	MOMENT OF INERTIA	4400.56 CM4
WEIGHT/LENGTH IN AIR .	1235.937 N/M	YIELD STRESS	360.00 MPA
SUBMERGED WGHT/LENG ..	659.899 N/M	STRESS INTENS FACTOR .	1.000
SPECIFIC GRAVITY	2.146	STEEL DENSITY	78500.0 N/M3
WRAP COAT THICKNESS ..	.040 CM	WRAP COAT DENSITY	12815.0 N/M3
CONCRETE THICKNESS ...	.250 CM	CONCRETE DENSITY	30440.0 N/M3

BARGE DATA

TOTAL PIPE TENSION ...	399.99 KN	RADIUS OF CURVATURE ..	300.00 M
NUMBER OF TENSIONERS .	1	BARGE TRIM ANGLE	.000 DEG
NO. OF PIPE SUPPORTS .	10	PIPE ANGLE AT STERN ..	13.021 DEG
BARGE HEADING	.000 DEG	OFFSET FROM R.O.W. ...	.00 M

STINGER DATA

NO. OF PIPE SUPPORTS .	6	STINGER STERN DEPTH ..	-16.68 M
NO. STINGER SECTIONS .	6	PIPE ANGLE AT STERN ..	21.950 DEG
RADIUS OF CURVATURE ..	200.00 M	STINGER LENGTH	43.26 M

SAGBEND DATA

WATER DEPTH	59.00 M	HORIZ PIPE TENSION ...	353.39 KN
TOUCHDOWN X-COORD. ...	-247.62 M	BOTTOM SLOPE ANGLE ...	.000 DEG

SOLUTION SUMMARY

NODE NO.	PIPE SECTION	X COORD	Y COORD	Z COORD	SUPPORT REACT VERT	SUPPORT REACT HORIZ	TOTAL MOMENT	TOTAL STRESS	PCT YLD
1	TENSIONR	77.8	6.2	.0	-2.4	.0	.0	48.6	13.
3	LAYBARGE	71.5	6.2	.0	25.7	.0	48.1	150.2	42.
5	LAYBARGE	65.4	6.0	.0	11.9	.0	34.7	122.0	34.
7	LAYBARGE	59.9	5.7	.0	16.5	.0	39.2	131.5	37.
9	LAYBARGE	53.3	5.3	.0	15.0	.0	37.8	128.4	36.
11	LAYBARGE	47.3	4.7	.0	19.7	.0	43.6	140.6	39.
13	LAYBARGE	38.2	3.7	.0	24.6	.0	49.9	153.7	43.
15	LAYBARGE	29.3	2.4	.0	19.4	.0	43.2	139.5	39.
17	LAYBARGE	23.1	1.3	.0	15.7	.0	38.4	129.1	36.
19	LAYBARGE	17.2	.2	.0	9.6	.0	32.9	117.3	33.
21	LAYBARGE	10.6	-1.2	.0	25.2	-1.3	59.4	173.2	48.
24	STINGER	-4.6	-5.1	.0	32.2	-1.6	79.6	215.6	60.
26	STINGER	-11.0	-7.1	.0	12.1	1.0	49.8	152.4	42.
28	STINGER	-17.3	-9.3	.0	18.7	-1.4	54.0	161.2	45.
30	STINGER	-23.5	-11.7	.0	16.0	-9.3	44.8	141.4	39.
32	STINGER	-29.7	-14.2	.1	.0	.0	3.9	54.7	15.

S T A T I C S O L U T I O N S U M M A R Y

34	STINGER	-35.9	-16.7	.2	.0	.0	11.1	69.7	19.
50	SAGBEND	-210.4	-57.7	.6	.0	.0	17.0	78.9	22.
54	SEABED	-258.3	-59.0	.0	8.6	-3.5	6.1	55.8	16.

O V E R B E N D P I P E S U P P O R T G E O M E T R Y

STATION NO.	LOCATION	PIPE NODE	SUPT NODE	PIPE COORDINATES X (M)	PIPE COORDINATES Y (M)	PIPE COORDINATES ANGLE (DEG)	SUPPORT COORDINATES X (M)	SUPPORT COORDINATES Y (M)	SUPPORT COORDINATES ANGLE (DEG)	VERTICAL REACTION (KN)	VERTICAL SEPARATION (M)
1	TENSIONR	1	2	77.788	2.560	.27	77.789	2.560	.00	-2.40	.000
2	LAYBARGE	3	4	71.488	2.509	.96	71.489	2.509	1.05	25.69	.000
3	LAYBARGE	5	6	65.374	2.335	2.23	65.375	2.335	2.22	11.87	.000
4	LAYBARGE	7	8	59.910	2.073	3.28	59.911	2.073	3.27	16.53	.000
5	LAYBARGE	9	10	53.320	1.624	4.50	53.321	1.624	4.53	14.99	.000
6	LAYBARGE	11	12	47.322	1.088	5.74	47.323	1.089	5.68	19.70	.000
7	LAYBARGE	13	14	38.214	.042	7.42	38.215	.042	7.43	24.61	.000
8	LAYBARGE	15	16	29.270	-1.261	9.10	29.271	-1.261	9.15	19.42	.000
9	LAYBARGE	17	18	23.132	-2.316	10.37	23.133	-2.316	10.34	15.68	.000
10	LAYBARGE	19	20	17.181	-3.464	11.44	17.182	-3.464	11.50	9.58	.000
11	LAYBARGE	21	22	10.626	-4.875	13.02	10.627	-4.874	12.78	25.24	.000
12	STINGER	24	25	-4.637	-8.781	15.98	-4.636	-8.781	16.25	32.22	.000
13	STINGER	26	27	-11.005	-10.753	18.23	-11.004	-10.753	18.16	12.06	.000
14	STINGER	28	29	-17.305	-12.937	20.02	-17.304	-12.936	20.07	18.69	.000

15	STINGER	30	31	-23.534	-15.312	21.63	-23.527	-15.328	21.98	16.03	.018
16	STINGER	32	33	-29.712	-17.818	22.25	-29.667	-17.927	23.89	.00	.118
17	STINGER	34	35	-35.887	-20.330	21.95	-35.716	-20.728	25.80	.00	.434

S T A T I C P I P E C O O R D I N A T E S, F O R C E S A N D S T R E S S E S

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	.00	.000	.270	.000	48.58	.00	.00	.00	48.58	13.49
3	LAYBARGE	71.49	6.16	.00	.000	.960	6.300	48.55	.00	-119.64	-.02	150.25	41.74
5	LAYBARGE	65.37	5.98	.00	.000	2.230	12.417	48.53	.00	-86.42	.01	122.00	33.89
7	LAYBARGE	59.91	5.72	.00	.000	3.282	17.887	48.49	.00	-97.67	-.01	131.52	36.53
9	LAYBARGE	53.32	5.27	.00	.000	4.501	24.493	48.43	.00	-94.09	.00	128.41	35.67
11	LAYBARGE	47.32	4.74	.00	.000	5.739	30.515	48.34	.00	-108.57	.00	140.62	39.06
13	LAYBARGE	38.21	3.69	.00	.000	7.423	39.683	48.18	.00	-124.13	-.01	153.70	42.69
15	LAYBARGE	29.27	2.39	.00	.000	9.100	48.722	47.99	.00	-107.58	.02	139.43	38.73
17	LAYBARGE	23.13	1.33	.00	.000	10.369	54.950	47.83	.00	-95.85	-.08	129.31	35.92
19	LAYBARGE	17.18	.19	.00	.001	11.440	61.011	47.67	.00	-81.01	.33	116.53	32.37
21	LAYBARGE	10.63	-1.22	.00	-.013	13.036	67.716	47.47	-.11	-151.22	-3.97	176.10	48.92
24	STINGER	-4.62	-5.11	.00	.013	15.531	83.451	46.98	-.44	-150.89	-3.97	175.50	48.75
26	STINGER	-11.02	-6.99	.00	-.002	17.122	90.118	46.76	-.61	-79.44	.05	114.59	31.83
28	STINGER	-17.37	-9.02	.00	-.004	18.320	96.785	46.50	-.78	-96.69	-2.08	129.10	35.86
30	STINGER	-23.67	-11.19	.00	.019	19.609	103.452	46.22	-.97	-91.82	3.25	124.81	34.67
32	STINGER	-29.93	-13.49	.01	-.282	20.782	110.119	45.93	-1.17	-80.48	-44.02	124.50	34.58
34	STINGER	-36.14	-15.90	.07	-.823	21.486	116.786	45.64	-1.38	-27.37	-27.06	79.05	21.96
36	SAGBEND	-47.31	-20.28	.26	-1.031	21.080	128.786	45.08	-1.76	30.88	2.33	72.30	20.08
37	SAGBEND	-58.55	-24.50	.45	-.896	20.022	140.787	44.55	-2.12	36.79	4.91	77.19	21.44
38	SAGBEND	-69.86	-28.49	.62	-.734	18.887	152.787	44.05	-2.47	37.83	4.99	77.75	21.60
39	SAGBEND	-81.25	-32.26	.75	-.577	17.731	164.787	43.57	-2.80	38.39	4.80	77.90	21.64
40	SAGBEND	-92.72	-35.80	.85	-.428	16.560	176.787	43.13	-3.10	38.89	4.60	78.01	21.67
41	SAGBEND	-104.26	-39.10	.92	-.286	15.373	188.787	42.71	-3.39	39.36	4.37	78.12	21.70
42	SAGBEND	-115.86	-42.16	.96	-.152	14.173	200.788	42.32	-3.65	39.80	4.10	78.22	21.73
43	SAGBEND	-127.52	-44.98	.98	-.029	12.960	212.788	41.97	-3.90	40.21	3.79	78.32	21.75
44	SAGBEND	-139.25	-47.55	.97	.084	11.735	224.788	41.65	-4.12	40.59	3.45	78.41	21.78
45	SAGBEND	-151.02	-49.86	.95	.185	10.499	236.788	41.35	-4.32	40.93	3.09	78.49	21.80
46	SAGBEND	-162.84	-51.92	.90	.275	9.254	248.789	41.09	-4.50	41.24	2.74	78.57	21.83
47	SAGBEND	-174.71	-53.72	.83	.355	7.999	260.789	40.87	-4.66	41.52	2.57	78.65	21.85
48	SAGBEND	-186.61	-55.26	.75	.434	6.736	272.789	40.67	-4.79	41.75	2.56	78.73	21.87
49	SAGBEND	-198.54	-56.53	.65	.512	5.467	284.789	40.51	-4.90	41.95	2.56	78.80	21.89
50	SAGBEND	-210.50	-57.54	.54	.590	4.192	296.790	40.38	-4.99	42.10	2.56	78.85	21.90
51	SAGBEND	-222.47	-58.29	.41	.667	2.915	308.790	40.29	-5.05	42.13	2.48	78.81	21.89
52	SAGBEND	-234.46	-58.76	.26	.735	1.644	320.790	40.23	-5.09	41.38	1.70	78.10	21.70
53	SAGBEND	-246.46	-58.98	.10	.714	.465	332.790	40.20	-5.11	33.16	-6.16	71.57	19.88
54	SEABED	-258.46	-59.01	.00	.144	-.008	344.790	40.20	-5.12	1.34	-19.32	59.39	16.50
55	SEABED	-270.46	-59.01	.00	-.004	.000	356.790	40.20	-5.11	-.11	.20	43.18	12.00
56	SEABED	-282.46	-59.01	.00	.000	.000	368.790	40.20	-5.11	.01	.01	43.00	11.94
57	SEABED	-294.46	-59.01	.00	.000	.000	380.790	40.20	-5.11	.00	.00	42.99	11.94
58	SEABED	-306.46	-59.01	.00	.000	.000	392.790	40.20	-5.11	.00	.00	42.99	11.94
59	SEABED	-318.46	-59.01	.00	.000	.000	404.790	40.20	-5.11	.00	.00	42.99	11.94
60	SEABED	-330.46	-59.01	.00	.000	.000	416.790	40.20	-5.11	.00	.00	42.99	11.94

S T A T I C P I P E C O O R D I N A T E S, F O R C E S A N D S T R E S S E S

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	SUPPORT REACTION VERT (KN)	SUPPORT REACTION HORIZ (KN)	SUPT SEPARATIONS VERT (M)	SUPT SEPARATIONS HORIZ (M)	PIPE TENSION (KN)	BENDING MOMENTS VERT (KN-M)	BENDING MOMENTS HORIZ (KN-M)	BENDING MOMENTS TOTAL (KN-M)
1	TENSIONR	77.79	6.21	.00	-2.40	-.01	.00	.00	399.99	.00	.00	.00
3	LAYBARGE	71.49	6.16	.00	25.69	.00	.00	.00	399.80	-48.06	-.01	48.06
5	LAYBARGE	65.37	5.98	.00	11.87	.00	.00	.00	399.65	-34.72	.01	34.72
7	LAYBARGE	59.91	5.72	.00	16.53	.00	.00	.00	399.30	-39.24	.00	39.24
9	LAYBARGE	53.32	5.27	.00	14.99	.00	.00	.00	398.75	-37.80	.00	37.80
11	LAYBARGE	47.32	4.74	.00	19.70	.00	.00	.00	398.07	-43.61	.00	43.61
13	LAYBARGE	38.21	3.69	.00	24.61	.00	.00	.00	396.74	-49.87	.00	49.87
15	LAYBARGE	29.27	2.39	.00	19.40	.01	.00	.00	395.16	-43.22	.01	43.22
17	LAYBARGE	23.13	1.33	.00	15.77	-.03	.00	.00	393.88	-38.51	-.03	38.51
19	LAYBARGE	17.18	.19	.00	9.25	-.02	.00	.00	392.49	-32.54	.13	32.54
21	LAYBARGE	10.63	-1.22	.00	26.29	-1.36	.00	.00	391.31	-60.75	-1.59	60.77

24	STINGER	-4.62	-5.11	.00	25.96	-1.37	.00	.00	388.74	-60.62	-1.59	60.64
26	STINGER	-11.02	-6.99	.00	7.48	-.29	.00	.00	387.65	-31.91	.02	31.91
28	STINGER	-17.37	-9.02	.00	14.09	-1.11	.00	.00	386.28	-38.85	-.83	38.85
30	STINGER	-23.67	-11.19	.00	12.85	2.12	.00	.00	384.86	-36.89	1.31	36.91
32	STINGER	-29.93	-13.49	.01	13.30	-7.71	.00	.01	383.34	-32.33	-17.69	36.85
34	STINGER	-36.14	-15.90	.07	5.90	-3.45	.04	.07	381.81	-11.00	-10.87	15.46
36	SAGBEND	-47.31	-20.28	.26	.00	.00	.00	.00	378.92	12.40	.93	12.44
37	SAGBEND	-58.55	-24.50	.45	.00	.00	.00	.00	376.14	14.78	1.97	14.91
38	SAGBEND	-69.86	-28.49	.62	.00	.00	.00	.00	373.50	15.20	2.01	15.33
39	SAGBEND	-81.25	-32.26	.75	.00	.00	.00	.00	371.01	15.42	1.93	15.54
40	SAGBEND	-92.72	-35.80	.85	.00	.00	.00	.00	368.68	15.62	1.85	15.73
41	SAGBEND	-104.26	-39.10	.92	.00	.00	.00	.00	366.50	15.81	1.76	15.91
42	SAGBEND	-115.86	-42.16	.96	.00	.00	.00	.00	364.48	15.99	1.65	16.07
43	SAGBEND	-127.52	-44.98	.98	.00	.00	.00	.00	362.62	16.15	1.52	16.22
44	SAGBEND	-139.25	-47.55	.97	.00	.00	.00	.00	360.93	16.30	1.39	16.36
45	SAGBEND	-151.02	-49.86	.95	.00	.00	.00	.00	359.40	16.44	1.24	16.49
46	SAGBEND	-162.84	-51.92	.90	.00	.00	.00	.00	358.04	16.57	1.10	16.60
47	SAGBEND	-174.71	-53.72	.83	.00	.00	.00	.00	356.85	16.68	1.03	16.71
48	SAGBEND	-186.61	-55.26	.75	.00	.00	.00	.00	355.84	16.77	1.03	16.81
49	SAGBEND	-198.54	-56.53	.65	.00	.00	.00	.00	354.99	16.85	1.03	16.88
50	SAGBEND	-210.50	-57.54	.54	.00	.00	.00	.00	354.33	16.91	1.03	16.94
51	SAGBEND	-222.47	-58.29	.41	.00	.00	.00	.00	353.84	16.93	1.00	16.96
52	SAGBEND	-234.46	-58.76	.26	.00	.00	.00	.00	353.52	16.62	.68	16.64
53	SAGBEND	-246.46	-58.98	.10	1.33	-1.43	.00	.00	353.38	13.32	-2.48	13.55
54	SEABED	-258.46	-59.01	.00	8.33	-4.21	.00	.00	353.39	.54	-7.76	7.78
55	SEABED	-270.46	-59.01	.00	7.98	.56	.00	.00	353.39	-.04	.08	.09
56	SEABED	-282.46	-59.01	.00	7.91	.00	.00	.00	353.39	.00	.00	.00
57	SEABED	-294.46	-59.01	.00	7.92	.00	.00	.00	353.39	.00	.00	.00
58	SEABED	-306.46	-59.01	.00	7.92	.00	.00	.00	353.39	.00	.00	.00
59	SEABED	-318.46	-59.01	.00	7.92	.00	.00	.00	353.39	.00	.00	.00
60	SEABED	-330.46	-59.01	.00	.00	.00	.00	.00	353.39	.00	.00	.00

STATIC SOLUTION SUMMARY

PIPE PROPERTIES (1)

PIPE SECTION LENGTH ..	12.00 M	ELASTIC MODULUS	207000. MPA
OUTSIDE DIAMETER	21.908 CM	CROSS SECTIONAL AREA .	278.27 CM2
WALL THICKNESS	1.270 CM	MOMENT OF INERTIA	4400.56 CM4
WEIGHT/LENGTH IN AIR .	1235.937 N/M	YIELD STRESS	360.00 MPA
SUBMERGED WGHT/LENG ..	659.899 N/M	STRESS INTENS FACTOR .	1.000
SPECIFIC GRAVITY	2.146	STEEL DENSITY	78500.0 N/M3
WRAP COAT THICKNESS ..	.040 CM	WRAP COAT DENSITY	12815.0 N/M3
CONCRETE THICKNESS ...	.250 CM	CONCRETE DENSITY	30440.0 N/M3

BARGE DATA

TOTAL PIPE TENSION ...	399.99 KN	RADIUS OF CURVATURE ..	300.00 M
NUMBER OF TENSIONERS .	1	BARGE TRIM ANGLE	.000 DEG
NO. OF PIPE SUPPORTS .	10	PIPE ANGLE AT STERN ..	13.036 DEG
BARGE HEADING	.000 DEG	OFFSET FROM R.O.W. ...	.00 M

STINGER DATA

NO. OF PIPE SUPPORTS .	6	STINGER STERN DEPTH ..	-15.90 M
NO. STINGER SECTIONS .	6	PIPE ANGLE AT STERN ..	21.486 DEG
RADIUS OF CURVATURE ..	300.00 M	STINGER LENGTH	43.24 M

SAGBEND DATA

WATER DEPTH	59.00 M	HORIZ PIPE TENSION ...	353.39 KN
TOUCHDOWN X-COORD. ...	-249.88 M	BOTTOM SLOPE ANGLE ...	.000 DEG

SOLUTION SUMMARY

NODE NO.	PIPE SECTION	X COORD	Y COORD	Z COORD	SUPPORT REACT VERT	HORIZ	TOTAL MOMENT	TOTAL STRESS	PCT YLD
1	TENSIONR	77.8	6.2	.0	-2.4	.0	.0	48.6	13.
3	LAYBARGE	71.5	6.2	.0	25.7	.0	48.1	150.2	42.
5	LAYBARGE	65.4	6.0	.0	11.9	.0	34.7	122.0	34.
7	LAYBARGE	59.9	5.7	.0	16.5	.0	39.2	131.5	37.
9	LAYBARGE	53.3	5.3	.0	15.0	.0	37.8	128.4	36.
11	LAYBARGE	47.3	4.7	.0	19.7	.0	43.6	140.6	39.
13	LAYBARGE	38.2	3.7	.0	24.6	.0	49.9	153.7	43.
15	LAYBARGE	29.3	2.4	.0	19.4	.0	43.2	139.4	39.
17	LAYBARGE	23.1	1.3	.0	15.8	.0	38.5	129.3	36.
19	LAYBARGE	17.2	.2	.0	9.3	.0	32.5	116.5	32.
21	LAYBARGE	10.6	-1.2	.0	26.3	-1.4	60.8	176.1	49.

24	STINGER	-4.6	-5.1	.0	26.0	-1.4	60.6	175.5	49.
26	STINGER	-11.0	-7.0	.0	7.5	-.3	31.9	114.6	32.
28	STINGER	-17.4	-9.0	.0	14.1	-1.1	38.9	129.1	36.
30	STINGER	-23.7	-11.2	.0	12.9	2.1	36.9	124.8	35.
32	STINGER	-29.9	-13.5	.0	13.3	-7.7	36.9	124.5	35.

S T A T I C S O L U T I O N S U M M A R Y

34	STINGER	-36.1	-15.9	.1	5.9	-3.4	15.5	79.1	22.
50	SAGBEND	-210.5	-57.5	.5	.0	.0	16.9	78.8	22.
54	SEABED	-258.5	-59.0	.0	8.3	-4.2	7.8	59.4	16.

O V E R B E N D P I P E S U P P O R T G E O M E T R Y

STATION NO.	LOCATION	PIPE NODE	SUPT NODE	/----- PIPE COORDINATES ----/ X (M)	Y (M)	ANGLE (DEG)	/--- SUPPORT COORDINATES ---/ X (M)	Y (M)	ANGLE (DEG)	VERTICAL REACTION (KN)	VERTICAL SEPARATION (M)
1	TENSIONR	1	2	77.788	2.560	.27	77.789	2.560	.00	-2.40	.000
2	LAYBARGE	3	4	71.488	2.509	.96	71.489	2.509	1.05	25.69	.000
3	LAYBARGE	5	6	65.374	2.335	2.23	65.375	2.335	2.22	11.87	.000
4	LAYBARGE	7	8	59.910	2.073	3.28	59.911	2.073	3.27	16.53	.000
5	LAYBARGE	9	10	53.320	1.624	4.50	53.321	1.624	4.53	14.99	.000
6	LAYBARGE	11	12	47.322	1.088	5.74	47.323	1.089	5.68	19.70	.000
7	LAYBARGE	13	14	38.214	.042	7.42	38.215	.042	7.43	24.61	.000
8	LAYBARGE	15	16	29.270	-1.261	9.10	29.271	-1.261	9.15	19.40	.000
9	LAYBARGE	17	18	23.132	-2.316	10.37	23.133	-2.316	10.34	15.77	.000
10	LAYBARGE	19	20	17.181	-3.464	11.44	17.182	-3.464	11.50	9.25	.000
11	LAYBARGE	21	22	10.626	-4.875	13.04	10.627	-4.874	12.78	26.29	.000
12	STINGER	24	25	-4.621	-8.757	15.53	-4.620	-8.756	15.79	25.96	.000
13	STINGER	26	27	-11.016	-10.642	17.12	-11.015	-10.641	17.06	7.48	.000
14	STINGER	28	29	-17.367	-12.668	18.32	-17.366	-12.668	18.33	14.09	.000
15	STINGER	30	31	-23.672	-14.836	19.61	-23.671	-14.835	19.61	12.85	.000
16	STINGER	32	33	-29.928	-17.139	20.78	-29.926	-17.142	20.88	13.30	.004
17	STINGER	34	35	-36.144	-19.551	21.49	-36.128	-19.588	22.15	5.90	.040

S T A T I C P I P E C O O R D I N A T E S, F O R C E S A N D S T R E S S E S

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	.00	.000	.270	.000	48.58	.00	.00	.00	48.58	13.49
3	LAYBARGE	71.49	6.16	.00	.000	.960	6.300	48.56	.00	-119.64	-.02	150.25	41.74
5	LAYBARGE	65.37	5.98	.00	.000	2.230	12.417	48.54	.00	-86.42	.01	122.00	33.89
7	LAYBARGE	59.91	5.72	.00	.000	3.282	17.887	48.50	.00	-97.67	-.01	131.52	36.53
9	LAYBARGE	53.32	5.27	.00	.000	4.501	24.493	48.43	.00	-94.09	.00	128.41	35.67
11	LAYBARGE	47.32	4.74	.00	.000	5.739	30.515	48.35	.00	-108.57	.00	140.63	39.06
13	LAYBARGE	38.21	3.69	.00	.000	7.423	39.683	48.18	.00	-124.14	-.01	153.70	42.70
15	LAYBARGE	29.27	2.39	.00	.000	9.100	48.722	47.99	.00	-107.56	.02	139.42	38.73
17	LAYBARGE	23.13	1.33	.00	.000	10.369	54.950	47.84	.00	-95.96	-.08	129.40	35.95
19	LAYBARGE	17.18	.19	.00	.001	11.438	61.011	47.67	.00	-80.57	.33	116.15	32.26
21	LAYBARGE	10.63	-1.22	.00	-.013	13.044	67.716	47.47	-.11	-152.99	-3.98	177.61	49.34
24	STINGER	-4.61	-5.09	.00	.014	15.309	83.439	46.99	-.44	-127.20	-3.88	155.38	43.16
26	STINGER	-11.02	-6.94	.00	-.004	16.572	90.106	46.77	-.60	-58.21	-.39	96.55	26.82
28	STINGER	-17.40	-8.88	.00	.005	17.449	96.773	46.52	-.77	-73.93	-.23	109.75	30.49
30	STINGER	-23.74	-10.94	.00	-.017	18.438	103.440	46.26	-.95	-73.47	-4.43	109.30	30.36
32	STINGER	-30.05	-13.10	.00	.070	19.322	110.108	45.99	-1.14	-59.37	13.97	98.41	27.34
34	STINGER	-36.32	-15.36	.00	-.333	20.535	116.775	45.69	-1.33	-118.10	-68.26	162.30	45.08
36	SAGBEND	-47.51	-19.69	.17	-1.026	21.131	128.775	45.16	-1.71	22.39	-1.50	65.10	18.08
37	SAGBEND	-58.73	-23.93	.36	-.936	20.168	140.775	44.63	-2.07	35.93	4.57	76.47	21.24
38	SAGBEND	-70.03	-27.96	.53	-.778	19.044	152.775	44.12	-2.42	37.68	4.98	77.66	21.57
39	SAGBEND	-81.42	-31.76	.67	-.620	17.891	164.775	43.64	-2.75	38.31	4.83	77.87	21.63

40	SAGBEND	-92.87	-35.33	.78	-.469	16.722	176.775	43.19	-3.06	38.82	4.62	77.99	21.66
41	SAGBEND	-104.40	-38.66	.86	-.326	15.538	188.775	42.77	-3.35	39.29	4.40	78.10	21.70
42	SAGBEND	-115.99	-41.76	.91	-.192	14.340	200.775	42.38	-3.62	39.74	4.15	78.21	21.72
43	SAGBEND	-127.65	-44.61	.94	-.067	13.128	212.776	42.02	-3.87	40.15	3.84	78.31	21.75
44	SAGBEND	-139.36	-47.21	.94	.048	11.905	224.776	41.69	-4.09	40.53	3.50	78.40	21.78
45	SAGBEND	-151.13	-49.56	.92	.151	10.671	236.776	41.39	-4.30	40.88	3.14	78.48	21.80
46	SAGBEND	-162.95	-51.65	.88	.242	9.426	248.776	41.13	-4.48	41.20	2.78	78.56	21.82
47	SAGBEND	-174.81	-53.49	.82	.323	8.172	260.776	40.90	-4.64	41.48	2.59	78.64	21.85
48	SAGBEND	-186.70	-55.06	.74	.402	6.911	272.777	40.70	-4.77	41.72	2.56	78.72	21.87
49	SAGBEND	-198.63	-56.37	.65	.480	5.642	284.777	40.53	-4.89	41.93	2.56	78.79	21.89
50	SAGBEND	-210.58	-57.42	.54	.558	4.369	296.777	40.40	-4.98	42.08	2.56	78.84	21.90
51	SAGBEND	-222.56	-58.20	.42	.636	3.091	308.777	40.30	-5.04	42.14	2.51	78.83	21.90
52	SAGBEND	-234.55	-58.71	.28	.707	1.818	320.778	40.24	-5.09	41.62	1.95	78.32	21.76
53	SAGBEND	-246.54	-58.96	.13	.714	.611	332.778	40.21	-5.11	35.64	-3.64	73.34	20.37
54	SEABED	-258.54	-59.01	.01	.248	-.003	344.778	40.20	-5.12	3.12	-22.11	61.90	17.19
55	SEABED	-270.54	-59.01	.00	-.006	.000	356.778	40.20	-5.11	-.17	-.18	43.20	12.00
56	SEABED	-282.54	-59.01	.00	.000	.000	368.778	40.20	-5.11	.01	.04	43.02	11.95
57	SEABED	-294.54	-59.01	.00	.000	.000	380.778	40.20	-5.11	.00	.00	42.99	11.94
58	SEABED	-306.54	-59.01	.00	.000	.000	392.778	40.20	-5.11	.00	.00	42.99	11.94
59	SEABED	-318.54	-59.01	.00	.000	.000	404.778	40.20	-5.11	.00	.00	42.99	11.94
60	SEABED	-330.54	-59.01	.00	.000	.000	416.778	40.20	-5.11	.00	.00	42.99	11.94

S T A T I C P I P E C O O R D I N A T E S, F O R C E S A N D S T R E S S E S

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	SUPPORT REACTION VERT (KN)	SUPPORT REACTION HORIZ (KN)	SUPT SEPARATIONS VERT (M)	SUPT SEPARATIONS HORIZ (M)	PIPE TENSION (KN)	BENDING MOMENTS VERT (KN-M)	BENDING MOMENTS HORIZ (KN-M)	BENDING MOMENTS TOTAL (KN-M)
1	TENSIONR	77.79	6.21	.00	-2.40	-.01	.00	.00	400.01	.00	.00	.00
3	LAYBARGE	71.49	6.16	.00	25.69	.00	.00	.00	399.82	-48.06	-.01	48.06
5	LAYBARGE	65.37	5.98	.00	11.87	.00	.00	.00	399.66	-34.72	.01	34.72
7	LAYBARGE	59.91	5.72	.00	16.53	.00	.00	.00	399.32	-39.24	.00	39.24
9	LAYBARGE	53.32	5.27	.00	14.99	.00	.00	.00	398.77	-37.80	.00	37.80
11	LAYBARGE	47.32	4.74	.00	19.70	.00	.00	.00	398.08	-43.61	.00	43.61
13	LAYBARGE	38.21	3.69	.00	24.62	.00	.00	.00	396.76	-49.87	.00	49.87
15	LAYBARGE	29.27	2.39	.00	19.39	.01	.00	.00	395.18	-43.21	.01	43.21
17	LAYBARGE	23.13	1.33	.00	15.81	-.03	.00	.00	393.90	-38.55	-.03	38.55
19	LAYBARGE	17.18	.19	.00	9.08	-.01	.00	.00	392.50	-32.37	.13	32.37
21	LAYBARGE	10.63	-1.22	.00	26.83	-1.36	.00	.00	391.32	-61.46	-1.60	61.48
24	STINGER	-4.61	-5.09	.00	22.77	-1.33	.00	.00	388.82	-51.10	-1.56	51.12
26	STINGER	-11.02	-6.94	.00	5.58	-.46	.00	.00	387.72	-23.39	-.16	23.39
28	STINGER	-17.40	-8.88	.00	11.61	-.39	.00	.00	386.42	-29.70	-.09	29.70
30	STINGER	-23.74	-10.94	.00	11.41	-2.01	.00	.00	385.06	-29.52	-1.78	29.57
32	STINGER	-30.05	-13.10	.00	6.09	5.31	.00	.00	383.65	-23.85	5.61	24.50
34	STINGER	-36.32	-15.36	.00	22.74	-13.19	.00	.00	382.03	-47.45	-27.42	54.80
36	SAGBEND	-47.51	-19.69	.17	.00	.00	.00	.00	379.32	8.99	-.60	9.01
37	SAGBEND	-58.73	-23.93	.36	.00	.00	.00	.00	376.52	14.43	1.84	14.55
38	SAGBEND	-70.03	-27.96	.53	.00	.00	.00	.00	373.86	15.14	2.00	15.27
39	SAGBEND	-81.42	-31.76	.67	.00	.00	.00	.00	371.35	15.39	1.94	15.51
40	SAGBEND	-92.87	-35.33	.78	.00	.00	.00	.00	368.99	15.60	1.86	15.71
41	SAGBEND	-104.40	-38.66	.86	.00	.00	.00	.00	366.79	15.78	1.77	15.88
42	SAGBEND	-115.99	-41.76	.91	.00	.00	.00	.00	364.75	15.96	1.67	16.05
43	SAGBEND	-127.65	-44.61	.94	.00	.00	.00	.00	362.87	16.13	1.54	16.20
44	SAGBEND	-139.36	-47.21	.94	.00	.00	.00	.00	361.16	16.28	1.41	16.34
45	SAGBEND	-151.13	-49.56	.92	.00	.00	.00	.00	359.60	16.42	1.26	16.47
46	SAGBEND	-162.95	-51.65	.88	.00	.00	.00	.00	358.22	16.55	1.12	16.59
47	SAGBEND	-174.81	-53.49	.82	.00	.00	.00	.00	357.01	16.66	1.04	16.70
48	SAGBEND	-186.70	-55.06	.74	.00	.00	.00	.00	355.97	16.76	1.03	16.79
49	SAGBEND	-198.63	-56.37	.65	.00	.00	.00	.00	355.11	16.84	1.03	16.87
50	SAGBEND	-210.58	-57.42	.54	.00	.00	.00	.00	354.41	16.91	1.03	16.94
51	SAGBEND	-222.56	-58.20	.42	.00	.00	.00	.00	353.90	16.93	1.01	16.96
52	SAGBEND	-234.55	-58.71	.28	.00	.00	.00	.00	353.56	16.72	.78	16.74
53	SAGBEND	-246.54	-58.96	.13	.67	-.63	.00	.00	353.40	14.32	-1.46	14.39
54	SEABED	-258.54	-59.01	.01	7.84	-4.81	.00	.00	353.39	1.25	-8.88	8.97
55	SEABED	-270.54	-59.01	.00	8.05	.53	.00	.00	353.39	-.07	-.07	.10
56	SEABED	-282.54	-59.01	.00	7.91	.01	.00	.00	353.39	.00	.02	.02
57	SEABED	-294.54	-59.01	.00	7.92	.00	.00	.00	353.39	.00	.00	.00
58	SEABED	-306.54	-59.01	.00	7.92	.00	.00	.00	353.39	.00	.00	.00
59	SEABED	-318.54	-59.01	.00	7.92	.00	.00	.00	353.39	.00	.00	.00
60	SEABED	-330.54	-59.01	.00	.00	.00	.00	.00	353.39	.00	.00	.00

S T A T I C S O L U T I O N S U M M A R Y

PIPE PROPERTIES (1)

PIPE SECTION LENGTH ..	12.00 M	ELASTIC MODULUS	207000. MPA
OUTSIDE DIAMETER	21.908 CM	CROSS SECTIONAL AREA .	278.27 CM2
WALL THICKNESS	1.270 CM	MOMENT OF INERTIA	4400.56 CM4
WEIGHT/LENGTH IN AIR .	1235.937 N/M	YIELD STRESS	360.00 MPA
SUBMERGED WGHT/LENG ..	659.899 N/M	STRESS INTENS FACTOR .	1.000
SPECIFIC GRAVITY	2.146	STEEL DENSITY	78500.0 N/M3
WRAP COAT THICKNESS ..	.040 CM	WRAP COAT DENSITY	12815.0 N/M3
CONCRETE THICKNESS ...	.250 CM	CONCRETE DENSITY	30440.0 N/M3

BARGE DATA

TOTAL PIPE TENSION ...	400.01 KN	RADIUS OF CURVATURE ..	300.00 M
NUMBER OF TENSIONERS .	1	BARGE TRIM ANGLE	.000 DEG
NO. OF PIPE SUPPORTS .	10	PIPE ANGLE AT STERN ..	13.044 DEG
BARGE HEADING	.000 DEG	OFFSET FROM R.O.W. ...	.00 M

STINGER DATA

NO. OF PIPE SUPPORTS .	6	STINGER STERN DEPTH ..	-15.36 M
NO. STINGER SECTIONS .	6	PIPE ANGLE AT STERN ..	20.535 DEG
RADIUS OF CURVATURE ..	400.00 M	STINGER LENGTH	43.22 M

SAGBEND DATA

WATER DEPTH	59.00 M	HORIZ PIPE TENSION ...	353.39 KN
TOUCHDOWN X-COORD. ...	-251.61 M	BOTTOM SLOPE ANGLE ...	.000 DEG

SOLUTION SUMMARY

NODE NO.	PIPE SECTION	X COORD	Y COORD	Z COORD	SUPPORT REACT VERT	HORIZ	TOTAL MOMENT	TOTAL STRESS	PCT YLD
1	TENSIONR	77.8	6.2	.0	-2.4	.0	.0	48.6	13.
3	LAYBARGE	71.5	6.2	.0	25.7	.0	48.1	150.2	42.
5	LAYBARGE	65.4	6.0	.0	11.9	.0	34.7	122.0	34.
7	LAYBARGE	59.9	5.7	.0	16.5	.0	39.2	131.5	37.
9	LAYBARGE	53.3	5.3	.0	15.0	.0	37.8	128.4	36.
11	LAYBARGE	47.3	4.7	.0	19.7	.0	43.6	140.6	39.
13	LAYBARGE	38.2	3.7	.0	24.6	.0	49.9	153.7	43.
15	LAYBARGE	29.3	2.4	.0	19.4	.0	43.2	139.4	39.
17	LAYBARGE	23.1	1.3	.0	15.8	.0	38.5	129.4	36.
19	LAYBARGE	17.2	.2	.0	9.1	.0	32.4	116.2	32.
21	LAYBARGE	10.6	-1.2	.0	26.8	-1.4	61.5	177.6	49.
24	STINGER	-4.6	-5.1	.0	22.8	-1.3	51.1	155.4	43.
26	STINGER	-11.0	-6.9	.0	5.6	-.5	23.4	96.5	27.
28	STINGER	-17.4	-8.9	.0	11.6	-.4	29.7	109.7	30.
30	STINGER	-23.7	-10.9	.0	11.4	-2.0	29.6	109.3	30.
32	STINGER	-30.0	-13.1	.0	6.1	5.3	24.5	98.4	27.

S T A T I C S O L U T I O N S U M M A R Y

34	STINGER	-36.3	-15.4	.0	22.7	-13.2	54.8	162.3	45.
50	SAGBEND	-210.6	-57.4	.5	.0	.0	16.9	78.8	22.
54	SEABED	-258.5	-59.0	.0	7.8	-4.8	9.0	61.9	17.

O V E R B E N D P I P E S U P P O R T G E O M E T R Y

STATION NO.	LOCATION	PIPE NODE	SUPT NODE	PIPE COORDINATES X (M)	PIPE COORDINATES Y (M)	PIPE COORDINATES ANGLE (DEG)	SUPPORT COORDINATES X (M)	SUPPORT COORDINATES Y (M)	SUPPORT COORDINATES ANGLE (DEG)	VERTICAL REACTION (KN)	VERTICAL SEPARATION (M)
1	TENSIONR	1	2	77.788	2.560	.27	77.789	2.560	.00	-2.40	.000

2	LAYBARGE	3	4	71.488	2.509	.96	71.489	2.509	1.05	25.69	.000
3	LAYBARGE	5	6	65.374	2.335	2.23	65.375	2.335	2.22	11.87	.000
4	LAYBARGE	7	8	59.910	2.073	3.28	59.911	2.073	3.27	16.53	.000
5	LAYBARGE	9	10	53.320	1.624	4.50	53.321	1.624	4.53	14.99	.000
6	LAYBARGE	11	12	47.322	1.088	5.74	47.323	1.089	5.68	19.70	.000
7	LAYBARGE	13	14	38.214	.042	7.42	38.215	.042	7.43	24.62	.000
8	LAYBARGE	15	16	29.270	-1.261	9.10	29.271	-1.261	9.15	19.39	.000
9	LAYBARGE	17	18	23.132	-2.316	10.37	23.133	-2.316	10.34	15.81	.000
10	LAYBARGE	19	20	17.181	-3.464	11.44	17.182	-3.464	11.50	9.08	.000
11	LAYBARGE	21	22	10.626	-4.875	13.04	10.627	-4.874	12.78	26.83	.000
12	STINGER	24	25	-4.612	-8.744	15.31	-4.611	-8.744	15.56	22.77	.000
13	STINGER	26	27	-11.020	-10.586	16.57	-11.019	-10.586	16.51	5.58	.000
14	STINGER	28	29	-17.396	-12.534	17.45	-17.395	-12.534	17.47	11.61	.000
15	STINGER	30	31	-23.739	-14.588	18.44	-23.738	-14.588	18.42	11.41	.000
16	STINGER	32	33	-30.046	-16.748	19.32	-30.045	-16.747	19.38	6.09	.000
17	STINGER	34	35	-36.317	-19.011	20.53	-36.316	-19.012	20.33	22.74	.001

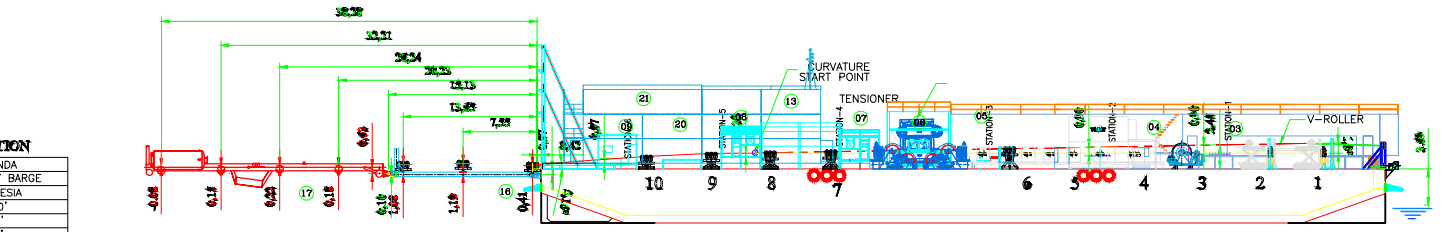
LAMPIRAN B
OUTPUT SOFTWARE MOSES
DAN DRAWING PIPELAYING BARGE
(PERMODELAN BARGE DAN RAO)

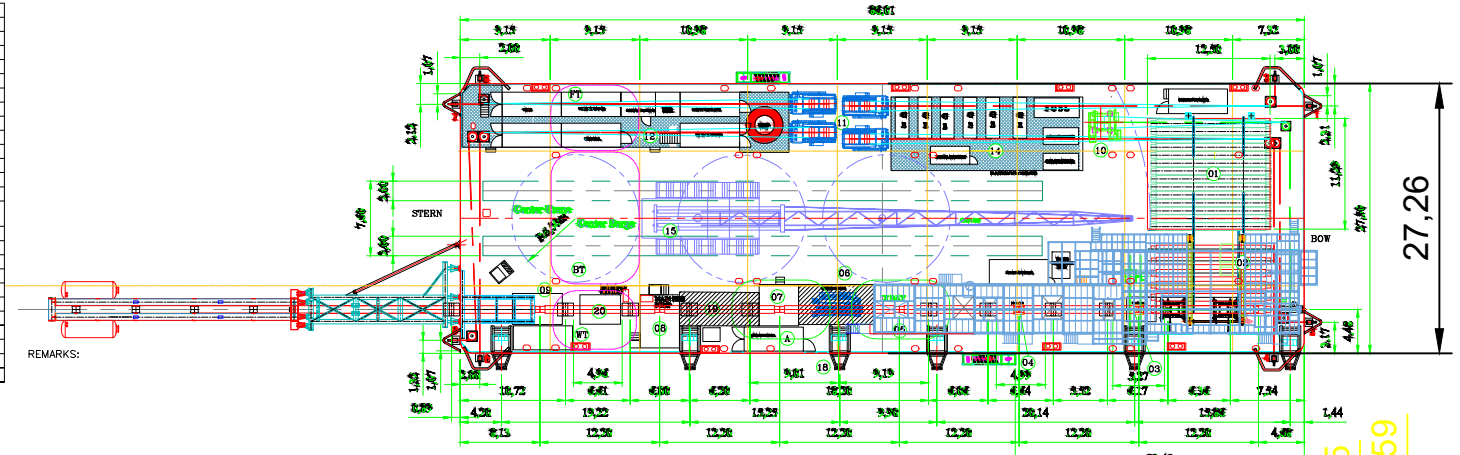
PONTOON INFORMATION

NAME	KALINDA
CLASSIFICATION	BKI PIPE LAY BARGE
FLAG	INDONESIA
LOA	280'
BREADTH	90'
DEPTH	18'
DRAFT	1.80 m (IN OPERATION)
MOORING	8 – POINTS
CRANE	TBA

LEGEND

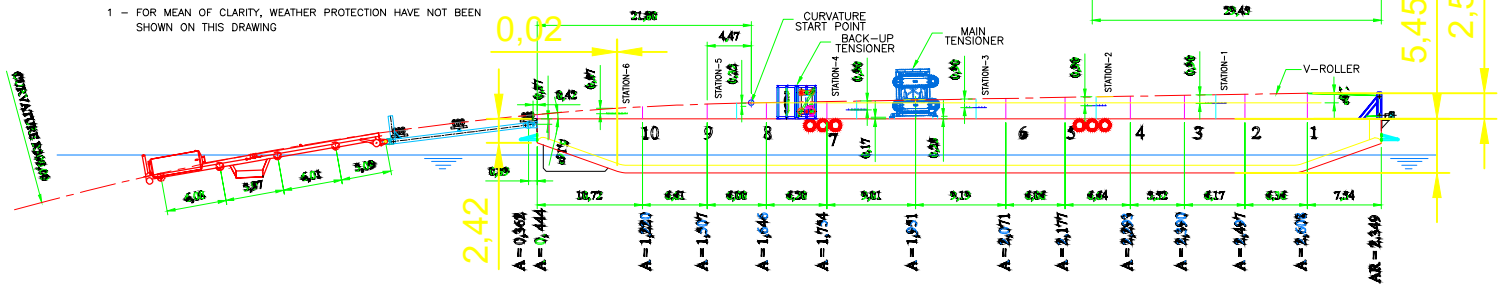
REP	FUNCTION
01	PIPE RACK
02	PIPE FACING MACHINES
03	WELDING STATION N°1
04	WELDING STATION N°2
05	NDT – REPAIR WELDING
06	MAIN TENSIONER – 30T CAPACITY
07	FIELD JOINT – ABRASIVE BLASTING
08	FIELD JOINT – COATING
09	FIELD JOINT – FOAM INFILL
10	ABANDON / RECOVERY WINCH 30T CAPACITY
11	MOORING WINCHES
12	OFFICES/WORKSHOPS/STORAGES/SANITARY/DIVING
13	WINCH & BARGE CONTROL ROOM
14	ENGINE DECK/DAY TANK/COMPRESSORS GENERATORS/FIRE PUMP
15	CRANE
16	STINGER–1 (OUTRIGGER) – 14.05m LENGTH
17	STINGER–2 (EXTENSION) – 26.89m LENGTH
18	DAVITS FIXED – QTY 6 – 25T CAPACITY
19	BACK UP TENSIONER
20	FLOATING DRUM INSTALLATION STATION
21	LUNCH ROOM 40 pax
A	MAIN TENSIONER CONTAINER
WT	FRESH WATER TANK
BT	BALLAST TANK
FT	FUEL TANK





REMARKS:

1 – FOR MEAN OF CLARITY, WEATHER PROTECTION HAVE NOT BEEN SHOWN ON THIS DRAWING



REV	DATE	DESCRIPTION	BY	CHECK
AG	11/02/13	ISSUED FOR REVIEW	GV	GV
AF	11/02/13	ISSUED FOR REVIEW	GV	GV
AE	23/07/12	ISSUED FOR REVIEW	PL	PL
AD	14/06/12	ISSUED FOR REVIEW	GV	GV
AC	27/04/12	ISSUED FOR REVIEW	GV	GV
AB	17/12/11	ISSUED FOR REVIEW	SGT	FA
AA	08/12/11	ISSUED FOR REVIEW	SGT	PL

PT GEOCEAN INDONESIA

SCALE	DRAWING NUMBER	REV
1/450	951–DRW–0001	AF

TITLE:

WORK BARGE KALINDA

GENERAL ARRANGEMENT

Input Permodelan Barge

```
$*********************************************      set data
$*********************************************      define body
&DESCRIBE BODY HULL
$*********************************************      DIMENSIONS
&DIMEN -SAVE -DIMEN METRES   M-TONS
$****************************************        define Hull
&DESCRIBE BODY Pipe_Lay_Barge
PGEN -PERM 1 -DIFTYPE STRIP  -CS_CURR 0 0 0  -TANAKA  1
 PLANE     0      -RECT  3.02804  5.4864  27.432
 PLANE  0.87186   -RECT  2.71782  5.4864  27.432
 PLANE  1.74371   -RECT   2.4076  5.4864  27.432
 PLANE  2.61557   -RECT  2.09739  5.4864  27.432
 PLANE  3.48742   -RECT  1.78717  5.4864  27.432
 PLANE  4.35928   -RECT  1.47696  5.4864  27.432
 PLANE  5.23113   -RECT  1.16674  5.4864  27.432
 PLANE  6.10299   -RECT  0.85653  5.4864  27.432
 PLANE  6.97484   -RECT  0.54631  5.4864  27.432
 PLANE   7.8467   -RECT   0.2361  5.4864  27.432
 PLANE  8.71855   -RECT  0.01565  5.4864  27.432
 PLANE  15.4963   -RECT     0     5.4864  27.432
 PLANE   22.274   -RECT     0     5.4864  27.432
 PLANE  29.0517   -RECT     0     5.4864  27.432
 PLANE  35.8294   -RECT     0     5.4864  27.432
 PLANE  42.6071   -RECT     0     5.4864  27.432
 PLANE  49.3848   -RECT     0     5.4864  27.432
 PLANE  56.1625   -RECT     0     5.4864  27.432
 PLANE  62.9402   -RECT     0     5.4864  27.432
 PLANE  69.7179   -RECT     0     5.4864  27.432
 PLANE  76.4956   -RECT     0     5.4864  27.432
 PLANE  77.3721   -RECT   0.1593  5.4864  27.432
 PLANE  78.2486   -RECT   0.4716  5.4864  27.432
 PLANE  79.1251   -RECT   0.7839  5.4864  27.432
 PLANE  80.0016   -RECT   1.0962  5.4864  27.432
 PLANE  80.8781   -RECT   1.4085  5.4864  27.432
 PLANE  81.7546   -RECT   1.7208  5.4864  27.432
 PLANE  82.6311   -RECT  2.03311  5.4864  27.432
 PLANE  83.5076   -RECT  2.34541  5.4864  27.432
 PLANE  84.3841   -RECT  2.65771  5.4864  27.432
 PLANE  85.2606   -RECT  2.97003  5.4864  27.432
END PGEN
```

Output RAO MOSES

```
*****************************************************************************************************
*                                         ***  MOSES  ***                                          *
*                                         ---------------                      December 19, 2019   *
*         Equilibrium Position                                                                      *
*         TUGAS AKHIR - PEMODELAN PIPELAY BARGE | BAGAS ADIYAN PRASTOWO                             *
*   Draft             =   1.8 Meters      Trim Angle       =   0.02 Deg.                            *
*   Roll Gy. Radius   =   8.2 Meters      Pitch Gy. Radius =  24.2 Meters   Yaw Gy. Radius   = 24.2 Meters *
*   Heading           =   0.00 Deg.       Forward Speed    =  0.00 Knots    Linearization Based on 1/ 20   *
*                                                                                                   *
*****************************************************************************************************
```

+++ M O T I O N   R E S P O N S E   O P E R A T O R S +++

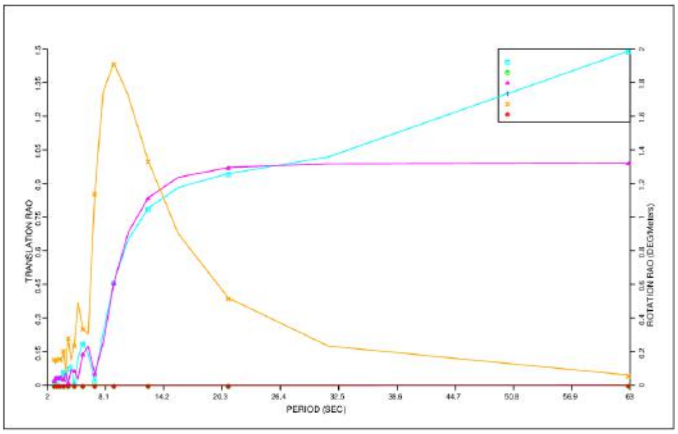
Results are in Body System

Of Point On Body PIPE_LAY At X = 42.7 Y = 0.0 Z = 2.2

Process is DEFAULT: Units Are Degrees, Meters, and M-Tons Unless Specified

E N C O U N T E R		Surge / Wave Ampl.		Sway / Wave Ampl.		Heave / Wave Ampl.		Roll / Wave Ampl.		Pitch / Wave Ampl.		Yaw / Wave Ampl.	
Frequency -(Rad/Sec)-	Period -(Sec)-	Ampl.	Phase	Ampl.	Phase	Ampl.	Phase	Ampl.	Phase	Ampl.	Phase	Ampl.	Phase
0.1000	62.83	1.490	99	0.000	0	0.991	-3	0.000	0	0.061	-78	0.001	112
0.2000	31.42	1.018	90	0.000	0	0.987	-3	0.000	0	0.233	-89	0.000	0
0.3000	20.94	0.944	92	0.000	0	0.971	0	0.000	0	0.519	-87	0.000	0
0.4000	15.71	0.881	99	0.000	0	0.927	7	0.000	0	0.902	-81	0.000	0
0.5000	12.57	0.789	108	0.000	0	0.836	16	0.000	0	1.334	-73	0.000	0
0.6000	10.47	0.649	119	0.000	0	0.681	25	0.000	0	1.721	-64	0.000	0
0.7000	8.98	0.459	131	0.000	0	0.456	33	0.000	0	1.915	-56	0.000	0
0.8000	7.85	0.236	145	0.000	0	0.189	41	0.000	0	1.745	-48	0.000	0
0.9000	6.98	0.018	175	0.000	0	0.052	-119	0.000	0	1.142	-40	0.000	0
1.0000	6.28	0.140	-7	0.000	0	0.173	-115	0.000	0	0.302	-32	0.000	0
1.1000	5.71	0.189	11	0.000	0	0.139	-100	0.000	0	0.339	167	0.000	0
1.2000	5.24	0.121	30	0.000	0	0.027	-56	0.001	-51	0.493	-172	0.000	0
1.3000	4.83	0.007	-137	0.000	0	0.066	109	0.001	-61	0.238	-140	0.000	0
1.4000	4.49	0.094	-107	0.000	0	0.069	145	0.000	0	0.149	35	0.000	0
1.5000	4.19	0.076	-82	0.000	0	0.013	-107	0.001	148	0.284	77	0.000	0
1.6000	3.93	0.012	119	0.000	0	0.055	7	0.001	163	0.075	132	0.000	0
1.7000	3.70	0.062	149	0.000	0	0.026	53	0.000	0	0.209	-53	0.000	0
1.8000	3.49	0.023	179	0.000	0	0.041	-117	0.001	47	0.136	-12	0.000	0

1.9000	3.31	0.036	28	0.000	0	0.034	-75	0.000	0	0.161	-173	0.000	0
2.0000	3.14	0.025	62	0.000	0	0.037	127	0.001	-62	0.150	-133	0.000	0
2.1000	2.99	0.023	-85	0.000	0	0.034	169	0.000	0	0.154	73	0.000	0
2.2000	2.86	0.018	-48	0.000	0	0.039	18	0.001	-169	0.130	115	0.000	0
2.3000	2.73	0.018	167	0.000	0	0.023	59	0.000	0	0.157	-34	0.000	0

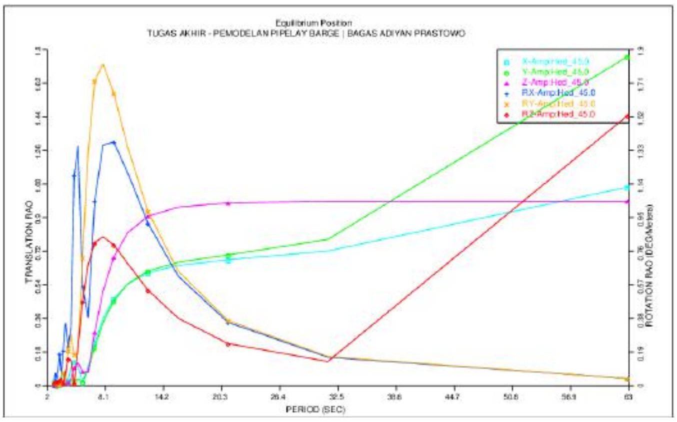



```
*****************************************************************************************************
*                                         ***  MOSES  ***                                           *
*                                         ---------------                    December 19, 2019     *
*          Equilibrium Position                                                                     *
*          TUGAS AKHIR - PEMODELAN PIPELAY BARGE | BAGAS ADIYAN PRASTOWO                            *
*    Draft             =  1.9 Meters      Trim Angle      =  0.01 Deg.                              *
*    Roll Gy. Radius   =  8.2 Meters      Pitch Gy. Radius =  24.2 Meters    Yaw Gy. Radius   =  24.2 Meters *
*    Heading           = 45.00 Deg.       Forward Speed   =  0.00 Knots      Linearization Based on 1/ 20    *
*                                                                                                   *
*****************************************************************************************************
```

+++ M O T I O N   R E S P O N S E   O P E R A T O R S +++

Results are in Body System
Of Point On Body PIPE_LAY At X = 42.7 Y = 0.0 Z = 2.2
Process is DEFAULT: Units Are Degrees, Meters, and M-Tons Unless Specified

E N C O U N T E R		Surge / Wave Ampl.		Sway / Wave Ampl.		Heave / Wave Ampl.		Roll / Wave Ampl.		Pitch / Wave Ampl.		Yaw / Wave Ampl.	
Frequency -(Rad/Sec)-	Period -(Sec)-	Ampl.	Phase	Ampl.	Phase	Ampl.	Phase	Ampl.	Phase	Ampl.	Phase	Ampl.	Phase
0.1000	62.83	1.063	90	1.762	142	0.988	-3	0.041	88	0.040	-76	1.526	-89
0.2000	31.42	0.721	85	0.783	105	0.988	-5	0.161	84	0.165	-90	0.137	-156
0.3000	20.94	0.674	86	0.700	95	0.980	-4	0.358	85	0.369	-92	0.238	-172
0.4000	15.71	0.643	89	0.661	94	0.956	-1	0.620	88	0.648	-90	0.382	-174
0.5000	12.57	0.604	93	0.614	96	0.907	2	0.919	92	0.985	-87	0.541	-172
0.6000	10.47	0.546	97	0.546	98	0.821	5	1.199	95	1.343	-84	0.688	-168
0.7000	8.98	0.464	101	0.453	101	0.687	7	1.379	99	1.654	-82	0.796	-162
0.8000	7.85	0.358	104	0.336	104	0.504	8	1.359	101	1.819	-82	0.841	-156
0.9000	6.98	0.232	109	0.206	108	0.285	8	1.045	104	1.722	-83	0.807	-148
1.0000	6.28	0.100	114	0.082	117	0.071	8	0.385	104	1.317	-83	0.683	-139
1.1000	5.71	0.019	-71	0.021	-131	0.075	-172	0.564	-74	0.725	-81	0.476	-129
1.2000	5.24	0.101	-59	0.038	-92	0.123	-167	1.354	-87	0.176	-75	0.222	-120
1.3000	4.83	0.128	-53	0.025	-22	0.096	-158	1.189	-104	0.177	109	0.013	122
1.4000	4.49	0.098	-47	0.036	1	0.037	-146	0.332	-107	0.287	120	0.144	88
1.5000	4.19	0.030	-40	0.017	-11	0.015	33	0.224	72	0.199	130	0.152	99
1.6000	3.93	0.037	144	0.011	-104	0.032	49	0.352	93	0.032	139	0.073	114
1.7000	3.70	0.066	151	0.014	-114	0.018	61	0.199	117	0.075	-24	0.011	-26
1.8000	3.49	0.043	159	0.007	-113	0.003	-86	0.058	-71	0.068	-11	0.044	-12
1.9000	3.31	0.006	-17	0.006	154	0.009	-79	0.181	-37	0.008	-17	0.030	21
2.0000	3.14	0.039	-5	0.008	157	0.003	-53	0.089	-20	0.022	-136	0.004	-130
2.1000	2.99	0.028	4	0.002	153	0.003	176	0.058	178	0.014	-85	0.028	-95
2.2000	2.86	0.007	-169	0.006	27	0.004	-130	0.070	-163	0.004	116	0.014	-71
2.3000	2.73	0.026	-157	0.004	47	0.001	-85	0.003	154	0.017	166	0.015	137

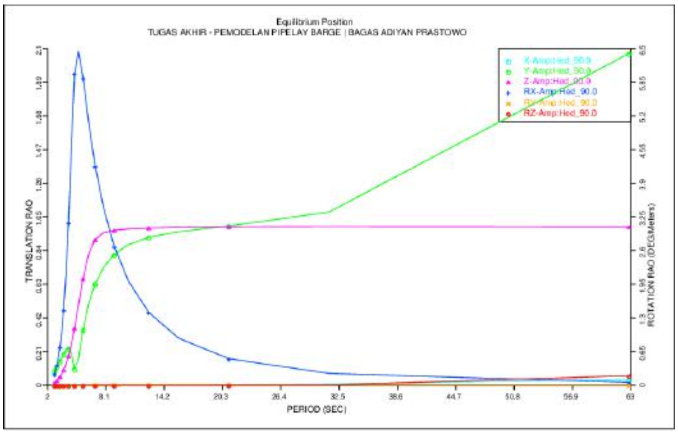


```
****************************************************************************************************
*                                    ***  MOSES  ***                                               *
*                                    ---------------                      December 19, 2019        *
*          Equilibrium Position                                                                    *
*          TUGAS AKHIR - PEMODELAN PIPELAY BARGE | BAGAS ADIYAN PRASTOWO                           *
*    Draft           =   1.9 Meters      Trim Angle       =  -0.00 Deg.                            *
*    Roll Gy. Radius  =   8.2 Meters     Pitch Gy. Radius =  24.2 Meters    Yaw Gy. Radius   =  24.2 Meters *
*    Heading          =  90.00 Deg.      Forward Speed    =  0.00 Knots     Linearization Based on 1/ 20    *
*                                                                                                  *
****************************************************************************************************
```

+++ M O T I O N   R E S P O N S E   O P E R A T O R S +++

Results are in Body System
Of Point On Body PIPE_LAY At X = 42.7 Y = 0.0 Z = 2.2
Process is DEFAULT: Units Are Degrees, Meters, and M-Tons Unless Specified

E N C O U N T E R		Surge / Wave Ampl.		Sway / Wave Ampl.		Heave / Wave Ampl.		Roll / Wave Ampl.		Pitch / Wave Ampl.		Yaw / Wave Ampl.	
Frequency -(Rad/Sec)-	Period -(Sec)-	Ampl.	Phase	Ampl.	Phase	Ampl.	Phase	Ampl.	Phase	Ampl.	Phase	Ampl.	Phase
0.1000	62.83	0.038	-5	2.069	132	0.988	-6	0.057	85	0.010	-7	0.186	-22
0.2000	31.42	0.008	-17	1.079	91	0.990	-14	0.228	76	0.011	-19	0.004	-23
0.3000	20.94	0.003	-29	0.993	74	0.988	-22	0.513	67	0.012	-34	0.002	-25
0.4000	15.71	0.002	-42	0.957	60	0.985	-32	0.908	56	0.013	-52	0.001	-28
0.5000	12.57	0.001	-61	0.922	45	0.980	-46	1.409	42	0.014	-74	0.001	-32
0.6000	10.47	0.001	-84	0.877	27	0.974	-63	2.005	24	0.015	-103	0.000	0
0.7000	8.98	0.001	-116	0.815	4	0.966	-86	2.682	1	0.015	-138	0.000	0
0.8000	7.85	0.000	0	0.734	-21	0.951	-113	3.427	-25	0.015	178	0.000	0
0.9000	6.98	0.000	0	0.632	-50	0.909	-146	4.232	-56	0.014	125	0.000	0
1.0000	6.28	0.000	0	0.505	-84	0.815	175	5.093	-92	0.011	64	0.000	0
1.1000	5.71	0.000	0	0.347	-120	0.664	135	5.934	-135	0.007	0	0.000	0
1.2000	5.24	0.000	0	0.161	-150	0.497	95	6.438	174	0.004	-68	0.001	-162
1.3000	4.83	0.000	0	0.101	-106	0.357	57	6.019	118	0.002	-141	0.001	141
1.4000	4.49	0.000	0	0.200	-128	0.253	21	4.601	62	0.001	140	0.000	0
1.5000	4.19	0.000	0	0.229	-170	0.181	-14	3.142	13	0.001	69	0.000	0
1.6000	3.93	0.000	0	0.218	147	0.131	-50	2.115	-30	0.001	12	0.000	0
1.7000	3.70	0.000	0	0.196	108	0.096	-86	1.456	-70	0.001	-37	0.000	0
1.8000	3.49	0.000	0	0.173	68	0.071	-123	1.029	-110	0.001	-83	0.000	0
1.9000	3.31	0.000	0	0.152	28	0.053	-162	0.742	-151	0.001	-128	0.000	0
2.0000	3.14	0.000	0	0.133	-13	0.040	157	0.543	167	0.001	-173	0.000	0
2.1000	2.99	0.000	0	0.117	-55	0.030	116	0.400	124	0.000	0	0.000	0
2.2000	2.86	0.000	0	0.103	-99	0.023	72	0.296	80	0.000	0	0.000	0
2.3000	2.73	0.000	0	0.091	-145	0.017	27	0.218	35	0.000	0	0.000	0



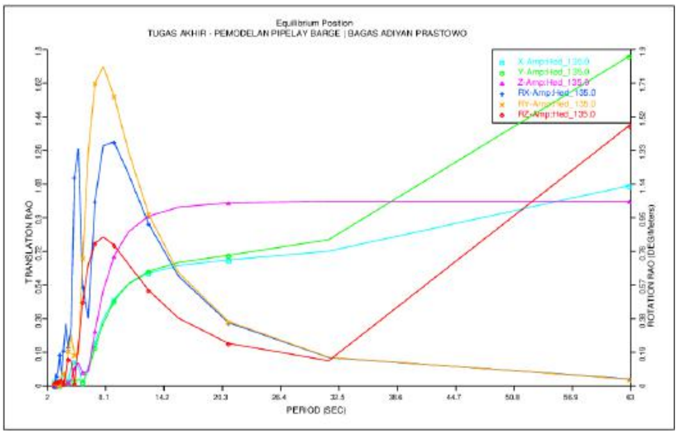

```
****************************************************************************************************
*                                    ***  MOSES  ***                                               *
*                                    ---------------                      December 19, 2019        *
*          Equilibrium Position                                                                    *
*          TUGAS AKHIR - PEMODELAN PIPELAY BARGE | BAGAS ADIYAN PRASTOWO                           *
*    Draft           =   1.9 Meters      Trim Angle       =  -0.01 Deg.                            *
*    Roll Gy. Radius  =   8.2 Meters     Pitch Gy. Radius =  24.2 Meters    Yaw Gy. Radius   =  24.2 Meters *
*    Heading          = 135.00 Deg.      Forward Speed    =  0.00 Knots     Linearization Based on 1/ 20    *
*                                                                                                  *
****************************************************************************************************
```

+++ M O T I O N   R E S P O N S E   O P E R A T O R S +++

Results are in Body System
Of Point On Body PIPE_LAY At X = 42.7 Y = 0.0 Z = 2.2
Process is DEFAULT: Units Are Degrees, Meters, and M-Tons Unless Specified

E N C O U N T E R		Surge / Wave Ampl.		Sway / Wave Ampl.		Heave / Wave Ampl.		Roll / Wave Ampl.		Pitch / Wave Ampl.		Yaw / Wave Ampl.	
Frequency -(Rad/Sec)-	Period -(Sec)-	Ampl.	Phase	Ampl.	Phase	Ampl.	Phase	Ampl.	Phase	Ampl.	Phase	Ampl.	Phase
0.1000	62.83	1.072	-88	1.765	139	0.988	-7	0.041	84	0.038	70	1.471	73
0.2000	31.42	0.722	-107	0.783	91	0.988	-19	0.161	70	0.163	67	0.143	7
0.3000	20.94	0.675	-125	0.700	63	0.980	-35	0.358	54	0.364	52	0.241	-24
0.4000	15.71	0.644	-147	0.661	37	0.957	-57	0.620	32	0.640	31	0.383	-51
0.5000	12.57	0.604	-175	0.614	7	0.909	-85	0.919	4	0.973	3	0.542	-80
0.6000	10.47	0.546	149	0.546	-28	0.824	-121	1.199	-30	1.327	-32	0.689	-115

0.7000	8.98	0.465	106	0.453	-71	0.694	-164	1.379	-73	1.637	-75	0.796	-155
0.8000	7.85	0.358	56	0.337	-120	0.513	142	1.359	-123	1.803	-128	0.841	157
0.9000	6.98	0.232	0	0.206	-176	0.293	82	1.044	179	1.712	171	0.807	106
1.0000	6.28	0.100	-63	0.082	125	0.077	11	0.384	112	1.313	104	0.683	48
1.1000	5.71	0.019	40	0.021	162	0.073	125	0.563	-140	0.725	32	0.475	-16
1.2000	5.24	0.101	-32	0.039	121	0.123	46	1.340	125	0.176	-41	0.222	-88
1.3000	4.83	0.128	-115	0.026	96	0.096	-33	1.181	21	0.177	54	0.014	67
1.4000	4.49	0.098	153	0.036	27	0.037	-117	0.329	-74	0.287	-29	0.144	-63
1.5000	4.19	0.030	55	0.017	-85	0.015	-35	0.223	0	0.199	-120	0.152	-154
1.6000	3.93	0.037	133	0.010	72	0.032	-130	0.351	-86	0.032	142	0.073	110
1.7000	3.70	0.066	21	0.014	-55	0.018	124	0.202	-177	0.075	-142	0.012	-142
1.8000	3.49	0.043	-95	0.007	-178	0.004	-148	0.058	-137	0.067	108	0.044	104
1.9000	3.31	0.006	-35	0.006	-36	0.009	89	0.180	131	0.007	-18	0.030	7
2.0000	3.14	0.039	-169	0.008	-173	0.003	-17	0.089	14	0.022	73	0.004	93
2.1000	2.99	0.028	52	0.002	29	0.003	61	0.058	63	0.014	-14	0.028	-30
2.2000	2.86	0.007	91	0.006	122	0.004	-32	0.070	-66	0.004	22	0.014	-161
2.3000	2.73	0.026	-61	0.004	-20	0.001	-137	0.001	79	0.017	-74	0.015	-103

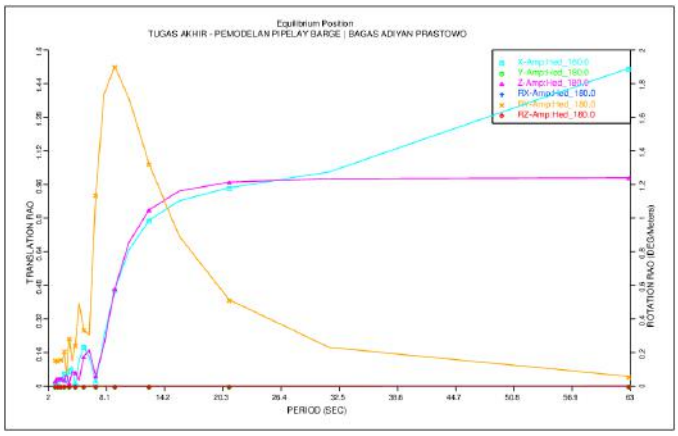



```
*****************************************************************************************************
*                                       ***  MOSES  ***                                             *
*                                      ---------------                       December 19, 2019     *
*       Equilibrium Position                                                                        *
*       TUGAS AKHIR - PEMODELAN PIPELAY BARGE | BAGAS ADIYAN PRASTOWO                               *
*  Draft          =   1.9 Meters     Trim Angle      =  -0.03 Deg.                                  *
*  Roll Gy. Radius  =   8.2 Meters   Pitch Gy. Radius =  24.2 Meters   Yaw Gy. Radius   =  24.2 Meters *
*  Heading         = 180.00 Deg.     Forward Speed   =   0.00 Knots    Linearization Based on 1/ 20  *
*                                                                                                   *
*****************************************************************************************************
```

+++ M O T I O N   R E S P O N S E   O P E R A T O R S +++

Results are in Body System
Of Point On Body PIPE_LAY At X = 42.7 Y = 0.0 Z = 2.2
Process is DEFAULT: Units Are Degrees, Meters, and M-Tons Unless Specified

E N C O U N T E R		Surge / Wave Ampl.		Sway / Wave Ampl.		Heave / Wave Ampl.		Roll / Wave Ampl.		Pitch / Wave Ampl.		Yaw / Wave Ampl.	
Frequency -(Rad/Sec)-	Period -(Sec)-	Ampl.	Phase	Ampl.	Phase	Ampl.	Phase	Ampl.	Phase	Ampl.	Phase	Ampl.	Phase
0.1000	62.83	1.513	-82	0.000	0	0.991	-8	0.000	0	0.058	76	0.000	0
0.2000	31.42	1.019	-109	0.000	0	0.987	-23	0.000	0	0.231	65	0.000	0
0.3000	20.94	0.945	-132	0.000	0	0.971	-44	0.000	0	0.515	45	0.000	0
0.4000	15.71	0.882	-161	0.000	0	0.928	-72	0.000	0	0.894	17	0.000	0
0.5000	12.57	0.789	163	0.000	0	0.839	-108	0.000	0	1.323	-18	0.000	0
0.6000	10.47	0.650	118	0.000	0	0.685	-153	0.000	0	1.709	-64	0.000	0
0.7000	8.98	0.459	64	0.000	0	0.463	149	0.000	0	1.902	-120	0.000	0
0.8000	7.85	0.235	2	0.000	0	0.197	81	0.000	0	1.736	173	0.000	0
0.9000	6.98	0.017	-59	0.000	0	0.048	-156	0.000	0	1.139	97	0.000	0
1.0000	6.28	0.140	29	0.000	0	0.172	108	0.000	0	0.304	11	0.000	0
1.1000	5.71	0.188	-58	0.000	0	0.140	17	0.000	0	0.337	105	0.000	0
1.2000	5.24	0.120	-155	0.000	0	0.028	-56	0.001	-54	0.495	11	0.000	0
1.3000	4.83	0.007	-74	0.000	0	0.065	-10	0.001	178	0.244	-80	0.000	0
1.4000	4.49	0.094	165	0.000	0	0.070	-108	0.000	0	0.148	-41	0.000	0
1.5000	4.19	0.076	43	0.000	0	0.013	-151	0.001	102	0.287	-140	0.000	0
1.6000	3.93	0.012	97	0.000	0	0.055	174	0.001	-28	0.082	120	0.000	0
1.7000	3.70	0.062	-45	0.000	0	0.027	55	0.000	0	0.209	128	0.000	0
1.8000	3.49	0.023	164	0.000	0	0.041	70	0.001	-126	0.141	-2	0.000	0
1.9000	3.31	0.036	-168	0.000	0	0.034	-70	0.000	0	0.161	8	0.000	0
2.0000	3.14	0.025	25	0.000	0	0.037	-62	0.001	101	0.153	-142	0.000	0
2.1000	2.99	0.023	35	0.000	0	0.034	135	0.000	0	0.153	-141	0.000	0
2.2000	2.86	0.018	-147	0.000	0	0.039	130	0.001	-63	0.133	49	0.000	0
2.3000	2.73	0.018	-155	0.000	0	0.023	-47	0.000	0	0.155	34	0.000	0


Equilibrium Position
TUGAS AKHIR - PEMODELAN PIPELAY BARGE | BAGAS ADIYAN PRASTOWO
X-Amplitud_180.0
Y-Amplitud_180.0
Z-Amplitud_180.0
RX-Amplitud_180.0
RY-Amplitud_180.0
RZ-Amplitud_180.0
TRANSLATION RAO
ROTATION RAO (DEG/Meters)
PERIOD (SEC)
2
8.1
14.2
20.3
26.4
32.5
38.6
44.7
50.8
56.9
63

LAMPIRAN C
INPUT DAN OUTPUT SOFTWARE OFFPIPE
(ANALISIS DINAMIS)

Input Analisis Dinamis Heading 0°

```
*COMM ****************************************************************
*COMM ******************** PROBLEM HEADING DATA **********************
*COMM ****************************************************************
*HEAD HEAD='TUGAS AKHIR CLUSTER I PHE WMO 8.625 in', JOB='ANALISIS DINAMIS',
      USER='BAGAS ADIYAN PRASTOWO', UNIT=2
*COMM ****************************************************************
*COMM ********************** PLOTTING DATA ***************************
*COMM ****************************************************************
*PROF ROW=1, NUMB=1, TYPE=4, TITL='MAXIMUM DYNAMIC STRESS',
      ORDL='PIPE Y COORDINATE', ABSL='PIPE X COORDINATE', ORDI=2, ABSC=1
*PROF ROW=2, NUMB=1, TYPE=4, TITL='MAXIMUM DYNAMIC STRESS',
      ORDL='MAXIMUM TOTAL  STRESS', ABSL='PIPE X COORDINATE', ORDI=14, ABSC=1
*HIST ROW=3, NUMB=2, NODE=34, TITL='DYNAMIC STRESS AT STINGER TIP',
      ORDL='DYNAMIC TOTAL STRESS', ABSL='TIME HISTORY', ORDI=14
*HIST ROW=4, NUMB=3, NODE=34, TITL='DYNAMIC STRESS AT STINGER TIP',
      ORDL='DYNAMIC TOTAL STRESS', ABSL='TIME HISTORY', ORDI=15
*COMM ****************************************************************
*COMM ********************** PRINTED OUTPUT **************************
*COMM ****************************************************************
*PRIN SUMM=1, DYNA=1, STRA=0, DNVS=1, WARN=1, PLOT=1
*COMM ****************************************************************
*COMM ******************* PIPE AND COATING DATA **********************
*COMM ****************************************************************
*PIPE ROW=1, LENG=12, DIAM=21.908, WALL=1.27, AREA=278.2704, YIEL=360,
      WEIG=1235.9373, SUBM=659.8987, ELAS=207000, POIS=0.3
*COAT ROW=1, TCOR=0.04, DCOR=12815, FJNT=0.0, DJNT=1500, TCON=0.25, DCON=30440,
      LENG=12, DSTE=78500
*COMM ****************************************************************
*COMM ************************ BARGE DATA ****************************
*COMM ****************************************************************
*BARG NUMB=11, GEOM=2, RADI=300, DECK=3.65, TRIM=0.0, XTAN=77, YTAN=2.56,
      TABL=(X,Y,SUPP,DAVI)
      77.789, 2.563, 2,
      71.489, 2.477, 1,
      65.375, 2.366, 1,
      59.911, 2.273, 1,
      53.321, 2.157, 1,
      47.323, 2.053, 1,
      38.215, 1.898, 1,
      29.271, 1.741, 1,
      23.133, 1.635, 1,
      17.182, 1.495, 1,
      10.627, 1.218, 1,
*SUPP ROW=1, TYPE=1, ANGL=30, INCL=60, OFFS=1
*COMM ****************************************************************
*COMM ********************** PIPE TENSION ****************************
*COMM ****************************************************************
*TENS TENS=300
*COMM ****************************************************************
*COMM ********************** STINGER DATA ****************************
*COMM ****************************************************************
*STIN NUMB=6, GEOM=4, TYPE=1, RADI=200, XHIT=0, YHIT=0,
      TABL=(X,Y,SUPP,SECT,LENG)
       -6.605,  -3.766, 1, 2, 6.667
      -13.425,  -5.361, 1, 1, 6.667
      -20.15,   -7.250, 1, 1, 6.667
      -26.772,  -9.353, 1, 1, 6.667
      -33.332, -11.663, 1, 1, 6.667
      -39.821, -14.338, 1, 1, 6.667
*COMM ****************************************************************
*COMM ******************** SAGBEND PIPE SPAN DATA ********************
*COMM ****************************************************************
*GEOM LENG=12, DEPT=53
*SOIL CFX=0.6, CFZ=0.6
*COMM ****************************************************************
*COMM ******************* CURRENT PROFILE DATA ***********************
*COMM ****************************************************************
*CURR NUMB=11, TABL=(DEPT,VELO,DIRE)
       0.00, 1.06, 90
       5.38, 1.04, 90
      10.76, 1.03, 90
      16.14, 1.01, 90
      21.52, 0.98, 90
      26.91, 0.96, 90
      31.29, 0.93, 90
```

```
      37.67, 0.89, 90
      43.05, 0.84, 90
      48.43, 0.76, 90
      52.81, 0.66, 90
*COMM ***************************************************************
*COMM ***************** INTEGRATION TIME STEP DATA ******************
*COMM ***************************************************************
*TIME STEP=0.4, STAR=60, STOP=10860, SAMP=0.8
*COMM ***************************************************************
*COMM ********************** WAVE SPECTRA ***************************
*COMM ***************************************************************
*SPEC SEAS=1, TYPE=8, DIRE=0, FMIN=0.1, FMAX=2.3, NUMB=20, HSIG=0.21, FPEA=1.01,
      JON1=0.010146, JON2=1.71
*COMM ***************************************************************
*COMM ************ LAYBARGE RAOS FOR SINGLE WAVE PERIOD **************
*COMM ***************************************************************
*RAOS NUMB=23, SEAS=1, SIGN=2, TABL=(FREQ,SRGM,SRGA,SWYM,SWYA,HEAM,HEAA)
      0.1, 0.868,   93, 0, 0, 0.86,     3
      0.2, 0.862,  100, 0, 0, 0.845,   11
      0.3, 0.845,  112, 0, 0, 0.807,   24
      0.4, 0.809,  130, 0, 0, 0.72,    42
      0.5, 0.743,  152, 0, 0, 0.551,   65
      0.6, 0.636,  180, 0, 0, 0.275,   93
      0.7, 0.484, -147, 0, 0, 0.103,  -54
      0.8, 0.296, -109, 0, 0, 0.516,  -18
      0.9, 0.097,  -67, 0, 0, 0.813,   21
      1,   0.07,   159, 0, 0, 0.798,   65
      1.1, 0.159, -148, 0, 0, 0.393,  113
      1.2, 0.147,  -90, 0, 0, 0.176,  -10
      1.3, 0.055,  -28, 0, 0, 0.559,   53
      1.4, 0.049, -141, 0, 0, 0.51,   122
      1.5, 0.089,  -69, 0, 0, 0.046, -163
      1.6, 0.042,    7, 0, 0, 0.429,   94
      1.7, 0.034,  -90, 0, 0, 0.415,  177
      1.8, 0.055,   -3, 0, 0, 0.088,   85
      1.9, 0.005,   88, 0, 0, 0.43,   177
      2,   0.04,     5, 0, 0, 0.13,   -85
      2.1, 0.017,  107, 0, 0, 0.335, -162
      2.2, 0.027,   34, 0, 0, 0.19,   -55
      2.3, 0.015,  146, 0, 0, 0.28,  -123
      TABL=(FREQ,ROLM,ROLA,PITM,PITA,YAWM,YAWA)
      0.1, 0, 0, 0.118,  -89, 0, 0
      0.2, 0, 0, 0.5,    -86, 0, 0
      0.3, 0, 0, 1.154,  -82, 0, 0
      0.4, 0, 0, 1.926,  -76, 0, 0
      0.5, 0, 0, 2.491,  -64, 0, 0
      0.6, 0, 0, 2.598,  -46, 0, 0
      0.7, 0, 0, 2.199,  -19, 0, 0
      0.8, 0, 0, 1.403,   14, 0, 0
      0.9, 0, 0, 0.459,   57, 0, 0
      1,   0, 0, 0.321,  -70, 0, 0
      1.1, 0, 0, 0.73,    -9, 0, 0
      1.2, 0, 0, 0.723,   59, 0, 0
      1.3, 0, 0, 0.311,  131, 0, 0
      1.4, 0, 0, 0.335,   26, 0, 0
      1.5, 0, 0, 0.724,  103, 0, 0
      1.6, 0, 0, 0.402, -177, 0, 0
      1.7, 0, 0, 0.378,   86, 0, 0
      1.8, 0, 0, 0.687,  174, 0, 0
      1.9, 0, 0, 0.068,  -92, 0, 0
      2,   0, 0, 0.611, -175, 0, 0
      2.1, 0, 0, 0.283,  -72, 0, 0
      2.2, 0, 0, 0.488, -145, 0, 0
      2.3, 0, 0, 0.307,  -33, 0, 0
*RUN ********************** RUN CASE 01 ****************************
*COMM ***************************************************************
*COMM ********************** RUN NEXT CASE **************************
*COMM ***************************************************************
*GEOM LENG=12, DEPT=53
*TENS TENS=300
*STIN NUMB=6, GEOM=4, TYPE=1, RADI=300, XHIT=0, YHIT=0,
      TABL=(X,Y,SUPP,SECT,LENG)
       -6.605,  -3.766, 1, 2, 6.667
      -13.425,  -5.361, 1, 1, 6.667
      -20.15,   -7.250, 1, 1, 6.667
      -26.772,  -9.353, 1, 1, 6.667
      -33.332, -11.663, 1, 1, 6.667
```

```
      -39.821, -14.338, 1, 1, 6.667
*RUN ************************ RUN CASE 02 ***************************
*COMM ************************************************************
*COMM ************************ RUN NEXT CASE ************************
*COMM ************************************************************
*GEOM LENG=12, DEPT=53
*TENS TENS=300
*STIN NUMB=6, GEOM=4, TYPE=1, RADI=400, XHIT=0, YHIT=0,
      TABL=(X,Y,SUPP,SECT,LENG)
       -6.605,  -3.766, 1, 2, 6.667
      -13.425,  -5.361, 1, 1, 6.667
      -20.15,   -7.250, 1, 1, 6.667
      -26.772,  -9.353, 1, 1, 6.667
      -33.332, -11.663, 1, 1, 6.667
      -39.821, -14.338, 1, 1, 6.667
*RUN ************************ RUN CASE 03 ***************************
*COMM ************************************************************
*COMM ************************ RUN NEXT CASE ************************
*COMM ************************************************************
*GEOM LENG=12, DEPT=53
*TENS TENS=400
*STIN NUMB=6, GEOM=4, TYPE=1, RADI=200, XHIT=0, YHIT=0,
      TABL=(X,Y,SUPP,SECT,LENG)
       -6.605,  -3.766, 1, 2, 6.667
      -13.425,  -5.361, 1, 1, 6.667
      -20.15,   -7.250, 1, 1, 6.667
      -26.772,  -9.353, 1, 1, 6.667
      -33.332, -11.663, 1, 1, 6.667
      -39.821, -14.338, 1, 1, 6.667
*RUN ************************ RUN CASE 04 ***************************
*COMM ************************************************************
*COMM ************************ RUN NEXT CASE ************************
*COMM ************************************************************
*GEOM LENG=12, DEPT=53
*TENS TENS=400
*STIN NUMB=6, GEOM=4, TYPE=1, RADI=300, XHIT=0, YHIT=0,
      TABL=(X,Y,SUPP,SECT,LENG)
       -6.605,  -3.766, 1, 2, 6.667
      -13.425,  -5.361, 1, 1, 6.667
      -20.15,   -7.250, 1, 1, 6.667
      -26.772,  -9.353, 1, 1, 6.667
      -33.332, -11.663, 1, 1, 6.667
      -39.821, -14.338, 1, 1, 6.667
*RUN ************************ RUN CASE 05 ***************************
*COMM ************************************************************
*COMM ************************ RUN NEXT CASE ************************
*COMM ************************************************************
*GEOM LENG=12, DEPT=53
*TENS TENS=400
*STIN NUMB=6, GEOM=4, TYPE=1, RADI=400, XHIT=0, YHIT=0,
      TABL=(X,Y,SUPP,SECT,LENG)
       -6.605,  -3.766, 1, 2, 6.667
      -13.425,  -5.361, 1, 1, 6.667
      -20.15,   -7.250, 1, 1, 6.667
      -26.772,  -9.353, 1, 1, 6.667
      -33.332, -11.663, 1, 1, 6.667
      -39.821, -14.338, 1, 1, 6.667
*RUN ************************ RUN CASE 06 ***************************
*COMM ************************************************************
*COMM ************************ RUN NEXT CASE ************************
*COMM ************************************************************
*COMM _____________________________________________________________
*GEOM LENG=12, DEPT=56
*TENS TENS=300
*STIN NUMB=6, GEOM=4, TYPE=1, RADI=200, XHIT=0, YHIT=0,
      TABL=(X,Y,SUPP,SECT,LENG)
       -6.605,  -3.766, 1, 2, 6.667
      -13.425,  -5.361, 1, 1, 6.667
      -20.15,   -7.250, 1, 1, 6.667
      -26.772,  -9.353, 1, 1, 6.667
      -33.332, -11.663, 1, 1, 6.667
      -39.821, -14.338, 1, 1, 6.667
*RUN ************************ RUN CASE 07 ***************************
*COMM ************************************************************
*COMM ************************ RUN NEXT CASE ************************
*COMM ************************************************************
*GEOM LENG=12, DEPT=56
```

```
*TENS TENS=300
*STIN NUMB=6, GEOM=4, TYPE=1, RADI=300, XHIT=0, YHIT=0,
      TABL=(X,Y,SUPP,SECT,LENG)
       -6.605,  -3.766, 1, 2, 6.667
      -13.425,  -5.361, 1, 1, 6.667
      -20.15,   -7.250, 1, 1, 6.667
      -26.772,  -9.353, 1, 1, 6.667
      -33.332, -11.663, 1, 1, 6.667
      -39.821, -14.338, 1, 1, 6.667
*RUN ********************** RUN CASE 08 ***************************
*COMM ************************************************************
*COMM ********************** RUN NEXT CASE ************************
*COMM ************************************************************
*GEOM LENG=12, DEPT=56
*TENS TENS=300
*STIN NUMB=6, GEOM=4, TYPE=1, RADI=400, XHIT=0, YHIT=0,
      TABL=(X,Y,SUPP,SECT,LENG)
       -6.605,  -3.766, 1, 2, 6.667
      -13.425,  -5.361, 1, 1, 6.667
      -20.15,   -7.250, 1, 1, 6.667
      -26.772,  -9.353, 1, 1, 6.667
      -33.332, -11.663, 1, 1, 6.667
      -39.821, -14.338, 1, 1, 6.667
*RUN ********************** RUN CASE 09 ***************************
*COMM ************************************************************
*COMM ********************** RUN NEXT CASE ************************
*COMM ************************************************************
*GEOM LENG=12, DEPT=56
*TENS TENS=400
*STIN NUMB=6, GEOM=4, TYPE=1, RADI=200, XHIT=0, YHIT=0,
      TABL=(X,Y,SUPP,SECT,LENG)
       -6.605,  -3.766, 1, 2, 6.667
      -13.425,  -5.361, 1, 1, 6.667
      -20.15,   -7.250, 1, 1, 6.667
      -26.772,  -9.353, 1, 1, 6.667
      -33.332, -11.663, 1, 1, 6.667
      -39.821, -14.338, 1, 1, 6.667
*RUN ********************** RUN CASE 10 ***************************
*COMM ************************************************************
*COMM ********************** RUN NEXT CASE ************************
*COMM ************************************************************
*GEOM LENG=12, DEPT=56
*TENS TENS=400
*STIN NUMB=6, GEOM=4, TYPE=1, RADI=300, XHIT=0, YHIT=0,
      TABL=(X,Y,SUPP,SECT,LENG)
       -6.605,  -3.766, 1, 2, 6.667
      -13.425,  -5.361, 1, 1, 6.667
      -20.15,   -7.250, 1, 1, 6.667
      -26.772,  -9.353, 1, 1, 6.667
      -33.332, -11.663, 1, 1, 6.667
      -39.821, -14.338, 1, 1, 6.667
*RUN ********************** RUN CASE 11 ***************************
*COMM ************************************************************
*COMM ********************** RUN NEXT CASE ************************
*COMM ************************************************************
*GEOM LENG=12, DEPT=53
*TENS TENS=400
*STIN NUMB=6, GEOM=4, TYPE=1, RADI=400, XHIT=0, YHIT=0,
      TABL=(X,Y,SUPP,SECT,LENG)
       -6.605,  -3.766, 1, 2, 6.667
      -13.425,  -5.361, 1, 1, 6.667
      -20.15,   -7.250, 1, 1, 6.667
      -26.772,  -9.353, 1, 1, 6.667
      -33.332, -11.663, 1, 1, 6.667
      -39.821, -14.338, 1, 1, 6.667
*RUN ********************** RUN CASE 12 ***************************
*COMM ************************************************************
*COMM ********************** RUN NEXT CASE ************************
*COMM ************************************************************
*COMM ____________________________________________________________
*GEOM LENG=12, DEPT=59
*TENS TENS=300
*STIN NUMB=6, GEOM=4, TYPE=1, RADI=200, XHIT=0, YHIT=0,
      TABL=(X,Y,SUPP,SECT,LENG)
       -6.605,  -3.766, 1, 2, 6.667
      -13.425,  -5.361, 1, 1, 6.667
      -20.15,   -7.250, 1, 1, 6.667
```

```
      -26.772,  -9.353, 1, 1, 6.667
      -33.332, -11.663, 1, 1, 6.667
      -39.821, -14.338, 1, 1, 6.667
*RUN ************************ RUN CASE 13 ****************************
*COMM ***************************************************************
*COMM ************************ RUN NEXT CASE ************************
*COMM ***************************************************************
*GEOM LENG=12, DEPT=59
*TENS TENS=300
*STIN NUMB=6, GEOM=4, TYPE=1, RADI=300, XHIT=0, YHIT=0,
      TABL=(X,Y,SUPP,SECT,LENG)
       -6.605,  -3.766, 1, 2, 6.667
      -13.425,  -5.361, 1, 1, 6.667
      -20.15,   -7.250, 1, 1, 6.667
      -26.772,  -9.353, 1, 1, 6.667
      -33.332, -11.663, 1, 1, 6.667
      -39.821, -14.338, 1, 1, 6.667
*RUN ************************ RUN CASE 14 ****************************
*COMM ***************************************************************
*COMM ************************ RUN NEXT CASE ************************
*COMM ***************************************************************
*GEOM LENG=12, DEPT=59
*TENS TENS=300
*STIN NUMB=6, GEOM=4, TYPE=1, RADI=400, XHIT=0, YHIT=0,
      TABL=(X,Y,SUPP,SECT,LENG)
       -6.605,  -3.766, 1, 2, 6.667
      -13.425,  -5.361, 1, 1, 6.667
      -20.15,   -7.250, 1, 1, 6.667
      -26.772,  -9.353, 1, 1, 6.667
      -33.332, -11.663, 1, 1, 6.667
      -39.821, -14.338, 1, 1, 6.667
*RUN ************************ RUN CASE 15 ****************************
*COMM ***************************************************************
*COMM ************************ RUN NEXT CASE ************************
*COMM ***************************************************************
*GEOM LENG=12, DEPT=59
*TENS TENS=400
*STIN NUMB=6, GEOM=4, TYPE=1, RADI=200, XHIT=0, YHIT=0,
      TABL=(X,Y,SUPP,SECT,LENG)
       -6.605,  -3.766, 1, 2, 6.667
      -13.425,  -5.361, 1, 1, 6.667
      -20.15,   -7.250, 1, 1, 6.667
      -26.772,  -9.353, 1, 1, 6.667
      -33.332, -11.663, 1, 1, 6.667
      -39.821, -14.338, 1, 1, 6.667
*RUN ************************ RUN CASE 16 ****************************
*COMM ***************************************************************
*COMM ************************ RUN NEXT CASE ************************
*COMM ***************************************************************
*GEOM LENG=12, DEPT=59
*TENS TENS=400
*STIN NUMB=6, GEOM=4, TYPE=1, RADI=300, XHIT=0, YHIT=0,
      TABL=(X,Y,SUPP,SECT,LENG)
       -6.605,  -3.766, 1, 2, 6.667
      -13.425,  -5.361, 1, 1, 6.667
      -20.15,   -7.250, 1, 1, 6.667
      -26.772,  -9.353, 1, 1, 6.667
      -33.332, -11.663, 1, 1, 6.667
      -39.821, -14.338, 1, 1, 6.667
*RUN ************************ RUN CASE 17 ****************************
*COMM ***************************************************************
*COMM ************************ RUN NEXT CASE ************************
*COMM ***************************************************************
*GEOM LENG=12, DEPT=59
*TENS TENS=400
*STIN NUMB=6, GEOM=4, TYPE=1, RADI=400, XHIT=0, YHIT=0,
      TABL=(X,Y,SUPP,SECT,LENG)
       -6.605,  -3.766, 1, 2, 6.667
      -13.425,  -5.361, 1, 1, 6.667
      -20.15,   -7.250, 1, 1, 6.667
      -26.772,  -9.353, 1, 1, 6.667
      -33.332, -11.663, 1, 1, 6.667
      -39.821, -14.338, 1, 1, 6.667
*RUN ************************ RUN CASE 18 ****************************
*END
*COMM ***************************************************************
*COMM ************************ END OF DATA ****************************
```

Output Analisis Dinamis Heading 0°

M A X I M U M D Y N A M I C P I P E F O R C E S A N D S T R E S S E S

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.265	0.00	36.79	0.00	0.00	0.00	36.79	10.22
3	LAYBARGE	71.49	6.16	0.00	0.000	0.957	6.30	36.77	0.00	-116.93	0.00	136.16	37.82
5	LAYBARGE	65.38	5.98	0.00	0.000	2.231	12.42	36.75	0.00	-84.25	0.00	108.36	30.10
7	LAYBARGE	59.91	5.72	0.00	0.000	3.278	17.89	36.70	0.00	-95.19	0.00	117.62	32.67
9	LAYBARGE	53.32	5.27	0.00	0.000	4.503	24.49	36.64	0.00	-91.69	0.00	114.57	31.83
11	LAYBARGE	47.32	4.74	0.00	0.000	5.731	30.51	36.55	0.00	-104.52	0.00	125.40	34.83
13	LAYBARGE	38.22	3.69	0.00	0.000	7.422	39.68	36.39	0.00	-118.21	0.00	136.87	38.02
15	LAYBARGE	29.27	2.39	0.00	0.000	9.105	48.72	36.20	0.00	-103.60	0.02	124.26	34.52
17	LAYBARGE	23.13	1.33	0.00	0.000	10.364	54.95	36.04	0.00	-93.11	-0.10	115.18	31.99
19	LAYBARGE	17.18	0.19	0.00	0.002	11.449	61.01	35.87	0.00	-81.20	0.42	104.81	29.11
21	LAYBARGE	10.63	-1.22	0.00	-0.015	12.982	67.72	35.68	-0.11	-135.52	-4.19	150.97	41.94
24	STINGER	-4.64	-5.13	0.00	0.019	16.017	83.47	35.17	-0.45	-184.53	-3.58	192.26	53.41
26	STINGER	-11.00	-7.10	0.00	-0.016	18.215	90.14	34.94	-0.62	-119.24	-2.81	136.61	37.95
28	STINGER	-17.30	-9.29	0.00	0.053	20.067	96.81	34.66	-0.81	-138.01	9.94	152.63	42.40
30	STINGER	-23.53	-11.68	0.00	-0.213	21.938	103.47	34.36	-1.01	-121.63	-46.17	144.90	40.25
32	STINGER	-29.68	-14.25	0.06	-0.856	23.154	110.14	34.05	-1.24	-53.66	-37.40	89.99	25.00
34	STINGER	-35.80	-16.89	0.17	-1.190	23.318	116.81	33.72	-1.47	18.87	-6.55	50.81	14.11
36	SAGBEND	-46.86	-21.54	0.40	-1.132	22.208	128.81	33.13	-1.87	46.34	5.60	73.38	20.38
37	SAGBEND	-58.02	-25.94	0.60	-0.923	20.732	140.81	32.57	-2.25	50.80	6.86	76.98	21.38
38	SAGBEND	-69.30	-30.03	0.76	-0.703	19.183	152.81	32.05	-2.61	52.21	6.78	77.91	21.64
39	SAGBEND	-80.69	-33.82	0.88	-0.492	17.597	164.81	31.57	-2.94	53.16	6.52	78.48	21.80
40	SAGBEND	-92.17	-37.29	0.96	-0.291	15.982	176.81	31.13	-3.24	54.09	6.25	79.01	21.95
41	SAGBEND	-103.76	-40.42	1.00	-0.101	14.340	188.81	30.73	-3.51	55.01	5.95	79.52	22.09
42	SAGBEND	-115.42	-43.23	1.00	0.077	12.672	200.81	30.38	-3.75	55.82	5.60	79.96	22.21
43	SAGBEND	-127.17	-45.69	0.97	0.243	10.985	212.81	30.06	-3.97	56.46	5.19	80.29	22.30
44	SAGBEND	-138.98	-47.80	0.90	0.395	9.278	224.81	29.80	-4.15	56.99	4.80	80.50	22.36
45	SAGBEND	-150.85	-49.55	0.81	0.534	7.554	236.81	29.58	-4.30	57.51	4.44	80.66	22.41
46	SAGBEND	-162.77	-50.95	0.68	0.662	5.816	248.81	29.40	-4.42	57.90	4.09	80.80	22.44
47	SAGBEND	-174.72	-51.99	0.53	0.778	4.070	260.81	29.27	-4.51	58.00	3.71	80.68	22.41
48	SAGBEND	-186.70	-52.66	0.36	0.875	2.338	272.81	29.19	-4.57	56.54	2.50	79.15	21.99
49	SAGBEND	-198.70	-52.97	0.17	0.869	0.755	284.81	29.15	-4.59	44.93	-5.68	69.60	19.33
50	SEABED	-210.69	-53.03	0.03	0.389	0.022	296.81	29.15	-4.60	6.90	-21.44	50.39	14.00
51	SEABED	-222.69	-53.03	0.00	0.012	-0.010	308.81	29.15	-4.60	-0.56	-3.57	34.61	9.61
52	SEABED	-234.69	-53.03	0.00	-0.005	0.000	320.81	29.15	-4.60	-0.09	0.29	31.94	8.87
53	SEABED	-246.69	-53.03	0.00	0.000	0.000	332.81	29.15	-4.60	0.01	0.04	31.73	8.81
54	SEABED	-258.69	-53.03	0.00	0.000	0.000	344.81	29.15	-4.60	0.00	0.00	31.70	8.81
55	SEABED	-270.69	-53.03	0.00	0.000	0.000	356.81	29.15	-4.60	0.00	0.00	31.70	8.80
56	SEABED	-282.69	-53.03	0.00	0.000	0.000	368.81	29.15	-4.60	0.00	0.00	31.70	8.80
57	SEABED	-294.69	-53.03	0.00	0.000	0.000	380.81	29.15	-4.60	0.00	0.00	31.70	8.80

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.266	0.00	36.75	0.00	0.00	0.00	36.75	10.21
3	LAYBARGE	71.49	6.16	0.00	0.000	0.958	6.30	36.73	0.00	-116.92	0.00	136.11	37.81
5	LAYBARGE	65.37	5.98	0.00	0.000	2.232	12.42	36.71	0.00	-84.24	0.00	108.31	30.09
7	LAYBARGE	59.91	5.72	0.00	0.000	3.278	17.89	36.67	0.00	-95.18	0.00	117.57	32.66
9	LAYBARGE	53.32	5.27	0.00	0.000	4.503	24.49	36.60	0.00	-91.68	0.00	114.53	31.81
11	LAYBARGE	47.32	4.74	0.00	0.000	5.732	30.51	36.52	0.00	-104.49	0.00	125.34	34.82
13	LAYBARGE	38.21	3.69	0.00	0.000	7.423	39.68	36.36	0.00	-118.20	0.00	136.83	38.01
15	LAYBARGE	29.27	2.39	0.00	0.000	9.105	48.72	36.17	0.00	-103.52	0.02	124.16	34.49
17	LAYBARGE	23.13	1.33	0.00	0.000	10.366	54.95	36.01	0.00	-93.39	-0.09	115.39	32.05
19	LAYBARGE	17.18	0.18	0.00	0.002	11.444	61.01	35.84	0.00	-79.99	0.38	103.74	28.82
21	LAYBARGE	10.63	-1.23	0.00	-0.014	13.004	67.72	35.64	-0.11	-140.17	-4.08	154.89	43.03
24	STINGER	-4.62	-5.11	0.00	0.015	15.562	83.45	35.15	-0.44	-139.87	-4.03	154.30	42.86
26	STINGER	-11.02	-6.99	0.00	-0.003	17.116	90.12	34.93	-0.61	-78.34	-0.12	101.79	28.27
28	STINGER	-17.37	-9.02	0.00	0.000	18.316	96.78	34.67	-0.78	-92.57	-1.45	113.75	31.60
30	STINGER	-23.67	-11.19	0.00	0.005	19.623	103.45	34.39	-0.97	-92.30	0.58	113.32	31.48
32	STINGER	-29.93	-13.49	0.00	-0.019	20.826	110.12	34.11	-1.17	-78.78	-6.77	101.72	28.26
34	STINGER	-36.13	-15.93	0.02	-0.510	22.051	116.79	33.79	-1.38	-98.08	-58.96	131.58	36.55
36	SAGBEND	-47.22	-20.52	0.21	-1.143	22.351	128.79	33.22	-1.78	32.04	-1.13	60.98	16.94
37	SAGBEND	-58.36	-24.96	0.42	-1.020	21.058	140.79	32.66	-2.17	48.74	6.09	75.25	20.90
38	SAGBEND	-69.62	-29.13	0.60	-0.809	19.537	152.79	32.13	-2.53	51.75	6.75	77.61	21.56
39	SAGBEND	-80.98	-32.98	0.74	-0.596	17.962	164.79	31.64	-2.86	52.93	6.57	78.32	21.76
40	SAGBEND	-92.44	-36.52	0.84	-0.393	16.356	176.79	31.19	-3.17	53.91	6.31	78.94	21.93
41	SAGBEND	-104.00	-39.74	0.90	-0.200	14.720	188.79	30.78	-3.45	54.85	6.02	79.46	22.07
42	SAGBEND	-115.65	-42.62	0.92	-0.019	13.058	200.79	30.42	-3.70	55.69	5.68	79.86	22.18
43	SAGBEND	-127.38	-45.16	0.91	0.149	11.372	212.79	30.10	-3.92	56.41	5.29	80.23	22.29
44	SAGBEND	-139.18	-47.35	0.86	0.305	9.669	224.79	29.82	-4.11	57.02	4.90	80.49	22.36
45	SAGBEND	-151.04	-49.19	0.78	0.447	7.946	236.79	29.59	-4.27	57.44	4.52	80.64	22.40
46	SAGBEND	-162.94	-50.66	0.68	0.577	6.213	248.79	29.40	-4.40	57.82	4.16	80.72	22.42
47	SAGBEND	-174.89	-51.78	0.54	0.696	4.468	260.79	29.26	-4.49	58.06	3.82	80.71	22.42
48	SAGBEND	-186.86	-52.53	0.39	0.801	2.729	272.79	29.17	-4.56	57.21	3.09	79.78	22.16
49	SAGBEND	-198.86	-52.93	0.21	0.849	1.081	284.79	29.12	-4.59	49.78	-1.40	73.39	20.39
50	SEABED	-210.85	-53.03	0.05	0.548	0.081	296.79	29.11	-4.60	13.32	-20.09	51.34	14.26
51	SEABED	-222.85	-53.03	0.00	0.048	-0.013	308.79	29.11	-4.60	-0.47	-7.18	37.59	10.44
52	SEABED	-234.85	-53.03	0.00	-0.007	-0.001	320.79	29.11	-4.60	-0.17	0.23	31.87	8.85
53	SEABED	-246.85	-53.03	0.00	-0.001	0.000	332.79	29.11	-4.60	0.01	0.09	31.73	8.81
54	SEABED	-258.85	-53.03	0.00	0.000	0.000	344.79	29.11	-4.60	0.00	0.00	31.67	8.80
55	SEABED	-270.85	-53.03	0.00	0.000	0.000	356.79	29.11	-4.60	0.00	0.00	31.66	8.80
56	SEABED	-282.85	-53.03	0.00	0.000	0.000	368.79	29.11	-4.60	0.00	0.00	31.66	8.80
57	SEABED	-294.85	-53.03	0.00	0.000	0.000	380.79	29.11	-4.60	0.00	0.00	31.66	8.80

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.265	0.00	36.78	0.00	0.00	0.00	36.78	10.22
3	LAYBARGE	71.49	6.16	0.00	0.000	0.957	6.30	36.76	0.00	-116.94	0.00	136.14	37.82
5	LAYBARGE	65.38	5.98	0.00	0.000	2.231	12.42	36.74	0.00	-84.25	0.00	108.34	30.10
7	LAYBARGE	59.91	5.72	0.00	0.000	3.278	17.89	36.69	0.00	-95.20	0.00	117.60	32.67
9	LAYBARGE	53.32	5.27	0.00	0.000	4.503	24.49	36.63	0.00	-91.69	0.00	114.56	31.82
11	LAYBARGE	47.32	4.74	0.00	0.000	5.731	30.51	36.54	0.00	-104.52	0.00	125.38	34.83
13	LAYBARGE	38.22	3.69	0.00	0.000	7.423	39.68	36.38	0.00	-118.24	0.00	136.88	38.02
15	LAYBARGE	29.27	2.39	0.00	0.000	9.104	48.72	36.19	0.00	-103.50	0.02	124.16	34.49
17	LAYBARGE	23.13	1.33	0.00	0.000	10.366	54.95	36.03	0.00	-93.55	-0.09	115.55	32.10
19	LAYBARGE	17.18	0.18	0.00	0.002	11.441	61.01	35.86	0.00	-79.39	0.38	103.22	28.67
21	LAYBARGE	10.63	-1.23	0.00	-0.014	13.014	67.72	35.67	-0.11	-142.52	-4.05	156.91	43.59
24	STINGER	-4.61	-5.10	0.00	0.014	15.337	83.44	35.18	-0.44	-117.77	-4.14	135.57	37.66
26	STINGER	-11.02	-6.94	0.00	0.000	16.564	90.11	34.96	-0.60	-57.21	0.59	83.86	23.29
28	STINGER	-17.40	-8.88	0.00	-0.013	17.454	96.77	34.71	-0.77	-72.62	-4.18	96.92	26.92
30	STINGER	-23.74	-10.94	0.00	0.058	18.415	103.44	34.45	-0.95	-66.47	11.77	92.25	25.63
32	STINGER	-30.05	-13.09	-0.01	0.093	19.230	110.11	34.18	-1.14	-53.71	-9.49	80.63	22.40
34	STINGER	-36.32	-15.36	0.00	-0.462	20.957	116.77	33.85	-1.33	-190.07	-63.06	204.56	56.82
36	SAGBEND	-47.43	-19.89	0.19	-1.161	22.397	128.77	33.32	-1.73	20.39	-1.63	51.22	14.23
37	SAGBEND	-58.56	-24.36	0.41	-1.046	21.249	140.77	32.75	-2.11	47.15	5.98	73.94	20.54
38	SAGBEND	-69.80	-28.56	0.59	-0.834	19.750	152.77	32.22	-2.48	51.42	6.73	77.33	21.48
39	SAGBEND	-81.14	-32.47	0.73	-0.621	18.180	164.77	31.72	-2.82	52.81	6.58	78.25	21.74
40	SAGBEND	-92.60	-36.05	0.84	-0.416	16.577	176.77	31.27	-3.13	53.79	6.34	78.85	21.90
41	SAGBEND	-104.14	-39.31	0.90	-0.222	14.944	188.77	30.85	-3.41	54.74	6.06	79.36	22.05
42	SAGBEND	-115.78	-42.24	0.93	-0.039	13.286	200.77	30.48	-3.67	55.55	5.73	79.79	22.16
43	SAGBEND	-127.50	-44.83	0.92	0.131	11.608	212.77	30.16	-3.89	56.27	5.35	80.17	22.27
44	SAGBEND	-139.29	-47.07	0.87	0.288	9.908	224.77	29.87	-4.09	56.87	4.97	80.48	22.35
45	SAGBEND	-151.14	-48.96	0.80	0.432	8.192	236.77	29.63	-4.25	57.33	4.58	80.69	22.41
46	SAGBEND	-163.04	-50.48	0.70	0.565	6.456	248.77	29.44	-4.38	57.73	4.24	80.79	22.44
47	SAGBEND	-174.98	-51.65	0.57	0.685	4.708	260.77	29.30	-4.48	58.02	3.90	80.71	22.42
48	SAGBEND	-186.95	-52.45	0.41	0.793	2.964	272.77	29.19	-4.55	57.50	3.30	80.02	22.23
49	SAGBEND	-198.94	-52.90	0.24	0.854	1.296	284.77	29.14	-4.59	51.85	-0.38	75.09	20.86
50	SEABED	-210.94	-53.03	0.07	0.630	0.144	296.77	29.13	-4.60	18.60	-18.32	52.86	14.68
51	SEABED	-222.94	-53.03	0.00	0.083	-0.015	308.77	29.13	-4.60	-0.21	-10.14	40.00	11.11
52	SEABED	-234.94	-53.03	0.00	-0.007	-0.002	320.77	29.13	-4.60	-0.23	0.07	31.86	8.85
53	SEABED	-246.94	-53.03	0.00	-0.001	0.000	332.77	29.13	-4.60	0.00	0.12	31.77	8.83
54	SEABED	-258.94	-53.03	0.00	0.000	0.000	344.77	29.13	-4.60	0.00	0.00	31.68	8.80
55	SEABED	-270.94	-53.03	0.00	0.000	0.000	356.77	29.13	-4.60	0.00	0.00	31.68	8.80
56	SEABED	-282.94	-53.03	0.00	0.000	0.000	368.77	29.13	-4.60	0.00	0.00	31.68	8.80
57	SEABED	-294.94	-53.03	0.00	0.000	0.000	380.77	29.13	-4.60	0.00	0.00	31.68	8.80

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.270	0.00	49.10	0.00	0.00	0.00	49.10	13.64
3	LAYBARGE	71.49	6.16	0.00	0.000	0.960	6.30	49.08	0.00	-119.79	0.00	150.89	41.92
5	LAYBARGE	65.37	5.98	0.00	0.000	2.230	12.42	49.06	0.00	-86.60	0.00	122.66	34.07
7	LAYBARGE	59.91	5.72	0.00	0.000	3.281	17.89	49.02	0.00	-97.83	0.00	132.17	36.71
9	LAYBARGE	53.32	5.27	0.00	0.000	4.501	24.49	48.95	0.00	-94.26	0.00	129.06	35.85
11	LAYBARGE	47.32	4.74	0.00	0.000	5.739	30.51	48.86	0.00	-108.83	0.00	141.37	39.27
13	LAYBARGE	38.21	3.69	0.00	0.000	7.423	39.68	48.70	0.00	-124.49	0.00	154.52	42.92
15	LAYBARGE	29.27	2.39	0.00	0.000	9.100	48.72	48.51	0.00	-107.87	0.01	140.19	38.94
17	LAYBARGE	23.13	1.33	0.00	0.000	10.367	54.95	48.35	0.00	-95.81	-0.06	129.79	36.05
19	LAYBARGE	17.18	0.18	0.00	0.001	11.443	61.01	48.18	0.00	-81.98	0.24	117.78	32.72
21	LAYBARGE	10.63	-1.23	0.00	-0.011	13.021	67.72	47.98	-0.11	-148.55	-3.56	174.34	48.43
24	STINGER	-4.64	-5.13	0.00	-0.005	15.975	83.47	47.47	-0.45	-198.75	-6.47	216.70	60.19
26	STINGER	-11.00	-7.10	0.00	0.060	18.234	90.14	47.25	-0.62	-125.08	14.01	154.48	42.91
28	STINGER	-17.30	-9.29	0.00	-0.322	19.987	96.81	46.97	-0.81	-128.53	-65.32	169.43	47.07
30	STINGER	-23.54	-11.64	0.08	-0.983	21.003	103.47	46.69	-1.01	-25.39	-23.86	76.53	21.26
32	STINGER	-29.77	-14.03	0.20	-1.154	20.924	110.14	46.39	-1.22	22.14	-1.93	65.30	18.14
34	STINGER	-36.00	-16.38	0.32	-1.124	20.447	116.81	46.09	-1.42	33.21	3.84	74.78	20.77
36	SAGBEND	-47.28	-20.47	0.53	-0.969	19.371	128.81	45.57	-1.78	37.28	5.30	78.14	21.70
37	SAGBEND	-58.64	-24.34	0.71	-0.801	18.238	140.81	45.08	-2.11	38.07	5.29	78.59	21.83
38	SAGBEND	-70.07	-27.98	0.85	-0.637	17.088	152.81	44.62	-2.43	38.52	5.14	78.76	21.88
39	SAGBEND	-81.58	-31.39	0.96	-0.481	15.921	164.81	44.18	-2.73	38.95	4.93	78.89	21.91
40	SAGBEND	-93.15	-34.56	1.04	-0.331	14.740	176.81	43.78	-3.00	39.40	4.74	78.99	21.94
41	SAGBEND	-104.79	-37.50	1.10	-0.187	13.546	188.81	43.41	-3.26	39.86	4.56	79.12	21.98
42	SAGBEND	-116.48	-40.18	1.12	-0.049	12.340	200.81	43.07	-3.49	40.30	4.36	79.25	22.01
43	SAGBEND	-128.23	-42.62	1.12	0.080	11.123	212.81	42.76	-3.70	40.70	4.14	79.37	22.05
44	SAGBEND	-140.03	-44.81	1.09	0.202	9.896	224.81	42.48	-3.89	41.02	3.88	79.44	22.07
45	SAGBEND	-151.87	-46.74	1.03	0.316	8.661	236.81	42.24	-4.06	41.26	3.61	79.48	22.08
46	SAGBEND	-163.75	-48.42	0.96	0.421	7.416	248.81	42.03	-4.20	41.43	3.37	79.47	22.07
47	SAGBEND	-175.67	-49.84	0.86	0.520	6.164	260.81	41.85	-4.32	41.64	3.14	79.48	22.08
48	SAGBEND	-187.61	-51.00	0.74	0.611	4.906	272.81	41.70	-4.42	41.87	2.95	79.46	22.07
49	SAGBEND	-199.58	-51.89	0.60	0.696	3.646	284.81	41.59	-4.50	42.01	2.79	79.38	22.05
50	SAGBEND	-211.56	-52.53	0.45	0.775	2.382	296.81	41.51	-4.56	41.90	2.54	79.07	21.96
51	SAGBEND	-223.55	-52.89	0.28	0.834	1.144	308.81	41.47	-4.59	39.45	1.03	76.84	21.34
52	SEABED	-235.55	-53.02	0.11	0.724	0.186	320.81	41.45	-4.60	18.53	-12.64	62.18	17.27
53	SEABED	-247.55	-53.03	0.01	0.196	-0.004	332.81	41.45	-4.60	0.91	-15.45	56.86	15.80
54	SEABED	-259.55	-53.03	0.00	0.002	-0.002	344.81	41.45	-4.60	-0.17	-1.28	44.97	12.49
55	SEABED	-271.55	-53.03	0.00	-0.002	0.000	356.81	41.45	-4.60	-0.01	0.13	44.03	12.23
56	SEABED	-283.55	-53.03	0.00	0.000	0.000	368.81	41.45	-4.60	0.00	0.02	43.94	12.21
57	SEABED	-295.55	-53.03	0.00	0.000	0.000	380.81	41.45	-4.60	0.00	0.00	43.93	12.20
58	SEABED	-307.55	-53.03	0.00	0.000	0.000	392.81	41.45	-4.60	0.00	0.00	43.93	12.20
59	SEABED	-319.55	-53.03	0.00	0.000	0.000	404.81	41.45	-4.60	0.00	0.00	43.93	12.20

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.272	0.00	49.09	0.00	0.00	0.00	49.09	13.64
3	LAYBARGE	71.49	6.16	0.00	0.000	0.962	6.30	49.07	0.00	-119.78	0.00	150.89	41.91
5	LAYBARGE	65.38	5.99	0.00	0.000	2.232	12.42	49.05	0.00	-86.59	0.00	122.66	34.07
7	LAYBARGE	59.91	5.72	0.00	0.000	3.284	17.89	49.01	0.00	-97.82	0.00	132.16	36.71
9	LAYBARGE	53.32	5.27	0.00	0.000	4.503	24.49	48.94	0.00	-94.25	0.00	129.06	35.85
11	LAYBARGE	47.32	4.74	0.00	0.000	5.741	30.51	48.86	0.00	-108.82	0.00	141.35	39.26
13	LAYBARGE	38.21	3.69	0.00	0.000	7.425	39.68	48.70	0.00	-124.49	0.00	154.51	42.92
15	LAYBARGE	29.27	2.39	0.00	0.000	9.102	48.72	48.50	0.00	-107.82	0.02	140.15	38.93
17	LAYBARGE	23.13	1.33	0.00	0.000	10.371	54.95	48.35	0.00	-96.00	-0.09	129.94	36.10
19	LAYBARGE	17.18	0.18	0.00	0.001	11.442	61.01	48.18	0.00	-81.16	0.36	117.07	32.52
21	LAYBARGE	10.63	-1.23	0.00	-0.014	13.038	67.72	47.98	-0.11	-151.85	-4.05	177.15	49.21
24	STINGER	-4.62	-5.11	0.00	0.016	15.534	83.45	47.48	-0.44	-151.67	-3.66	176.66	49.07
26	STINGER	-11.02	-6.99	0.00	-0.012	17.121	90.12	47.26	-0.61	-79.13	-2.23	114.61	31.84
28	STINGER	-17.37	-9.02	0.00	0.036	18.332	96.78	47.00	-0.78	-100.01	7.56	132.57	36.82
30	STINGER	-23.67	-11.18	0.00	-0.211	19.533	103.45	46.73	-0.97	-77.81	-40.99	121.50	33.75
32	STINGER	-29.94	-13.46	0.06	-0.779	20.313	110.12	46.45	-1.17	-44.37	-36.43	95.57	26.55
34	STINGER	-36.18	-15.79	0.16	-1.073	20.412	116.79	46.15	-1.37	17.39	-5.31	61.53	17.09
36	SAGBEND	-47.46	-19.89	0.37	-1.019	19.514	128.79	45.63	-1.73	35.70	4.53	76.63	21.29
37	SAGBEND	-58.80	-23.79	0.56	-0.860	18.401	140.79	45.14	-2.07	37.87	5.25	78.33	21.76
38	SAGBEND	-70.23	-27.47	0.71	-0.697	17.255	152.79	44.67	-2.38	38.49	5.17	78.65	21.85
39	SAGBEND	-81.72	-30.91	0.84	-0.539	16.089	164.79	44.23	-2.68	38.96	4.97	78.84	21.90
40	SAGBEND	-93.28	-34.12	0.93	-0.387	14.909	176.79	43.83	-2.96	39.38	4.77	78.99	21.94
41	SAGBEND	-104.91	-37.09	1.00	-0.242	13.718	188.79	43.45	-3.22	39.82	4.61	79.12	21.98
42	SAGBEND	-116.60	-39.81	1.03	-0.104	12.515	200.79	43.10	-3.46	40.27	4.42	79.23	22.01
43	SAGBEND	-128.34	-42.29	1.04	0.026	11.300	212.79	42.79	-3.67	40.68	4.20	79.35	22.04
44	SAGBEND	-140.13	-44.51	1.02	0.150	10.074	224.79	42.51	-3.86	41.01	3.95	79.43	22.06
45	SAGBEND	-151.97	-46.48	0.98	0.265	8.837	236.79	42.26	-4.03	41.25	3.68	79.46	22.07
46	SAGBEND	-163.84	-48.20	0.91	0.372	7.594	248.79	42.04	-4.18	41.44	3.43	79.50	22.08
47	SAGBEND	-175.76	-49.65	0.82	0.472	6.344	260.79	41.86	-4.31	41.63	3.21	79.50	22.08
48	SAGBEND	-187.69	-50.85	0.72	0.563	5.087	272.79	41.71	-4.41	41.88	3.01	79.46	22.07
49	SAGBEND	-199.66	-51.78	0.59	0.649	3.826	284.79	41.59	-4.49	42.06	2.84	79.38	22.05
50	SAGBEND	-211.64	-52.45	0.44	0.729	2.565	296.79	41.51	-4.55	41.99	2.64	79.13	21.98
51	SAGBEND	-223.63	-52.86	0.28	0.793	1.318	308.79	41.46	-4.58	40.21	1.49	77.48	21.52
52	SEABED	-235.63	-53.01	0.12	0.727	0.274	320.79	41.44	-4.60	23.77	-10.17	64.87	18.02
53	SEABED	-247.63	-53.03	0.02	0.230	0.000	332.79	41.44	-4.60	1.73	-16.60	57.64	16.01
54	SEABED	-259.63	-53.03	0.00	0.005	-0.003	344.79	41.44	-4.60	-0.20	-1.77	45.29	12.58
55	SEABED	-271.63	-53.03	0.00	-0.002	0.000	356.79	41.44	-4.60	-0.02	0.13	44.02	12.23
56	SEABED	-283.63	-53.03	0.00	0.000	0.000	368.79	41.44	-4.60	0.00	0.02	43.94	12.20
57	SEABED	-295.63	-53.03	0.00	0.000	0.000	380.79	41.44	-4.60	0.00	0.00	43.92	12.20
58	SEABED	-307.63	-53.03	0.00	0.000	0.000	392.79	41.44	-4.60	0.00	0.00	43.92	12.20
59	SEABED	-319.63	-53.03	0.00	0.000	0.000	404.79	41.44	-4.60	0.00	0.00	43.92	12.20

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.269	0.00	49.06	0.00	0.00	0.00	49.06	13.63
3	LAYBARGE	71.49	6.16	0.00	0.000	0.959	6.30	49.04	0.00	-119.77	0.00	150.84	41.90
5	LAYBARGE	65.37	5.98	0.00	0.000	2.229	12.42	49.02	0.00	-86.58	0.00	122.62	34.06
7	LAYBARGE	59.91	5.72	0.00	0.000	3.280	17.89	48.98	0.00	-97.81	0.00	132.12	36.70
9	LAYBARGE	53.32	5.27	0.00	0.000	4.500	24.49	48.91	0.00	-94.24	0.00	129.02	35.84
11	LAYBARGE	47.32	4.74	0.00	0.000	5.738	30.51	48.83	0.00	-108.80	0.00	141.31	39.25
13	LAYBARGE	38.21	3.69	0.00	0.000	7.422	39.68	48.67	0.00	-124.46	0.00	154.46	42.91
15	LAYBARGE	29.27	2.39	0.00	0.000	9.099	48.72	48.48	0.00	-107.78	0.02	140.09	38.91
17	LAYBARGE	23.13	1.33	0.00	0.000	10.368	54.95	48.32	0.00	-96.10	-0.08	129.99	36.11
19	LAYBARGE	17.18	0.19	0.00	0.001	11.437	61.01	48.15	0.00	-80.72	0.34	116.70	32.42
21	LAYBARGE	10.63	-1.23	0.00	-0.013	13.043	67.72	47.95	-0.11	-153.55	-3.97	178.55	49.60
24	STINGER	-4.61	-5.10	0.00	0.014	15.308	83.44	47.47	-0.44	-127.78	-3.95	156.31	43.42
26	STINGER	-11.02	-6.94	0.00	-0.003	16.571	90.11	47.25	-0.60	-58.16	-0.17	96.96	26.93
28	STINGER	-17.40	-8.88	0.00	-0.001	17.451	96.77	47.00	-0.77	-74.72	-1.84	110.78	30.77
30	STINGER	-23.74	-10.94	0.00	0.009	18.426	103.44	46.74	-0.95	-71.99	2.34	108.37	30.10
32	STINGER	-30.05	-13.09	0.01	-0.226	19.267	110.11	46.47	-1.14	-56.34	-34.11	102.53	28.48
34	STINGER	-36.33	-15.33	0.06	-0.737	19.874	116.77	46.18	-1.33	-42.12	-36.63	94.01	26.11
36	SAGBEND	-47.61	-19.41	0.25	-1.032	19.589	128.77	45.67	-1.69	30.55	1.86	72.04	20.01
37	SAGBEND	-58.95	-23.33	0.44	-0.905	18.533	140.77	45.17	-2.03	37.36	5.01	77.81	21.62
38	SAGBEND	-70.36	-27.03	0.61	-0.745	17.393	152.77	44.70	-2.35	38.42	5.16	78.55	21.82
39	SAGBEND	-81.85	-30.50	0.74	-0.586	16.232	164.77	44.26	-2.65	38.91	4.99	78.78	21.88
40	SAGBEND	-93.40	-33.74	0.84	-0.434	15.055	176.77	43.85	-2.93	39.32	4.79	78.93	21.93
41	SAGBEND	-105.02	-36.74	0.92	-0.288	13.864	188.77	43.47	-3.19	39.77	4.62	79.07	21.96
42	SAGBEND	-116.70	-39.49	0.96	-0.149	12.663	200.77	43.12	-3.43	40.22	4.43	79.23	22.01
43	SAGBEND	-128.44	-42.00	0.98	-0.018	11.448	212.77	42.80	-3.65	40.66	4.21	79.39	22.05
44	SAGBEND	-140.22	-44.25	0.97	0.107	10.224	224.77	42.52	-3.84	41.01	3.97	79.50	22.08
45	SAGBEND	-152.06	-46.26	0.94	0.223	8.989	236.77	42.27	-4.02	41.26	3.70	79.55	22.10
46	SAGBEND	-163.93	-48.00	0.88	0.331	7.746	248.77	42.05	-4.17	41.44	3.45	79.53	22.09
47	SAGBEND	-175.83	-49.49	0.80	0.431	6.496	260.77	41.86	-4.30	41.65	3.21	79.49	22.08
48	SAGBEND	-187.77	-50.72	0.70	0.524	5.241	272.77	41.70	-4.40	41.81	2.99	79.48	22.08
49	SAGBEND	-199.73	-51.68	0.58	0.610	3.980	284.77	41.58	-4.48	42.00	2.82	79.42	22.06
50	SAGBEND	-211.71	-52.38	0.44	0.691	2.715	296.77	41.50	-4.54	42.01	2.62	79.21	22.00
51	SAGBEND	-223.70	-52.82	0.29	0.759	1.465	308.77	41.44	-4.58	40.71	1.72	77.90	21.64
52	SEABED	-235.70	-53.01	0.13	0.729	0.366	320.77	41.42	-4.60	28.09	-7.46	67.78	18.83
53	SEABED	-247.70	-53.03	0.02	0.275	0.007	332.77	41.42	-4.60	2.77	-16.40	57.77	16.05
54	SEABED	-259.70	-53.03	0.00	0.012	-0.004	344.77	41.42	-4.60	-0.22	-2.46	45.90	12.75
55	SEABED	-271.70	-53.03	0.00	-0.002	0.000	356.77	41.42	-4.60	-0.04	0.11	43.99	12.22
56	SEABED	-283.70	-53.03	0.00	0.000	0.000	368.77	41.42	-4.60	0.00	0.03	43.92	12.20
57	SEABED	-295.70	-53.03	0.00	0.000	0.000	380.77	41.42	-4.60	0.00	0.00	43.90	12.19
58	SEABED	-307.70	-53.03	0.00	0.000	0.000	392.77	41.42	-4.60	0.00	0.00	43.90	12.19
59	SEABED	-319.70	-53.03	0.00	0.000	0.000	404.77	41.42	-4.60	0.00	0.00	43.90	12.19

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.266	0.00	36.79	0.00	0.00	0.00	36.79	10.22
3	LAYBARGE	71.49	6.16	0.00	0.000	0.958	6.30	36.76	0.00	-116.93	0.00	136.15	37.82
5	LAYBARGE	65.37	5.98	0.00	0.000	2.232	12.42	36.75	0.00	-84.25	0.00	108.36	30.10
7	LAYBARGE	59.91	5.72	0.00	0.000	3.279	17.89	36.70	0.00	-95.19	0.00	117.62	32.67
9	LAYBARGE	53.32	5.27	0.00	0.000	4.504	24.49	36.64	0.00	-91.69	0.00	114.57	31.83
11	LAYBARGE	47.32	4.74	0.00	0.000	5.732	30.51	36.55	0.00	-104.52	0.00	125.39	34.83
13	LAYBARGE	38.21	3.69	0.00	0.000	7.424	39.68	36.39	0.00	-118.21	0.00	136.87	38.02
15	LAYBARGE	29.27	2.39	0.00	0.000	9.106	48.72	36.20	0.00	-103.60	0.02	124.26	34.52
17	LAYBARGE	23.13	1.33	0.00	0.000	10.365	54.95	36.04	0.00	-93.11	-0.10	115.18	31.99
19	LAYBARGE	17.18	0.18	0.00	0.002	11.450	61.01	35.87	0.00	-81.20	0.40	104.79	29.11
21	LAYBARGE	10.63	-1.23	0.00	-0.014	12.982	67.72	35.68	-0.11	-135.52	-4.13	150.97	41.94
24	STINGER	-4.64	-5.13	0.00	0.016	16.018	83.47	35.17	-0.45	-184.50	-3.86	192.24	53.40
26	STINGER	-11.00	-7.10	0.00	-0.009	18.216	90.14	34.94	-0.62	-119.40	-1.22	136.74	37.98
28	STINGER	-17.30	-9.29	0.00	0.021	20.065	96.81	34.66	-0.81	-137.36	3.35	151.83	42.18
30	STINGER	-23.53	-11.68	0.00	-0.081	21.952	103.47	34.36	-1.01	-124.48	-19.15	141.59	39.33
32	STINGER	-29.67	-14.26	0.03	-0.634	23.509	110.14	34.04	-1.24	-95.96	-53.31	127.80	35.50
34	STINGER	-35.77	-16.96	0.13	-1.143	24.095	116.81	33.71	-1.47	5.42	-11.52	44.74	12.43
36	SAGBEND	-46.75	-21.79	0.36	-1.154	23.158	128.81	33.09	-1.89	44.30	4.94	71.62	19.89
37	SAGBEND	-57.84	-26.37	0.57	-0.952	21.711	140.81	32.51	-2.29	50.25	6.74	76.46	21.24
38	SAGBEND	-69.05	-30.66	0.73	-0.733	20.170	152.81	31.97	-2.66	51.89	6.72	77.59	21.55
39	SAGBEND	-80.36	-34.65	0.86	-0.523	18.593	164.81	31.46	-3.01	52.93	6.45	78.22	21.73
40	SAGBEND	-91.79	-38.31	0.94	-0.324	16.983	176.81	31.00	-3.33	53.90	6.14	78.78	21.88
41	SAGBEND	-103.31	-41.65	0.99	-0.137	15.346	188.81	30.57	-3.62	54.88	5.80	79.29	22.03
42	SAGBEND	-114.93	-44.66	1.00	0.037	13.682	200.81	30.19	-3.88	55.75	5.38	79.77	22.16
43	SAGBEND	-126.63	-47.33	0.97	0.195	11.995	212.81	29.85	-4.11	56.51	4.91	80.16	22.27
44	SAGBEND	-138.40	-49.65	0.92	0.337	10.286	224.81	29.56	-4.31	57.10	4.40	80.44	22.34
45	SAGBEND	-150.24	-51.61	0.83	0.463	8.560	236.81	29.31	-4.48	57.61	3.94	80.65	22.40
46	SAGBEND	-162.13	-53.22	0.73	0.577	6.817	248.81	29.11	-4.62	58.11	3.69	80.84	22.45
47	SAGBEND	-174.07	-54.46	0.59	0.685	5.059	260.81	28.96	-4.72	58.45	3.61	80.87	22.46
48	SAGBEND	-186.03	-55.33	0.44	0.789	3.299	272.81	28.85	-4.80	58.15	3.30	80.42	22.34
49	SAGBEND	-198.02	-55.84	0.27	0.862	1.589	284.81	28.78	-4.84	54.17	1.00	76.78	21.33
50	SEABED	-210.02	-56.02	0.09	0.715	0.260	296.81	28.76	-4.86	26.73	-15.34	56.71	15.75
51	SEABED	-222.02	-56.03	0.01	0.134	-0.014	308.81	28.76	-4.86	0.79	-13.59	42.72	11.87
52	SEABED	-234.02	-56.03	0.00	-0.007	-0.003	320.81	28.76	-4.86	-0.34	-0.38	31.85	8.85
53	SEABED	-246.02	-56.03	0.00	-0.002	0.000	332.81	28.76	-4.86	-0.01	0.17	31.61	8.78
54	SEABED	-258.02	-56.03	0.00	0.000	0.000	344.81	28.76	-4.86	0.00	0.00	31.48	8.74
55	SEABED	-270.02	-56.03	0.00	0.000	0.000	356.81	28.76	-4.86	0.00	0.00	31.48	8.74
56	SEABED	-282.02	-56.03	0.00	0.000	0.000	368.81	28.76	-4.86	0.00	0.00	31.47	8.74
57	SEABED	-294.02	-56.03	0.00	0.000	0.000	380.81	28.76	-4.86	0.00	0.00	31.47	8.74

M A X I M U M D Y N A M I C P I P E F O R C E S A N D S T R E S S E S

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.264	0.00	36.75	0.00	0.00	0.00	36.75	10.21
3	LAYBARGE	71.49	6.16	0.00	0.000	0.957	6.30	36.73	0.00	-116.92	0.00	136.09	37.80
5	LAYBARGE	65.38	5.98	0.00	0.000	2.230	12.42	36.71	0.00	-84.24	0.00	108.31	30.08
7	LAYBARGE	59.91	5.72	0.00	0.000	3.277	17.89	36.67	0.00	-95.18	0.00	117.56	32.66
9	LAYBARGE	53.32	5.27	0.00	0.000	4.502	24.49	36.60	0.00	-91.68	0.00	114.52	31.81
11	LAYBARGE	47.32	4.74	0.00	0.000	5.730	30.51	36.52	0.00	-104.49	0.00	125.33	34.81
13	LAYBARGE	38.22	3.69	0.00	0.000	7.422	39.68	36.36	0.00	-118.19	0.00	136.82	38.00
15	LAYBARGE	29.27	2.39	0.00	0.000	9.104	48.72	36.17	0.00	-103.51	0.02	124.15	34.49
17	LAYBARGE	23.13	1.33	0.00	0.000	10.365	54.95	36.01	0.00	-93.39	-0.09	115.38	32.05
19	LAYBARGE	17.18	0.19	0.00	0.002	11.443	61.01	35.84	0.00	-80.00	0.39	103.75	28.82
21	LAYBARGE	10.63	-1.22	0.00	-0.014	13.002	67.72	35.64	-0.11	-140.15	-4.07	154.87	43.02
24	STINGER	-4.62	-5.11	0.00	0.015	15.562	83.45	35.15	-0.44	-139.87	-4.03	154.29	42.86
26	STINGER	-11.01	-6.99	0.00	-0.003	17.114	90.12	34.93	-0.61	-78.17	-0.10	101.66	28.24
28	STINGER	-17.37	-9.02	0.00	-0.001	18.318	96.78	34.67	-0.78	-93.28	-1.53	114.36	31.77
30	STINGER	-23.67	-11.19	0.00	0.006	19.608	103.45	34.39	-0.97	-89.45	0.95	110.91	30.81
32	STINGER	-29.93	-13.49	0.00	0.086	20.818	110.12	34.10	-1.17	-82.87	8.16	105.18	29.22
34	STINGER	-36.13	-15.94	0.00	-0.378	22.407	116.79	33.77	-1.38	-142.34	-67.32	167.83	46.62
36	SAGBEND	-47.16	-20.67	0.18	-1.144	23.260	128.79	33.20	-1.79	26.21	-2.21	56.08	15.58
37	SAGBEND	-58.22	-25.30	0.39	-1.037	22.045	140.79	32.61	-2.20	47.77	5.85	74.32	20.65
38	SAGBEND	-69.40	-29.66	0.57	-0.827	20.543	152.79	32.06	-2.57	51.43	6.64	77.18	21.44
39	SAGBEND	-80.69	-33.72	0.72	-0.615	18.974	164.79	31.55	-2.93	52.75	6.47	78.06	21.68
40	SAGBEND	-92.09	-37.46	0.82	-0.413	17.373	176.79	31.07	-3.25	53.71	6.19	78.65	21.85
41	SAGBEND	-103.59	-40.88	0.88	-0.223	15.743	188.79	30.64	-3.55	54.64	5.86	79.13	21.98
42	SAGBEND	-115.19	-43.97	0.91	-0.047	14.086	200.79	30.25	-3.82	55.56	5.45	79.61	22.11
43	SAGBEND	-126.87	-46.72	0.90	0.115	12.402	212.79	29.90	-4.05	56.35	4.99	80.01	22.23
44	SAGBEND	-138.63	-49.12	0.86	0.260	10.697	224.79	29.60	-4.26	57.01	4.50	80.33	22.31
45	SAGBEND	-150.45	-51.17	0.80	0.390	8.974	236.79	29.34	-4.44	57.51	4.03	80.56	22.38
46	SAGBEND	-162.33	-52.86	0.70	0.507	7.234	248.79	29.13	-4.59	57.98	3.72	80.76	22.43
47	SAGBEND	-174.25	-54.19	0.59	0.616	5.482	260.79	28.96	-4.70	58.41	3.60	80.87	22.46
48	SAGBEND	-186.21	-55.15	0.45	0.722	3.721	272.79	28.84	-4.78	58.41	3.39	80.63	22.40
49	SAGBEND	-198.20	-55.75	0.29	0.807	1.989	284.79	28.76	-4.84	55.92	1.92	78.34	21.76
50	SEABED	-210.19	-56.00	0.12	0.751	0.491	296.79	28.73	-4.86	38.05	-9.66	64.15	17.82
51	SEABED	-222.19	-56.03	0.01	0.211	-0.004	308.79	28.73	-4.86	3.14	-17.52	46.24	12.84
52	SEABED	-234.19	-56.03	0.00	-0.004	-0.006	320.79	28.73	-4.86	-0.49	-1.07	32.38	8.99
53	SEABED	-246.19	-56.03	0.00	-0.003	0.000	332.79	28.73	-4.86	-0.04	0.22	31.63	8.79
54	SEABED	-258.19	-56.03	0.00	0.000	0.000	344.79	28.73	-4.86	0.01	0.01	31.45	8.74
55	SEABED	-270.19	-56.03	0.00	0.000	0.000	356.79	28.73	-4.86	0.00	0.00	31.45	8.73
56	SEABED	-282.19	-56.03	0.00	0.000	0.000	368.79	28.73	-4.86	0.00	0.00	31.44	8.73
57	SEABED	-294.19	-56.03	0.00	0.000	0.000	380.79	28.73	-4.86	0.00	0.00	31.44	8.73

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.269	0.00	36.74	0.00	0.00	0.00	36.74	10.21
3	LAYBARGE	71.49	6.16	0.00	0.000	0.961	6.30	36.72	0.00	-116.92	0.00	136.09	37.80
5	LAYBARGE	65.37	5.99	0.00	0.000	2.234	12.42	36.70	0.00	-84.24	0.00	108.30	30.08
7	LAYBARGE	59.91	5.73	0.00	0.000	3.281	17.89	36.66	0.00	-95.18	0.00	117.56	32.66
9	LAYBARGE	53.32	5.28	0.00	0.000	4.506	24.49	36.59	0.00	-91.68	0.00	114.52	31.81
11	LAYBARGE	47.32	4.74	0.00	0.000	5.734	30.51	36.51	0.00	-104.49	0.00	125.33	34.81
13	LAYBARGE	38.21	3.69	0.00	0.000	7.426	39.68	36.35	0.00	-118.20	0.00	136.82	38.01
15	LAYBARGE	29.27	2.39	0.00	0.000	9.108	48.72	36.16	0.00	-103.48	0.02	124.12	34.48
17	LAYBARGE	23.13	1.34	0.00	0.000	10.370	54.95	36.00	0.00	-93.56	-0.09	115.50	32.08
19	LAYBARGE	17.18	0.19	0.00	0.002	11.445	61.01	35.83	0.00	-79.39	0.38	103.26	28.68
21	LAYBARGE	10.63	-1.22	0.00	-0.014	13.017	67.72	35.63	-0.11	-142.49	-4.04	156.83	43.56
24	STINGER	-4.61	-5.09	0.00	0.013	15.341	83.44	35.15	-0.44	-117.93	-4.15	135.65	37.68
26	STINGER	-11.02	-6.94	0.00	0.000	16.565	90.11	34.93	-0.60	-56.67	0.63	83.34	23.15
28	STINGER	-17.40	-8.88	0.00	-0.015	17.469	96.77	34.68	-0.77	-75.10	-4.35	98.96	27.49
30	STINGER	-23.74	-10.94	0.00	0.063	18.375	103.44	34.42	-0.95	-57.61	12.45	84.58	23.50
32	STINGER	-30.05	-13.08	-0.01	0.094	19.168	110.11	34.15	-1.14	-60.41	-10.51	86.67	24.07
34	STINGER	-36.32	-15.36	0.00	-0.472	21.284	116.77	33.80	-1.33	-235.16	-63.02	241.26	67.02
36	SAGBEND	-47.37	-20.02	0.19	-1.172	23.293	128.77	33.27	-1.74	14.35	-1.62	46.10	12.81
37	SAGBEND	-58.43	-24.68	0.41	-1.056	22.229	140.77	32.68	-2.14	46.13	5.97	73.00	20.28
38	SAGBEND	-69.59	-29.08	0.59	-0.844	20.753	152.77	32.12	-2.52	51.08	6.69	76.99	21.39
39	SAGBEND	-80.87	-33.18	0.74	-0.631	19.193	164.77	31.60	-2.88	52.56	6.51	77.96	21.65
40	SAGBEND	-92.25	-36.97	0.84	-0.427	17.594	176.77	31.12	-3.21	53.58	6.24	78.53	21.81
41	SAGBEND	-103.74	-40.43	0.91	-0.234	15.967	188.77	30.68	-3.51	54.52	5.92	79.07	21.96
42	SAGBEND	-115.32	-43.57	0.94	-0.056	14.315	200.77	30.29	-3.78	55.47	5.52	79.59	22.11
43	SAGBEND	-126.99	-46.36	0.93	0.107	12.635	212.77	29.93	-4.02	56.31	5.07	80.04	22.23
44	SAGBEND	-138.74	-48.82	0.89	0.256	10.932	224.77	29.62	-4.24	56.97	4.58	80.37	22.32
45	SAGBEND	-150.55	-50.91	0.83	0.388	9.210	236.77	29.36	-4.42	57.48	4.10	80.58	22.38
46	SAGBEND	-162.43	-52.65	0.73	0.506	7.471	248.77	29.14	-4.57	57.94	3.76	80.77	22.44
47	SAGBEND	-174.35	-54.03	0.62	0.615	5.719	260.77	28.96	-4.69	58.33	3.63	80.88	22.47
48	SAGBEND	-186.30	-55.04	0.48	0.722	3.960	272.77	28.84	-4.77	58.52	3.46	80.70	22.42
49	SAGBEND	-198.28	-55.69	0.32	0.813	2.222	284.77	28.76	-4.83	56.74	2.34	78.96	21.93
50	SAGBEND	-210.28	-55.98	0.15	0.796	0.659	296.77	28.72	-4.85	42.97	-6.62	67.78	18.83
51	SEABED	-222.28	-56.03	0.02	0.307	0.010	308.77	28.72	-4.86	5.35	-19.41	48.29	13.41
52	SEABED	-234.28	-56.03	0.00	0.005	-0.008	320.77	28.72	-4.86	-0.55	-2.42	33.48	9.30
53	SEABED	-246.28	-56.03	0.00	-0.004	0.000	332.77	28.72	-4.86	-0.07	0.26	31.64	8.79
54	SEABED	-258.28	-56.03	0.00	0.000	0.000	344.77	28.72	-4.86	0.01	0.03	31.45	8.74
55	SEABED	-270.28	-56.03	0.00	0.000	0.000	356.77	28.72	-4.86	0.00	0.00	31.43	8.73
56	SEABED	-282.28	-56.03	0.00	0.000	0.000	368.77	28.72	-4.86	0.00	0.00	31.43	8.73
57	SEABED	-294.28	-56.03	0.00	0.000	0.000	380.77	28.72	-4.86	0.00	0.00	31.43	8.73
58	SEABED	-306.28	-56.03	0.00	0.000	0.000	392.77	28.72	-4.86	0.00	0.00	31.43	8.73

M A X I M U M D Y N A M I C P I P E F O R C E S A N D S T R E S S E S

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	SUPPORT REACTION VERT (KN)	SUPPORT REACTION HORIZ (KN)	SUPT SEPARATIONS VERT (M)	SUPT SEPARATIONS HORIZ (M)	PIPE TENSION (KN)	BENDING MOMENTS VERT (KN-M)	BENDING MOMENTS HORIZ (KN-M)	BENDING MOMENTS TOTAL (KN-M)
1	TENSIONR	77.79	6.21	0.00	-2.56	-0.01	0.00	0.00	302.55	0.00	0.00	0.00
3	LAYBARGE	71.49	6.16	0.00	23.52	0.00	0.00	0.00	302.37	-46.97	0.00	46.97
5	LAYBARGE	65.37	5.99	0.00	10.08	0.00	0.00	0.00	302.21	-33.84	0.00	33.84
7	LAYBARGE	59.91	5.73	0.00	14.57	0.00	0.00	0.00	301.87	-38.24	0.00	38.24
9	LAYBARGE	53.32	5.28	0.00	13.08	0.00	0.00	0.00	301.31	-36.83	0.00	36.83
11	LAYBARGE	47.32	4.74	0.00	17.23	0.00	0.00	0.00	300.63	-41.98	0.00	41.98
13	LAYBARGE	38.21	3.69	0.00	21.53	0.00	0.00	0.00	299.30	-47.49	0.00	47.49
15	LAYBARGE	29.27	2.39	0.00	16.91	0.01	0.00	0.00	297.71	-41.57	0.01	41.57
17	LAYBARGE	23.13	1.34	0.00	13.88	-0.04	0.00	0.00	296.42	-37.59	-0.04	37.59
19	LAYBARGE	17.18	0.19	0.00	7.69	-0.03	0.00	0.00	295.02	-31.89	0.15	31.89
21	LAYBARGE	10.63	-1.22	0.00	22.69	-1.37	0.00	0.00	293.87	-57.24	-1.62	57.27
24	STINGER	-4.61	-5.09	0.00	19.36	-1.42	0.00	0.00	291.35	-47.38	-1.67	47.41
26	STINGER	-11.02	-6.94	0.00	4.28	-0.08	0.00	0.00	290.22	-22.76	0.25	22.77
28	STINGER	-17.40	-8.88	0.00	11.27	-1.97	0.00	0.00	288.90	-30.17	-1.75	30.22
30	STINGER	-23.74	-10.94	0.00	7.16	2.27	0.00	0.00	287.56	-23.15	5.00	23.67
32	STINGER	-30.05	-13.08	-0.01	0.00	0.00	0.02	-0.01	286.13	-24.27	-4.22	24.63
34	STINGER	-36.32	-15.36	0.00	39.07	-9.99	0.00	0.00	284.14	-94.47	-25.32	97.78
36	SAGBEND	-47.37	-20.02	0.19	0.00	0.00	0.00	0.00	281.54	5.76	-0.65	5.80
37	SAGBEND	-58.43	-24.68	0.41	0.00	0.00	0.00	0.00	278.43	18.53	2.40	18.69
38	SAGBEND	-69.59	-29.08	0.59	0.00	0.00	0.00	0.00	275.51	20.52	2.69	20.70
39	SAGBEND	-80.87	-33.18	0.74	0.00	0.00	0.00	0.00	272.79	21.12	2.62	21.28
40	SAGBEND	-92.25	-36.97	0.84	0.00	0.00	0.00	0.00	270.27	21.52	2.51	21.67
41	SAGBEND	-103.74	-40.43	0.91	0.00	0.00	0.00	0.00	267.97	21.90	2.38	22.03
42	SAGBEND	-115.32	-43.57	0.94	0.00	0.00	0.00	0.00	265.89	22.28	2.22	22.39
43	SAGBEND	-126.99	-46.36	0.93	0.00	0.00	0.00	0.00	264.04	22.62	2.04	22.71
44	SAGBEND	-138.74	-48.82	0.89	0.00	0.00	0.00	0.00	262.42	22.89	1.84	22.96
45	SAGBEND	-150.55	-50.91	0.83	0.00	0.00	0.00	0.00	261.03	23.09	1.65	23.15
46	SAGBEND	-162.43	-52.65	0.73	0.00	0.00	0.00	0.00	259.88	23.28	1.51	23.32
47	SAGBEND	-174.35	-54.03	0.62	0.00	0.00	0.00	0.00	258.97	23.43	1.46	23.48
48	SAGBEND	-186.30	-55.04	0.48	0.00	0.00	0.00	0.00	258.30	23.51	1.39	23.55
49	SAGBEND	-198.28	-55.69	0.32	0.00	0.00	0.00	0.00	257.88	22.80	0.94	22.81
50	SAGBEND	-210.28	-55.98	0.15	1.88	-1.09	0.00	0.00	257.70	17.26	-2.66	17.41
51	SEABED	-222.28	-56.03	0.02	8.15	-3.44	0.00	0.00	257.70	2.15	-7.80	8.09
52	SEABED	-234.28	-56.03	0.00	8.16	0.11	0.00	0.00	257.70	-0.22	-0.97	1.00
53	SEABED	-246.28	-56.03	0.00	7.92	0.11	0.00	0.00	257.70	-0.03	0.10	0.11
54	SEABED	-258.28	-56.03	0.00	7.92	0.00	0.00	0.00	257.70	0.00	0.01	0.01
55	SEABED	-270.28	-56.03	0.00	7.92	0.00	0.00	0.00	257.70	0.00	0.00	0.00
56	SEABED	-282.28	-56.03	0.00	7.92	0.00	0.00	0.00	257.70	0.00	0.00	0.00
57	SEABED	-294.28	-56.03	0.00	7.92	0.00	0.00	0.00	257.70	0.00	0.00	0.00
58	SEABED	-306.28	-56.03	0.00	0.00	0.00	0.00	0.00	257.70	0.00	0.00	0.00

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.272	0.00	49.08	0.00	0.00	0.00	49.08	13.63
3	LAYBARGE	71.49	6.16	0.00	0.000	0.962	6.30	49.06	0.00	-119.79	0.00	150.88	41.91
5	LAYBARGE	65.38	5.99	0.00	0.000	2.232	12.42	49.04	0.00	-86.59	0.00	122.65	34.07
7	LAYBARGE	59.91	5.72	0.00	0.000	3.284	17.89	49.00	0.00	-97.82	0.00	132.15	36.71
9	LAYBARGE	53.32	5.27	0.00	0.000	4.503	24.49	48.93	0.00	-94.25	0.00	129.05	35.85
11	LAYBARGE	47.32	4.74	0.00	0.000	5.741	30.51	48.85	0.00	-108.82	0.00	141.35	39.26
13	LAYBARGE	38.22	3.69	0.00	0.000	7.425	39.68	48.69	0.00	-124.48	0.00	154.49	42.92
15	LAYBARGE	29.27	2.39	0.00	0.000	9.102	48.72	48.49	0.00	-107.86	0.01	140.17	38.94
17	LAYBARGE	23.13	1.33	0.00	0.000	10.370	54.95	48.34	0.00	-95.81	-0.06	129.77	36.05
19	LAYBARGE	17.18	0.19	0.00	0.001	11.445	61.01	48.17	0.00	-81.99	0.26	117.79	32.72
21	LAYBARGE	10.63	-1.22	0.00	-0.012	13.023	67.72	47.97	-0.11	-148.48	-3.68	174.25	48.40
24	STINGER	-4.64	-5.13	0.00	0.001	15.978	83.47	47.46	-0.45	-198.65	-5.67	216.60	60.17
26	STINGER	-11.00	-7.10	0.00	0.042	18.239	90.14	47.23	-0.62	-124.74	9.54	153.84	42.73
28	STINGER	-17.30	-9.29	0.00	-0.187	20.013	96.81	46.95	-0.81	-130.83	-42.68	163.64	45.46
30	STINGER	-23.54	-11.65	0.05	-0.787	21.321	103.47	46.67	-1.01	-63.66	-39.51	110.62	30.73
32	STINGER	-29.74	-14.10	0.16	-1.116	21.595	110.14	46.36	-1.22	12.35	-5.93	57.87	16.08
34	STINGER	-35.94	-16.54	0.28	-1.125	21.210	116.81	46.05	-1.44	30.57	2.74	72.36	20.10
36	SAGBEND	-47.17	-20.78	0.49	-0.983	20.164	128.81	45.51	-1.80	36.85	5.16	77.65	21.57
37	SAGBEND	-58.47	-24.81	0.67	-0.816	19.038	140.81	45.00	-2.15	37.88	5.24	78.28	21.74
38	SAGBEND	-69.85	-28.61	0.81	-0.652	17.893	152.81	44.52	-2.48	38.42	5.07	78.49	21.80
39	SAGBEND	-81.30	-32.18	0.93	-0.496	16.731	164.81	44.07	-2.79	38.88	4.86	78.64	21.84
40	SAGBEND	-92.83	-35.51	1.01	-0.347	15.555	176.81	43.64	-3.08	39.30	4.67	78.80	21.89
41	SAGBEND	-104.42	-38.61	1.07	-0.204	14.365	188.81	43.25	-3.35	39.77	4.47	78.96	21.93
42	SAGBEND	-116.08	-41.47	1.10	-0.070	13.161	200.81	42.89	-3.60	40.28	4.25	79.11	21.98
43	SAGBEND	-127.79	-44.07	1.10	0.056	11.944	212.81	42.56	-3.83	40.71	3.99	79.25	22.01
44	SAGBEND	-139.56	-46.43	1.08	0.173	10.716	224.81	42.26	-4.03	41.06	3.68	79.34	22.04
45	SAGBEND	-151.37	-48.53	1.03	0.279	9.479	236.81	41.99	-4.21	41.32	3.37	79.37	22.05
46	SAGBEND	-163.23	-50.38	0.96	0.376	8.234	248.81	41.76	-4.37	41.53	3.06	79.41	22.06
47	SAGBEND	-175.12	-51.97	0.87	0.464	6.979	260.81	41.56	-4.51	41.77	2.79	79.42	22.06
48	SAGBEND	-187.05	-53.30	0.77	0.544	5.718	272.81	41.39	-4.62	41.96	2.66	79.41	22.06
49	SAGBEND	-199.00	-54.36	0.65	0.622	4.450	284.81	41.26	-4.72	42.22	2.65	79.36	22.04
50	SAGBEND	-210.97	-55.16	0.51	0.699	3.182	296.81	41.16	-4.78	42.32	2.62	79.24	22.01
51	SAGBEND	-222.96	-55.69	0.35	0.771	1.915	308.81	41.09	-4.83	41.78	2.17	78.62	21.84
52	SAGBEND	-234.95	-55.97	0.19	0.792	0.714	320.81	41.06	-4.85	36.04	-2.85	73.75	20.49
53	SEABED	-246.95	-56.03	0.05	0.468	0.051	332.81	41.06	-4.86	7.95	-17.65	59.55	16.54
54	SEABED	-258.95	-56.03	0.00	0.049	-0.006	344.81	41.05	-4.86	-0.15	-6.27	48.71	13.53
55	SEABED	-270.95	-56.03	0.00	-0.003	-0.001	356.81	41.06	-4.86	-0.09	-0.06	43.76	12.16
56	SEABED	-282.95	-56.03	0.00	-0.001	0.000	368.81	41.06	-4.86	0.00	0.06	43.74	12.15
57	SEABED	-294.95	-56.03	0.00	0.000	0.000	380.81	41.06	-4.86	0.00	0.00	43.69	12.14
58	SEABED	-306.95	-56.03	0.00	0.000	0.000	392.81	41.06	-4.86	0.00	0.00	43.69	12.14
59	SEABED	-318.95	-56.03	0.00	0.000	0.000	404.81	41.06	-4.86	0.00	0.00	43.69	12.14
60	SEABED	-330.95	-56.03	0.00	0.000	0.000	416.81	41.06	-4.86	0.00	0.00	43.69	12.14

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.272	0.00	49.08	0.00	0.00	0.00	49.08	13.63
3	LAYBARGE	71.49	6.16	0.00	0.000	0.962	6.30	49.06	0.00	-119.78	0.00	150.87	41.91
5	LAYBARGE	65.37	5.99	0.00	0.000	2.232	12.42	49.04	0.00	-86.59	0.00	122.64	34.07
7	LAYBARGE	59.91	5.73	0.00	0.000	3.283	17.89	49.00	0.00	-97.82	0.00	132.14	36.71
9	LAYBARGE	53.32	5.28	0.00	0.000	4.503	24.49	48.93	0.00	-94.25	0.00	129.04	35.85
11	LAYBARGE	47.32	4.74	0.00	0.000	5.740	30.51	48.85	0.00	-108.81	0.00	141.33	39.26
13	LAYBARGE	38.21	3.70	0.00	0.000	7.425	39.68	48.69	0.00	-124.47	0.00	154.49	42.91
15	LAYBARGE	29.27	2.39	0.00	0.000	9.102	48.72	48.50	0.00	-107.81	0.02	140.13	38.93
17	LAYBARGE	23.13	1.34	0.00	0.000	10.370	54.95	48.34	0.00	-95.99	-0.08	129.92	36.09
19	LAYBARGE	17.18	0.19	0.00	0.001	11.442	61.01	48.17	0.00	-81.14	0.35	117.09	32.52
21	LAYBARGE	10.63	-1.22	0.00	-0.014	13.038	67.72	47.97	-0.11	-151.80	-4.01	177.09	49.19
24	STINGER	-4.62	-5.11	0.00	0.015	15.534	83.45	47.48	-0.44	-151.63	-3.78	176.59	49.05
26	STINGER	-11.02	-6.99	0.00	-0.008	17.120	90.12	47.26	-0.61	-78.83	-1.15	114.57	31.82
28	STINGER	-17.37	-9.02	0.00	0.018	18.335	96.78	47.00	-0.78	-99.79	2.99	132.23	36.73
30	STINGER	-23.67	-11.19	0.00	-0.072	19.555	103.45	46.72	-0.97	-79.74	-17.96	116.26	32.29
32	STINGER	-29.93	-13.48	0.03	-0.582	20.639	110.12	46.43	-1.17	-83.90	-52.70	131.02	36.39
34	STINGER	-36.16	-15.86	0.12	-1.040	21.099	116.79	46.14	-1.38	7.13	-9.48	56.22	15.62
36	SAGBEND	-47.38	-20.12	0.33	-1.035	20.319	128.79	45.60	-1.75	34.59	4.08	75.61	21.00
37	SAGBEND	-58.67	-24.18	0.52	-0.880	19.219	140.79	45.08	-2.10	37.66	5.18	78.05	21.68
38	SAGBEND	-70.03	-28.02	0.68	-0.716	18.079	152.79	44.60	-2.43	38.36	5.11	78.43	21.79
39	SAGBEND	-81.48	-31.63	0.81	-0.559	16.920	164.79	44.14	-2.75	38.84	4.90	78.59	21.83
40	SAGBEND	-92.99	-35.00	0.91	-0.408	15.746	176.79	43.71	-3.04	39.29	4.70	78.76	21.88
41	SAGBEND	-104.57	-38.13	0.97	-0.264	14.557	188.79	43.31	-3.31	39.70	4.51	78.92	21.92
42	SAGBEND	-116.22	-41.03	1.01	-0.129	13.353	200.79	42.95	-3.56	40.20	4.31	79.07	21.96
43	SAGBEND	-127.92	-43.68	1.03	-0.002	12.138	212.79	42.61	-3.79	40.67	4.07	79.18	22.00
44	SAGBEND	-139.68	-46.08	1.02	0.115	10.912	224.79	42.31	-4.00	41.05	3.80	79.26	22.02
45	SAGBEND	-151.49	-48.22	0.98	0.224	9.676	236.79	42.04	-4.19	41.33	3.51	79.32	22.03
46	SAGBEND	-163.34	-50.11	0.92	0.322	8.429	248.79	41.80	-4.35	41.51	3.21	79.34	22.04
47	SAGBEND	-175.23	-51.74	0.85	0.412	7.177	260.79	41.59	-4.49	41.70	2.95	79.35	22.04
48	SAGBEND	-187.15	-53.11	0.75	0.494	5.917	272.79	41.42	-4.61	41.95	2.81	79.35	22.04
49	SAGBEND	-199.10	-54.21	0.64	0.573	4.651	284.79	41.28	-4.70	42.19	2.83	79.35	22.04
50	SAGBEND	-211.07	-55.05	0.51	0.651	3.383	296.79	41.18	-4.78	42.29	2.86	79.27	22.02
51	SAGBEND	-223.05	-55.63	0.37	0.725	2.117	308.79	41.11	-4.82	42.01	2.57	78.81	21.89
52	SAGBEND	-235.05	-55.94	0.21	0.765	0.893	320.79	41.07	-4.85	37.93	-1.71	75.32	20.92
53	SEABED	-247.04	-56.03	0.06	0.541	0.094	332.79	41.06	-4.86	11.81	-16.53	59.85	16.63
54	SEABED	-259.04	-56.03	0.00	0.081	-0.006	344.79	41.06	-4.86	0.17	-9.37	51.37	14.27
55	SEABED	-271.04	-56.03	0.00	-0.003	-0.001	356.79	41.06	-4.86	-0.12	-0.35	44.00	12.22
56	SEABED	-283.04	-56.03	0.00	-0.001	0.000	368.79	41.06	-4.86	-0.01	0.09	43.76	12.16
57	SEABED	-295.04	-56.03	0.00	0.000	0.000	380.79	41.06	-4.86	0.00	0.01	43.70	12.14
58	SEABED	-307.04	-56.03	0.00	0.000	0.000	392.79	41.06	-4.86	0.00	0.00	43.69	12.14
59	SEABED	-319.04	-56.03	0.00	0.000	0.000	404.79	41.06	-4.86	0.00	0.00	43.69	12.14
60	SEABED	-331.04	-56.03	0.00	0.000	0.000	416.79	41.06	-4.86	0.00	0.00	43.69	12.14

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.270	0.00	49.05	0.00	0.00	0.00	49.05	13.63
3	LAYBARGE	71.49	6.16	0.00	0.000	0.960	6.30	49.03	0.00	-119.77	0.00	150.84	41.90
5	LAYBARGE	65.37	5.99	0.00	0.000	2.230	12.42	49.01	0.00	-86.59	0.00	122.61	34.06
7	LAYBARGE	59.91	5.72	0.00	0.000	3.282	17.89	48.97	0.00	-97.81	0.00	132.11	36.70
9	LAYBARGE	53.32	5.28	0.00	0.000	4.501	24.49	48.90	0.00	-94.24	0.00	129.01	35.84
11	LAYBARGE	47.32	4.74	0.00	0.000	5.739	30.51	48.82	0.00	-108.80	0.00	141.29	39.25
13	LAYBARGE	38.21	3.69	0.00	0.000	7.423	39.68	48.66	0.00	-124.46	0.00	154.45	42.90
15	LAYBARGE	29.27	2.39	0.00	0.000	9.100	48.72	48.46	0.00	-107.77	0.02	140.07	38.91
17	LAYBARGE	23.13	1.33	0.00	0.000	10.369	54.95	48.31	0.00	-96.09	-0.08	129.98	36.11
19	LAYBARGE	17.18	0.19	0.00	0.001	11.438	61.01	48.14	0.00	-80.70	0.34	116.67	32.41
21	LAYBARGE	10.63	-1.22	0.00	-0.013	13.044	67.72	47.94	-0.11	-153.52	-3.97	178.49	49.58
24	STINGER	-4.61	-5.09	0.00	0.014	15.309	83.44	47.45	-0.44	-127.75	-3.95	156.25	43.40
26	STINGER	-11.02	-6.94	0.00	-0.003	16.572	90.11	47.23	-0.60	-58.17	-0.16	96.95	26.93
28	STINGER	-17.40	-8.88	0.00	-0.001	17.452	96.77	46.99	-0.77	-74.71	-1.86	110.78	30.77
30	STINGER	-23.74	-10.94	0.00	0.009	18.428	103.44	46.73	-0.95	-71.99	2.40	108.24	30.07
32	STINGER	-30.05	-13.09	0.01	-0.225	19.268	110.11	46.45	-1.14	-56.37	-34.14	102.53	28.48
34	STINGER	-36.33	-15.33	0.06	-0.736	19.875	116.77	46.17	-1.33	-41.73	-36.44	93.63	26.01
36	SAGBEND	-47.61	-19.41	0.25	-1.032	19.586	128.77	45.66	-1.69	30.51	1.84	72.03	20.01
37	SAGBEND	-58.95	-23.33	0.44	-0.906	18.531	140.77	45.16	-2.03	37.39	5.00	77.82	21.62
38	SAGBEND	-70.36	-27.04	0.61	-0.745	17.395	152.77	44.69	-2.35	38.42	5.17	78.53	21.81
39	SAGBEND	-81.85	-30.50	0.74	-0.586	16.233	164.77	44.25	-2.65	38.93	5.00	78.72	21.87
40	SAGBEND	-93.40	-33.74	0.84	-0.434	15.056	176.77	43.84	-2.93	39.32	4.80	78.89	21.91
41	SAGBEND	-105.02	-36.74	0.92	-0.289	13.865	188.77	43.46	-3.19	39.77	4.63	79.04	21.96
42	SAGBEND	-116.70	-39.49	0.96	-0.149	12.662	200.77	43.11	-3.43	40.27	4.43	79.19	22.00
43	SAGBEND	-128.44	-42.00	0.98	-0.018	11.447	212.77	42.79	-3.65	40.70	4.22	79.34	22.04
44	SAGBEND	-140.22	-44.26	0.97	0.107	10.222	224.77	42.51	-3.84	41.05	3.97	79.43	22.06
45	SAGBEND	-152.05	-46.26	0.94	0.223	8.988	236.77	42.25	-4.02	41.29	3.70	79.45	22.07
46	SAGBEND	-163.93	-48.01	0.88	0.331	7.744	248.77	42.03	-4.17	41.44	3.44	79.43	22.06
47	SAGBEND	-175.83	-49.49	0.80	0.432	6.494	260.77	41.84	-4.29	41.62	3.21	79.45	22.07
48	SAGBEND	-187.77	-50.72	0.70	0.524	5.237	272.77	41.69	-4.40	41.82	3.00	79.43	22.06
49	SAGBEND	-199.73	-51.68	0.58	0.611	3.977	284.77	41.57	-4.48	42.00	2.83	79.36	22.04
50	SAGBEND	-211.71	-52.38	0.44	0.691	2.717	296.77	41.48	-4.54	42.01	2.63	79.16	21.99
51	SAGBEND	-223.70	-52.82	0.29	0.759	1.467	308.77	41.43	-4.58	40.74	1.73	77.91	21.64
52	SEABED	-235.70	-53.01	0.13	0.729	0.367	320.77	41.40	-4.60	28.03	-7.41	67.87	18.85
53	SEABED	-247.70	-53.03	0.02	0.275	0.007	332.77	41.40	-4.60	2.76	-16.43	57.77	16.05
54	SEABED	-259.70	-53.03	0.00	0.012	-0.004	344.77	41.40	-4.60	-0.21	-2.47	45.88	12.74
55	SEABED	-271.70	-53.03	0.00	-0.002	0.000	356.77	41.40	-4.60	-0.04	0.11	43.97	12.21
56	SEABED	-283.70	-53.03	0.00	0.000	0.000	368.77	41.40	-4.60	0.00	0.03	43.91	12.20
57	SEABED	-295.70	-53.03	0.00	0.000	0.000	380.77	41.40	-4.60	0.00	0.00	43.88	12.19
58	SEABED	-307.70	-53.03	0.00	0.000	0.000	392.77	41.40	-4.60	0.00	0.00	43.88	12.19
59	SEABED	-319.70	-53.03	0.00	0.000	0.000	404.77	41.40	-4.60	0.00	0.00	43.88	12.19

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.266	0.00	36.76	0.00	0.00	0.00	36.76	10.21
3	LAYBARGE	71.49	6.16	0.00	0.000	0.958	6.30	36.74	0.00	-116.93	0.00	136.13	37.81
5	LAYBARGE	65.38	5.98	0.00	0.000	2.232	12.42	36.72	0.00	-84.25	0.00	108.33	30.09
7	LAYBARGE	59.91	5.72	0.00	0.000	3.279	17.89	36.68	0.00	-95.19	0.00	117.59	32.66
9	LAYBARGE	53.32	5.27	0.00	0.000	4.504	24.49	36.61	0.00	-91.69	0.00	114.54	31.82
11	LAYBARGE	47.32	4.74	0.00	0.000	5.732	30.51	36.53	0.00	-104.52	0.00	125.36	34.82
13	LAYBARGE	38.22	3.69	0.00	0.000	7.423	39.68	36.37	0.00	-118.21	0.00	136.84	38.01
15	LAYBARGE	29.27	2.39	0.00	0.000	9.106	48.72	36.17	0.00	-103.59	0.02	124.22	34.51
17	LAYBARGE	23.13	1.33	0.00	0.000	10.365	54.95	36.02	0.00	-93.11	-0.09	115.16	31.99
19	LAYBARGE	17.18	0.19	0.00	0.002	11.450	61.01	35.85	0.00	-81.20	0.39	104.76	29.10
21	LAYBARGE	10.63	-1.22	0.00	-0.014	12.982	67.72	35.65	-0.11	-135.52	-4.07	150.94	41.93
24	STINGER	-4.64	-5.13	0.00	0.014	16.017	83.47	35.14	-0.45	-184.42	-4.12	192.15	53.38
26	STINGER	-11.01	-7.10	0.00	-0.001	18.218	90.14	34.91	-0.62	-119.73	0.38	136.96	38.05
28	STINGER	-17.30	-9.29	0.00	-0.008	20.058	96.81	34.63	-0.81	-136.10	-3.30	150.68	41.85
30	STINGER	-23.53	-11.68	0.00	0.039	21.976	103.47	34.33	-1.01	-130.39	8.12	145.78	40.50
32	STINGER	-29.67	-14.27	0.01	-0.389	23.805	110.14	34.00	-1.24	-124.16	-61.96	152.24	42.29
34	STINGER	-35.74	-17.03	0.09	-1.042	24.765	116.81	33.67	-1.48	-16.86	-20.92	57.12	15.87
36	SAGBEND	-46.65	-22.01	0.31	-1.167	24.070	128.81	33.04	-1.91	41.74	4.03	69.26	19.24
37	SAGBEND	-57.66	-26.78	0.52	-0.979	22.661	140.81	32.43	-2.32	49.72	6.64	75.90	21.08
38	SAGBEND	-68.80	-31.25	0.69	-0.761	21.135	152.81	31.87	-2.71	51.66	6.71	77.27	21.46
39	SAGBEND	-80.04	-35.43	0.82	-0.551	19.565	164.81	31.34	-3.08	52.77	6.43	77.93	21.65
40	SAGBEND	-91.41	-39.29	0.91	-0.353	17.963	176.81	30.85	-3.41	53.76	6.07	78.51	21.81
41	SAGBEND	-102.87	-42.83	0.96	-0.170	16.330	188.81	30.40	-3.72	54.73	5.64	79.03	21.95
42	SAGBEND	-114.44	-46.03	0.98	-0.002	14.665	200.81	29.99	-4.00	55.72	5.15	79.55	22.10
43	SAGBEND	-126.09	-48.90	0.96	0.147	12.976	212.81	29.63	-4.24	56.55	4.58	80.02	22.23
44	SAGBEND	-137.82	-51.42	0.92	0.278	11.266	224.81	29.31	-4.46	57.27	4.01	80.36	22.32
45	SAGBEND	-149.62	-53.59	0.85	0.393	9.536	236.81	29.04	-4.65	57.81	3.69	80.61	22.39
46	SAGBEND	-161.48	-55.39	0.75	0.503	7.786	248.81	28.81	-4.81	58.30	3.65	80.85	22.46
47	SAGBEND	-173.40	-56.84	0.64	0.612	6.023	260.81	28.63	-4.93	58.73	3.66	81.02	22.51
48	SAGBEND	-185.35	-57.91	0.50	0.719	4.251	272.81	28.49	-5.02	58.92	3.54	80.92	22.48
49	SAGBEND	-197.32	-58.62	0.34	0.814	2.488	284.81	28.41	-5.08	57.63	2.59	79.60	22.11
50	SAGBEND	-209.32	-58.96	0.16	0.818	0.860	296.81	28.36	-5.11	47.25	-4.87	70.94	19.71
51	SEABED	-221.32	-59.03	0.03	0.381	0.035	308.81	28.36	-5.12	8.56	-20.70	49.80	13.83
52	SEABED	-233.32	-59.03	0.00	0.013	-0.011	320.81	28.36	-5.12	-0.58	-3.56	34.11	9.48
53	SEABED	-245.32	-59.03	0.00	-0.005	0.000	332.81	28.36	-5.12	-0.11	0.28	31.48	8.74
54	SEABED	-257.32	-59.03	0.00	0.000	0.000	344.81	28.36	-5.12	0.01	0.04	31.27	8.69
55	SEABED	-269.32	-59.03	0.00	0.000	0.000	356.81	28.36	-5.12	0.00	0.00	31.24	8.68
56	SEABED	-281.32	-59.03	0.00	0.000	0.000	368.81	28.36	-5.12	0.00	0.00	31.23	8.68
57	SEABED	-293.32	-59.03	0.00	0.000	0.000	380.81	28.36	-5.12	0.00	0.00	31.23	8.68
58	SEABED	-305.32	-59.03	0.00	0.000	0.000	392.81	28.36	-5.12	0.00	0.00	31.23	8.68

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.268	0.00	36.76	0.00	0.00	0.00	36.76	10.21
3	LAYBARGE	71.49	6.16	0.00	0.000	0.960	6.30	36.73	0.00	-116.93	0.00	136.12	37.81
5	LAYBARGE	65.37	5.98	0.00	0.000	2.234	12.42	36.71	0.00	-84.25	0.00	108.32	30.09
7	LAYBARGE	59.91	5.72	0.00	0.000	3.281	17.89	36.67	0.00	-95.19	0.00	117.58	32.66
9	LAYBARGE	53.32	5.27	0.00	0.000	4.506	24.49	36.61	0.00	-91.69	0.00	114.54	31.82
11	LAYBARGE	47.32	4.74	0.00	0.000	5.734	30.51	36.52	0.00	-104.51	0.00	125.36	34.82
13	LAYBARGE	38.21	3.69	0.00	0.000	7.426	39.68	36.36	0.00	-118.22	0.00	136.85	38.01
15	LAYBARGE	29.27	2.39	0.00	0.000	9.107	48.72	36.17	0.00	-103.53	0.02	124.17	34.49
17	LAYBARGE	23.13	1.34	0.00	0.000	10.369	54.95	36.01	0.00	-93.40	-0.09	115.41	32.06
19	LAYBARGE	17.18	0.19	0.00	0.002	11.447	61.01	35.84	0.00	-79.98	0.38	103.74	28.82
21	LAYBARGE	10.63	-1.22	0.00	-0.014	13.006	67.72	35.65	-0.11	-140.15	-4.06	154.86	43.02
24	STINGER	-4.62	-5.11	0.00	0.014	15.565	83.45	35.15	-0.44	-139.90	-4.10	154.33	42.87
26	STINGER	-11.02	-6.99	0.00	-0.001	17.117	90.12	34.93	-0.61	-78.13	0.32	101.62	28.23
28	STINGER	-17.37	-9.02	0.00	-0.008	18.323	96.78	34.67	-0.78	-93.41	-3.06	114.50	31.80
30	STINGER	-23.67	-11.19	0.00	0.036	19.610	103.45	34.40	-0.97	-88.90	7.20	110.66	30.74
32	STINGER	-29.93	-13.49	-0.01	0.090	20.763	110.12	34.11	-1.17	-75.85	-2.57	98.89	27.47
34	STINGER	-36.13	-15.94	0.00	-0.430	22.666	116.79	33.76	-1.38	-191.63	-65.00	206.26	57.29
36	SAGBEND	-47.10	-20.80	0.18	-1.167	24.134	128.79	33.19	-1.81	19.71	-1.94	50.59	14.05
37	SAGBEND	-58.09	-25.61	0.40	-1.056	23.006	140.79	32.57	-2.22	46.65	5.87	73.37	20.38
38	SAGBEND	-69.19	-30.15	0.58	-0.845	21.523	152.79	32.00	-2.62	51.10	6.61	76.81	21.34
39	SAGBEND	-80.41	-34.40	0.73	-0.633	19.962	164.79	31.46	-2.99	52.54	6.42	77.76	21.60
40	SAGBEND	-91.75	-38.34	0.83	-0.432	18.369	176.79	30.96	-3.33	53.51	6.10	78.34	21.76
41	SAGBEND	-103.19	-41.96	0.90	-0.245	16.745	188.79	30.50	-3.64	54.49	5.71	78.90	21.92
42	SAGBEND	-114.73	-45.25	0.93	-0.073	15.087	200.79	30.08	-3.93	55.47	5.24	79.44	22.07
43	SAGBEND	-126.36	-48.21	0.93	0.081	13.404	212.79	29.71	-4.18	56.39	4.70	79.89	22.19
44	SAGBEND	-138.07	-50.82	0.90	0.217	11.700	224.79	29.38	-4.41	57.11	4.13	80.26	22.29
45	SAGBEND	-149.86	-53.07	0.84	0.336	9.975	236.79	29.09	-4.61	57.66	3.76	80.53	22.37
46	SAGBEND	-161.70	-54.97	0.76	0.447	8.232	248.79	28.85	-4.77	58.15	3.65	80.76	22.43
47	SAGBEND	-173.60	-56.51	0.66	0.556	6.471	260.79	28.66	-4.90	58.61	3.65	80.93	22.48
48	SAGBEND	-185.55	-57.68	0.53	0.664	4.700	272.79	28.51	-5.00	58.89	3.60	80.94	22.48
49	SAGBEND	-197.52	-58.47	0.38	0.765	2.929	284.79	28.41	-5.07	58.28	3.13	80.20	22.28
50	SAGBEND	-209.51	-58.91	0.21	0.821	1.240	296.79	28.36	-5.11	51.91	-0.77	74.68	20.75
51	SEABED	-221.51	-59.03	0.06	0.568	0.121	308.79	28.35	-5.12	16.82	-18.88	51.80	14.39
52	SEABED	-233.51	-59.03	0.00	0.059	-0.015	320.79	28.35	-5.12	-0.34	-8.11	37.88	10.52
53	SEABED	-245.51	-59.03	0.00	-0.007	-0.002	332.79	28.35	-5.12	-0.21	0.19	31.43	8.73
54	SEABED	-257.51	-59.03	0.00	-0.001	0.000	344.79	28.35	-5.12	0.00	0.10	31.30	8.69
55	SEABED	-269.51	-59.03	0.00	0.000	0.000	356.79	28.35	-5.12	0.00	0.00	31.23	8.67
56	SEABED	-281.51	-59.03	0.00	0.000	0.000	368.79	28.35	-5.12	0.00	0.00	31.22	8.67
57	SEABED	-293.51	-59.03	0.00	0.000	0.000	380.79	28.35	-5.12	0.00	0.00	31.22	8.67
58	SEABED	-305.51	-59.03	0.00	0.000	0.000	392.79	28.35	-5.12	0.00	0.00	31.22	8.67

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.267	0.00	36.73	0.00	0.00	0.00	36.73	10.20
3	LAYBARGE	71.49	6.16	0.00	0.000	0.959	6.30	36.71	0.00	-116.92	0.00	136.09	37.80
5	LAYBARGE	65.37	5.99	0.00	0.000	2.233	12.42	36.69	0.00	-84.24	0.00	108.29	30.08
7	LAYBARGE	59.91	5.72	0.00	0.000	3.280	17.89	36.64	0.00	-95.19	0.00	117.55	32.65
9	LAYBARGE	53.32	5.27	0.00	0.000	4.505	24.49	36.58	0.00	-91.68	0.00	114.51	31.81
11	LAYBARGE	47.32	4.74	0.00	0.000	5.733	30.51	36.49	0.00	-104.50	0.00	125.32	34.81
13	LAYBARGE	38.22	3.69	0.00	0.000	7.425	39.68	36.33	0.00	-118.22	0.00	136.82	38.00
15	LAYBARGE	29.27	2.39	0.00	0.000	9.106	48.72	36.14	0.00	-103.49	0.02	124.11	34.47
17	LAYBARGE	23.13	1.33	0.00	0.000	10.368	54.95	35.98	0.00	-93.54	-0.09	115.49	32.08
19	LAYBARGE	17.18	0.19	0.00	0.002	11.443	61.01	35.81	0.00	-79.39	0.38	103.20	28.67
21	LAYBARGE	10.63	-1.23	0.00	-0.014	13.015	67.72	35.62	-0.11	-142.45	-4.04	156.80	43.56
24	STINGER	-4.61	-5.10	0.00	0.013	15.341	83.44	35.13	-0.44	-117.98	-4.15	135.70	37.69
26	STINGER	-11.02	-6.94	0.00	0.000	16.560	90.11	34.91	-0.60	-56.00	0.64	82.75	22.99
28	STINGER	-17.40	-8.88	0.00	-0.015	17.480	96.77	34.66	-0.77	-77.83	-4.38	101.27	28.13
30	STINGER	-23.74	-10.94	0.00	0.064	18.323	103.44	34.41	-0.95	-46.40	12.55	75.41	20.95
32	STINGER	-30.05	-13.07	-0.01	0.094	19.102	110.11	34.13	-1.14	-69.50	-10.61	94.29	26.19
34	STINGER	-36.32	-15.36	0.00	-0.477	21.615	116.77	33.76	-1.33	-278.45	-63.70	277.10	76.97
36	SAGBEND	-47.31	-20.16	0.19	-1.190	24.173	128.77	33.24	-1.75	8.55	-1.73	41.27	11.47
37	SAGBEND	-58.29	-24.99	0.41	-1.075	23.188	140.77	32.62	-2.17	45.08	5.93	72.11	20.03
38	SAGBEND	-69.38	-29.58	0.60	-0.862	21.722	152.77	32.04	-2.57	50.74	6.65	76.61	21.28
39	SAGBEND	-80.59	-33.87	0.75	-0.649	20.169	164.77	31.50	-2.94	52.34	6.45	77.67	21.58
40	SAGBEND	-91.90	-37.85	0.85	-0.446	18.580	176.77	30.99	-3.29	53.42	6.14	78.30	21.75
41	SAGBEND	-103.33	-41.51	0.92	-0.257	16.958	188.77	30.53	-3.60	54.35	5.76	78.83	21.90
42	SAGBEND	-114.86	-44.85	0.96	-0.082	15.305	200.77	30.11	-3.89	55.32	5.29	79.31	22.03
43	SAGBEND	-126.48	-47.84	0.96	0.074	13.627	212.77	29.73	-4.15	56.20	4.75	79.80	22.17
44	SAGBEND	-138.18	-50.50	0.93	0.212	11.923	224.77	29.39	-4.38	56.94	4.18	80.20	22.28
45	SAGBEND	-149.96	-52.80	0.87	0.333	10.200	236.77	29.10	-4.58	57.55	3.77	80.50	22.36
46	SAGBEND	-161.80	-54.75	0.79	0.445	8.457	248.77	28.85	-4.75	58.10	3.62	80.72	22.42
47	SAGBEND	-173.69	-56.33	0.69	0.554	6.697	260.77	28.65	-4.89	58.57	3.61	80.95	22.49
48	SAGBEND	-185.63	-57.55	0.56	0.663	4.928	272.77	28.50	-4.99	58.91	3.58	81.01	22.50
49	SAGBEND	-197.60	-58.39	0.41	0.766	3.154	284.77	28.40	-5.06	58.45	3.22	80.43	22.34
50	SAGBEND	-209.59	-58.87	0.24	0.835	1.443	296.77	28.34	-5.11	53.52	0.57	76.07	21.13
51	SEABED	-221.58	-59.02	0.08	0.655	0.194	308.77	28.32	-5.12	22.41	-16.72	54.18	15.05
52	SEABED	-233.58	-59.03	0.00	0.097	-0.015	320.77	28.32	-5.12	0.25	-10.97	40.29	11.19
53	SEABED	-245.58	-59.03	0.00	-0.008	-0.002	332.77	28.32	-5.12	-0.29	-0.07	31.43	8.73
54	SEABED	-257.58	-59.03	0.00	-0.001	0.000	344.77	28.32	-5.12	0.00	0.13	31.31	8.70
55	SEABED	-269.58	-59.03	0.00	0.000	0.000	356.77	28.32	-5.12	0.00	0.00	31.20	8.67
56	SEABED	-281.58	-59.03	0.00	0.000	0.000	368.77	28.32	-5.12	0.00	0.00	31.20	8.67
57	SEABED	-293.58	-59.03	0.00	0.000	0.000	380.77	28.32	-5.12	0.00	0.00	31.20	8.67
58	SEABED	-305.58	-59.03	0.00	0.000	0.000	392.77	28.32	-5.12	0.00	0.00	31.20	8.67

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

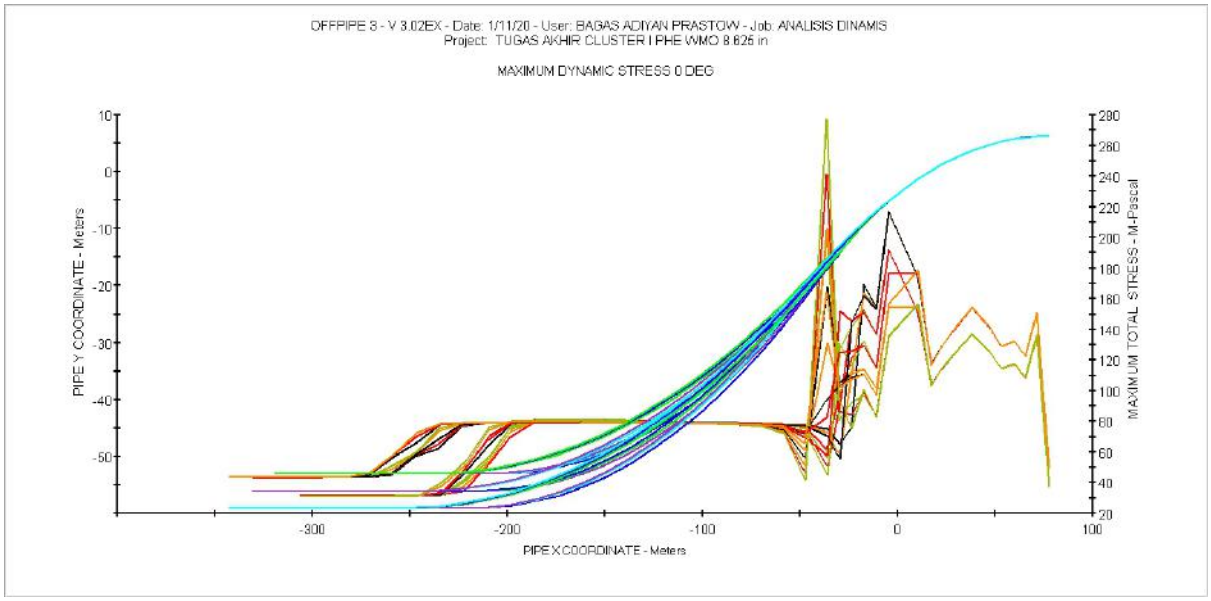
NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.271	0.00	49.05	0.00	0.00	0.00	49.05	13.62
3	LAYBARGE	71.49	6.16	0.00	0.000	0.961	6.30	49.03	0.00	-119.77	0.00	150.83	41.90
5	LAYBARGE	65.38	5.98	0.00	0.000	2.231	12.42	49.01	0.00	-86.58	0.00	122.60	34.06
7	LAYBARGE	59.91	5.72	0.00	0.000	3.282	17.89	48.97	0.00	-97.81	0.00	132.10	36.70
9	LAYBARGE	53.32	5.27	0.00	0.000	4.502	24.49	48.90	0.00	-94.24	0.00	129.00	35.83
11	LAYBARGE	47.32	4.74	0.00	0.000	5.739	30.51	48.81	0.00	-108.80	0.00	141.29	39.25
13	LAYBARGE	38.22	3.69	0.00	0.000	7.424	39.68	48.65	0.00	-124.45	0.00	154.43	42.90
15	LAYBARGE	29.27	2.39	0.00	0.000	9.101	48.72	48.46	0.00	-107.84	0.02	140.12	38.92
17	LAYBARGE	23.13	1.33	0.00	0.000	10.368	54.95	48.30	0.00	-95.79	-0.07	129.72	36.03
19	LAYBARGE	17.18	0.19	0.00	0.001	11.444	61.01	48.13	0.00	-81.98	0.31	117.73	32.70
21	LAYBARGE	10.63	-1.22	0.00	-0.013	13.021	67.72	47.93	-0.11	-148.42	-3.87	174.19	48.39
24	STINGER	-4.64	-5.13	0.00	0.009	15.977	83.47	47.42	-0.45	-198.73	-4.66	216.61	60.17
26	STINGER	-11.00	-7.10	0.00	0.014	18.235	90.14	47.20	-0.62	-124.11	3.88	153.02	42.51
28	STINGER	-17.30	-9.29	0.00	-0.073	20.024	96.81	46.92	-0.81	-133.54	-18.54	161.60	44.89
30	STINGER	-23.53	-11.66	0.03	-0.605	21.627	103.47	46.62	-1.01	-100.96	-54.74	144.46	40.13
32	STINGER	-29.71	-14.17	0.13	-1.087	22.248	110.14	46.32	-1.23	2.47	-9.84	55.28	15.35
34	STINGER	-35.89	-16.68	0.25	-1.136	21.950	116.81	46.00	-1.45	27.83	1.68	70.13	19.48
36	SAGBEND	-47.05	-21.07	0.46	-1.005	20.939	128.81	45.44	-1.83	36.43	5.04	77.35	21.49
37	SAGBEND	-58.30	-25.25	0.64	-0.839	19.822	140.81	44.91	-2.19	37.72	5.20	78.14	21.71
38	SAGBEND	-69.63	-29.21	0.79	-0.676	18.680	152.81	44.41	-2.54	38.28	5.04	78.32	21.76
39	SAGBEND	-81.03	-32.94	0.91	-0.519	17.521	164.81	43.94	-2.86	38.75	4.81	78.44	21.79
40	SAGBEND	-92.51	-36.43	1.00	-0.371	16.347	176.81	43.49	-3.16	39.21	4.60	78.60	21.83
41	SAGBEND	-104.06	-39.69	1.06	-0.231	15.156	188.81	43.08	-3.45	39.69	4.37	78.73	21.87
42	SAGBEND	-115.67	-42.71	1.09	-0.099	13.954	200.81	42.70	-3.71	40.18	4.10	78.85	21.90
43	SAGBEND	-127.35	-45.48	1.10	0.023	12.739	212.81	42.35	-3.95	40.62	3.78	78.98	21.94
44	SAGBEND	-139.08	-48.00	1.08	0.133	11.512	224.81	42.03	-4.17	40.99	3.43	79.08	21.97
45	SAGBEND	-150.87	-50.26	1.05	0.232	10.274	236.81	41.74	-4.36	41.31	3.06	79.14	21.98
46	SAGBEND	-162.70	-52.28	0.99	0.320	9.026	248.81	41.49	-4.54	41.57	2.74	79.20	22.00
47	SAGBEND	-174.57	-54.03	0.91	0.401	7.768	260.81	41.27	-4.69	41.82	2.60	79.26	22.02
48	SAGBEND	-186.47	-55.52	0.82	0.479	6.505	272.81	41.08	-4.82	42.07	2.61	79.30	22.03
49	SAGBEND	-198.41	-56.75	0.72	0.557	5.236	284.81	40.92	-4.92	42.29	2.62	79.30	22.03
50	SAGBEND	-210.37	-57.71	0.59	0.636	3.961	296.81	40.80	-5.01	42.47	2.62	79.25	22.01
51	SAGBEND	-222.35	-58.40	0.45	0.713	2.683	308.81	40.72	-5.07	42.44	2.53	79.04	21.96
52	SAGBEND	-234.34	-58.83	0.29	0.778	1.420	320.81	40.66	-5.10	40.95	1.63	77.63	21.56
53	SEABED	-246.34	-59.01	0.13	0.738	0.331	332.81	40.64	-5.12	26.50	-8.36	66.36	18.43
54	SEABED	-258.34	-59.03	0.02	0.265	0.004	344.81	40.64	-5.12	2.31	-16.39	57.25	15.90
55	SEABED	-270.34	-59.03	0.00	0.011	-0.003	356.81	40.64	-5.12	-0.22	-2.32	45.31	12.59
56	SEABED	-282.34	-59.03	0.00	-0.002	0.000	368.81	40.64	-5.12	-0.03	0.12	43.52	12.09
57	SEABED	-294.34	-59.03	0.00	0.000	0.000	380.81	40.64	-5.12	0.00	0.03	43.45	12.07
58	SEABED	-306.34	-59.03	0.00	0.000	0.000	392.81	40.64	-5.12	0.00	0.00	43.43	12.06
59	SEABED	-318.34	-59.03	0.00	0.000	0.000	404.81	40.64	-5.12	0.00	0.00	43.43	12.06
60	SEABED	-330.34	-59.03	0.00	0.000	0.000	416.81	40.64	-5.12	0.00	0.00	43.43	12.06

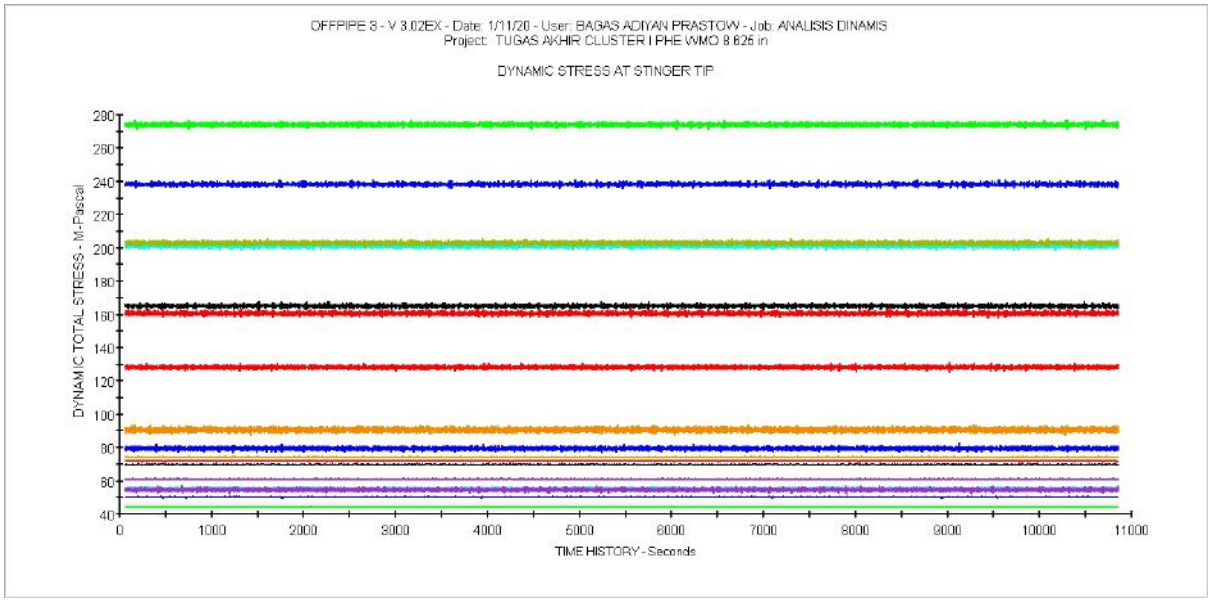
MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.271	0.00	49.09	0.00	0.00	0.00	49.09	13.64
3	LAYBARGE	71.49	6.16	0.00	0.000	0.961	6.30	49.07	0.00	-119.78	0.00	150.89	41.91
5	LAYBARGE	65.37	5.98	0.00	0.000	2.231	12.42	49.05	0.00	-86.59	0.00	122.66	34.07
7	LAYBARGE	59.91	5.72	0.00	0.000	3.283	17.89	49.01	0.00	-97.82	0.00	132.16	36.71
9	LAYBARGE	53.32	5.27	0.00	0.000	4.502	24.49	48.94	0.00	-94.25	0.00	129.06	35.85
11	LAYBARGE	47.32	4.74	0.00	0.000	5.740	30.51	48.86	0.00	-108.82	0.00	141.35	39.26
13	LAYBARGE	38.22	3.69	0.00	0.000	7.424	39.68	48.70	0.00	-124.49	0.00	154.51	42.92
15	LAYBARGE	29.27	2.39	0.00	0.000	9.101	48.72	48.51	0.00	-107.82	0.02	140.15	38.93
17	LAYBARGE	23.13	1.33	0.00	0.000	10.369	54.95	48.35	0.00	-96.00	-0.08	129.95	36.10
19	LAYBARGE	17.18	0.19	0.00	0.001	11.441	61.01	48.18	0.00	-81.14	0.34	117.07	32.52
21	LAYBARGE	10.63	-1.22	0.00	-0.013	13.037	67.72	47.98	-0.11	-151.83	-3.98	177.14	49.20
24	STINGER	-4.62	-5.11	0.00	0.014	15.532	83.45	47.49	-0.44	-151.49	-3.97	176.52	49.03
26	STINGER	-11.01	-6.99	0.00	-0.002	17.123	90.12	47.27	-0.61	-79.55	0.08	115.17	31.99
28	STINGER	-17.37	-9.02	0.00	-0.003	18.321	96.78	47.01	-0.78	-96.93	-2.28	129.67	36.02
30	STINGER	-23.67	-11.19	0.00	0.018	19.609	103.45	46.73	-0.97	-92.70	4.17	125.88	34.97
32	STINGER	-29.93	-13.49	0.01	-0.286	20.779	110.12	46.44	-1.17	-80.81	-44.75	125.16	34.77
34	STINGER	-36.14	-15.90	0.07	-0.830	21.484	116.79	46.14	-1.38	-30.94	-29.12	82.61	22.95
36	SAGBEND	-47.31	-20.28	0.27	-1.042	21.084	128.79	45.59	-1.76	31.33	2.50	72.63	20.17
37	SAGBEND	-58.55	-24.50	0.46	-0.907	20.025	140.79	45.05	-2.13	37.18	5.03	77.58	21.55
38	SAGBEND	-69.86	-28.49	0.62	-0.745	18.891	152.79	44.55	-2.47	38.22	5.10	78.22	21.73
39	SAGBEND	-81.25	-32.26	0.75	-0.588	17.736	164.79	44.07	-2.80	38.74	4.89	78.42	21.78
40	SAGBEND	-92.72	-35.80	0.86	-0.438	16.563	176.79	43.62	-3.11	39.21	4.68	78.59	21.83
41	SAGBEND	-104.25	-39.10	0.93	-0.296	15.378	188.79	43.20	-3.39	39.63	4.44	78.77	21.88
42	SAGBEND	-115.86	-42.17	0.98	-0.163	14.178	200.79	42.81	-3.66	40.10	4.17	78.93	21.92
43	SAGBEND	-127.52	-44.98	1.00	-0.039	12.965	212.79	42.45	-3.90	40.59	3.87	79.06	21.96
44	SAGBEND	-139.24	-47.55	0.99	0.074	11.740	224.79	42.13	-4.13	41.02	3.54	79.16	21.99
45	SAGBEND	-151.02	-49.87	0.97	0.175	10.503	236.79	41.84	-4.33	41.35	3.16	79.23	22.01
46	SAGBEND	-162.84	-51.92	0.92	0.265	9.255	248.79	41.57	-4.51	41.61	2.80	79.28	22.02
47	SAGBEND	-174.70	-53.72	0.86	0.345	8.000	260.79	41.35	-4.66	41.81	2.63	79.31	22.03
48	SAGBEND	-186.60	-55.26	0.78	0.424	6.738	272.79	41.15	-4.80	42.05	2.63	79.31	22.03
49	SAGBEND	-198.53	-56.54	0.68	0.502	5.470	284.79	40.99	-4.91	42.27	2.67	79.31	22.03
50	SAGBEND	-210.49	-57.55	0.57	0.580	4.197	296.79	40.87	-4.99	42.45	2.67	79.27	22.02
51	SAGBEND	-222.47	-58.29	0.44	0.657	2.920	308.79	40.77	-5.06	42.51	2.62	79.13	21.98
52	SAGBEND	-234.46	-58.77	0.30	0.727	1.652	320.79	40.71	-5.10	41.56	1.98	78.16	21.71
53	SAGBEND	-246.45	-58.99	0.14	0.721	0.493	332.79	40.69	-5.12	32.14	-5.41	70.42	19.56
54	SEABED	-258.45	-59.03	0.03	0.315	0.018	344.79	40.69	-5.12	4.33	-17.11	58.09	16.14
55	SEABED	-270.45	-59.03	0.00	0.017	-0.005	356.79	40.68	-5.12	-0.22	-3.13	45.92	12.76
56	SEABED	-282.45	-59.03	0.00	-0.003	0.000	368.79	40.68	-5.12	-0.05	0.11	43.56	12.10
57	SEABED	-294.45	-59.03	0.00	0.000	0.000	380.79	40.68	-5.12	0.00	0.03	43.50	12.08
58	SEABED	-306.45	-59.03	0.00	0.000	0.000	392.79	40.69	-5.12	0.00	0.00	43.47	12.08
59	SEABED	-318.45	-59.03	0.00	0.000	0.000	404.79	40.69	-5.12	0.00	0.00	43.47	12.08
60	SEABED	-330.45	-59.03	0.00	0.000	0.000	416.79	40.69	-5.12	0.00	0.00	43.47	12.08

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.269	0.00	49.08	0.00	0.00	0.00	49.08	13.63
3	LAYBARGE	71.49	6.16	0.00	0.000	0.959	6.30	49.06	0.00	-119.78	0.00	150.88	41.91
5	LAYBARGE	65.37	5.98	0.00	0.000	2.230	12.42	49.04	0.00	-86.59	0.00	122.65	34.07
7	LAYBARGE	59.91	5.72	0.00	0.000	3.281	17.89	49.00	0.00	-97.82	0.00	132.15	36.71
9	LAYBARGE	53.32	5.27	0.00	0.000	4.501	24.49	48.93	0.00	-94.25	0.00	129.05	35.85
11	LAYBARGE	47.32	4.74	0.00	0.000	5.738	30.51	48.85	0.00	-108.81	0.00	141.34	39.26
13	LAYBARGE	38.21	3.69	0.00	0.000	7.423	39.68	48.69	0.00	-124.49	0.00	154.50	42.92
15	LAYBARGE	29.27	2.39	0.00	0.000	9.099	48.72	48.49	0.00	-107.79	0.02	140.12	38.92
17	LAYBARGE	23.13	1.33	0.00	0.000	10.368	54.95	48.34	0.00	-96.11	-0.08	130.03	36.12
19	LAYBARGE	17.18	0.18	0.00	0.001	11.437	61.01	48.17	0.00	-80.70	0.34	116.67	32.41
21	LAYBARGE	10.63	-1.23	0.00	-0.013	13.043	67.72	47.97	-0.11	-153.61	-3.98	178.64	49.62
24	STINGER	-4.61	-5.09	0.00	0.014	15.308	83.44	47.48	-0.44	-127.84	-3.93	156.41	43.45
26	STINGER	-11.02	-6.94	0.00	-0.003	16.571	90.11	47.26	-0.60	-58.14	-0.21	96.95	26.93
28	STINGER	-17.40	-8.88	0.00	0.000	17.451	96.77	47.01	-0.77	-74.69	-1.26	110.90	30.81
30	STINGER	-23.74	-10.94	0.00	0.001	18.427	103.44	46.75	-0.95	-71.31	-1.00	107.55	29.88
32	STINGER	-30.05	-13.10	0.00	0.076	19.322	110.11	46.48	-1.14	-64.12	9.15	101.96	28.32
34	STINGER	-36.32	-15.36	0.00	-0.357	20.557	116.77	46.18	-1.33	-120.14	-67.48	163.60	45.44
36	SAGBEND	-47.51	-19.69	0.17	-1.037	21.136	128.77	45.65	-1.71	22.98	-1.47	65.61	18.22
37	SAGBEND	-58.73	-23.93	0.36	-0.944	20.171	140.77	45.11	-2.08	36.35	4.66	76.86	21.35
38	SAGBEND	-70.03	-27.96	0.54	-0.786	19.047	152.77	44.60	-2.43	38.07	5.06	78.13	21.70
39	SAGBEND	-81.41	-31.76	0.68	-0.629	17.894	164.77	44.12	-2.76	38.70	4.89	78.39	21.77
40	SAGBEND	-92.87	-35.34	0.79	-0.478	16.722	176.77	43.66	-3.07	39.16	4.67	78.57	21.82
41	SAGBEND	-104.40	-38.67	0.87	-0.335	15.539	188.77	43.24	-3.36	39.57	4.45	78.72	21.87
42	SAGBEND	-115.99	-41.76	0.92	-0.200	14.342	200.77	42.85	-3.62	40.04	4.19	78.87	21.91
43	SAGBEND	-127.65	-44.61	0.95	-0.075	13.132	212.77	42.49	-3.87	40.50	3.90	79.01	21.95
44	SAGBEND	-139.36	-47.21	0.95	0.039	11.909	224.77	42.16	-4.10	40.94	3.56	79.10	21.97
45	SAGBEND	-151.13	-49.56	0.93	0.143	10.673	236.77	41.86	-4.30	41.29	3.20	79.18	21.99
46	SAGBEND	-162.94	-51.66	0.90	0.234	9.429	248.77	41.59	-4.48	41.55	2.82	79.26	22.02
47	SAGBEND	-174.80	-53.49	0.84	0.316	8.175	260.77	41.36	-4.64	41.79	2.63	79.31	22.03
48	SAGBEND	-186.70	-55.07	0.76	0.394	6.915	272.77	41.16	-4.78	41.99	2.61	79.34	22.04
49	SAGBEND	-198.62	-56.38	0.67	0.473	5.647	284.77	41.00	-4.89	42.24	2.62	79.32	22.03
50	SAGBEND	-210.58	-57.43	0.57	0.551	4.371	296.77	40.87	-4.98	42.44	2.63	79.28	22.02
51	SAGBEND	-222.55	-58.21	0.44	0.628	3.094	308.77	40.77	-5.05	42.52	2.59	79.16	21.99
52	SAGBEND	-234.54	-58.73	0.30	0.700	1.820	320.77	40.70	-5.09	41.87	2.10	78.43	21.79
53	SAGBEND	-246.54	-58.98	0.15	0.713	0.627	332.77	40.67	-5.11	34.89	-3.37	72.64	20.18
54	SEABED	-258.54	-59.03	0.03	0.365	0.037	344.77	40.67	-5.12	6.41	-16.90	58.37	16.21
55	SEABED	-270.54	-59.03	0.00	0.027	-0.006	356.77	40.67	-5.12	-0.19	-4.11	46.75	12.99
56	SEABED	-282.54	-59.03	0.00	-0.003	-0.001	368.77	40.67	-5.12	-0.07	0.08	43.53	12.09
57	SEABED	-294.54	-59.03	0.00	0.000	0.000	380.77	40.67	-5.12	0.00	0.04	43.49	12.08
58	SEABED	-306.54	-59.03	0.00	0.000	0.000	392.77	40.67	-5.12	0.00	0.00	43.46	12.07
59	SEABED	-318.54	-59.03	0.00	0.000	0.000	404.77	40.67	-5.12	0.00	0.00	43.46	12.07
60	SEABED	-330.54	-59.03	0.00	0.000	0.000	416.77	40.67	-5.12	0.00	0.00	43.46	12.07


OFFPIPE 8 - V 3.02EX - Date: 1/11/20 - User: BAGAS ADIYAN PRASTOWO - Job: ANALISIS DINAMIS
Project: TUGAS AKHIR CLUSTER I PHE WMO 8.625 in
MAXIMUM DYNAMIC STRESS 0 DEG
PIPE Y COORDINATE - Meters
MAXIMUM TOTAL STRESS - M-Pascal
PIPE X COORDINATE - Meters


OFFPIPE 8 - V 3.02EX - Date: 1/11/20 - User: BAGAS ADIYAN PRASTOWO - Job: ANALISIS DINAMIS
Project: TUGAS AKHIR CLUSTER I PHE WMO 8.625 in
DYNAMIC STRESS AT STINGER TIP
DYNAMIC TOTAL STRESS - M-Pascal
TIME HISTORY - Seconds

Output Analisis Dinamis Heading 45°

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	-0.001	0.266	0.00	36.60	0.00	0.00	0.00	36.60	10.17
3	LAYBARGE	71.49	6.16	0.00	-0.001	0.959	6.30	36.58	0.00	-116.85	0.12	135.88	37.74
5	LAYBARGE	65.38	5.98	0.00	0.000	2.232	12.42	36.56	0.00	-84.19	0.09	108.11	30.03
7	LAYBARGE	59.91	5.72	0.00	0.000	3.279	17.89	36.52	0.00	-95.12	0.10	117.36	32.60
9	LAYBARGE	53.32	5.27	0.00	0.000	4.504	24.49	36.45	0.00	-91.62	0.10	114.32	31.76
11	LAYBARGE	47.32	4.74	0.00	0.000	5.732	30.51	36.37	0.00	-104.41	0.10	125.10	34.75
13	LAYBARGE	38.22	3.69	0.00	0.000	7.424	39.68	36.21	0.00	-118.06	-0.11	136.55	37.93
15	LAYBARGE	29.27	2.39	0.00	0.000	9.106	48.72	36.01	0.00	-103.50	0.12	123.98	34.44
17	LAYBARGE	23.13	1.33	0.00	-0.001	10.366	54.95	35.86	0.00	-93.04	-0.20	114.94	31.93
19	LAYBARGE	17.18	0.19	0.00	0.001	11.450	61.01	35.69	0.00	-81.16	0.49	104.61	29.06
21	LAYBARGE	10.63	-1.22	0.00	-0.016	12.983	67.72	35.49	-0.11	-135.21	-4.48	150.52	41.81
24	STINGER	-4.64	-5.13	0.00	0.018	16.018	83.47	34.98	-0.45	-184.20	-3.93	191.79	53.28
26	STINGER	-11.00	-7.10	0.00	-0.018	18.216	90.14	34.75	-0.62	-119.24	-2.85	136.35	37.87
28	STINGER	-17.30	-9.29	0.00	0.052	20.068	96.81	34.47	-0.81	-138.35	10.26	152.77	42.44
30	STINGER	-23.53	-11.68	0.00	-0.213	21.940	103.47	34.17	-1.01	-122.96	-46.82	145.04	40.29
32	STINGER	-29.68	-14.25	0.06	-0.856	23.155	110.14	33.86	-1.24	-52.50	-37.81	89.31	24.81
34	STINGER	-35.80	-16.89	0.17	-1.189	23.317	116.81	33.53	-1.47	18.54	-6.69	50.66	14.07
36	SAGBEND	-46.86	-21.54	0.40	-1.132	22.208	128.81	32.94	-1.87	45.96	5.87	73.20	20.33
37	SAGBEND	-58.02	-25.94	0.60	-0.922	20.732	140.81	32.39	-2.25	50.43	7.13	76.77	21.32
38	SAGBEND	-69.30	-30.03	0.76	-0.703	19.183	152.81	31.87	-2.61	51.90	7.01	77.68	21.58
39	SAGBEND	-80.69	-33.82	0.88	-0.492	17.597	164.81	31.39	-2.93	52.96	6.72	78.23	21.73
40	SAGBEND	-92.17	-37.28	0.96	-0.291	15.982	176.81	30.95	-3.23	53.90	6.41	78.71	21.86
41	SAGBEND	-103.76	-40.42	1.00	-0.101	14.341	188.81	30.55	-3.51	54.75	6.04	79.14	21.98
42	SAGBEND	-115.42	-43.23	1.00	0.078	12.675	200.81	30.20	-3.75	55.53	5.66	79.53	22.09
43	SAGBEND	-127.17	-45.69	0.97	0.243	10.986	212.81	29.89	-3.96	56.20	5.24	79.87	22.19
44	SAGBEND	-138.98	-47.80	0.90	0.394	9.278	224.81	29.62	-4.15	56.81	4.86	80.14	22.26
45	SAGBEND	-150.85	-49.55	0.81	0.534	7.554	236.81	29.40	-4.30	57.32	4.49	80.38	22.33
46	SAGBEND	-162.77	-50.95	0.68	0.662	5.816	248.81	29.23	-4.42	57.73	4.15	80.54	22.37
47	SAGBEND	-174.72	-51.99	0.53	0.779	4.070	260.81	29.10	-4.51	57.81	3.75	80.46	22.35
48	SAGBEND	-186.70	-52.66	0.36	0.875	2.338	272.81	29.01	-4.57	56.36	2.51	79.05	21.96
49	SAGBEND	-198.70	-52.97	0.17	0.869	0.755	284.81	28.97	-4.59	44.62	-5.52	69.41	19.28
50	SEABED	-210.69	-53.03	0.03	0.389	0.022	296.81	28.97	-4.60	6.66	-21.43	50.31	13.98
51	SEABED	-222.69	-53.03	0.00	0.012	-0.010	308.81	28.97	-4.60	-0.55	-3.53	34.45	9.57
52	SEABED	-234.69	-53.03	0.00	-0.005	0.000	320.81	28.97	-4.60	-0.08	0.28	31.76	8.82
53	SEABED	-246.69	-53.03	0.00	0.000	0.000	332.81	28.97	-4.60	0.01	0.04	31.55	8.77
54	SEABED	-258.69	-53.03	0.00	0.000	0.000	344.81	28.97	-4.60	0.00	0.00	31.52	8.76
55	SEABED	-270.69	-53.03	0.00	0.000	0.000	356.81	28.97	-4.60	0.00	0.00	31.52	8.76
56	SEABED	-282.69	-53.03	0.00	0.000	0.000	368.81	28.97	-4.60	0.00	0.00	31.52	8.76
57	SEABED	-294.69	-53.03	0.00	0.000	0.000	380.81	28.97	-4.60	0.00	0.00	31.52	8.76

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.266	0.00	36.62	0.00	0.00	0.00	36.62	10.17
3	LAYBARGE	71.49	6.16	0.00	0.000	0.958	6.30	36.60	0.00	-116.84	-0.13	135.91	37.75
5	LAYBARGE	65.37	5.98	0.00	0.000	2.232	12.42	36.58	0.00	-84.19	0.10	108.14	30.04
7	LAYBARGE	59.91	5.72	0.00	0.000	3.279	17.89	36.54	0.00	-95.13	0.11	117.39	32.61
9	LAYBARGE	53.32	5.27	0.00	0.000	4.504	24.49	36.47	0.00	-91.63	0.11	114.35	31.77
11	LAYBARGE	47.32	4.74	0.00	0.000	5.732	30.51	36.39	0.00	-104.42	0.11	125.14	34.76
13	LAYBARGE	38.21	3.69	0.00	0.000	7.423	39.68	36.23	0.00	-118.09	-0.12	136.61	37.95
15	LAYBARGE	29.27	2.39	0.00	0.000	9.105	48.72	36.03	0.00	-103.45	0.14	123.97	34.43
17	LAYBARGE	23.13	1.33	0.00	0.000	10.367	54.95	35.88	0.00	-93.36	-0.21	115.23	32.01
19	LAYBARGE	17.18	0.19	0.00	0.001	11.444	61.01	35.71	0.00	-79.95	0.47	103.61	28.78
21	LAYBARGE	10.63	-1.22	0.00	-0.015	13.004	67.72	35.51	-0.11	-139.99	-4.36	154.61	42.95
24	STINGER	-4.62	-5.11	0.00	0.014	15.563	83.45	35.02	-0.44	-139.70	-4.32	154.04	42.79
26	STINGER	-11.01	-6.99	0.00	-0.004	17.116	90.12	34.79	-0.61	-78.36	-0.23	101.69	28.25
28	STINGER	-17.37	-9.02	0.00	-0.001	18.317	96.78	34.53	-0.78	-92.51	-1.48	113.52	31.53
30	STINGER	-23.67	-11.19	0.00	0.003	19.624	103.45	34.26	-0.97	-92.80	0.91	113.62	31.56
32	STINGER	-29.93	-13.49	0.00	-0.018	20.826	110.12	33.97	-1.17	-80.48	-7.76	102.68	28.52
34	STINGER	-36.13	-15.93	0.02	-0.510	22.051	116.79	33.66	-1.38	-96.74	-59.56	130.73	36.31
36	SAGBEND	-47.22	-20.52	0.21	-1.143	22.347	128.79	33.09	-1.78	31.75	-1.40	60.82	16.89
37	SAGBEND	-58.36	-24.96	0.42	-1.021	21.055	140.79	32.52	-2.17	48.38	6.44	75.07	20.85
38	SAGBEND	-69.61	-29.13	0.60	-0.808	19.535	152.79	32.00	-2.53	51.45	7.03	77.42	21.50
39	SAGBEND	-80.98	-32.98	0.74	-0.597	17.959	164.79	31.51	-2.86	52.73	6.85	78.17	21.71
40	SAGBEND	-92.44	-36.52	0.84	-0.392	16.352	176.79	31.06	-3.17	53.71	6.54	78.67	21.85
41	SAGBEND	-104.00	-39.74	0.90	-0.200	14.716	188.79	30.65	-3.45	54.58	6.17	79.10	21.97
42	SAGBEND	-115.65	-42.62	0.92	-0.020	13.054	200.79	30.29	-3.70	55.37	5.78	79.47	22.07
43	SAGBEND	-127.38	-45.16	0.91	0.150	11.371	212.79	29.97	-3.92	56.07	5.37	79.81	22.17
44	SAGBEND	-139.18	-47.35	0.86	0.304	9.669	224.79	29.69	-4.11	56.68	4.98	80.11	22.25
45	SAGBEND	-151.04	-49.19	0.78	0.447	7.948	236.79	29.46	-4.27	57.21	4.60	80.37	22.32
46	SAGBEND	-162.94	-50.66	0.68	0.578	6.214	248.79	29.28	-4.39	57.64	4.26	80.54	22.37
47	SAGBEND	-174.89	-51.78	0.54	0.697	4.469	260.79	29.13	-4.49	57.87	3.91	80.54	22.37
48	SAGBEND	-186.86	-52.53	0.39	0.801	2.730	272.79	29.04	-4.56	57.03	3.14	79.67	22.13
49	SAGBEND	-198.86	-52.93	0.21	0.849	1.084	284.79	28.99	-4.59	49.59	-1.32	73.34	20.37
50	SEABED	-210.85	-53.03	0.05	0.549	0.082	296.79	28.98	-4.60	13.05	-19.95	51.28	14.25
51	SEABED	-222.85	-53.03	0.00	0.048	-0.013	308.79	28.98	-4.60	-0.46	-7.22	37.49	10.41
52	SEABED	-234.85	-53.03	0.00	-0.007	-0.001	320.79	28.98	-4.60	-0.16	0.23	31.75	8.82
53	SEABED	-246.85	-53.03	0.00	-0.001	0.000	332.79	28.98	-4.60	0.01	0.09	31.60	8.78
54	SEABED	-258.85	-53.03	0.00	0.000	0.000	344.79	28.98	-4.60	0.00	0.00	31.54	8.76
55	SEABED	-270.85	-53.03	0.00	0.000	0.000	356.79	28.98	-4.60	0.00	0.00	31.53	8.76
56	SEABED	-282.85	-53.03	0.00	0.000	0.000	368.79	28.98	-4.60	0.00	0.00	31.53	8.76
57	SEABED	-294.85	-53.03	0.00	0.000	0.000	380.79	28.98	-4.60	0.00	0.00	31.53	8.76

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.001	0.267	0.00	36.61	0.00	0.00	0.00	36.61	10.17
3	LAYBARGE	71.49	6.16	0.00	0.001	0.959	6.30	36.59	0.00	-116.84	-0.13	135.89	37.75
5	LAYBARGE	65.38	5.98	0.00	0.001	2.233	12.42	36.57	0.00	-84.19	-0.10	108.12	30.03
7	LAYBARGE	59.91	5.72	0.00	0.001	3.279	17.89	36.53	0.00	-95.12	-0.10	117.37	32.60
9	LAYBARGE	53.32	5.27	0.00	0.001	4.504	24.49	36.46	0.00	-91.62	-0.10	114.33	31.76
11	LAYBARGE	47.32	4.74	0.00	0.002	5.732	30.51	36.38	0.00	-104.40	0.11	125.11	34.75
13	LAYBARGE	38.22	3.69	0.00	0.001	7.424	39.68	36.21	0.00	-118.08	-0.12	136.57	37.94
15	LAYBARGE	29.27	2.39	0.00	0.001	9.106	48.72	36.02	0.00	-103.41	0.12	123.92	34.42
17	LAYBARGE	23.13	1.33	0.00	0.001	10.368	54.95	35.87	0.00	-93.49	-0.20	115.32	32.03
19	LAYBARGE	17.18	0.19	0.00	0.002	11.443	61.01	35.69	0.00	-79.35	0.45	103.10	28.64
21	LAYBARGE	10.63	-1.22	0.00	-0.014	13.015	67.72	35.50	-0.11	-142.27	-4.33	156.51	43.48
24	STINGER	-4.61	-5.09	0.00	0.013	15.339	83.44	35.01	-0.44	-117.53	-4.39	135.19	37.55
26	STINGER	-11.02	-6.94	0.00	0.000	16.566	90.11	34.79	-0.60	-57.19	0.65	83.70	23.25
28	STINGER	-17.40	-8.88	0.00	-0.014	17.456	96.77	34.54	-0.77	-72.67	-4.15	96.80	26.89
30	STINGER	-23.74	-10.94	0.00	0.057	18.417	103.44	34.28	-0.95	-66.72	11.89	91.98	25.55
32	STINGER	-30.05	-13.09	-0.01	0.092	19.233	110.11	34.01	-1.14	-53.98	-9.13	81.07	22.52
34	STINGER	-36.32	-15.36	0.00	-0.462	20.956	116.77	33.69	-1.33	-187.88	-65.94	202.86	56.35
36	SAGBEND	-47.43	-19.89	0.19	-1.160	22.391	128.77	33.16	-1.73	20.19	-2.17	51.22	14.23
37	SAGBEND	-58.56	-24.36	0.41	-1.046	21.248	140.77	32.59	-2.11	46.85	6.42	73.77	20.49
38	SAGBEND	-69.80	-28.56	0.59	-0.833	19.751	152.77	32.06	-2.48	51.15	7.12	77.15	21.43
39	SAGBEND	-81.15	-32.46	0.73	-0.621	18.182	164.77	31.57	-2.82	52.58	6.91	78.01	21.67
40	SAGBEND	-92.60	-36.05	0.84	-0.416	16.577	176.77	31.11	-3.13	53.57	6.61	78.54	21.82
41	SAGBEND	-104.14	-39.31	0.90	-0.221	14.946	188.77	30.70	-3.41	54.43	6.26	78.97	21.94
42	SAGBEND	-115.78	-42.24	0.93	-0.039	13.289	200.77	30.33	-3.66	55.22	5.86	79.37	22.05
43	SAGBEND	-127.50	-44.82	0.92	0.132	11.609	212.77	30.01	-3.89	55.97	5.43	79.75	22.15
44	SAGBEND	-139.29	-47.06	0.87	0.289	9.908	224.77	29.72	-4.08	56.62	5.04	80.07	22.24
45	SAGBEND	-151.14	-48.95	0.80	0.433	8.189	236.77	29.49	-4.25	57.19	4.67	80.32	22.31
46	SAGBEND	-163.04	-50.48	0.70	0.565	6.456	248.77	29.29	-4.38	57.65	4.31	80.51	22.36
47	SAGBEND	-174.98	-51.65	0.57	0.685	4.713	260.77	29.15	-4.48	57.88	3.97	80.57	22.38
48	SAGBEND	-186.95	-52.45	0.41	0.792	2.970	272.77	29.05	-4.55	57.29	3.33	79.94	22.20
49	SAGBEND	-198.94	-52.90	0.24	0.855	1.297	284.77	28.99	-4.59	51.63	-0.35	75.02	20.84
50	SEABED	-210.94	-53.03	0.07	0.630	0.144	296.77	28.98	-4.60	18.27	-18.12	52.78	14.66
51	SEABED	-222.94	-53.03	0.00	0.082	-0.015	308.77	28.98	-4.60	-0.19	-10.11	39.96	11.10
52	SEABED	-234.94	-53.03	0.00	-0.007	-0.002	320.77	28.98	-4.60	-0.23	0.07	31.72	8.81
53	SEABED	-246.94	-53.03	0.00	-0.001	0.000	332.77	28.98	-4.60	0.00	0.12	31.63	8.79
54	SEABED	-258.94	-53.03	0.00	0.000	0.000	344.77	28.98	-4.60	0.00	0.00	31.53	8.76
55	SEABED	-270.94	-53.03	0.00	0.000	0.000	356.77	28.98	-4.60	0.00	0.00	31.53	8.76
56	SEABED	-282.94	-53.03	0.00	0.000	0.000	368.77	28.98	-4.60	0.00	0.00	31.53	8.76
57	SEABED	-294.94	-53.03	0.00	0.000	0.000	380.77	28.98	-4.60	0.00	0.00	31.53	8.76

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	-0.002	0.270	0.00	48.82	0.00	0.00	0.00	48.82	13.56
3	LAYBARGE	71.49	6.16	0.00	-0.002	0.960	6.30	48.79	0.00	-119.67	0.13	150.51	41.81
5	LAYBARGE	65.37	5.98	0.00	-0.002	2.230	12.42	48.77	0.00	-86.52	0.10	122.31	33.98
7	LAYBARGE	59.91	5.72	0.00	-0.001	3.282	17.89	48.73	0.00	-97.73	0.11	131.80	36.61
9	LAYBARGE	53.32	5.27	0.00	-0.001	4.501	24.49	48.67	0.00	-94.17	0.10	128.71	35.75
11	LAYBARGE	47.32	4.74	0.00	-0.001	5.739	30.51	48.58	0.00	-108.68	0.11	140.96	39.16
13	LAYBARGE	38.21	3.69	0.00	-0.001	7.423	39.68	48.42	0.00	-124.29	0.12	154.06	42.80
15	LAYBARGE	29.27	2.39	0.00	-0.001	9.100	48.72	48.23	0.00	-107.73	0.12	139.80	38.83
17	LAYBARGE	23.13	1.33	0.00	-0.001	10.368	54.95	48.07	0.00	-95.73	-0.16	129.44	35.96
19	LAYBARGE	17.18	0.19	0.00	0.000	11.443	61.01	47.90	0.00	-81.96	0.32	117.52	32.64
21	LAYBARGE	10.63	-1.22	0.00	-0.011	13.021	67.72	47.70	-0.11	-148.14	-3.81	173.71	48.25
24	STINGER	-4.64	-5.13	0.00	-0.004	15.976	83.47	47.19	-0.45	-198.54	-6.89	216.22	60.06
26	STINGER	-11.00	-7.10	0.00	0.059	18.234	90.14	46.97	-0.62	-125.12	14.53	154.05	42.79
28	STINGER	-17.30	-9.29	0.00	-0.321	19.988	96.81	46.69	-0.81	-128.72	-65.12	169.07	46.96
30	STINGER	-23.54	-11.63	0.08	-0.981	21.002	103.47	46.41	-1.01	-24.30	-23.30	75.41	20.95
32	STINGER	-29.77	-14.03	0.20	-1.154	20.927	110.14	46.11	-1.22	21.91	-1.83	65.05	18.07
34	STINGER	-36.00	-16.38	0.32	-1.123	20.448	116.81	45.81	-1.42	32.96	3.90	74.66	20.74
36	SAGBEND	-47.28	-20.47	0.53	-0.968	19.370	128.81	45.29	-1.78	36.94	5.40	77.91	21.64
37	SAGBEND	-58.64	-24.34	0.71	-0.801	18.237	140.81	44.80	-2.11	37.80	5.36	78.29	21.75
38	SAGBEND	-70.07	-27.98	0.85	-0.637	17.086	152.81	44.34	-2.43	38.34	5.21	78.44	21.79
39	SAGBEND	-81.58	-31.39	0.96	-0.480	15.919	164.81	43.91	-2.72	38.83	5.00	78.56	21.82
40	SAGBEND	-93.15	-34.56	1.04	-0.330	14.739	176.81	43.51	-3.00	39.30	4.79	78.68	21.85
41	SAGBEND	-104.79	-37.50	1.10	-0.187	13.546	188.81	43.14	-3.25	39.73	4.60	78.78	21.88
42	SAGBEND	-116.48	-40.18	1.12	-0.049	12.340	200.81	42.80	-3.49	40.12	4.38	78.86	21.90
43	SAGBEND	-128.23	-42.62	1.12	0.080	11.123	212.81	42.49	-3.70	40.47	4.13	78.93	21.92
44	SAGBEND	-140.03	-44.81	1.09	0.202	9.896	224.81	42.21	-3.89	40.77	3.87	78.99	21.94
45	SAGBEND	-151.87	-46.75	1.03	0.316	8.659	236.81	41.97	-4.06	41.05	3.63	79.06	21.96
46	SAGBEND	-163.75	-48.42	0.96	0.422	7.414	248.81	41.76	-4.20	41.31	3.40	79.11	21.97
47	SAGBEND	-175.67	-49.84	0.86	0.520	6.162	260.81	41.58	-4.32	41.56	3.17	79.13	21.98
48	SAGBEND	-187.61	-51.00	0.74	0.611	4.905	272.81	41.43	-4.42	41.76	2.95	79.14	21.98
49	SAGBEND	-199.58	-51.89	0.60	0.696	3.643	284.81	41.32	-4.50	41.87	2.77	79.11	21.97
50	SAGBEND	-211.56	-52.53	0.45	0.775	2.381	296.81	41.24	-4.56	41.74	2.51	78.87	21.91
51	SAGBEND	-223.55	-52.89	0.28	0.835	1.145	308.81	41.20	-4.59	39.26	0.96	76.72	21.31
52	SEABED	-235.55	-53.02	0.11	0.723	0.186	320.81	41.18	-4.60	18.12	-12.46	61.88	17.19
53	SEABED	-247.55	-53.03	0.01	0.195	-0.004	332.81	41.18	-4.60	0.84	-15.30	56.54	15.70
54	SEABED	-259.55	-53.03	0.00	0.002	-0.002	344.81	41.18	-4.60	-0.16	-1.22	44.68	12.41
55	SEABED	-271.55	-53.03	0.00	-0.002	0.000	356.81	41.18	-4.60	-0.01	0.13	43.77	12.16
56	SEABED	-283.55	-53.03	0.00	0.000	0.000	368.81	41.18	-4.60	0.00	0.02	43.68	12.13
57	SEABED	-295.55	-53.03	0.00	0.000	0.000	380.81	41.18	-4.60	0.00	0.00	43.66	12.13
58	SEABED	-307.55	-53.03	0.00	0.000	0.000	392.81	41.18	-4.60	0.00	0.00	43.66	12.13
59	SEABED	-319.55	-53.03	0.00	0.000	0.000	404.81	41.18	-4.60	0.00	0.00	43.66	12.13

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.270	0.00	48.84	0.00	0.00	0.00	48.84	13.57
3	LAYBARGE	71.49	6.16	0.00	0.000	0.960	6.30	48.82	0.00	-119.68	0.13	150.55	41.82
5	LAYBARGE	65.38	5.99	0.00	0.000	2.230	12.42	48.80	0.00	-86.52	0.10	122.34	33.98
7	LAYBARGE	59.91	5.72	0.00	0.000	3.282	17.89	48.76	0.00	-97.74	0.11	131.84	36.62
9	LAYBARGE	53.32	5.27	0.00	0.000	4.502	24.49	48.69	0.00	-94.17	0.10	128.74	35.76
11	LAYBARGE	47.32	4.74	0.00	0.001	5.739	30.51	48.61	0.00	-108.69	0.11	140.99	39.16
13	LAYBARGE	38.22	3.69	0.00	0.001	7.424	39.68	48.45	0.00	-124.31	-0.12	154.11	42.81
15	LAYBARGE	29.27	2.39	0.00	0.002	9.100	48.72	48.25	0.00	-107.70	0.13	139.80	38.83
17	LAYBARGE	23.13	1.33	0.00	0.001	10.369	54.95	48.10	0.00	-95.93	-0.20	129.63	36.01
19	LAYBARGE	17.18	0.19	0.00	0.003	11.440	61.01	47.93	0.00	-81.11	0.44	116.84	32.46
21	LAYBARGE	10.63	-1.22	0.00	-0.012	13.037	67.72	47.73	-0.11	-151.55	-4.34	176.64	49.07
24	STINGER	-4.62	-5.11	0.00	0.018	15.532	83.45	47.23	-0.44	-151.29	-3.87	176.09	48.91
26	STINGER	-11.01	-6.99	0.00	-0.010	17.120	90.12	47.01	-0.61	-79.35	-2.47	114.77	31.88
28	STINGER	-17.37	-9.02	0.00	0.036	18.330	96.78	46.75	-0.78	-100.05	8.20	132.15	36.71
30	STINGER	-23.67	-11.18	0.00	-0.210	19.530	103.45	46.48	-0.97	-78.18	-40.93	121.14	33.65
32	STINGER	-29.94	-13.46	0.06	-0.778	20.314	110.12	46.20	-1.17	-43.57	-35.89	94.60	26.28
34	STINGER	-36.18	-15.79	0.16	-1.073	20.412	116.79	45.91	-1.37	17.10	-5.18	61.31	17.03
36	SAGBEND	-47.46	-19.90	0.37	-1.020	19.514	128.79	45.39	-1.73	35.37	4.65	76.52	21.26
37	SAGBEND	-58.80	-23.80	0.56	-0.861	18.400	140.79	44.89	-2.07	37.57	5.34	78.18	21.72
38	SAGBEND	-70.23	-27.47	0.71	-0.697	17.252	152.79	44.43	-2.38	38.25	5.24	78.43	21.79
39	SAGBEND	-81.72	-30.91	0.84	-0.539	16.088	164.79	43.99	-2.68	38.76	5.06	78.58	21.83
40	SAGBEND	-93.28	-34.12	0.93	-0.388	14.910	176.79	43.58	-2.96	39.23	4.86	78.71	21.86
41	SAGBEND	-104.91	-37.09	0.99	-0.243	13.719	188.79	43.21	-3.22	39.67	4.66	78.81	21.89
42	SAGBEND	-116.60	-39.81	1.03	-0.105	12.515	200.79	42.86	-3.45	40.07	4.42	78.91	21.92
43	SAGBEND	-128.34	-42.29	1.04	0.026	11.300	212.79	42.55	-3.67	40.44	4.18	79.00	21.94
44	SAGBEND	-140.13	-44.51	1.02	0.149	10.074	224.79	42.27	-3.86	40.77	3.92	79.08	21.97
45	SAGBEND	-151.97	-46.48	0.98	0.264	8.839	236.79	42.02	-4.03	41.04	3.67	79.13	21.98
46	SAGBEND	-163.84	-48.20	0.91	0.371	7.595	248.79	41.80	-4.18	41.29	3.44	79.16	21.99
47	SAGBEND	-175.76	-49.65	0.82	0.471	6.344	260.79	41.62	-4.31	41.52	3.22	79.17	21.99
48	SAGBEND	-187.69	-50.85	0.72	0.563	5.087	272.79	41.47	-4.41	41.71	3.01	79.16	21.99
49	SAGBEND	-199.66	-51.78	0.59	0.649	3.826	284.79	41.35	-4.49	41.86	2.83	79.13	21.98
50	SAGBEND	-211.64	-52.45	0.44	0.728	2.562	296.79	41.27	-4.55	41.79	2.60	78.94	21.93
51	SAGBEND	-223.63	-52.86	0.28	0.793	1.316	308.79	41.22	-4.58	40.04	1.41	77.37	21.49
52	SEABED	-235.63	-53.01	0.12	0.728	0.273	320.79	41.20	-4.60	23.24	-9.84	64.59	17.94
53	SEABED	-247.63	-53.03	0.02	0.229	0.000	332.79	41.20	-4.60	1.65	-16.49	57.49	15.97
54	SEABED	-259.63	-53.03	0.00	0.005	-0.003	344.79	41.20	-4.60	-0.19	-1.73	45.08	12.52
55	SEABED	-271.63	-53.03	0.00	-0.002	0.000	356.79	41.20	-4.60	-0.02	0.13	43.79	12.16
56	SEABED	-283.63	-53.03	0.00	0.000	0.000	368.79	41.20	-4.60	0.00	0.02	43.70	12.14
57	SEABED	-295.63	-53.03	0.00	0.000	0.000	380.79	41.20	-4.60	0.00	0.00	43.68	12.13
58	SEABED	-307.63	-53.03	0.00	0.000	0.000	392.79	41.20	-4.60	0.00	0.00	43.68	12.13
59	SEABED	-319.63	-53.03	0.00	0.000	0.000	404.79	41.20	-4.60	0.00	0.00	43.68	12.13

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.270	0.00	48.82	0.00	0.00	0.00	48.82	13.56
3	LAYBARGE	71.49	6.16	0.00	0.001	0.959	6.30	48.80	0.00	-119.67	0.13	150.51	41.81
5	LAYBARGE	65.38	5.98	0.00	0.001	2.230	12.42	48.78	0.00	-86.51	0.10	122.31	33.98
7	LAYBARGE	59.91	5.72	0.00	0.000	3.281	17.89	48.74	0.00	-97.73	0.11	131.80	36.61
9	LAYBARGE	53.32	5.27	0.00	0.000	4.501	24.49	48.67	0.00	-94.17	0.11	128.71	35.75
11	LAYBARGE	47.32	4.74	0.00	0.000	5.738	30.51	48.59	0.00	-108.67	0.11	140.96	39.15
13	LAYBARGE	38.22	3.69	0.00	0.000	7.423	39.68	48.43	0.00	-124.29	-0.12	154.07	42.80
15	LAYBARGE	29.27	2.39	0.00	0.000	9.099	48.72	48.23	0.00	-107.67	0.14	139.75	38.82
17	LAYBARGE	23.13	1.33	0.00	-0.001	10.369	54.95	48.08	0.00	-96.02	-0.20	129.69	36.03
19	LAYBARGE	17.18	0.19	0.00	0.001	11.438	61.01	47.91	0.00	-80.66	0.42	116.45	32.35
21	LAYBARGE	10.63	-1.22	0.00	-0.014	13.044	67.72	47.70	-0.11	-153.29	-4.25	178.09	49.47
24	STINGER	-4.61	-5.09	0.00	0.013	15.308	83.44	47.22	-0.44	-127.52	-4.23	155.88	43.30
26	STINGER	-11.02	-6.94	0.00	-0.004	16.571	90.11	47.00	-0.60	-58.15	-0.19	96.67	26.85
28	STINGER	-17.40	-8.88	0.00	-0.003	17.452	96.77	46.75	-0.77	-74.90	-2.22	110.76	30.77
30	STINGER	-23.74	-10.94	0.00	0.009	18.427	103.44	46.50	-0.95	-72.36	3.50	108.23	30.06
32	STINGER	-30.05	-13.09	0.01	-0.224	19.268	110.11	46.22	-1.14	-56.43	-33.97	102.13	28.37
34	STINGER	-36.33	-15.33	0.06	-0.735	19.873	116.77	45.94	-1.33	-40.90	-35.95	92.74	25.76
36	SAGBEND	-47.61	-19.41	0.25	-1.031	19.588	128.77	45.43	-1.68	30.28	1.93	71.88	19.97
37	SAGBEND	-58.95	-23.33	0.44	-0.904	18.534	140.77	44.93	-2.02	37.04	5.15	77.71	21.59
38	SAGBEND	-70.36	-27.04	0.61	-0.743	17.393	152.77	44.46	-2.35	38.14	5.28	78.38	21.77
39	SAGBEND	-81.85	-30.51	0.74	-0.585	16.232	164.77	44.03	-2.65	38.70	5.10	78.55	21.82
40	SAGBEND	-93.40	-33.74	0.84	-0.433	15.055	176.77	43.62	-2.93	39.18	4.91	78.66	21.85
41	SAGBEND	-105.02	-36.74	0.92	-0.287	13.865	188.77	43.24	-3.19	39.61	4.70	78.76	21.88
42	SAGBEND	-116.70	-39.49	0.96	-0.149	12.662	200.77	42.89	-3.43	40.03	4.48	78.85	21.90
43	SAGBEND	-128.44	-42.00	0.98	-0.017	11.448	212.77	42.57	-3.64	40.40	4.24	78.93	21.93
44	SAGBEND	-140.22	-44.25	0.97	0.108	10.224	224.77	42.29	-3.84	40.72	3.98	79.00	21.94
45	SAGBEND	-152.05	-46.26	0.94	0.223	8.990	236.77	42.04	-4.01	41.01	3.71	79.04	21.96
46	SAGBEND	-163.93	-48.00	0.88	0.331	7.748	248.77	41.82	-4.16	41.26	3.48	79.09	21.97
47	SAGBEND	-175.83	-49.49	0.80	0.431	6.497	260.77	41.63	-4.29	41.49	3.24	79.11	21.97
48	SAGBEND	-187.77	-50.72	0.70	0.524	5.241	272.77	41.47	-4.40	41.68	3.02	79.12	21.98
49	SAGBEND	-199.73	-51.68	0.58	0.610	3.980	284.77	41.35	-4.48	41.83	2.84	79.11	21.98
50	SAGBEND	-211.71	-52.38	0.44	0.691	2.717	296.77	41.26	-4.54	41.81	2.63	78.98	21.94
51	SAGBEND	-223.70	-52.82	0.29	0.759	1.466	308.77	41.21	-4.58	40.52	1.70	77.79	21.61
52	SEABED	-235.70	-53.01	0.13	0.729	0.367	320.77	41.19	-4.60	27.58	-7.21	67.51	18.75
53	SEABED	-247.70	-53.03	0.02	0.276	0.007	332.77	41.19	-4.60	2.65	-16.42	57.60	16.00
54	SEABED	-259.70	-53.03	0.00	0.012	-0.004	344.77	41.19	-4.60	-0.21	-2.44	45.67	12.69
55	SEABED	-271.70	-53.03	0.00	-0.002	0.000	356.77	41.19	-4.60	-0.03	0.11	43.76	12.16
56	SEABED	-283.70	-53.03	0.00	0.000	0.000	368.77	41.19	-4.60	0.00	0.03	43.69	12.14
57	SEABED	-295.70	-53.03	0.00	0.000	0.000	380.77	41.19	-4.60	0.00	0.00	43.67	12.13
58	SEABED	-307.70	-53.03	0.00	0.000	0.000	392.77	41.19	-4.60	0.00	0.00	43.67	12.13
59	SEABED	-319.70	-53.03	0.00	0.000	0.000	404.77	41.19	-4.60	0.00	0.00	43.67	12.13

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.001	0.267	0.00	36.61	0.00	0.00	0.00	36.61	10.17
3	LAYBARGE	71.49	6.16	0.00	0.001	0.959	6.30	36.59	0.00	-116.84	0.13	135.90	37.75
5	LAYBARGE	65.37	5.99	0.00	0.001	2.233	12.42	36.57	0.00	-84.19	0.10	108.13	30.04
7	LAYBARGE	59.91	5.72	0.00	0.001	3.280	17.89	36.53	0.00	-95.12	0.11	117.38	32.61
9	LAYBARGE	53.32	5.27	0.00	0.000	4.505	24.49	36.46	0.00	-91.62	-0.11	114.34	31.76
11	LAYBARGE	47.32	4.74	0.00	0.000	5.733	30.51	36.38	0.00	-104.42	0.11	125.13	34.76
13	LAYBARGE	38.21	3.69	0.00	-0.001	7.424	39.68	36.22	0.00	-118.07	-0.12	136.57	37.94
15	LAYBARGE	29.27	2.39	0.00	-0.001	9.107	48.72	36.02	0.00	-103.51	0.13	124.00	34.45
17	LAYBARGE	23.13	1.33	0.00	-0.001	10.366	54.95	35.87	0.00	-93.05	-0.21	114.95	31.93
19	LAYBARGE	17.18	0.19	0.00	0.001	11.451	61.01	35.70	0.00	-81.16	0.48	104.62	29.06
21	LAYBARGE	10.63	-1.22	0.00	-0.016	12.983	67.72	35.50	-0.11	-135.22	-4.43	150.54	41.82
24	STINGER	-4.64	-5.13	0.00	0.015	16.019	83.47	34.99	-0.45	-184.17	-4.24	191.79	53.28
26	STINGER	-11.00	-7.10	0.00	-0.009	18.217	90.14	34.76	-0.62	-119.40	-1.26	136.47	37.91
28	STINGER	-17.30	-9.29	0.00	0.020	20.065	96.81	34.48	-0.81	-137.73	3.68	151.98	42.22
30	STINGER	-23.53	-11.68	0.00	-0.081	21.953	103.47	34.18	-1.01	-125.86	-19.90	142.17	39.49
32	STINGER	-29.67	-14.26	0.03	-0.635	23.509	110.14	33.86	-1.24	-95.05	-53.92	127.25	35.35
34	STINGER	-35.77	-16.96	0.13	-1.145	24.095	116.81	33.53	-1.47	5.11	-11.80	44.84	12.46
36	SAGBEND	-46.75	-21.79	0.36	-1.156	23.158	128.81	32.92	-1.89	44.00	5.27	71.45	19.85
37	SAGBEND	-57.84	-26.37	0.57	-0.954	21.712	140.81	32.34	-2.29	49.93	7.01	76.32	21.20
38	SAGBEND	-69.05	-30.66	0.73	-0.735	20.172	152.81	31.80	-2.66	51.63	6.99	77.42	21.50
39	SAGBEND	-80.36	-34.65	0.85	-0.524	18.594	164.81	31.29	-3.01	52.76	6.67	78.02	21.67
40	SAGBEND	-91.79	-38.31	0.94	-0.325	16.984	176.81	30.83	-3.32	53.75	6.31	78.53	21.81
41	SAGBEND	-103.31	-41.65	0.99	-0.137	15.346	188.81	30.41	-3.61	54.66	5.92	78.99	21.94
42	SAGBEND	-114.93	-44.66	1.00	0.036	13.683	200.81	30.03	-3.87	55.48	5.43	79.40	22.06
43	SAGBEND	-126.63	-47.33	0.97	0.194	11.994	212.81	29.69	-4.11	56.22	4.95	79.76	22.16
44	SAGBEND	-138.40	-49.65	0.92	0.336	10.284	224.81	29.40	-4.31	56.90	4.45	80.08	22.24
45	SAGBEND	-150.24	-51.61	0.83	0.463	8.555	236.81	29.15	-4.48	57.47	4.02	80.36	22.32
46	SAGBEND	-162.13	-53.22	0.73	0.577	6.812	248.81	28.95	-4.62	57.97	3.76	80.58	22.38
47	SAGBEND	-174.07	-54.46	0.59	0.685	5.057	260.81	28.79	-4.72	58.27	3.65	80.68	22.41
48	SAGBEND	-186.03	-55.33	0.44	0.789	3.299	272.81	28.68	-4.80	57.96	3.30	80.28	22.30
49	SAGBEND	-198.02	-55.84	0.27	0.862	1.589	284.81	28.62	-4.84	53.92	0.93	76.72	21.31
50	SEABED	-210.02	-56.02	0.09	0.715	0.260	296.81	28.60	-4.86	26.31	-15.07	56.51	15.70
51	SEABED	-222.02	-56.03	0.01	0.134	-0.014	308.81	28.60	-4.86	0.73	-13.52	42.58	11.83
52	SEABED	-234.02	-56.03	0.00	-0.007	-0.003	320.81	28.60	-4.86	-0.33	-0.36	31.67	8.80
53	SEABED	-246.02	-56.03	0.00	-0.002	0.000	332.81	28.60	-4.86	-0.01	0.17	31.44	8.73
54	SEABED	-258.02	-56.03	0.00	0.000	0.000	344.81	28.60	-4.86	0.00	0.00	31.31	8.70
55	SEABED	-270.02	-56.03	0.00	0.000	0.000	356.81	28.60	-4.86	0.00	0.00	31.31	8.70
56	SEABED	-282.02	-56.03	0.00	0.000	0.000	368.81	28.60	-4.86	0.00	0.00	31.31	8.70
57	SEABED	-294.02	-56.03	0.00	0.000	0.000	380.81	28.60	-4.86	0.00	0.00	31.31	8.70

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	-0.001	0.266	0.00	36.63	0.00	0.00	0.00	36.63	10.17
3	LAYBARGE	71.49	6.16	0.00	-0.001	0.958	6.30	36.61	0.00	-116.85	0.14	135.91	37.75
5	LAYBARGE	65.37	5.98	0.00	-0.001	2.232	12.42	36.59	0.00	-84.19	0.10	108.14	30.04
7	LAYBARGE	59.91	5.72	0.00	-0.001	3.278	17.89	36.55	0.00	-95.13	0.11	117.39	32.61
9	LAYBARGE	53.32	5.27	0.00	0.000	4.503	24.49	36.48	0.00	-91.63	0.11	114.36	31.77
11	LAYBARGE	47.32	4.74	0.00	0.000	5.731	30.51	36.39	0.00	-104.42	0.12	125.14	34.76
13	LAYBARGE	38.21	3.69	0.00	0.000	7.423	39.68	36.23	0.00	-118.09	0.12	136.60	37.94
15	LAYBARGE	29.27	2.39	0.00	0.000	9.105	48.72	36.04	0.00	-103.45	0.14	123.97	34.44
17	LAYBARGE	23.13	1.33	0.00	-0.001	10.366	54.95	35.88	0.00	-93.34	-0.20	115.21	32.00
19	LAYBARGE	17.18	0.18	0.00	0.001	11.444	61.01	35.71	0.00	-79.96	0.47	103.63	28.79
21	LAYBARGE	10.63	-1.23	0.00	-0.014	13.004	67.72	35.52	-0.11	-139.94	-4.37	154.56	42.93
24	STINGER	-4.62	-5.11	0.00	0.015	15.563	83.45	35.02	-0.44	-139.65	-4.33	153.99	42.78
26	STINGER	-11.01	-6.99	0.00	-0.003	17.115	90.12	34.80	-0.61	-78.15	-0.20	101.52	28.20
28	STINGER	-17.37	-9.02	0.00	-0.001	18.320	96.78	34.54	-0.78	-93.33	-1.52	114.27	31.74
30	STINGER	-23.67	-11.19	0.00	0.006	19.610	103.45	34.27	-0.97	-89.69	1.29	110.71	30.75
32	STINGER	-29.93	-13.49	0.00	0.086	20.820	110.12	33.98	-1.17	-83.19	7.88	105.50	29.31
34	STINGER	-36.13	-15.94	0.00	-0.378	22.408	116.79	33.65	-1.38	-140.60	-70.27	167.17	46.44
36	SAGBEND	-47.15	-20.67	0.18	-1.144	23.259	128.79	33.08	-1.79	25.92	-2.78	56.04	15.57
37	SAGBEND	-58.22	-25.30	0.39	-1.039	22.047	140.79	32.49	-2.20	47.42	6.35	74.14	20.60
38	SAGBEND	-69.40	-29.66	0.58	-0.828	20.544	152.79	31.94	-2.57	51.12	7.09	76.99	21.39
39	SAGBEND	-80.69	-33.72	0.72	-0.615	18.976	164.79	31.42	-2.93	52.50	6.83	77.83	21.62
40	SAGBEND	-92.09	-37.46	0.82	-0.414	17.374	176.79	30.95	-3.25	53.52	6.52	78.39	21.78
41	SAGBEND	-103.60	-40.88	0.88	-0.222	15.743	188.79	30.52	-3.55	54.44	6.09	78.89	21.91
42	SAGBEND	-115.19	-43.97	0.91	-0.047	14.085	200.79	30.13	-3.82	55.31	5.62	79.32	22.03
43	SAGBEND	-126.87	-46.72	0.90	0.114	12.402	212.79	29.78	-4.05	56.08	5.12	79.70	22.14
44	SAGBEND	-138.63	-49.12	0.86	0.261	10.698	224.79	29.48	-4.26	56.75	4.62	80.01	22.22
45	SAGBEND	-150.45	-51.17	0.80	0.390	8.973	236.79	29.22	-4.44	57.39	4.17	80.32	22.31
46	SAGBEND	-162.33	-52.86	0.70	0.507	7.234	248.79	29.01	-4.59	57.92	3.85	80.56	22.38
47	SAGBEND	-174.25	-54.19	0.59	0.617	5.480	260.79	28.84	-4.70	58.26	3.71	80.71	22.42
48	SAGBEND	-186.21	-55.15	0.45	0.722	3.721	272.79	28.72	-4.78	58.17	3.48	80.52	22.37
49	SAGBEND	-198.20	-55.75	0.29	0.807	1.988	284.79	28.64	-4.83	55.72	1.94	78.26	21.74
50	SEABED	-210.19	-56.00	0.12	0.751	0.490	296.79	28.61	-4.86	37.74	-9.50	63.94	17.76
51	SEABED	-222.19	-56.03	0.01	0.210	-0.004	308.79	28.61	-4.86	3.04	-17.63	46.26	12.85
52	SEABED	-234.19	-56.03	0.00	-0.005	-0.006	320.79	28.61	-4.86	-0.48	-1.06	32.25	8.96
53	SEABED	-246.19	-56.03	0.00	-0.003	0.000	332.79	28.61	-4.86	-0.04	0.22	31.51	8.75
54	SEABED	-258.19	-56.03	0.00	0.000	0.000	344.79	28.61	-4.86	0.01	0.01	31.33	8.70
55	SEABED	-270.19	-56.03	0.00	0.000	0.000	356.79	28.61	-4.86	0.00	0.00	31.33	8.70
56	SEABED	-282.19	-56.03	0.00	0.000	0.000	368.79	28.61	-4.86	0.00	0.00	31.32	8.70
57	SEABED	-294.19	-56.03	0.00	0.000	0.000	380.79	28.61	-4.86	0.00	0.00	31.32	8.70

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.001	0.266	0.00	36.61	0.00	0.00	0.00	36.61	10.17
3	LAYBARGE	71.49	6.16	0.00	0.001	0.958	6.30	36.58	0.00	-116.84	0.12	135.89	37.75
5	LAYBARGE	65.37	5.98	0.00	0.001	2.232	12.42	36.57	0.00	-84.19	0.09	108.12	30.03
7	LAYBARGE	59.91	5.72	0.00	0.001	3.279	17.89	36.52	0.00	-95.12	0.10	117.37	32.60
9	LAYBARGE	53.32	5.27	0.00	0.001	4.504	24.49	36.46	0.00	-91.62	0.09	114.33	31.76
11	LAYBARGE	47.32	4.74	0.00	0.000	5.732	30.51	36.37	0.00	-104.41	0.10	125.11	34.75
13	LAYBARGE	38.21	3.69	0.00	0.000	7.424	39.68	36.21	0.00	-118.08	-0.11	136.58	37.94
15	LAYBARGE	29.27	2.39	0.00	0.000	9.105	48.72	36.02	0.00	-103.41	0.12	123.92	34.42
17	LAYBARGE	23.13	1.33	0.00	-0.001	10.367	54.95	35.86	0.00	-93.48	-0.19	115.32	32.03
19	LAYBARGE	17.18	0.19	0.00	0.001	11.442	61.01	35.69	0.00	-79.35	0.46	103.09	28.64
21	LAYBARGE	10.63	-1.22	0.00	-0.015	13.015	67.72	35.49	-0.11	-142.26	-4.32	156.51	43.48
24	STINGER	-4.61	-5.09	0.00	0.013	15.339	83.44	35.01	-0.44	-117.63	-4.40	135.28	37.58
26	STINGER	-11.02	-6.94	0.00	0.000	16.563	90.11	34.79	-0.60	-56.65	0.74	83.23	23.12
28	STINGER	-17.40	-8.88	0.00	-0.015	17.467	96.77	34.54	-0.77	-74.98	-4.49	98.75	27.43
30	STINGER	-23.74	-10.94	0.00	0.063	18.372	103.44	34.28	-0.95	-57.17	13.28	84.46	23.46
32	STINGER	-30.05	-13.08	-0.01	0.093	19.166	110.11	34.01	-1.14	-60.15	-11.07	86.33	23.98
34	STINGER	-36.32	-15.36	0.00	-0.471	21.285	116.77	33.67	-1.33	-233.50	-65.66	239.94	66.65
36	SAGBEND	-47.37	-20.02	0.19	-1.170	23.297	128.77	33.14	-1.74	14.07	-2.11	46.06	12.79
37	SAGBEND	-58.43	-24.68	0.41	-1.054	22.233	140.77	32.55	-2.14	45.81	6.44	72.87	20.24
38	SAGBEND	-69.59	-29.08	0.59	-0.843	20.753	152.77	31.99	-2.52	50.81	7.08	76.81	21.33
39	SAGBEND	-80.87	-33.18	0.74	-0.628	19.193	164.77	31.47	-2.88	52.35	6.87	77.77	21.60
40	SAGBEND	-92.25	-36.97	0.84	-0.427	17.595	176.77	30.99	-3.21	53.40	6.53	78.33	21.76
41	SAGBEND	-103.74	-40.43	0.91	-0.234	15.968	188.77	30.56	-3.51	54.33	6.14	78.79	21.89
42	SAGBEND	-115.32	-43.57	0.94	-0.056	14.313	200.77	30.16	-3.78	55.17	5.69	79.22	22.00
43	SAGBEND	-126.99	-46.36	0.93	0.107	12.634	212.77	29.81	-4.02	55.96	5.17	79.62	22.12
44	SAGBEND	-138.74	-48.81	0.89	0.256	10.932	224.77	29.50	-4.23	56.68	4.65	79.97	22.21
45	SAGBEND	-150.55	-50.91	0.83	0.388	9.211	236.77	29.23	-4.42	57.32	4.20	80.29	22.30
46	SAGBEND	-162.43	-52.65	0.74	0.505	7.472	248.77	29.01	-4.57	57.85	3.86	80.54	22.37
47	SAGBEND	-174.35	-54.03	0.62	0.614	5.720	260.77	28.84	-4.69	58.23	3.72	80.70	22.42
48	SAGBEND	-186.30	-55.04	0.48	0.720	3.961	272.77	28.71	-4.77	58.26	3.55	80.58	22.38
49	SAGBEND	-198.28	-55.69	0.32	0.812	2.220	284.77	28.63	-4.83	56.46	2.40	78.89	21.91
50	SAGBEND	-210.28	-55.98	0.15	0.797	0.657	296.77	28.60	-4.85	42.73	-6.40	67.61	18.78
51	SEABED	-222.28	-56.03	0.02	0.308	0.010	308.77	28.59	-4.86	5.19	-19.61	48.25	13.40
52	SEABED	-234.28	-56.03	0.00	0.005	-0.008	320.77	28.59	-4.86	-0.55	-2.44	33.33	9.26
53	SEABED	-246.28	-56.03	0.00	-0.004	0.000	332.77	28.59	-4.86	-0.06	0.26	31.52	8.76
54	SEABED	-258.28	-56.03	0.00	0.000	0.000	344.77	28.59	-4.86	0.01	0.03	31.33	8.70
55	SEABED	-270.28	-56.03	0.00	0.000	0.000	356.77	28.59	-4.86	0.00	0.00	31.31	8.70
56	SEABED	-282.28	-56.03	0.00	0.000	0.000	368.77	28.59	-4.86	0.00	0.00	31.31	8.70
57	SEABED	-294.28	-56.03	0.00	0.000	0.000	380.77	28.59	-4.86	0.00	0.00	31.31	8.70
58	SEABED	-306.28	-56.03	0.00	0.000	0.000	392.77	28.59	-4.86	0.00	0.00	31.31	8.70

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.270	0.00	48.83	0.00	0.00	0.00	48.83	13.56
3	LAYBARGE	71.49	6.16	0.00	0.000	0.960	6.30	48.81	0.00	-119.69	0.15	150.52	41.81
5	LAYBARGE	65.37	5.99	0.00	0.000	2.231	12.42	48.79	0.00	-86.52	0.11	122.32	33.98
7	LAYBARGE	59.91	5.72	0.00	0.000	3.282	17.89	48.75	0.00	-97.74	0.12	131.81	36.61
9	LAYBARGE	53.32	5.27	0.00	0.000	4.502	24.49	48.68	0.00	-94.17	0.12	128.72	35.75
11	LAYBARGE	47.32	4.74	0.00	0.000	5.739	30.51	48.60	0.00	-108.69	0.13	140.97	39.16
13	LAYBARGE	38.21	3.69	0.00	0.000	7.424	39.68	48.43	0.00	-124.30	0.13	154.07	42.80
15	LAYBARGE	29.27	2.39	0.00	0.000	9.101	48.72	48.24	0.00	-107.74	0.15	139.81	38.84
17	LAYBARGE	23.13	1.33	0.00	0.000	10.368	54.95	48.09	0.00	-95.73	-0.18	129.44	35.96
19	LAYBARGE	17.18	0.19	0.00	0.001	11.444	61.01	47.91	0.00	-81.96	0.37	117.53	32.65
21	LAYBARGE	10.63	-1.23	0.00	-0.012	13.021	67.72	47.72	-0.11	-148.16	-4.02	173.74	48.26
24	STINGER	-4.64	-5.13	0.00	0.001	15.976	83.47	47.20	-0.45	-198.24	-6.00	216.00	60.00
26	STINGER	-11.00	-7.10	0.00	0.042	18.237	90.14	46.98	-0.62	-125.08	9.74	153.90	42.75
28	STINGER	-17.30	-9.29	0.00	-0.187	20.012	96.81	46.70	-0.81	-131.86	-43.09	163.59	45.44
30	STINGER	-23.54	-11.65	0.05	-0.786	21.322	103.47	46.42	-1.01	-63.10	-39.86	110.34	30.65
32	STINGER	-29.74	-14.10	0.16	-1.116	21.599	110.14	46.11	-1.22	11.96	-6.04	57.66	16.02
34	STINGER	-35.94	-16.54	0.28	-1.126	21.212	116.81	45.80	-1.44	30.28	2.87	72.27	20.07
36	SAGBEND	-47.17	-20.78	0.49	-0.983	20.167	128.81	45.27	-1.80	36.54	5.31	77.52	21.53
37	SAGBEND	-58.47	-24.80	0.67	-0.816	19.042	140.81	44.76	-2.15	37.63	5.36	78.10	21.69
38	SAGBEND	-69.85	-28.61	0.81	-0.652	17.895	152.81	44.27	-2.48	38.22	5.20	78.27	21.74
39	SAGBEND	-81.30	-32.18	0.93	-0.496	16.732	164.81	43.82	-2.79	38.74	4.97	78.40	21.78
40	SAGBEND	-92.83	-35.51	1.01	-0.347	15.555	176.81	43.40	-3.08	39.21	4.76	78.53	21.81
41	SAGBEND	-104.42	-38.61	1.07	-0.204	14.363	188.81	43.01	-3.35	39.66	4.53	78.64	21.84
42	SAGBEND	-116.08	-41.47	1.10	-0.070	13.159	200.81	42.65	-3.60	40.08	4.27	78.74	21.87
43	SAGBEND	-127.79	-44.07	1.10	0.056	11.944	212.81	42.32	-3.82	40.45	3.97	78.82	21.89
44	SAGBEND	-139.56	-46.43	1.07	0.173	10.716	224.81	42.02	-4.03	40.79	3.66	78.88	21.91
45	SAGBEND	-151.37	-48.54	1.03	0.279	9.479	236.81	41.75	-4.21	41.10	3.37	78.96	21.93
46	SAGBEND	-163.23	-50.38	0.96	0.376	8.232	248.81	41.52	-4.37	41.39	3.07	79.01	21.95
47	SAGBEND	-175.12	-51.97	0.87	0.463	6.978	260.81	41.32	-4.51	41.65	2.80	79.05	21.96
48	SAGBEND	-187.05	-53.30	0.77	0.543	5.717	272.81	41.15	-4.62	41.86	2.66	79.08	21.97
49	SAGBEND	-199.00	-54.36	0.65	0.621	4.451	284.81	41.02	-4.72	42.03	2.64	79.09	21.97
50	SAGBEND	-210.97	-55.16	0.51	0.699	3.181	296.81	40.92	-4.78	42.10	2.59	79.03	21.95
51	SAGBEND	-222.96	-55.69	0.35	0.771	1.914	308.81	40.85	-4.83	41.59	2.14	78.49	21.80
52	SAGBEND	-234.95	-55.97	0.19	0.792	0.713	320.81	40.82	-4.85	35.78	-2.67	73.64	20.45
53	SEABED	-246.95	-56.03	0.05	0.468	0.052	332.81	40.81	-4.86	7.70	-17.57	59.37	16.49
54	SEABED	-258.95	-56.03	0.00	0.049	-0.006	344.81	40.81	-4.86	-0.13	-6.14	48.48	13.47
55	SEABED	-270.95	-56.03	0.00	-0.003	-0.001	356.81	40.81	-4.86	-0.08	-0.05	43.52	12.09
56	SEABED	-282.95	-56.03	0.00	-0.001	0.000	368.81	40.81	-4.86	0.00	0.06	43.50	12.08
57	SEABED	-294.95	-56.03	0.00	0.000	0.000	380.81	40.81	-4.86	0.00	0.00	43.45	12.07
58	SEABED	-306.95	-56.03	0.00	0.000	0.000	392.81	40.81	-4.86	0.00	0.00	43.45	12.07
59	SEABED	-318.95	-56.03	0.00	0.000	0.000	404.81	40.81	-4.86	0.00	0.00	43.45	12.07
60	SEABED	-330.95	-56.03	0.00	0.000	0.000	416.81	40.81	-4.86	0.00	0.00	43.45	12.07

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	-0.001	0.270	0.00	48.82	0.00	0.00	0.00	48.82	13.56
3	LAYBARGE	71.49	6.16	0.00	-0.001	0.959	6.30	48.80	0.00	-119.67	-0.15	150.50	41.81
5	LAYBARGE	65.37	5.98	0.00	-0.001	2.230	12.42	48.78	0.00	-86.51	-0.11	122.31	33.97
7	LAYBARGE	59.91	5.72	0.00	0.000	3.281	17.89	48.73	0.00	-97.73	-0.12	131.80	36.61
9	LAYBARGE	53.32	5.27	0.00	0.000	4.501	24.49	48.67	0.00	-94.16	-0.11	128.70	35.75
11	LAYBARGE	47.32	4.74	0.00	0.000	5.738	30.51	48.58	0.00	-108.67	-0.12	140.95	39.15
13	LAYBARGE	38.21	3.69	0.00	-0.001	7.423	39.68	48.42	0.00	-124.28	-0.14	154.05	42.79
15	LAYBARGE	29.27	2.39	0.00	-0.001	9.099	48.72	48.23	0.00	-107.68	0.13	139.76	38.82
17	LAYBARGE	23.13	1.33	0.00	-0.002	10.368	54.95	48.07	0.00	-95.92	-0.20	129.60	36.00
19	LAYBARGE	17.18	0.19	0.00	0.000	11.439	61.01	47.90	0.00	-81.11	0.43	116.80	32.45
21	LAYBARGE	10.63	-1.22	0.00	-0.015	13.036	67.72	47.70	-0.11	-151.48	-4.31	176.56	49.04
24	STINGER	-4.62	-5.11	0.00	0.014	15.532	83.45	47.21	-0.44	-151.32	-4.08	176.09	48.91
26	STINGER	-11.02	-6.99	0.00	-0.008	17.118	90.12	46.99	-0.61	-78.83	-1.17	114.22	31.73
28	STINGER	-17.37	-9.02	0.00	0.018	18.332	96.78	46.73	-0.78	-100.13	3.25	132.28	36.74
30	STINGER	-23.67	-11.19	0.00	-0.072	19.554	103.45	46.46	-0.97	-81.11	-18.67	116.49	32.36
32	STINGER	-29.93	-13.48	0.03	-0.580	20.639	110.12	46.17	-1.17	-82.97	-52.72	130.15	36.15
34	STINGER	-36.16	-15.86	0.12	-1.037	21.099	116.79	45.88	-1.38	6.84	-9.55	56.15	15.60
36	SAGBEND	-47.37	-20.12	0.33	-1.035	20.318	128.79	45.34	-1.75	34.25	4.28	75.51	20.97
37	SAGBEND	-58.66	-24.18	0.52	-0.879	19.220	140.79	44.83	-2.10	37.33	5.33	77.90	21.64
38	SAGBEND	-70.03	-28.02	0.68	-0.716	18.078	152.79	44.34	-2.43	38.10	5.24	78.23	21.73
39	SAGBEND	-81.48	-31.63	0.81	-0.560	16.918	164.79	43.88	-2.74	38.63	5.04	78.37	21.77
40	SAGBEND	-92.99	-35.00	0.91	-0.409	15.743	176.79	43.46	-3.04	39.12	4.83	78.49	21.80
41	SAGBEND	-104.57	-38.14	0.97	-0.266	14.554	188.79	43.06	-3.31	39.58	4.59	78.60	21.83
42	SAGBEND	-116.22	-41.03	1.02	-0.131	13.351	200.79	42.70	-3.56	40.00	4.34	78.70	21.86
43	SAGBEND	-127.92	-43.68	1.03	-0.003	12.137	212.79	42.36	-3.79	40.39	4.05	78.78	21.88
44	SAGBEND	-139.68	-46.07	1.02	0.115	10.912	224.79	42.06	-4.00	40.74	3.73	78.86	21.91
45	SAGBEND	-151.49	-48.22	0.98	0.223	9.675	236.79	41.79	-4.18	41.05	3.43	78.92	21.92
46	SAGBEND	-163.34	-50.11	0.93	0.322	8.430	248.79	41.55	-4.35	41.34	3.12	78.99	21.94
47	SAGBEND	-175.23	-51.74	0.85	0.411	7.178	260.79	41.35	-4.49	41.61	2.84	79.03	21.95
48	SAGBEND	-187.15	-53.10	0.76	0.491	5.919	272.79	41.17	-4.61	41.83	2.68	79.06	21.96
49	SAGBEND	-199.10	-54.21	0.65	0.570	4.653	284.79	41.03	-4.70	42.01	2.64	79.07	21.96
50	SAGBEND	-211.07	-55.05	0.52	0.647	3.384	296.79	40.93	-4.77	42.11	2.61	79.03	21.95
51	SAGBEND	-223.05	-55.63	0.37	0.722	2.115	308.79	40.86	-4.82	41.77	2.37	78.66	21.85
52	SAGBEND	-235.05	-55.94	0.22	0.769	0.891	320.79	40.82	-4.85	37.72	-0.22	75.18	20.88
53	SEABED	-247.04	-56.03	0.07	0.566	0.093	332.79	40.81	-4.86	11.41	-15.37	59.22	16.45
54	SEABED	-259.04	-56.03	0.00	0.092	-0.006	344.79	40.81	-4.86	0.14	-9.30	51.17	14.21
55	SEABED	-271.04	-56.03	0.00	-0.003	-0.001	356.79	40.81	-4.86	-0.12	-0.33	43.72	12.14
56	SEABED	-283.04	-56.03	0.00	-0.001	0.000	368.79	40.81	-4.86	-0.01	0.09	43.51	12.09
57	SEABED	-295.04	-56.03	0.00	0.000	0.000	380.79	40.81	-4.86	0.00	0.01	43.45	12.07
58	SEABED	-307.04	-56.03	0.00	0.000	0.000	392.79	40.81	-4.86	0.00	0.00	43.44	12.07
59	SEABED	-319.04	-56.03	0.00	0.000	0.000	404.79	40.81	-4.86	0.00	0.00	43.44	12.07
60	SEABED	-331.04	-56.03	0.00	0.000	0.000	416.79	40.81	-4.86	0.00	0.00	43.44	12.07

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.001	0.270	0.00	48.84	0.00	0.00	0.00	48.84	13.57
3	LAYBARGE	71.49	6.16	0.00	0.000	0.960	6.30	48.82	0.00	-119.67	0.13	150.54	41.82
5	LAYBARGE	65.38	5.99	0.00	0.000	2.230	12.42	48.80	0.00	-86.52	0.09	122.34	33.98
7	LAYBARGE	59.91	5.72	0.00	0.000	3.281	17.89	48.76	0.00	-97.73	0.11	131.83	36.62
9	LAYBARGE	53.32	5.27	0.00	0.000	4.501	24.49	48.69	0.00	-94.17	0.10	128.73	35.76
11	LAYBARGE	47.32	4.74	0.00	0.000	5.739	30.51	48.61	0.00	-108.68	0.11	140.98	39.16
13	LAYBARGE	38.22	3.69	0.00	0.000	7.423	39.68	48.45	0.00	-124.30	-0.12	154.10	42.81
15	LAYBARGE	29.27	2.39	0.00	0.000	9.100	48.72	48.25	0.00	-107.67	0.13	139.78	38.83
17	LAYBARGE	23.13	1.33	0.00	-0.001	10.369	54.95	48.10	0.00	-96.03	-0.18	129.72	36.03
19	LAYBARGE	17.18	0.19	0.00	0.001	11.438	61.01	47.93	0.00	-80.67	0.42	116.44	32.34
21	LAYBARGE	10.63	-1.22	0.00	-0.014	13.044	67.72	47.73	-0.11	-153.28	-4.25	178.10	49.47
24	STINGER	-4.61	-5.09	0.00	0.014	15.309	83.44	47.24	-0.44	-127.51	-4.20	155.89	43.30
26	STINGER	-11.02	-6.94	0.00	-0.003	16.572	90.11	47.02	-0.60	-58.16	-0.20	96.69	26.86
28	STINGER	-17.40	-8.88	0.00	-0.002	17.452	96.77	46.77	-0.77	-74.98	-2.32	110.87	30.80
30	STINGER	-23.74	-10.94	0.00	0.011	18.428	103.44	46.52	-0.95	-72.56	3.92	108.32	30.09
32	STINGER	-30.05	-13.09	0.01	-0.224	19.267	110.11	46.24	-1.14	-56.40	-33.97	102.15	28.38
34	STINGER	-36.33	-15.33	0.06	-0.736	19.875	116.77	45.96	-1.33	-40.87	-36.00	92.77	25.77
36	SAGBEND	-47.61	-19.41	0.25	-1.035	19.589	128.77	45.45	-1.68	30.28	1.90	71.88	19.97
37	SAGBEND	-58.95	-23.33	0.44	-0.907	18.533	140.77	44.95	-2.02	37.04	5.16	77.70	21.58
38	SAGBEND	-70.36	-27.04	0.61	-0.745	17.393	152.77	44.48	-2.35	38.14	5.28	78.36	21.77
39	SAGBEND	-81.85	-30.51	0.74	-0.587	16.231	164.77	44.04	-2.65	38.69	5.12	78.53	21.81
40	SAGBEND	-93.40	-33.74	0.84	-0.435	15.054	176.77	43.63	-2.93	39.17	4.93	78.66	21.85
41	SAGBEND	-105.02	-36.74	0.92	-0.289	13.865	188.77	43.25	-3.19	39.62	4.71	78.78	21.88
42	SAGBEND	-116.70	-39.49	0.96	-0.151	12.661	200.77	42.90	-3.43	40.02	4.48	78.89	21.91
43	SAGBEND	-128.44	-42.00	0.98	-0.019	11.447	212.77	42.59	-3.64	40.39	4.24	78.98	21.94
44	SAGBEND	-140.22	-44.26	0.97	0.106	10.223	224.77	42.30	-3.84	40.72	3.98	79.06	21.96
45	SAGBEND	-152.05	-46.26	0.93	0.222	8.989	236.77	42.05	-4.01	41.01	3.72	79.12	21.98
46	SAGBEND	-163.93	-48.00	0.88	0.330	7.746	248.77	41.83	-4.16	41.27	3.48	79.16	21.99
47	SAGBEND	-175.83	-49.49	0.80	0.430	6.496	260.77	41.64	-4.29	41.50	3.25	79.18	21.99
48	SAGBEND	-187.77	-50.72	0.70	0.524	5.239	272.77	41.49	-4.40	41.69	3.03	79.18	21.99
49	SAGBEND	-199.73	-51.68	0.58	0.610	3.979	284.77	41.37	-4.48	41.85	2.85	79.15	21.99
50	SAGBEND	-211.71	-52.38	0.44	0.691	2.715	296.77	41.28	-4.54	41.83	2.63	79.00	21.94
51	SAGBEND	-223.70	-52.82	0.29	0.759	1.464	308.77	41.22	-4.58	40.52	1.70	77.79	21.61
52	SEABED	-235.70	-53.01	0.13	0.729	0.365	320.77	41.20	-4.60	27.55	-7.23	67.49	18.75
53	SEABED	-247.70	-53.03	0.02	0.276	0.007	332.77	41.20	-4.60	2.64	-16.43	57.58	16.00
54	SEABED	-259.70	-53.03	0.00	0.012	-0.004	344.77	41.20	-4.60	-0.21	-2.43	45.67	12.69
55	SEABED	-271.70	-53.03	0.00	-0.002	0.000	356.77	41.20	-4.60	-0.03	0.11	43.77	12.16
56	SEABED	-283.70	-53.03	0.00	0.000	0.000	368.77	41.20	-4.60	0.00	0.03	43.70	12.14
57	SEABED	-295.70	-53.03	0.00	0.000	0.000	380.77	41.20	-4.60	0.00	0.00	43.68	12.13
58	SEABED	-307.70	-53.03	0.00	0.000	0.000	392.77	41.20	-4.60	0.00	0.00	43.68	12.13
59	SEABED	-319.70	-53.03	0.00	0.000	0.000	404.77	41.20	-4.60	0.00	0.00	43.68	12.13

M A X I M U M D Y N A M I C P I P E F O R C E S A N D S T R E S S E S

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.266	0.00	36.60	0.00	0.00	0.00	36.60	10.17
3	LAYBARGE	71.49	6.16	0.00	0.000	0.958	6.30	36.58	0.00	-116.84	0.13	135.88	37.75
5	LAYBARGE	65.38	5.98	0.00	0.000	2.232	12.42	36.56	0.00	-84.19	0.10	108.11	30.03
7	LAYBARGE	59.91	5.72	0.00	0.000	3.279	17.89	36.52	0.00	-95.12	0.11	117.36	32.60
9	LAYBARGE	53.32	5.27	0.00	0.000	4.504	24.49	36.45	0.00	-91.62	0.11	114.32	31.76
11	LAYBARGE	47.32	4.74	0.00	0.000	5.732	30.51	36.37	0.00	-104.42	0.11	125.11	34.75
13	LAYBARGE	38.22	3.69	0.00	0.000	7.423	39.68	36.21	0.00	-118.07	0.12	136.55	37.93
15	LAYBARGE	29.27	2.39	0.00	0.000	9.106	48.72	36.01	0.00	-103.50	0.13	123.98	34.44
17	LAYBARGE	23.13	1.33	0.00	-0.001	10.365	54.95	35.86	0.00	-93.05	-0.20	114.94	31.93
19	LAYBARGE	17.18	0.19	0.00	0.001	11.450	61.01	35.69	0.00	-81.16	0.47	104.62	29.06
21	LAYBARGE	10.63	-1.22	0.00	-0.015	12.982	67.72	35.49	-0.11	-135.24	-4.35	150.53	41.81
24	STINGER	-4.64	-5.13	0.00	0.013	16.017	83.47	34.98	-0.45	-184.10	-4.49	191.72	53.25
26	STINGER	-11.00	-7.10	0.00	-0.003	18.218	90.14	34.75	-0.62	-119.70	0.43	136.75	37.99
28	STINGER	-17.30	-9.29	0.00	-0.011	20.058	96.81	34.47	-0.81	-136.31	-3.85	150.71	41.86
30	STINGER	-23.53	-11.68	0.00	0.038	21.976	103.47	34.17	-1.01	-130.88	9.67	145.94	40.54
32	STINGER	-29.67	-14.27	0.01	-0.387	23.806	110.14	33.84	-1.24	-124.48	-61.93	152.04	42.23
34	STINGER	-35.74	-17.03	0.09	-1.040	24.765	116.81	33.51	-1.48	-16.27	-20.78	56.63	15.73
36	SAGBEND	-46.65	-22.02	0.31	-1.167	24.070	128.81	32.88	-1.91	41.51	4.17	69.09	19.19
37	SAGBEND	-57.66	-26.78	0.52	-0.977	22.663	140.81	32.28	-2.32	49.33	6.85	75.72	21.03
38	SAGBEND	-68.80	-31.25	0.69	-0.761	21.137	152.81	31.71	-2.71	51.34	6.91	77.09	21.41
39	SAGBEND	-80.04	-35.43	0.82	-0.551	19.567	164.81	31.18	-3.07	52.53	6.62	77.76	21.60
40	SAGBEND	-91.41	-39.29	0.91	-0.353	17.962	176.81	30.69	-3.41	53.60	6.21	78.31	21.75
41	SAGBEND	-102.87	-42.83	0.96	-0.170	16.327	188.81	30.25	-3.72	54.59	5.75	78.80	21.89
42	SAGBEND	-114.44	-46.03	0.98	-0.001	14.665	200.81	29.84	-3.99	55.49	5.20	79.24	22.01
43	SAGBEND	-126.09	-48.90	0.96	0.147	12.977	212.81	29.48	-4.24	56.27	4.62	79.63	22.12
44	SAGBEND	-137.82	-51.42	0.92	0.277	11.266	224.81	29.16	-4.46	56.98	4.05	79.98	22.22
45	SAGBEND	-149.62	-53.59	0.85	0.393	9.534	236.81	28.89	-4.65	57.59	3.74	80.30	22.31
46	SAGBEND	-161.48	-55.39	0.75	0.503	7.785	248.81	28.66	-4.81	58.14	3.71	80.56	22.38
47	SAGBEND	-173.40	-56.84	0.64	0.612	6.022	260.81	28.48	-4.93	58.57	3.70	80.77	22.44
48	SAGBEND	-185.35	-57.91	0.50	0.719	4.251	272.81	28.34	-5.02	58.70	3.57	80.74	22.43
49	SAGBEND	-197.32	-58.62	0.34	0.813	2.490	284.81	28.25	-5.08	57.43	2.60	79.50	22.08
50	SAGBEND	-209.32	-58.96	0.16	0.818	0.861	296.81	28.21	-5.11	47.01	-4.66	70.83	19.67
51	SEABED	-221.32	-59.03	0.03	0.381	0.035	308.81	28.21	-5.12	8.35	-20.71	49.71	13.81
52	SEABED	-233.32	-59.03	0.00	0.012	-0.011	320.81	28.21	-5.12	-0.57	-3.47	33.96	9.43
53	SEABED	-245.32	-59.03	0.00	-0.005	0.000	332.81	28.21	-5.12	-0.10	0.28	31.33	8.70
54	SEABED	-257.32	-59.03	0.00	0.000	0.000	344.81	28.21	-5.12	0.01	0.04	31.12	8.64
55	SEABED	-269.32	-59.03	0.00	0.000	0.000	356.81	28.21	-5.12	0.00	0.00	31.09	8.64
56	SEABED	-281.32	-59.03	0.00	0.000	0.000	368.81	28.21	-5.12	0.00	0.00	31.08	8.63
57	SEABED	-293.32	-59.03	0.00	0.000	0.000	380.81	28.21	-5.12	0.00	0.00	31.08	8.63
58	SEABED	-305.32	-59.03	0.00	0.000	0.000	392.81	28.21	-5.12	0.00	0.00	31.08	8.63

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.267	0.00	36.62	0.00	0.00	0.00	36.62	10.17
3	LAYBARGE	71.49	6.16	0.00	0.000	0.959	6.30	36.59	0.00	-116.85	-0.13	135.89	37.75
5	LAYBARGE	65.38	5.98	0.00	0.000	2.233	12.42	36.57	0.00	-84.19	-0.10	108.12	30.03
7	LAYBARGE	59.91	5.72	0.00	0.000	3.280	17.89	36.53	0.00	-95.12	-0.11	117.37	32.60
9	LAYBARGE	53.32	5.27	0.00	0.000	4.505	24.49	36.47	0.00	-91.63	-0.10	114.34	31.76
11	LAYBARGE	47.32	4.74	0.00	0.000	5.733	30.51	36.38	0.00	-104.41	-0.11	125.11	34.75
13	LAYBARGE	38.22	3.69	0.00	0.000	7.424	39.68	36.22	0.00	-118.08	-0.12	136.57	37.94
15	LAYBARGE	29.27	2.39	0.00	0.000	9.106	48.72	36.03	0.00	-103.44	0.12	123.94	34.43
17	LAYBARGE	23.13	1.33	0.00	0.000	10.367	54.95	35.87	0.00	-93.34	-0.20	115.20	32.00
19	LAYBARGE	17.18	0.19	0.00	0.002	11.445	61.01	35.70	0.00	-79.95	0.46	103.61	28.78
21	LAYBARGE	10.63	-1.22	0.00	-0.014	13.005	67.72	35.50	-0.11	-139.94	-4.34	154.54	42.93
24	STINGER	-4.62	-5.11	0.00	0.014	15.564	83.45	35.01	-0.44	-139.68	-4.37	153.99	42.78
26	STINGER	-11.01	-6.99	0.00	-0.001	17.116	90.12	34.79	-0.61	-78.11	0.42	101.47	28.19
28	STINGER	-17.37	-9.02	0.00	-0.008	18.322	96.78	34.53	-0.78	-93.46	-3.04	114.41	31.78
30	STINGER	-23.67	-11.19	0.00	0.036	19.608	103.45	34.26	-0.97	-89.18	7.43	110.47	30.69
32	STINGER	-29.93	-13.49	-0.01	0.090	20.762	110.12	33.97	-1.17	-76.13	-2.22	99.23	27.56
34	STINGER	-36.13	-15.94	0.00	-0.430	22.664	116.79	33.62	-1.38	-189.33	-68.03	204.62	56.84
36	SAGBEND	-47.10	-20.80	0.18	-1.166	24.133	128.79	33.05	-1.80	19.48	-2.48	50.55	14.04
37	SAGBEND	-58.09	-25.61	0.40	-1.055	23.006	140.79	32.44	-2.22	46.32	6.31	73.22	20.34
38	SAGBEND	-69.19	-30.16	0.58	-0.845	21.522	152.79	31.86	-2.62	50.75	6.99	76.64	21.29
39	SAGBEND	-80.41	-34.41	0.73	-0.633	19.963	164.79	31.33	-2.99	52.25	6.75	77.56	21.55
40	SAGBEND	-91.75	-38.35	0.83	-0.432	18.368	176.79	30.83	-3.33	53.34	6.39	78.14	21.71
41	SAGBEND	-103.19	-41.97	0.90	-0.245	16.743	188.79	30.37	-3.64	54.30	5.93	78.63	21.84
42	SAGBEND	-114.73	-45.26	0.93	-0.072	15.087	200.79	29.95	-3.93	55.19	5.40	79.08	21.97
43	SAGBEND	-126.36	-48.21	0.93	0.081	13.405	212.79	29.58	-4.18	56.03	4.81	79.49	22.08
44	SAGBEND	-138.07	-50.82	0.90	0.217	11.700	224.79	29.25	-4.41	56.81	4.21	79.89	22.19
45	SAGBEND	-149.86	-53.07	0.84	0.336	9.973	236.79	28.97	-4.60	57.48	3.83	80.25	22.29
46	SAGBEND	-161.70	-54.97	0.76	0.447	8.229	248.79	28.73	-4.77	58.07	3.73	80.56	22.38
47	SAGBEND	-173.60	-56.51	0.66	0.556	6.468	260.79	28.54	-4.90	58.53	3.74	80.78	22.44
48	SAGBEND	-185.55	-57.68	0.53	0.664	4.699	272.79	28.39	-5.00	58.75	3.68	80.83	22.45
49	SAGBEND	-197.52	-58.47	0.38	0.765	2.930	284.79	28.29	-5.07	58.06	3.18	80.12	22.26
50	SAGBEND	-209.51	-58.91	0.21	0.821	1.239	296.79	28.23	-5.11	51.69	-0.75	74.64	20.73
51	SEABED	-221.51	-59.03	0.06	0.567	0.121	308.79	28.22	-5.12	16.55	-18.73	51.76	14.38
52	SEABED	-233.51	-59.03	0.00	0.058	-0.015	320.79	28.22	-5.12	-0.33	-8.19	37.87	10.52
53	SEABED	-245.51	-59.03	0.00	-0.007	-0.002	332.79	28.22	-5.12	-0.21	0.19	31.31	8.70
54	SEABED	-257.51	-59.03	0.00	-0.001	0.000	344.79	28.22	-5.12	0.00	0.10	31.18	8.66
55	SEABED	-269.51	-59.03	0.00	0.000	0.000	356.79	28.22	-5.12	0.00	0.00	31.10	8.64
56	SEABED	-281.51	-59.03	0.00	0.000	0.000	368.79	28.22	-5.12	0.00	0.00	31.10	8.64
57	SEABED	-293.51	-59.03	0.00	0.000	0.000	380.79	28.22	-5.12	0.00	0.00	31.10	8.64
58	SEABED	-305.51	-59.03	0.00	0.000	0.000	392.79	28.22	-5.12	0.00	0.00	31.10	8.64

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.266	0.00	36.60	0.00	0.00	0.00	36.60	10.17
3	LAYBARGE	71.49	6.16	0.00	0.000	0.959	6.30	36.57	0.00	-116.85	0.14	135.88	37.74
5	LAYBARGE	65.37	5.98	0.00	0.000	2.232	12.42	36.56	0.00	-84.19	0.10	108.11	30.03
7	LAYBARGE	59.91	5.72	0.00	0.000	3.279	17.89	36.51	0.00	-95.13	0.11	117.36	32.60
9	LAYBARGE	53.32	5.27	0.00	0.000	4.504	24.49	36.45	0.00	-91.63	0.11	114.32	31.76
11	LAYBARGE	47.32	4.74	0.00	0.000	5.732	30.51	36.36	0.00	-104.41	0.12	125.10	34.75
13	LAYBARGE	38.21	3.69	0.00	0.000	7.424	39.68	36.20	0.00	-118.09	0.12	136.57	37.93
15	LAYBARGE	29.27	2.39	0.00	0.000	9.106	48.72	36.01	0.00	-103.41	0.13	123.90	34.42
17	LAYBARGE	23.13	1.33	0.00	-0.001	10.368	54.95	35.85	0.00	-93.49	-0.20	115.31	32.03
19	LAYBARGE	17.18	0.18	0.00	0.001	11.443	61.01	35.68	0.00	-79.36	0.46	103.11	28.64
21	LAYBARGE	10.63	-1.22	0.00	-0.014	13.014	67.72	35.48	-0.11	-142.23	-4.34	156.48	43.47
24	STINGER	-4.61	-5.09	0.00	0.013	15.340	83.44	35.00	-0.44	-117.76	-4.41	135.37	37.60
26	STINGER	-11.02	-6.94	0.00	0.000	16.560	90.11	34.78	-0.60	-55.99	0.74	82.67	22.96
28	STINGER	-17.40	-8.88	0.00	-0.015	17.479	96.77	34.53	-0.77	-77.70	-4.51	101.06	28.07
30	STINGER	-23.74	-10.94	0.00	0.064	18.322	103.44	34.27	-0.95	-46.09	13.38	75.40	20.95
32	STINGER	-30.05	-13.07	-0.01	0.094	19.101	110.11	34.00	-1.13	-69.16	-11.17	93.93	26.09
34	STINGER	-36.32	-15.36	0.00	-0.476	21.614	116.77	33.63	-1.33	-276.52	-66.59	275.73	76.59
36	SAGBEND	-47.31	-20.16	0.19	-1.191	24.170	128.77	33.11	-1.75	8.36	-2.23	41.26	11.46
37	SAGBEND	-58.29	-24.99	0.41	-1.076	23.184	140.77	32.50	-2.17	44.79	6.36	71.98	20.00
38	SAGBEND	-69.38	-29.58	0.60	-0.862	21.722	152.77	31.92	-2.57	50.44	7.03	76.44	21.23
39	SAGBEND	-80.59	-33.87	0.75	-0.649	20.171	164.77	31.37	-2.94	52.12	6.80	77.48	21.52
40	SAGBEND	-91.90	-37.85	0.85	-0.446	18.579	176.77	30.87	-3.28	53.21	6.43	78.07	21.69
41	SAGBEND	-103.33	-41.51	0.92	-0.257	16.957	188.77	30.41	-3.60	54.19	6.00	78.58	21.83
42	SAGBEND	-114.86	-44.85	0.96	-0.083	15.304	200.77	29.99	-3.89	55.09	5.47	79.03	21.95
43	SAGBEND	-126.48	-47.84	0.96	0.074	13.627	212.77	29.61	-4.15	55.95	4.88	79.44	22.07
44	SAGBEND	-138.18	-50.50	0.93	0.212	11.925	224.77	29.27	-4.38	56.72	4.31	79.84	22.18
45	SAGBEND	-149.96	-52.80	0.87	0.333	10.200	236.77	28.98	-4.58	57.41	3.86	80.19	22.28
46	SAGBEND	-161.80	-54.75	0.79	0.445	8.457	248.77	28.74	-4.75	58.01	3.72	80.52	22.37
47	SAGBEND	-173.69	-56.33	0.69	0.554	6.699	260.77	28.54	-4.89	58.50	3.73	80.77	22.44
48	SAGBEND	-185.63	-57.54	0.56	0.663	4.929	272.77	28.38	-4.99	58.78	3.69	80.86	22.46
49	SAGBEND	-197.60	-58.39	0.41	0.766	3.159	284.77	28.28	-5.06	58.29	3.31	80.33	22.31
50	SAGBEND	-209.59	-58.87	0.24	0.834	1.447	296.77	28.22	-5.11	53.34	0.60	76.01	21.11
51	SEABED	-221.58	-59.02	0.08	0.655	0.194	308.77	28.20	-5.12	22.15	-16.59	54.08	15.02
52	SEABED	-233.58	-59.03	0.00	0.097	-0.015	320.77	28.20	-5.12	0.22	-11.09	40.33	11.20
53	SEABED	-245.58	-59.03	0.00	-0.008	-0.002	332.77	28.20	-5.12	-0.28	-0.07	31.31	8.70
54	SEABED	-257.58	-59.03	0.00	-0.001	0.000	344.77	28.20	-5.12	0.00	0.14	31.19	8.66
55	SEABED	-269.58	-59.03	0.00	0.000	0.000	356.77	28.20	-5.12	0.00	0.00	31.08	8.63
56	SEABED	-281.58	-59.03	0.00	0.000	0.000	368.77	28.20	-5.12	0.00	0.00	31.08	8.63
57	SEABED	-293.58	-59.03	0.00	0.000	0.000	380.77	28.20	-5.12	0.00	0.00	31.08	8.63
58	SEABED	-305.58	-59.03	0.00	0.000	0.000	392.77	28.20	-5.12	0.00	0.00	31.08	8.63

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

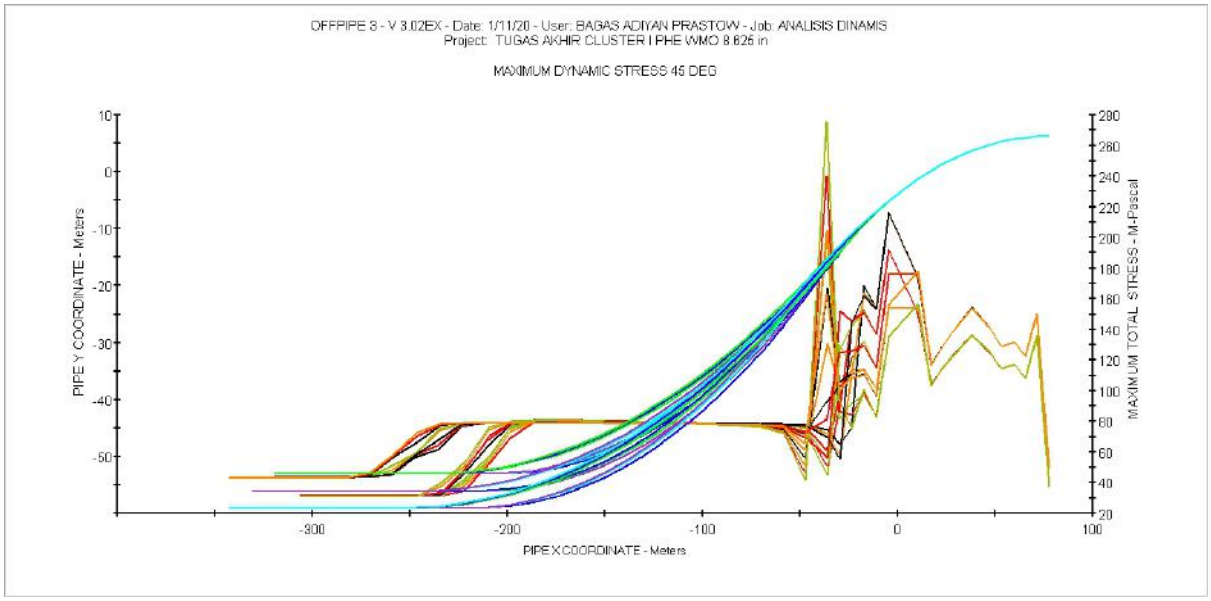
NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.270	0.00	48.85	0.00	0.00	0.00	48.85	13.57
3	LAYBARGE	71.49	6.16	0.00	0.000	0.960	6.30	48.82	0.00	-119.68	0.14	150.53	41.81
5	LAYBARGE	65.38	5.99	0.00	0.000	2.230	12.42	48.80	0.00	-86.52	0.10	122.33	33.98
7	LAYBARGE	59.91	5.72	0.00	0.000	3.282	17.89	48.76	0.00	-97.74	0.11	131.82	36.62
9	LAYBARGE	53.32	5.28	0.00	-0.001	4.501	24.49	48.69	0.00	-94.17	0.10	128.73	35.76
11	LAYBARGE	47.32	4.74	0.00	-0.001	5.739	30.51	48.61	0.00	-108.69	0.12	140.98	39.16
13	LAYBARGE	38.22	3.69	0.00	0.000	7.423	39.68	48.45	0.00	-124.30	-0.12	154.08	42.80
15	LAYBARGE	29.27	2.39	0.00	0.000	9.100	48.72	48.25	0.00	-107.74	0.13	139.82	38.84
17	LAYBARGE	23.13	1.33	0.00	0.000	10.368	54.95	48.10	0.00	-95.72	-0.19	129.45	35.96
19	LAYBARGE	17.18	0.19	0.00	0.002	11.443	61.01	47.93	0.00	-81.96	0.40	117.56	32.66
21	LAYBARGE	10.63	-1.22	0.00	-0.012	13.021	67.72	47.73	-0.11	-148.16	-4.16	173.75	48.26
24	STINGER	-4.64	-5.13	0.00	0.010	15.977	83.47	47.22	-0.45	-198.36	-4.90	216.08	60.02
26	STINGER	-11.00	-7.10	0.00	0.016	18.234	90.14	46.99	-0.62	-124.55	4.21	153.23	42.56
28	STINGER	-17.30	-9.29	0.00	-0.071	20.024	96.81	46.71	-0.81	-134.86	-19.07	161.91	44.97
30	STINGER	-23.53	-11.66	0.03	-0.606	21.627	103.47	46.42	-1.01	-100.39	-55.14	143.97	39.99
32	STINGER	-29.71	-14.17	0.13	-1.088	22.248	110.14	46.12	-1.23	2.29	-9.97	55.17	15.33
34	STINGER	-35.89	-16.68	0.25	-1.137	21.953	116.81	45.80	-1.45	27.62	1.89	69.92	19.42
36	SAGBEND	-47.05	-21.07	0.46	-1.006	20.940	128.81	45.24	-1.83	36.13	5.20	77.14	21.43
37	SAGBEND	-58.30	-25.25	0.64	-0.840	19.822	140.81	44.71	-2.19	37.45	5.35	77.92	21.64
38	SAGBEND	-69.63	-29.21	0.79	-0.677	18.678	152.81	44.21	-2.53	38.07	5.17	78.11	21.70
39	SAGBEND	-81.03	-32.94	0.91	-0.520	17.520	164.81	43.74	-2.86	38.60	4.92	78.25	21.74
40	SAGBEND	-92.51	-36.43	1.00	-0.372	16.346	176.81	43.30	-3.16	39.11	4.71	78.38	21.77
41	SAGBEND	-104.06	-39.69	1.06	-0.232	15.157	188.81	42.89	-3.44	39.58	4.46	78.51	21.81
42	SAGBEND	-115.67	-42.71	1.09	-0.100	13.954	200.81	42.51	-3.71	40.03	4.15	78.63	21.84
43	SAGBEND	-127.35	-45.48	1.10	0.021	12.739	212.81	42.16	-3.95	40.44	3.81	78.73	21.87
44	SAGBEND	-139.08	-48.00	1.08	0.132	11.512	224.81	41.84	-4.16	40.81	3.45	78.80	21.89
45	SAGBEND	-150.87	-50.27	1.05	0.232	10.274	236.81	41.55	-4.36	41.17	3.08	78.88	21.91
46	SAGBEND	-162.70	-52.28	0.99	0.320	9.025	248.81	41.30	-4.54	41.47	2.77	78.96	21.93
47	SAGBEND	-174.57	-54.03	0.91	0.400	7.770	260.81	41.08	-4.69	41.74	2.64	79.03	21.95
48	SAGBEND	-186.47	-55.52	0.82	0.478	6.506	272.81	40.89	-4.82	41.99	2.63	79.08	21.97
49	SAGBEND	-198.41	-56.75	0.72	0.557	5.234	284.81	40.74	-4.92	42.18	2.64	79.10	21.97
50	SAGBEND	-210.37	-57.71	0.59	0.635	3.959	296.81	40.61	-5.01	42.31	2.63	79.08	21.97
51	SAGBEND	-222.35	-58.41	0.45	0.711	2.683	308.81	40.53	-5.07	42.28	2.53	78.92	21.92
52	SAGBEND	-234.34	-58.83	0.29	0.778	1.419	320.81	40.47	-5.10	40.78	1.60	77.53	21.54
53	SEABED	-246.34	-59.01	0.13	0.738	0.330	332.81	40.45	-5.12	26.16	-8.14	66.08	18.36
54	SEABED	-258.34	-59.03	0.02	0.266	0.004	344.81	40.45	-5.12	2.22	-16.39	57.04	15.84
55	SEABED	-270.34	-59.03	0.00	0.011	-0.003	356.81	40.45	-5.12	-0.21	-2.29	45.11	12.53
56	SEABED	-282.34	-59.03	0.00	-0.002	0.000	368.81	40.45	-5.12	-0.03	0.12	43.33	12.04
57	SEABED	-294.34	-59.03	0.00	0.000	0.000	380.81	40.45	-5.12	0.00	0.03	43.26	12.02
58	SEABED	-306.34	-59.03	0.00	0.000	0.000	392.81	40.45	-5.12	0.00	0.00	43.24	12.01
59	SEABED	-318.34	-59.03	0.00	0.000	0.000	404.81	40.45	-5.12	0.00	0.00	43.24	12.01
60	SEABED	-330.34	-59.03	0.00	0.000	0.000	416.81	40.45	-5.12	0.00	0.00	43.24	12.01

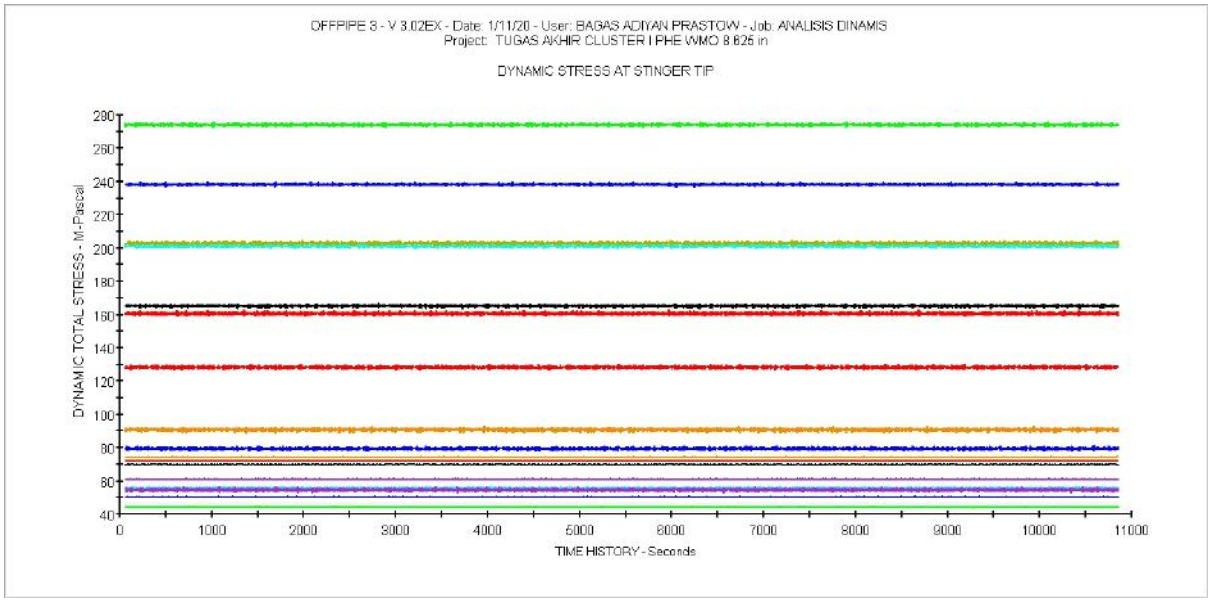
MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.269	0.00	48.82	0.00	0.00	0.00	48.82	13.56
3	LAYBARGE	71.49	6.16	0.00	-0.001	0.959	6.30	48.80	0.00	-119.66	-0.13	150.50	41.81
5	LAYBARGE	65.38	5.98	0.00	0.000	2.229	12.42	48.78	0.00	-86.51	-0.10	122.31	33.97
7	LAYBARGE	59.91	5.72	0.00	0.000	3.281	17.89	48.74	0.00	-97.72	-0.11	131.80	36.61
9	LAYBARGE	53.32	5.27	0.00	0.000	4.500	24.49	48.67	0.00	-94.16	-0.10	128.70	35.75
11	LAYBARGE	47.32	4.74	0.00	0.000	5.738	30.51	48.59	0.00	-108.67	-0.11	140.95	39.15
13	LAYBARGE	38.21	3.69	0.00	0.000	7.422	39.68	48.43	0.00	-124.28	-0.13	154.05	42.79
15	LAYBARGE	29.27	2.39	0.00	0.001	9.099	48.72	48.23	0.00	-107.69	0.13	139.76	38.82
17	LAYBARGE	23.13	1.33	0.00	0.000	10.368	54.95	48.08	0.00	-95.91	-0.19	129.60	36.00
19	LAYBARGE	17.18	0.19	0.00	0.002	11.439	61.01	47.91	0.00	-81.10	0.42	116.81	32.45
21	LAYBARGE	10.63	-1.22	0.00	-0.013	13.035	67.72	47.71	-0.11	-151.50	-4.26	176.58	49.05
24	STINGER	-4.62	-5.11	0.00	0.015	15.530	83.45	47.22	-0.44	-151.17	-4.27	175.97	48.88
26	STINGER	-11.02	-6.99	0.00	-0.001	17.121	90.12	47.00	-0.61	-79.52	0.11	114.82	31.89
28	STINGER	-17.37	-9.02	0.00	-0.002	18.319	96.78	46.74	-0.78	-97.14	-2.67	129.68	36.02
30	STINGER	-23.67	-11.19	0.00	0.017	19.607	103.45	46.46	-0.97	-93.10	5.42	125.84	34.95
32	STINGER	-29.93	-13.49	0.01	-0.287	20.778	110.12	46.17	-1.17	-80.95	-44.68	124.70	34.64
34	STINGER	-36.14	-15.90	0.07	-0.831	21.484	116.79	45.87	-1.38	-29.70	-28.47	81.44	22.62
36	SAGBEND	-47.31	-20.28	0.27	-1.041	21.083	128.79	45.32	-1.76	31.05	2.59	72.48	20.13
37	SAGBEND	-58.55	-24.50	0.46	-0.907	20.024	140.79	44.79	-2.13	36.87	5.16	77.43	21.51
38	SAGBEND	-69.86	-28.50	0.62	-0.745	18.891	152.79	44.28	-2.47	37.90	5.24	78.03	21.67
39	SAGBEND	-81.25	-32.27	0.76	-0.587	17.735	164.79	43.81	-2.80	38.49	5.02	78.20	21.72
40	SAGBEND	-92.72	-35.80	0.86	-0.438	16.563	176.79	43.36	-3.11	39.01	4.78	78.34	21.76
41	SAGBEND	-104.25	-39.10	0.93	-0.296	15.377	188.79	42.94	-3.39	39.50	4.54	78.46	21.79
42	SAGBEND	-115.86	-42.17	0.98	-0.163	14.177	200.79	42.55	-3.66	39.94	4.24	78.57	21.82
43	SAGBEND	-127.52	-44.98	1.00	-0.039	12.964	212.79	42.20	-3.90	40.36	3.90	78.66	21.85
44	SAGBEND	-139.24	-47.55	0.99	0.074	11.740	224.79	41.87	-4.13	40.74	3.54	78.74	21.87
45	SAGBEND	-151.02	-49.86	0.97	0.175	10.503	236.79	41.58	-4.33	41.08	3.16	78.81	21.89
46	SAGBEND	-162.84	-51.92	0.92	0.265	9.257	248.79	41.32	-4.50	41.39	2.81	78.86	21.91
47	SAGBEND	-174.70	-53.72	0.86	0.345	8.002	260.79	41.09	-4.66	41.66	2.65	78.93	21.92
48	SAGBEND	-186.60	-55.26	0.78	0.423	6.740	272.79	40.90	-4.79	41.91	2.64	78.99	21.94
49	SAGBEND	-198.53	-56.54	0.68	0.501	5.472	284.79	40.74	-4.90	42.13	2.65	79.02	21.95
50	SAGBEND	-210.49	-57.55	0.57	0.580	4.197	296.79	40.61	-4.99	42.29	2.65	79.03	21.95
51	SAGBEND	-222.47	-58.30	0.44	0.657	2.920	308.79	40.52	-5.06	42.31	2.59	78.94	21.93
52	SAGBEND	-234.46	-58.77	0.30	0.727	1.651	320.79	40.46	-5.10	41.38	1.93	78.05	21.68
53	SAGBEND	-246.45	-58.99	0.14	0.721	0.493	332.79	40.43	-5.12	31.81	-5.14	70.22	19.51
54	SEABED	-258.45	-59.03	0.03	0.315	0.018	344.79	40.43	-5.12	4.16	-17.08	57.91	16.09
55	SEABED	-270.45	-59.03	0.00	0.017	-0.005	356.79	40.43	-5.12	-0.22	-3.05	45.67	12.69
56	SEABED	-282.45	-59.03	0.00	-0.003	0.000	368.79	40.43	-5.12	-0.05	0.11	43.31	12.03
57	SEABED	-294.45	-59.03	0.00	0.000	0.000	380.79	40.43	-5.12	0.00	0.03	43.24	12.01
58	SEABED	-306.45	-59.03	0.00	0.000	0.000	392.79	40.43	-5.12	0.00	0.00	43.22	12.00
59	SEABED	-318.45	-59.03	0.00	0.000	0.000	404.79	40.43	-5.12	0.00	0.00	43.22	12.00
60	SEABED	-330.45	-59.03	0.00	0.000	0.000	416.79	40.43	-5.12	0.00	0.00	43.22	12.00

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.270	0.00	48.81	0.00	0.00	0.00	48.81	13.56
3	LAYBARGE	71.49	6.16	0.00	-0.001	0.960	6.30	48.79	0.00	-119.67	0.14	150.49	41.80
5	LAYBARGE	65.38	5.98	0.00	-0.001	2.230	12.42	48.77	0.00	-86.51	0.11	122.29	33.97
7	LAYBARGE	59.91	5.72	0.00	0.000	3.282	17.89	48.72	0.00	-97.73	0.12	131.78	36.61
9	LAYBARGE	53.32	5.27	0.00	0.000	4.502	24.49	48.66	0.00	-94.17	0.11	128.69	35.75
11	LAYBARGE	47.32	4.74	0.00	0.000	5.739	30.51	48.57	0.00	-108.67	0.12	140.93	39.15
13	LAYBARGE	38.22	3.69	0.00	0.000	7.424	39.68	48.41	0.00	-124.29	0.13	154.04	42.79
15	LAYBARGE	29.27	2.39	0.00	0.000	9.100	48.72	48.22	0.00	-107.66	0.14	139.73	38.81
17	LAYBARGE	23.13	1.33	0.00	-0.001	10.369	54.95	48.06	0.00	-96.03	-0.19	129.68	36.02
19	LAYBARGE	17.18	0.19	0.00	0.001	11.438	61.01	47.89	0.00	-80.67	0.42	116.40	32.33
21	LAYBARGE	10.63	-1.22	0.00	-0.014	13.044	67.72	47.69	-0.11	-153.28	-4.30	178.08	49.47
24	STINGER	-4.61	-5.09	0.00	0.014	15.309	83.44	47.21	-0.44	-127.50	-4.22	155.85	43.29
26	STINGER	-11.02	-6.94	0.00	-0.004	16.572	90.11	46.99	-0.60	-58.15	-0.27	96.70	26.86
28	STINGER	-17.40	-8.88	0.00	0.000	17.452	96.77	46.74	-0.77	-74.64	-1.23	110.55	30.71
30	STINGER	-23.74	-10.94	0.00	0.000	18.428	103.44	46.48	-0.95	-71.49	-1.05	107.68	29.91
32	STINGER	-30.05	-13.10	0.00	0.074	19.323	110.11	46.21	-1.14	-64.23	9.12	101.69	28.25
34	STINGER	-36.32	-15.36	0.00	-0.358	20.555	116.77	45.91	-1.33	-118.17	-69.15	162.79	45.22
36	SAGBEND	-47.51	-19.69	0.17	-1.035	21.135	128.77	45.38	-1.71	22.74	-1.76	65.48	18.19
37	SAGBEND	-58.73	-23.93	0.37	-0.942	20.170	140.77	44.84	-2.08	36.07	4.91	76.74	21.32
38	SAGBEND	-70.03	-27.96	0.54	-0.783	19.046	152.77	44.33	-2.43	37.80	5.29	77.94	21.65
39	SAGBEND	-81.41	-31.76	0.68	-0.627	17.894	164.77	43.85	-2.76	38.44	5.11	78.16	21.71
40	SAGBEND	-92.87	-35.33	0.79	-0.476	16.724	176.77	43.40	-3.07	38.96	4.87	78.29	21.75
41	SAGBEND	-104.40	-38.67	0.87	-0.333	15.541	188.77	42.98	-3.35	39.44	4.63	78.40	21.78
42	SAGBEND	-115.99	-41.76	0.92	-0.199	14.343	200.77	42.59	-3.62	39.87	4.33	78.52	21.81
43	SAGBEND	-127.65	-44.61	0.95	-0.073	13.131	212.77	42.23	-3.87	40.30	3.99	78.62	21.84
44	SAGBEND	-139.36	-47.21	0.95	0.041	11.907	224.77	41.90	-4.10	40.68	3.63	78.71	21.86
45	SAGBEND	-151.13	-49.56	0.93	0.144	10.672	236.77	41.60	-4.30	41.04	3.25	78.78	21.88
46	SAGBEND	-162.94	-51.66	0.90	0.234	9.428	248.77	41.34	-4.48	41.38	2.87	78.85	21.90
47	SAGBEND	-174.80	-53.49	0.84	0.316	8.175	260.77	41.11	-4.64	41.66	2.68	78.94	21.93
48	SAGBEND	-186.70	-55.07	0.76	0.394	6.914	272.77	40.91	-4.78	41.93	2.65	79.01	21.95
49	SAGBEND	-198.62	-56.38	0.67	0.473	5.645	284.77	40.74	-4.89	42.14	2.67	79.05	21.96
50	SAGBEND	-210.58	-57.43	0.57	0.551	4.371	296.77	40.61	-4.98	42.30	2.68	79.05	21.96
51	SAGBEND	-222.55	-58.21	0.44	0.628	3.094	308.77	40.51	-5.05	42.35	2.63	78.98	21.94
52	SAGBEND	-234.54	-58.72	0.31	0.700	1.822	320.77	40.45	-5.09	41.69	2.11	78.31	21.75
53	SAGBEND	-246.54	-58.98	0.15	0.714	0.629	332.77	40.42	-5.11	34.69	-3.27	72.51	20.14
54	SEABED	-258.54	-59.03	0.03	0.365	0.036	344.77	40.41	-5.12	6.25	-16.85	58.18	16.16
55	SEABED	-270.54	-59.03	0.00	0.028	-0.006	356.77	40.41	-5.12	-0.19	-4.11	46.54	12.93
56	SEABED	-282.54	-59.03	0.00	-0.003	-0.001	368.77	40.41	-5.12	-0.07	0.07	43.28	12.02
57	SEABED	-294.54	-59.03	0.00	0.000	0.000	380.77	40.41	-5.12	0.00	0.04	43.23	12.01
58	SEABED	-306.54	-59.03	0.00	0.000	0.000	392.77	40.41	-5.12	0.00	0.00	43.20	12.00
59	SEABED	-318.54	-59.03	0.00	0.000	0.000	404.77	40.41	-5.12	0.00	0.00	43.20	12.00
60	SEABED	-330.54	-59.03	0.00	0.000	0.000	416.77	40.41	-5.12	0.00	0.00	43.20	12.00


OFFPIPE 8 - V 8.02EX - Date: 1/11/20 - User: BAGAS ADIYAN PRASTOWO - Job: ANALISIS DINAMIS
Project: TUGAS AKHIR CLUSTER I PHE WMO 8.625 in
MAXIMUM DYNAMIC STRESS 45 DEG
PIPE Y COORDINATE - Meters
MAXIMUM TOTAL STRESS - M-Pascal
PIPE X COORDINATE - Meters


OFFPIPE 8 - V 8.02EX - Date: 1/11/20 - User: BAGAS ADIYAN PRASTOWO - Job: ANALISIS DINAMIS
Project: TUGAS AKHIR CLUSTER I PHE WMO 8.625 in
DYNAMIC STRESS AT STINGER TIP
DYNAMIC TOTAL STRESS - M-Pascal
TIME HISTORY - Seconds

Ouput Analisis Dinamis Heading 90°

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.266	0.00	37.33	0.00	0.00	0.00	37.33	10.37
3	LAYBARGE	71.49	6.16	0.00	0.000	0.958	6.30	37.30	0.00	-117.11	-0.92	136.85	38.01
5	LAYBARGE	65.37	5.99	0.00	0.000	2.232	12.42	37.28	0.00	-84.38	-0.70	109.01	30.28
7	LAYBARGE	59.91	5.73	0.00	-0.001	3.279	17.89	37.24	0.00	-95.36	-0.76	118.30	32.86
9	LAYBARGE	53.32	5.28	0.00	-0.001	4.504	24.49	37.18	0.00	-91.84	-0.75	115.24	32.01
11	LAYBARGE	47.32	4.74	0.00	-0.001	5.732	30.51	37.09	0.00	-104.79	-0.79	126.16	35.05
13	LAYBARGE	38.21	3.70	0.00	-0.002	7.424	39.68	36.93	0.00	-118.62	-0.85	137.75	38.26
15	LAYBARGE	29.27	2.39	0.00	-0.002	9.106	48.72	36.74	0.00	-103.88	0.84	125.04	34.73
17	LAYBARGE	23.13	1.34	0.00	-0.003	10.365	54.95	36.58	0.00	-93.25	-0.95	115.84	32.18
19	LAYBARGE	17.18	0.19	0.00	-0.001	11.450	61.01	36.41	0.00	-81.28	1.09	105.46	29.30
21	LAYBARGE	10.63	-1.22	0.00	-0.018	12.983	67.72	36.20	-0.11	-136.34	-6.02	152.19	42.28
24	STINGER	-4.64	-5.13	0.00	0.015	16.018	83.47	35.69	-0.45	-185.41	-6.13	193.54	53.76
26	STINGER	-11.00	-7.10	0.00	-0.019	18.216	90.14	35.46	-0.62	-119.67	-3.61	137.19	38.11
28	STINGER	-17.30	-9.28	0.00	0.041	20.066	96.81	35.17	-0.81	-139.95	13.07	154.64	42.96
30	STINGER	-23.53	-11.68	0.00	-0.230	21.924	103.47	34.87	-1.02	-131.44	-52.70	149.32	41.48
32	STINGER	-29.68	-14.24	0.06	-0.858	23.152	110.14	34.56	-1.24	-61.67	-45.66	100.19	27.83
34	STINGER	-35.80	-16.89	0.18	-1.186	23.321	116.81	34.23	-1.47	20.91	-9.26	51.46	14.30
36	SAGBEND	-46.86	-21.54	0.41	-1.128	22.204	128.81	33.63	-1.88	46.27	8.01	74.27	20.63
37	SAGBEND	-58.02	-25.93	0.61	-0.917	20.725	140.81	33.06	-2.26	50.90	9.15	78.03	21.67
38	SAGBEND	-69.30	-30.03	0.77	-0.695	19.174	152.81	32.54	-2.61	52.56	8.76	78.95	21.93
39	SAGBEND	-80.69	-33.81	0.89	-0.488	17.592	164.81	32.06	-2.94	53.70	8.23	79.49	22.08
40	SAGBEND	-92.18	-37.28	0.97	-0.283	15.980	176.81	31.61	-3.24	54.63	7.70	79.93	22.20
41	SAGBEND	-103.76	-40.42	1.01	-0.094	14.343	188.81	31.22	-3.52	55.39	7.09	80.32	22.31
42	SAGBEND	-115.42	-43.22	1.01	0.083	12.682	200.81	30.86	-3.76	56.03	6.47	80.63	22.40
43	SAGBEND	-127.17	-45.68	0.98	0.251	10.996	212.81	30.55	-3.97	56.59	5.93	80.85	22.46
44	SAGBEND	-138.98	-47.80	0.91	0.402	9.285	224.81	30.28	-4.15	57.17	5.50	80.97	22.49
45	SAGBEND	-150.85	-49.56	0.81	0.539	7.555	236.81	30.06	-4.30	57.81	5.17	80.98	22.49
46	SAGBEND	-162.77	-50.95	0.68	0.668	5.819	248.81	29.89	-4.42	58.35	4.83	81.07	22.52
47	SAGBEND	-174.72	-51.99	0.53	0.780	4.070	260.81	29.76	-4.51	58.63	4.42	80.88	22.47
48	SAGBEND	-186.70	-52.65	0.36	0.875	2.335	272.81	29.68	-4.57	57.21	3.09	79.26	22.02
49	SAGBEND	-198.70	-52.97	0.17	0.873	0.759	284.81	29.64	-4.59	45.57	-5.95	70.13	19.48
50	SEABED	-210.69	-53.03	0.03	0.399	0.023	296.81	29.64	-4.60	7.61	-22.10	50.79	14.11
51	SEABED	-222.69	-53.03	0.00	0.015	-0.010	308.81	29.64	-4.60	-0.57	-4.37	35.20	9.78
52	SEABED	-234.69	-53.03	0.00	-0.005	0.000	320.81	29.64	-4.60	-0.10	0.29	32.42	9.00
53	SEABED	-246.69	-53.03	0.00	0.000	0.000	332.81	29.64	-4.60	0.01	0.05	32.22	8.95
54	SEABED	-258.69	-53.03	0.00	0.000	0.000	344.81	29.64	-4.60	0.00	-0.01	32.18	8.94
55	SEABED	-270.69	-53.03	0.00	0.000	0.000	356.81	29.64	-4.60	0.00	0.00	32.18	8.94
56	SEABED	-282.69	-53.03	0.00	0.000	0.000	368.81	29.64	-4.60	0.00	0.00	32.18	8.94
57	SEABED	-294.69	-53.03	0.00	0.000	0.000	380.81	29.64	-4.60	0.00	0.00	32.18	8.94

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.266	0.00	37.23	0.00	0.00	0.00	37.23	10.34
3	LAYBARGE	71.49	6.16	0.00	0.000	0.958	6.30	37.20	0.00	-117.07	-0.93	136.71	37.98
5	LAYBARGE	65.37	5.98	0.00	0.000	2.232	12.42	37.18	0.00	-84.35	-0.71	108.89	30.25
7	LAYBARGE	59.91	5.72	0.00	0.000	3.279	17.89	37.14	0.00	-95.32	-0.77	118.17	32.82
9	LAYBARGE	53.32	5.27	0.00	0.000	4.504	24.49	37.08	0.00	-91.81	-0.76	115.12	31.98
11	LAYBARGE	47.32	4.74	0.00	0.000	5.732	30.51	36.99	0.00	-104.73	-0.80	126.02	35.00
13	LAYBARGE	38.21	3.69	0.00	-0.001	7.424	39.68	36.83	0.00	-118.55	-0.87	137.60	38.22
15	LAYBARGE	29.27	2.39	0.00	-0.001	9.106	48.72	36.64	0.00	-103.77	0.86	124.84	34.68
17	LAYBARGE	23.13	1.33	0.00	-0.001	10.367	54.95	36.48	0.00	-93.52	-0.95	115.96	32.21
19	LAYBARGE	17.18	0.18	0.00	0.001	11.445	61.01	36.31	0.00	-80.08	1.05	104.37	28.99
21	LAYBARGE	10.63	-1.23	0.00	-0.014	13.004	67.72	36.10	-0.11	-140.83	-5.91	155.89	43.30
24	STINGER	-4.62	-5.11	0.00	0.013	15.563	83.45	35.61	-0.45	-140.45	-5.88	155.24	43.12
26	STINGER	-11.01	-6.99	0.00	-0.004	17.116	90.12	35.38	-0.61	-78.61	-1.14	102.44	28.45
28	STINGER	-17.37	-9.02	0.00	-0.002	18.317	96.78	35.12	-0.79	-92.98	-2.22	114.14	31.71
30	STINGER	-23.67	-11.19	0.00	0.004	19.623	103.45	34.84	-0.98	-95.51	4.20	116.52	32.37
32	STINGER	-29.93	-13.49	0.00	-0.024	20.827	110.12	34.55	-1.18	-90.88	-18.60	111.27	30.91
34	STINGER	-36.13	-15.93	0.02	-0.520	22.051	116.79	34.23	-1.39	-106.16	-69.39	142.66	39.63
36	SAGBEND	-47.22	-20.52	0.22	-1.158	22.347	128.79	33.66	-1.79	32.61	-3.74	61.32	17.03
37	SAGBEND	-58.36	-24.96	0.43	-1.024	21.055	140.79	33.09	-2.17	48.67	8.82	76.11	21.14
38	SAGBEND	-69.61	-29.13	0.61	-0.817	19.536	152.79	32.56	-2.53	51.96	9.37	78.63	21.84
39	SAGBEND	-80.98	-32.99	0.75	-0.597	17.961	164.79	32.07	-2.87	53.40	8.91	79.48	22.08
40	SAGBEND	-92.44	-36.53	0.84	-0.398	16.350	176.79	31.62	-3.18	54.51	8.14	80.02	22.23
41	SAGBEND	-104.00	-39.74	0.91	-0.201	14.716	188.79	31.21	-3.46	55.40	7.54	80.39	22.33
42	SAGBEND	-115.65	-42.62	0.93	-0.017	13.056	200.79	30.84	-3.70	56.07	6.84	80.62	22.39
43	SAGBEND	-127.38	-45.16	0.91	0.147	11.371	212.79	30.52	-3.92	56.50	6.27	80.70	22.42
44	SAGBEND	-139.18	-47.35	0.87	0.305	9.665	224.79	30.24	-4.11	56.99	5.83	80.86	22.46
45	SAGBEND	-151.04	-49.19	0.79	0.449	7.945	236.79	30.01	-4.27	57.60	5.46	80.93	22.48
46	SAGBEND	-162.94	-50.67	0.68	0.579	6.211	248.79	29.83	-4.40	58.30	5.19	81.05	22.51
47	SAGBEND	-174.89	-51.78	0.55	0.702	4.467	260.79	29.69	-4.49	58.65	4.80	80.95	22.49
48	SAGBEND	-186.86	-52.54	0.39	0.805	2.726	272.79	29.60	-4.56	57.86	3.88	79.94	22.21
49	SAGBEND	-198.86	-52.93	0.21	0.853	1.082	284.79	29.55	-4.59	50.23	-1.66	73.64	20.46
50	SEABED	-210.85	-53.03	0.06	0.553	0.083	296.79	29.54	-4.60	14.11	-20.61	51.71	14.36
51	SEABED	-222.85	-53.03	0.00	0.052	-0.013	308.79	29.54	-4.60	-0.51	-8.52	38.58	10.72
52	SEABED	-234.85	-53.03	0.00	-0.007	-0.001	320.79	29.54	-4.60	-0.18	0.24	32.30	8.97
53	SEABED	-246.85	-53.03	0.00	-0.001	0.000	332.79	29.54	-4.60	0.01	0.10	32.15	8.93
54	SEABED	-258.85	-53.03	0.00	0.000	0.000	344.79	29.54	-4.60	0.00	-0.01	32.09	8.91
55	SEABED	-270.85	-53.03	0.00	0.000	0.000	356.79	29.54	-4.60	0.00	0.00	32.09	8.91
56	SEABED	-282.85	-53.03	0.00	0.000	0.000	368.79	29.54	-4.60	0.00	0.00	32.09	8.91
57	SEABED	-294.85	-53.03	0.00	0.000	0.000	380.79	29.54	-4.60	0.00	0.00	32.09	8.91

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.20	0.00	0.000	0.266	0.00	37.26	0.00	0.00	0.00	37.26	10.35
3	LAYBARGE	71.49	6.15	0.00	0.000	0.958	6.30	37.24	0.00	-117.10	-0.86	136.77	37.99
5	LAYBARGE	65.37	5.98	0.00	0.000	2.232	12.42	37.22	0.00	-84.37	-0.65	108.93	30.26
7	LAYBARGE	59.91	5.72	0.00	0.000	3.279	17.89	37.18	0.00	-95.34	-0.72	118.22	32.84
9	LAYBARGE	53.32	5.27	0.00	0.000	4.504	24.49	37.11	0.00	-91.83	-0.70	115.17	31.99
11	LAYBARGE	47.32	4.73	0.00	0.000	5.732	30.51	37.03	0.00	-104.77	-0.74	126.08	35.02
13	LAYBARGE	38.21	3.69	0.00	0.000	7.424	39.68	36.86	0.00	-118.61	-0.80	137.68	38.24
15	LAYBARGE	29.27	2.38	0.00	0.000	9.105	48.72	36.67	0.00	-103.77	0.78	124.88	34.69
17	LAYBARGE	23.13	1.33	0.00	-0.001	10.367	54.95	36.51	0.00	-93.66	-0.88	116.12	32.26
19	LAYBARGE	17.18	0.18	0.00	0.001	11.442	61.01	36.34	0.00	-79.53	0.99	103.94	28.87
21	LAYBARGE	10.63	-1.23	0.00	-0.015	13.014	67.72	36.13	-0.11	-143.13	-5.76	157.89	43.86
24	STINGER	-4.61	-5.10	0.00	0.013	15.338	83.44	35.64	-0.45	-118.23	-5.66	136.42	37.90
26	STINGER	-11.02	-6.94	0.00	-0.001	16.565	90.11	35.42	-0.61	-57.27	1.35	84.35	23.43
28	STINGER	-17.40	-8.89	0.00	-0.014	17.455	96.77	35.17	-0.78	-73.44	-4.66	97.95	27.21
30	STINGER	-23.74	-10.94	0.01	0.055	18.415	103.44	34.91	-0.96	-68.62	15.63	93.12	25.87
32	STINGER	-30.05	-13.10	0.00	0.090	19.232	110.11	34.64	-1.14	-57.13	-10.53	84.34	23.43
34	STINGER	-36.32	-15.37	0.01	-0.465	20.960	116.77	34.30	-1.34	-190.06	-82.33	210.90	58.58
36	SAGBEND	-47.43	-19.89	0.19	-1.167	22.394	128.77	33.77	-1.73	20.26	-4.84	51.96	14.43
37	SAGBEND	-58.56	-24.36	0.41	-1.057	21.248	140.77	33.19	-2.12	47.32	8.93	74.83	20.79
38	SAGBEND	-69.80	-28.57	0.59	-0.831	19.751	152.77	32.66	-2.49	51.76	9.52	78.41	21.78
39	SAGBEND	-81.14	-32.47	0.74	-0.622	18.182	164.77	32.16	-2.83	53.25	9.13	79.35	22.04
40	SAGBEND	-92.60	-36.06	0.84	-0.414	16.573	176.77	31.70	-3.14	54.27	8.35	79.84	22.18
41	SAGBEND	-104.14	-39.32	0.91	-0.218	14.943	188.77	31.28	-3.42	55.08	7.75	80.17	22.27
42	SAGBEND	-115.78	-42.24	0.93	-0.041	13.285	200.77	30.91	-3.67	55.83	7.04	80.49	22.36
43	SAGBEND	-127.50	-44.83	0.92	0.136	11.602	212.77	30.58	-3.90	56.52	6.29	80.81	22.45
44	SAGBEND	-139.29	-47.07	0.88	0.291	9.901	224.77	30.30	-4.09	57.12	5.82	81.01	22.50
45	SAGBEND	-151.14	-48.95	0.80	0.434	8.184	236.77	30.06	-4.25	57.80	5.51	81.10	22.53
46	SAGBEND	-163.04	-50.48	0.70	0.568	6.447	248.77	29.87	-4.38	58.32	5.31	81.20	22.56
47	SAGBEND	-174.98	-51.65	0.57	0.690	4.709	260.77	29.73	-4.48	58.79	4.96	81.15	22.54
48	SAGBEND	-186.95	-52.45	0.42	0.796	2.964	272.77	29.63	-4.55	58.18	4.18	80.26	22.29
49	SAGBEND	-198.94	-52.90	0.24	0.859	1.294	284.77	29.57	-4.59	52.32	-0.95	75.30	20.92
50	SEABED	-210.94	-53.03	0.07	0.637	0.146	296.77	29.56	-4.60	20.10	-19.08	53.52	14.87
51	SEABED	-222.94	-53.03	0.00	0.084	-0.015	308.77	29.56	-4.60	-0.32	-12.04	41.43	11.51
52	SEABED	-234.94	-53.03	0.00	-0.007	-0.002	320.77	29.56	-4.60	-0.25	0.16	32.29	8.97
53	SEABED	-246.94	-53.03	0.00	-0.001	0.000	332.77	29.56	-4.60	0.00	0.15	32.19	8.94
54	SEABED	-258.94	-53.03	0.00	0.000	0.000	344.77	29.56	-4.60	0.00	-0.01	32.11	8.92
55	SEABED	-270.94	-53.03	0.00	0.000	0.000	356.77	29.56	-4.60	0.00	0.00	32.11	8.92
56	SEABED	-282.94	-53.03	0.00	0.000	0.000	368.77	29.56	-4.60	0.00	0.00	32.11	8.92
57	SEABED	-294.94	-53.03	0.00	0.000	0.000	380.77	29.56	-4.60	0.00	0.00	32.11	8.92

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.270	0.00	49.74	0.00	0.00	0.00	49.74	13.82
3	LAYBARGE	71.49	6.16	0.00	0.000	0.960	6.30	49.72	0.00	-119.96	0.97	151.68	42.13
5	LAYBARGE	65.37	5.98	0.00	0.001	2.230	12.42	49.70	0.00	-86.73	0.73	123.42	34.28
7	LAYBARGE	59.91	5.72	0.00	0.001	3.282	17.89	49.66	0.00	-97.98	0.81	132.95	36.93
9	LAYBARGE	53.32	5.27	0.00	0.002	4.501	24.49	49.59	0.00	-94.41	0.79	129.84	36.07
11	LAYBARGE	47.32	4.74	0.00	0.002	5.739	30.51	49.51	0.00	-109.09	0.85	142.24	39.51
13	LAYBARGE	38.21	3.69	0.00	0.003	7.423	39.68	49.35	0.00	-124.88	0.93	155.50	43.19
15	LAYBARGE	29.27	2.39	0.00	0.004	9.100	48.72	49.15	0.00	-108.15	0.92	141.08	39.19
17	LAYBARGE	23.13	1.33	0.00	0.004	10.368	54.95	49.00	0.00	-95.93	-0.88	130.54	36.26
19	LAYBARGE	17.18	0.19	0.00	0.006	11.443	61.01	48.82	0.00	-82.13	1.09	118.64	32.96
21	LAYBARGE	10.63	-1.23	0.00	-0.008	13.021	67.72	48.62	-0.11	-149.13	-5.71	175.44	48.73
24	STINGER	-4.64	-5.13	0.00	0.013	15.978	83.47	48.10	-0.45	-200.44	-8.90	218.73	60.76
26	STINGER	-11.00	-7.10	0.00	0.033	18.221	90.14	47.88	-0.62	-125.35	15.03	154.92	43.03
28	STINGER	-17.31	-9.29	0.01	-0.343	19.956	96.81	47.60	-0.81	-135.91	-65.58	171.42	47.62
30	STINGER	-23.55	-11.64	0.09	-0.983	20.994	103.47	47.32	-1.02	-32.87	-28.69	84.51	23.47
32	STINGER	-29.77	-14.03	0.20	-1.147	20.929	110.14	47.02	-1.22	23.77	-3.39	65.89	18.30
34	STINGER	-36.00	-16.38	0.33	-1.110	20.452	116.81	46.71	-1.43	33.53	5.56	75.51	20.97
36	SAGBEND	-47.28	-20.47	0.54	-0.952	19.370	128.81	46.19	-1.78	37.24	6.60	79.19	22.00
37	SAGBEND	-58.64	-24.34	0.72	-0.790	18.237	140.81	45.70	-2.12	38.19	6.49	79.66	22.13
38	SAGBEND	-70.07	-27.98	0.86	-0.629	17.085	152.81	45.23	-2.44	38.86	6.29	79.82	22.17
39	SAGBEND	-81.58	-31.39	0.97	-0.470	15.917	164.81	44.80	-2.73	39.40	5.94	79.93	22.20
40	SAGBEND	-93.15	-34.56	1.06	-0.322	14.740	176.81	44.39	-3.01	39.87	5.60	80.03	22.23
41	SAGBEND	-104.79	-37.49	1.10	-0.181	13.545	188.81	44.02	-3.26	40.24	5.37	80.11	22.25
42	SAGBEND	-116.48	-40.18	1.13	-0.041	12.341	200.81	43.68	-3.49	40.58	5.01	80.17	22.27
43	SAGBEND	-128.23	-42.62	1.12	0.089	11.126	212.81	43.37	-3.70	40.86	4.60	80.18	22.27
44	SAGBEND	-140.03	-44.81	1.09	0.209	9.898	224.81	43.10	-3.89	41.07	4.31	80.13	22.26
45	SAGBEND	-151.87	-46.75	1.04	0.323	8.661	236.81	42.86	-4.06	41.30	3.95	80.02	22.23
46	SAGBEND	-163.75	-48.43	0.96	0.427	7.415	248.81	42.65	-4.21	41.60	3.73	79.94	22.21
47	SAGBEND	-175.67	-49.84	0.86	0.523	6.163	260.81	42.47	-4.33	41.98	3.51	79.93	22.20
48	SAGBEND	-187.61	-51.00	0.74	0.614	4.905	272.81	42.33	-4.43	42.31	3.31	79.85	22.18
49	SAGBEND	-199.58	-51.90	0.61	0.699	3.643	284.81	42.21	-4.50	42.49	3.15	79.70	22.14
50	SAGBEND	-211.56	-52.53	0.45	0.777	2.380	296.81	42.14	-4.56	42.33	2.86	79.30	22.03
51	SAGBEND	-223.55	-52.89	0.28	0.838	1.140	308.81	42.09	-4.59	39.78	1.25	77.12	21.42
52	SEABED	-235.55	-53.02	0.11	0.728	0.188	320.81	42.07	-4.60	19.66	-13.39	62.87	17.46
53	SEABED	-247.55	-53.03	0.01	0.198	-0.004	332.81	42.07	-4.60	1.09	-16.07	57.48	15.97
54	SEABED	-259.55	-53.03	0.00	0.002	-0.002	344.81	42.07	-4.60	-0.17	-1.49	45.67	12.69
55	SEABED	-271.55	-53.03	0.00	-0.002	0.000	356.81	42.07	-4.60	-0.02	0.13	44.65	12.40
56	SEABED	-283.55	-53.03	0.00	0.000	0.000	368.81	42.07	-4.60	0.00	0.02	44.57	12.38
57	SEABED	-295.55	-53.03	0.00	0.000	0.000	380.81	42.08	-4.60	0.00	0.00	44.55	12.38
58	SEABED	-307.55	-53.03	0.00	0.000	0.000	392.81	42.08	-4.60	0.00	0.00	44.55	12.38
59	SEABED	-319.55	-53.03	0.00	0.000	0.000	404.81	42.08	-4.60	0.00	0.00	44.55	12.38

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.270	0.00	49.69	0.00	0.00	0.00	49.69	13.80
3	LAYBARGE	71.49	6.16	0.00	0.000	0.960	6.30	49.67	0.00	-119.95	0.94	151.63	42.12
5	LAYBARGE	65.37	5.98	0.00	0.001	2.230	12.42	49.65	0.00	-86.73	0.71	123.37	34.27
7	LAYBARGE	59.91	5.72	0.00	0.001	3.282	17.89	49.61	0.00	-97.98	0.78	132.89	36.91
9	LAYBARGE	53.32	5.27	0.00	0.002	4.501	24.49	49.54	0.00	-94.40	0.77	129.78	36.05
11	LAYBARGE	47.32	4.74	0.00	0.002	5.739	30.51	49.46	0.00	-109.08	0.81	142.17	39.49
13	LAYBARGE	38.21	3.69	0.00	0.003	7.423	39.68	49.29	0.00	-124.87	0.87	155.44	43.18
15	LAYBARGE	29.27	2.39	0.00	0.003	9.100	48.72	49.10	0.00	-108.10	0.87	140.98	39.16
17	LAYBARGE	23.13	1.33	0.00	0.003	10.368	54.95	48.94	0.00	-96.13	-0.87	130.65	36.29
19	LAYBARGE	17.18	0.19	0.00	0.005	11.440	61.01	48.77	0.00	-81.29	1.01	117.86	32.74
21	LAYBARGE	10.63	-1.22	0.00	-0.009	13.036	67.72	48.56	-0.11	-152.57	-6.03	178.33	49.54
24	STINGER	-4.62	-5.11	0.00	0.020	15.531	83.45	48.07	-0.45	-152.14	-5.60	177.59	49.33
26	STINGER	-11.01	-6.99	0.00	0.001	17.122	90.12	47.85	-0.61	-80.67	-3.03	116.35	32.32
28	STINGER	-17.37	-9.02	0.00	0.013	18.317	96.78	47.59	-0.79	-100.41	8.89	133.24	37.01
30	STINGER	-23.67	-11.18	0.01	-0.230	19.502	103.45	47.31	-0.98	-86.27	-41.74	123.80	34.39
32	STINGER	-29.94	-13.46	0.07	-0.779	20.311	110.12	47.03	-1.17	-52.47	-41.09	104.18	28.94
34	STINGER	-36.19	-15.79	0.17	-1.071	20.412	116.79	46.73	-1.38	18.83	-6.89	62.05	17.24
36	SAGBEND	-47.46	-19.89	0.38	-1.015	19.518	128.79	46.21	-1.73	35.71	6.21	77.61	21.56
37	SAGBEND	-58.81	-23.79	0.57	-0.856	18.402	140.79	45.71	-2.07	38.00	6.70	79.42	22.06
38	SAGBEND	-70.23	-27.47	0.73	-0.690	17.253	152.79	45.24	-2.39	38.77	6.48	79.75	22.15
39	SAGBEND	-81.72	-30.91	0.85	-0.534	16.088	164.79	44.80	-2.69	39.33	6.19	79.91	22.20
40	SAGBEND	-93.28	-34.12	0.94	-0.383	14.910	176.79	44.39	-2.97	39.82	5.84	80.01	22.23
41	SAGBEND	-104.91	-37.08	1.01	-0.238	13.718	188.79	44.02	-3.23	40.23	5.45	80.07	22.24
42	SAGBEND	-116.60	-39.81	1.04	-0.099	12.515	200.79	43.67	-3.46	40.60	5.10	80.12	22.26
43	SAGBEND	-128.34	-42.29	1.05	0.031	11.301	212.79	43.36	-3.68	40.93	4.73	80.15	22.26
44	SAGBEND	-140.13	-44.51	1.03	0.154	10.075	224.79	43.08	-3.87	41.15	4.36	80.12	22.26
45	SAGBEND	-151.97	-46.48	0.98	0.269	8.837	236.79	42.83	-4.04	41.27	4.11	80.04	22.23
46	SAGBEND	-163.84	-48.20	0.92	0.376	7.592	248.79	42.61	-4.19	41.56	3.86	79.93	22.20
47	SAGBEND	-175.76	-49.65	0.83	0.473	6.341	260.79	42.43	-4.31	41.92	3.66	79.85	22.18
48	SAGBEND	-187.69	-50.85	0.72	0.563	5.087	272.79	42.28	-4.41	42.32	3.45	79.80	22.17
49	SAGBEND	-199.66	-51.78	0.59	0.652	3.825	284.79	42.17	-4.49	42.56	3.27	79.67	22.13
50	SAGBEND	-211.64	-52.45	0.45	0.732	2.564	296.79	42.08	-4.55	42.50	3.03	79.35	22.04
51	SAGBEND	-223.63	-52.86	0.29	0.796	1.316	308.79	42.03	-4.58	40.67	1.83	77.74	21.59
52	SEABED	-235.63	-53.01	0.12	0.733	0.276	320.79	42.02	-4.60	24.81	-10.93	65.79	18.28
53	SEABED	-247.63	-53.03	0.02	0.240	0.001	332.79	42.02	-4.60	2.02	-17.03	58.48	16.24
54	SEABED	-259.63	-53.03	0.00	0.008	-0.003	344.79	42.02	-4.60	-0.21	-2.37	46.04	12.79
55	SEABED	-271.63	-53.03	0.00	-0.002	0.000	356.79	42.02	-4.60	-0.03	0.14	44.59	12.39
56	SEABED	-283.63	-53.03	0.00	0.000	0.000	368.79	42.02	-4.60	0.00	0.03	44.51	12.36
57	SEABED	-295.63	-53.03	0.00	0.000	0.000	380.79	42.02	-4.60	0.00	0.00	44.50	12.36
58	SEABED	-307.63	-53.03	0.00	0.000	0.000	392.79	42.02	-4.60	0.00	0.00	44.50	12.36
59	SEABED	-319.63	-53.03	0.00	0.000	0.000	404.79	42.02	-4.60	0.00	0.00	44.49	12.36

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.270	0.00	49.61	0.00	0.00	0.00	49.61	13.78
3	LAYBARGE	71.49	6.16	0.00	0.000	0.960	6.30	49.59	0.00	-119.93	0.89	151.53	42.09
5	LAYBARGE	65.37	5.99	0.00	0.000	2.230	12.42	49.57	0.00	-86.71	0.68	123.28	34.24
7	LAYBARGE	59.91	5.72	0.00	0.000	3.282	17.89	49.53	0.00	-97.96	0.74	132.80	36.89
9	LAYBARGE	53.32	5.27	0.00	0.000	4.501	24.49	49.46	0.00	-94.39	0.73	129.69	36.03
11	LAYBARGE	47.32	4.74	0.00	0.001	5.739	30.51	49.38	0.00	-109.05	0.78	142.07	39.46
13	LAYBARGE	38.21	3.69	0.00	0.001	7.423	39.68	49.22	0.00	-124.83	0.85	155.33	43.15
15	LAYBARGE	29.27	2.39	0.00	0.001	9.100	48.72	49.02	0.00	-108.04	0.84	140.86	39.13
17	LAYBARGE	23.13	1.33	0.00	0.001	10.369	54.95	48.87	0.00	-96.22	-0.88	130.65	36.29
19	LAYBARGE	17.18	0.19	0.00	0.003	11.438	61.01	48.70	0.00	-80.85	0.98	117.40	32.61
21	LAYBARGE	10.63	-1.22	0.00	-0.013	13.044	67.72	48.49	-0.11	-154.15	-5.92	179.57	49.88
24	STINGER	-4.61	-5.09	0.00	0.016	15.309	83.44	48.00	-0.45	-128.29	-5.76	157.29	43.69
26	STINGER	-11.02	-6.94	0.00	-0.002	16.571	90.11	47.78	-0.61	-58.29	-0.66	97.36	27.04
28	STINGER	-17.40	-8.88	0.00	0.004	17.454	96.77	47.53	-0.78	-76.49	-3.63	112.86	31.35
30	STINGER	-23.74	-10.94	0.00	-0.002	18.418	103.44	47.27	-0.96	-74.06	-12.32	110.22	30.62
32	STINGER	-30.05	-13.09	0.01	-0.228	19.247	110.11	47.00	-1.14	-63.74	-35.04	104.34	28.98
34	STINGER	-36.33	-15.33	0.06	-0.732	19.873	116.77	46.72	-1.34	-50.79	-41.91	103.25	28.68
36	SAGBEND	-47.61	-19.41	0.26	-1.029	19.588	128.77	46.20	-1.69	31.14	3.53	72.55	20.15
37	SAGBEND	-58.95	-23.33	0.45	-0.899	18.534	140.77	45.70	-2.03	37.37	6.53	78.85	21.90
38	SAGBEND	-70.36	-27.03	0.62	-0.735	17.392	152.77	45.22	-2.35	38.56	6.61	79.53	22.09
39	SAGBEND	-81.85	-30.51	0.75	-0.582	16.229	164.77	44.78	-2.66	39.25	6.24	79.79	22.16
40	SAGBEND	-93.40	-33.74	0.85	-0.430	15.052	176.77	44.37	-2.94	39.78	5.92	79.94	22.21
41	SAGBEND	-105.02	-36.74	0.93	-0.281	13.864	188.77	43.99	-3.20	40.19	5.65	80.01	22.22
42	SAGBEND	-116.70	-39.49	0.97	-0.145	12.662	200.77	43.64	-3.44	40.52	5.26	80.06	22.24
43	SAGBEND	-128.44	-42.00	0.99	-0.013	11.448	212.77	43.32	-3.65	40.84	4.87	80.08	22.24
44	SAGBEND	-140.22	-44.25	0.98	0.116	10.225	224.77	43.03	-3.85	41.12	4.54	80.07	22.24
45	SAGBEND	-152.06	-46.25	0.94	0.229	8.989	236.77	42.78	-4.02	41.30	4.16	80.00	22.22
46	SAGBEND	-163.93	-48.00	0.88	0.334	7.744	248.77	42.56	-4.17	41.43	3.92	79.89	22.19
47	SAGBEND	-175.83	-49.49	0.80	0.434	6.495	260.77	42.38	-4.30	41.81	3.68	79.75	22.15
48	SAGBEND	-187.77	-50.72	0.70	0.528	5.240	272.77	42.22	-4.40	42.18	3.49	79.66	22.13
49	SAGBEND	-199.73	-51.68	0.58	0.614	3.981	284.77	42.10	-4.49	42.42	3.33	79.55	22.10
50	SAGBEND	-211.71	-52.38	0.45	0.693	2.718	296.77	42.02	-4.54	42.41	3.10	79.31	22.03
51	SAGBEND	-223.70	-52.82	0.30	0.761	1.469	308.77	41.96	-4.58	41.13	2.07	78.06	21.68
52	SEABED	-235.70	-53.01	0.13	0.735	0.369	320.77	41.94	-4.60	28.85	-7.74	68.54	19.04
53	SEABED	-247.70	-53.03	0.02	0.277	0.007	332.77	41.94	-4.60	3.03	-17.43	58.48	16.24
54	SEABED	-259.70	-53.03	0.00	0.011	-0.004	344.77	41.94	-4.60	-0.22	-2.84	46.46	12.91
55	SEABED	-271.70	-53.03	0.00	-0.003	0.000	356.77	41.94	-4.60	-0.04	0.12	44.50	12.36
56	SEABED	-283.70	-53.03	0.00	0.000	0.000	368.77	41.94	-4.60	0.00	0.03	44.44	12.34
57	SEABED	-295.70	-53.03	0.00	0.000	0.000	380.77	41.94	-4.60	0.00	0.00	44.42	12.34
58	SEABED	-307.70	-53.03	0.00	0.000	0.000	392.77	41.94	-4.60	0.00	0.00	44.42	12.34
59	SEABED	-319.70	-53.03	0.00	0.000	0.000	404.77	41.94	-4.60	0.00	0.00	44.42	12.34

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.266	0.00	37.31	0.00	0.00	0.00	37.31	10.36
3	LAYBARGE	71.49	6.16	0.00	0.000	0.958	6.30	37.29	0.00	-117.10	0.91	136.83	38.01
5	LAYBARGE	65.37	5.98	0.00	0.001	2.232	12.42	37.27	0.00	-84.38	0.69	108.99	30.27
7	LAYBARGE	59.91	5.72	0.00	0.001	3.279	17.89	37.22	0.00	-95.35	0.75	118.27	32.85
9	LAYBARGE	53.32	5.27	0.00	0.002	4.504	24.49	37.16	0.00	-91.84	0.74	115.22	32.01
11	LAYBARGE	47.32	4.74	0.00	0.002	5.732	30.51	37.07	0.00	-104.79	0.79	126.14	35.04
13	LAYBARGE	38.21	3.69	0.00	0.003	7.424	39.68	36.91	0.00	-118.61	0.85	137.73	38.26
15	LAYBARGE	29.27	2.39	0.00	0.003	9.106	48.72	36.72	0.00	-103.88	0.85	125.01	34.73
17	LAYBARGE	23.13	1.33	0.00	0.003	10.365	54.95	36.56	0.00	-93.25	-0.86	115.82	32.17
19	LAYBARGE	17.18	0.19	0.00	0.006	11.450	61.01	36.39	0.00	-81.31	1.07	105.50	29.31
21	LAYBARGE	10.63	-1.22	0.00	-0.010	12.983	67.72	36.18	-0.11	-136.31	-5.84	152.15	42.26
24	STINGER	-4.64	-5.13	0.00	0.023	16.018	83.47	35.67	-0.45	-185.37	-6.18	193.49	53.75
26	STINGER	-11.00	-7.10	0.00	-0.002	18.216	90.14	35.44	-0.62	-119.90	-2.03	137.05	38.07
28	STINGER	-17.30	-9.29	0.00	0.029	20.065	96.81	35.16	-0.81	-140.75	8.15	155.11	43.09
30	STINGER	-23.53	-11.68	0.00	-0.077	21.948	103.47	34.86	-1.02	-135.69	-32.09	149.50	41.53
32	STINGER	-29.67	-14.26	0.03	-0.636	23.509	110.14	34.53	-1.24	-104.68	-64.87	139.54	38.76
34	STINGER	-35.77	-16.96	0.13	-1.158	24.094	116.81	34.20	-1.48	7.36	-15.27	47.27	13.13
36	SAGBEND	-46.75	-21.79	0.36	-1.166	23.157	128.81	33.58	-1.90	44.27	7.61	72.47	20.13
37	SAGBEND	-57.84	-26.37	0.57	-0.959	21.711	140.81	32.99	-2.30	50.31	9.11	77.51	21.53
38	SAGBEND	-69.05	-30.66	0.73	-0.742	20.172	152.81	32.44	-2.67	52.22	8.93	78.65	21.85
39	SAGBEND	-80.36	-34.65	0.86	-0.529	18.595	164.81	31.93	-3.01	53.52	8.42	79.33	22.04
40	SAGBEND	-91.79	-38.31	0.94	-0.330	16.982	176.81	31.46	-3.33	54.59	7.70	79.83	22.18
41	SAGBEND	-103.31	-41.66	0.99	-0.140	15.346	188.81	31.04	-3.62	55.43	7.09	80.19	22.28
42	SAGBEND	-114.93	-44.66	1.00	0.038	13.681	200.81	30.66	-3.88	56.10	6.38	80.52	22.37
43	SAGBEND	-126.63	-47.33	0.98	0.196	11.992	212.81	30.32	-4.11	56.70	5.70	80.78	22.44
44	SAGBEND	-138.40	-49.65	0.92	0.341	10.284	224.81	30.03	-4.31	57.29	5.19	80.94	22.48
45	SAGBEND	-150.24	-51.61	0.84	0.469	8.554	236.81	29.78	-4.48	58.02	4.77	81.04	22.51
46	SAGBEND	-162.13	-53.22	0.73	0.581	6.810	248.81	29.58	-4.62	58.66	4.60	81.31	22.59
47	SAGBEND	-174.07	-54.46	0.60	0.689	5.059	260.81	29.43	-4.73	59.14	4.46	81.32	22.59
48	SAGBEND	-186.03	-55.33	0.44	0.792	3.296	272.81	29.32	-4.80	58.81	4.00	80.67	22.41
49	SAGBEND	-198.02	-55.84	0.27	0.865	1.588	284.81	29.25	-4.84	54.64	1.42	76.89	21.36
50	SEABED	-210.02	-56.02	0.09	0.719	0.262	296.81	29.24	-4.86	28.19	-16.24	57.64	16.01
51	SEABED	-222.02	-56.03	0.01	0.139	-0.014	308.81	29.23	-4.86	1.02	-15.38	44.11	12.25
52	SEABED	-234.02	-56.03	0.00	-0.007	-0.003	320.81	29.23	-4.86	-0.36	-0.59	32.29	8.97
53	SEABED	-246.02	-56.03	0.00	-0.002	0.000	332.81	29.24	-4.86	-0.01	0.19	32.07	8.91
54	SEABED	-258.02	-56.03	0.00	0.000	0.000	344.81	29.24	-4.86	0.00	0.01	31.95	8.87
55	SEABED	-270.02	-56.03	0.00	0.000	0.000	356.81	29.24	-4.86	0.00	0.00	31.94	8.87
56	SEABED	-282.02	-56.03	0.00	0.000	0.000	368.81	29.24	-4.86	0.00	0.00	31.94	8.87
57	SEABED	-294.02	-56.03	0.00	0.000	0.000	380.81	29.24	-4.86	0.00	0.00	31.94	8.87

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.266	0.00	37.26	0.00	0.00	0.00	37.26	10.35
3	LAYBARGE	71.49	6.16	0.00	0.000	0.958	6.30	37.24	0.00	-117.08	0.92	136.76	37.99
5	LAYBARGE	65.37	5.99	0.00	0.000	2.232	12.42	37.22	0.00	-84.36	0.70	108.93	30.26
7	LAYBARGE	59.91	5.73	0.00	0.001	3.279	17.89	37.18	0.00	-95.34	0.76	118.21	32.84
9	LAYBARGE	53.32	5.28	0.00	0.001	4.504	24.49	37.11	0.00	-91.83	0.75	115.16	31.99
11	LAYBARGE	47.32	4.74	0.00	0.001	5.732	30.51	37.03	0.00	-104.75	0.78	126.07	35.02
13	LAYBARGE	38.21	3.70	0.00	0.001	7.424	39.68	36.86	0.00	-118.58	0.83	137.66	38.24
15	LAYBARGE	29.27	2.39	0.00	0.002	9.106	48.72	36.67	0.00	-103.79	0.85	124.89	34.69
17	LAYBARGE	23.13	1.34	0.00	0.001	10.367	54.95	36.51	0.00	-93.52	-0.90	116.01	32.22
19	LAYBARGE	17.18	0.19	0.00	0.004	11.445	61.01	36.34	0.00	-80.10	1.09	104.39	29.00
21	LAYBARGE	10.63	-1.22	0.00	-0.012	13.004	67.72	36.14	-0.11	-140.83	-5.92	155.94	43.32
24	STINGER	-4.62	-5.10	0.00	0.018	15.564	83.45	35.64	-0.45	-140.50	-5.87	155.34	43.15
26	STINGER	-11.01	-6.99	0.00	-0.001	17.115	90.12	35.42	-0.61	-78.26	-1.09	102.22	28.40
28	STINGER	-17.37	-9.02	0.00	0.003	18.319	96.78	35.15	-0.79	-93.85	-2.05	115.32	32.03
30	STINGER	-23.67	-11.18	0.00	0.008	19.611	103.45	34.88	-0.98	-91.82	4.86	112.43	31.23
32	STINGER	-29.93	-13.49	0.00	0.070	20.810	110.12	34.59	-1.18	-85.28	9.17	107.10	29.75
34	STINGER	-36.13	-15.93	0.00	-0.385	22.402	116.79	34.25	-1.39	-146.12	-83.58	178.00	49.44
36	SAGBEND	-47.16	-20.67	0.18	-1.144	23.261	128.79	33.68	-1.80	26.15	-5.90	56.59	15.72
37	SAGBEND	-58.22	-25.30	0.40	-1.037	22.051	140.79	33.08	-2.20	47.88	8.73	75.42	20.95
38	SAGBEND	-69.40	-29.66	0.58	-0.820	20.544	152.79	32.52	-2.58	51.81	9.43	78.32	21.76
39	SAGBEND	-80.69	-33.71	0.73	-0.615	18.974	164.79	32.01	-2.93	53.31	8.85	79.10	21.97
40	SAGBEND	-92.09	-37.46	0.83	-0.407	17.375	176.79	31.53	-3.26	54.24	8.27	79.60	22.11
41	SAGBEND	-103.60	-40.88	0.89	-0.218	15.741	188.79	31.09	-3.55	55.07	7.59	80.01	22.23
42	SAGBEND	-115.19	-43.97	0.92	-0.041	14.083	200.79	30.70	-3.82	55.80	6.81	80.33	22.31
43	SAGBEND	-126.87	-46.71	0.91	0.126	12.401	212.79	30.35	-4.06	56.56	6.02	80.65	22.40
44	SAGBEND	-138.63	-49.12	0.87	0.269	10.696	224.79	30.05	-4.27	57.31	5.42	80.94	22.48
45	SAGBEND	-150.45	-51.16	0.80	0.394	8.977	236.79	29.79	-4.44	57.93	5.00	81.18	22.55
46	SAGBEND	-162.33	-52.86	0.71	0.514	7.237	248.79	29.58	-4.59	58.61	4.73	81.28	22.58
47	SAGBEND	-174.25	-54.19	0.59	0.623	5.483	260.79	29.41	-4.70	59.13	4.64	81.27	22.58
48	SAGBEND	-186.21	-55.15	0.45	0.722	3.726	272.79	29.29	-4.79	59.12	4.37	80.96	22.49
49	SAGBEND	-198.20	-55.75	0.29	0.812	1.987	284.79	29.22	-4.84	56.55	2.64	78.39	21.78
50	SEABED	-210.19	-56.00	0.12	0.759	0.494	296.79	29.19	-4.86	39.37	-10.24	65.33	18.15
51	SEABED	-222.19	-56.03	0.01	0.221	-0.003	308.79	29.19	-4.86	3.73	-19.67	47.93	13.31
52	SEABED	-234.19	-56.03	0.00	-0.003	-0.006	320.79	29.19	-4.86	-0.51	-1.58	32.89	9.13
53	SEABED	-246.19	-56.03	0.00	-0.003	0.000	332.79	29.19	-4.86	-0.05	0.25	32.07	8.91
54	SEABED	-258.19	-56.03	0.00	0.000	0.000	344.79	29.19	-4.86	0.01	0.02	31.91	8.86
55	SEABED	-270.19	-56.03	0.00	0.000	0.000	356.79	29.19	-4.86	0.00	-0.01	31.90	8.86
56	SEABED	-282.19	-56.03	0.00	0.000	0.000	368.79	29.19	-4.86	0.00	0.00	31.90	8.86
57	SEABED	-294.19	-56.03	0.00	0.000	0.000	380.79	29.19	-4.86	0.00	0.00	31.90	8.86

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.266	0.00	37.28	0.00	0.00	0.00	37.28	10.36
3	LAYBARGE	71.49	6.16	0.00	0.000	0.958	6.30	37.26	0.00	-117.10	-0.90	136.79	38.00
5	LAYBARGE	65.37	5.98	0.00	0.000	2.232	12.42	37.24	0.00	-84.37	-0.68	108.96	30.27
7	LAYBARGE	59.91	5.72	0.00	0.000	3.279	17.89	37.20	0.00	-95.35	-0.74	118.24	32.85
9	LAYBARGE	53.32	5.27	0.00	0.000	4.504	24.49	37.13	0.00	-91.84	-0.73	115.19	32.00
11	LAYBARGE	47.32	4.74	0.00	0.000	5.732	30.51	37.05	0.00	-104.77	-0.77	126.10	35.03
13	LAYBARGE	38.21	3.69	0.00	-0.001	7.424	39.68	36.89	0.00	-118.62	-0.84	137.71	38.25
15	LAYBARGE	29.27	2.39	0.00	-0.001	9.105	48.72	36.69	0.00	-103.78	0.83	124.90	34.70
17	LAYBARGE	23.13	1.33	0.00	-0.001	10.367	54.95	36.54	0.00	-93.68	-0.93	116.16	32.27
19	LAYBARGE	17.18	0.18	0.00	0.000	11.442	61.01	36.36	0.00	-79.51	0.99	103.92	28.87
21	LAYBARGE	10.63	-1.23	0.00	-0.014	13.015	67.72	36.16	-0.11	-143.17	-5.85	157.95	43.88
24	STINGER	-4.61	-5.10	0.00	0.011	15.339	83.44	35.67	-0.45	-118.42	-5.75	136.62	37.95
26	STINGER	-11.02	-6.94	0.00	-0.001	16.562	90.11	35.45	-0.61	-56.69	1.50	83.93	23.31
28	STINGER	-17.40	-8.89	0.00	-0.016	17.466	96.77	35.20	-0.78	-75.29	-5.21	99.69	27.69
30	STINGER	-23.74	-10.94	0.00	0.058	18.372	103.44	34.94	-0.96	-57.49	18.91	85.64	23.79
32	STINGER	-30.05	-13.08	-0.01	0.087	19.165	110.11	34.66	-1.14	-60.40	-14.78	87.77	24.38
34	STINGER	-36.32	-15.36	0.00	-0.474	21.285	116.77	34.31	-1.34	-237.19	-84.25	248.62	69.06
36	SAGBEND	-47.37	-20.03	0.19	-1.179	23.296	128.77	33.78	-1.74	14.14	-5.29	46.85	13.01
37	SAGBEND	-58.43	-24.68	0.41	-1.061	22.231	140.77	33.18	-2.15	46.30	9.20	73.99	20.55
38	SAGBEND	-69.59	-29.08	0.60	-0.848	20.753	152.77	32.62	-2.53	51.50	9.56	78.02	21.67
39	SAGBEND	-80.87	-33.18	0.74	-0.629	19.193	164.77	32.09	-2.89	53.10	9.04	79.06	21.96
40	SAGBEND	-92.25	-36.97	0.85	-0.424	17.593	176.77	31.61	-3.22	54.07	8.57	79.60	22.11
41	SAGBEND	-103.74	-40.43	0.91	-0.235	15.965	188.77	31.17	-3.52	54.97	7.77	79.98	22.22
42	SAGBEND	-115.32	-43.57	0.94	-0.056	14.312	200.77	30.77	-3.79	55.70	6.92	80.28	22.30
43	SAGBEND	-126.99	-46.36	0.94	0.108	12.630	212.77	30.42	-4.03	56.43	6.14	80.62	22.40
44	SAGBEND	-138.74	-48.81	0.90	0.261	10.927	224.77	30.11	-4.24	57.11	5.52	80.90	22.47
45	SAGBEND	-150.55	-50.91	0.83	0.393	9.208	236.77	29.84	-4.42	57.98	5.11	81.07	22.52
46	SAGBEND	-162.43	-52.65	0.74	0.510	7.472	248.77	29.62	-4.57	58.64	4.79	81.28	22.58
47	SAGBEND	-174.35	-54.03	0.62	0.619	5.721	260.77	29.45	-4.69	59.07	4.78	81.43	22.62
48	SAGBEND	-186.30	-55.04	0.48	0.725	3.966	272.77	29.33	-4.78	59.18	4.54	81.14	22.54
49	SAGBEND	-198.28	-55.69	0.32	0.817	2.223	284.77	29.24	-4.83	57.24	3.19	79.07	21.97
50	SAGBEND	-210.28	-55.98	0.14	0.800	0.658	296.77	29.21	-4.86	44.19	-7.83	68.70	19.08
51	SEABED	-222.28	-56.03	0.02	0.299	0.011	308.77	29.21	-4.86	6.09	-21.22	49.57	13.77
52	SEABED	-234.28	-56.03	0.00	0.003	-0.008	320.77	29.21	-4.86	-0.57	-3.04	34.07	9.46
53	SEABED	-246.28	-56.03	0.00	-0.004	0.000	332.77	29.21	-4.86	-0.08	0.29	32.12	8.92
54	SEABED	-258.28	-56.03	0.00	0.000	0.000	344.77	29.21	-4.86	0.01	0.04	31.94	8.87
55	SEABED	-270.28	-56.03	0.00	0.000	0.000	356.77	29.21	-4.86	0.00	-0.01	31.92	8.87
56	SEABED	-282.28	-56.03	0.00	0.000	0.000	368.77	29.21	-4.86	0.00	0.00	31.92	8.87
57	SEABED	-294.28	-56.03	0.00	0.000	0.000	380.77	29.21	-4.86	0.00	0.00	31.92	8.87
58	SEABED	-306.28	-56.03	0.00	0.000	0.000	392.77	29.21	-4.86	0.00	0.00	31.91	8.87

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.270	0.00	49.68	0.00	0.00	0.00	49.68	13.80
3	LAYBARGE	71.49	6.16	0.00	0.001	0.960	6.30	49.65	0.00	-119.96	0.98	151.62	42.12
5	LAYBARGE	65.37	5.98	0.00	0.001	2.230	12.42	49.63	0.00	-86.73	0.74	123.36	34.27
7	LAYBARGE	59.91	5.72	0.00	0.002	3.282	17.89	49.59	0.00	-97.99	0.81	132.88	36.91
9	LAYBARGE	53.32	5.27	0.00	0.003	4.501	24.49	49.52	0.00	-94.41	0.80	129.77	36.05
11	LAYBARGE	47.32	4.74	0.00	0.003	5.739	30.51	49.44	0.00	-109.09	0.86	142.17	39.49
13	LAYBARGE	38.21	3.69	0.00	0.004	7.423	39.68	49.28	0.00	-124.89	0.94	155.43	43.18
15	LAYBARGE	29.27	2.39	0.00	0.006	9.100	48.72	49.08	0.00	-108.15	0.91	141.01	39.17
17	LAYBARGE	23.13	1.33	0.00	0.006	10.368	54.95	48.93	0.00	-95.94	-0.86	130.47	36.24
19	LAYBARGE	17.18	0.18	0.00	0.008	11.443	61.01	48.76	0.00	-82.15	0.91	118.59	32.94
21	LAYBARGE	10.63	-1.23	0.00	-0.004	13.021	67.72	48.55	-0.11	-149.31	-5.60	175.54	48.76
24	STINGER	-4.64	-5.13	0.00	0.010	15.975	83.47	48.04	-0.45	-199.33	-7.64	217.65	60.46
26	STINGER	-11.00	-7.11	0.00	0.054	18.237	90.14	47.81	-0.62	-127.57	13.28	156.92	43.59
28	STINGER	-17.30	-9.29	0.00	-0.179	20.010	96.81	47.53	-0.81	-141.30	-53.37	168.63	46.84
30	STINGER	-23.54	-11.65	0.05	-0.786	21.325	103.47	47.24	-1.02	-71.14	-48.46	120.71	33.53
32	STINGER	-29.74	-14.10	0.16	-1.123	21.600	110.14	46.94	-1.23	13.81	-8.56	57.95	16.10
34	STINGER	-35.94	-16.54	0.29	-1.134	21.215	116.81	46.63	-1.44	30.82	4.33	73.11	20.31
36	SAGBEND	-47.17	-20.78	0.49	-0.993	20.169	128.81	46.09	-1.81	36.70	6.84	78.58	21.83
37	SAGBEND	-58.47	-24.81	0.67	-0.820	19.043	140.81	45.57	-2.16	37.92	6.62	79.31	22.03
38	SAGBEND	-69.85	-28.61	0.82	-0.657	17.897	152.81	45.09	-2.49	38.61	6.48	79.55	22.10
39	SAGBEND	-81.30	-32.18	0.93	-0.501	16.733	164.81	44.63	-2.80	39.19	6.13	79.70	22.14
40	SAGBEND	-92.83	-35.51	1.02	-0.349	15.553	176.81	44.21	-3.09	39.74	5.67	79.83	22.17
41	SAGBEND	-104.42	-38.61	1.08	-0.206	14.362	188.81	43.82	-3.36	40.23	5.33	79.92	22.20
42	SAGBEND	-116.08	-41.47	1.10	-0.072	13.161	200.81	43.46	-3.61	40.61	4.98	79.96	22.21
43	SAGBEND	-127.79	-44.08	1.10	0.055	11.945	212.81	43.13	-3.83	40.88	4.51	79.96	22.21
44	SAGBEND	-139.56	-46.44	1.08	0.172	10.716	224.81	42.83	-4.04	41.12	4.12	79.95	22.21
45	SAGBEND	-151.37	-48.54	1.03	0.280	9.477	236.81	42.57	-4.22	41.40	3.76	80.00	22.22
46	SAGBEND	-163.23	-50.38	0.96	0.378	8.233	248.81	42.34	-4.38	41.80	3.48	80.00	22.22
47	SAGBEND	-175.12	-51.97	0.88	0.466	6.983	260.81	42.14	-4.51	42.16	3.28	79.95	22.21
48	SAGBEND	-187.05	-53.30	0.77	0.545	5.718	272.81	41.97	-4.63	42.39	3.16	79.85	22.18
49	SAGBEND	-199.00	-54.36	0.65	0.622	4.449	284.81	41.84	-4.72	42.71	3.11	79.72	22.14
50	SAGBEND	-210.97	-55.16	0.51	0.701	3.181	296.81	41.74	-4.79	42.84	3.01	79.51	22.09
51	SAGBEND	-222.96	-55.69	0.36	0.773	1.909	308.81	41.67	-4.83	42.18	2.48	78.84	21.90
52	SAGBEND	-234.95	-55.97	0.19	0.795	0.713	320.81	41.64	-4.85	36.48	-3.24	74.28	20.63
53	SEABED	-246.95	-56.03	0.05	0.474	0.053	332.81	41.63	-4.86	8.80	-18.11	59.96	16.66
54	SEABED	-258.95	-56.03	0.00	0.053	-0.006	344.81	41.63	-4.86	-0.18	-7.17	49.67	13.80
55	SEABED	-270.95	-56.03	0.00	-0.003	-0.001	356.81	41.63	-4.86	-0.09	-0.15	44.36	12.32
56	SEABED	-282.95	-56.03	0.00	-0.001	0.000	368.81	41.63	-4.86	0.00	0.07	44.31	12.31
57	SEABED	-294.95	-56.03	0.00	0.000	0.000	380.81	41.63	-4.86	0.00	0.01	44.27	12.30
58	SEABED	-306.95	-56.03	0.00	0.000	0.000	392.81	41.63	-4.86	0.00	0.00	44.26	12.30
59	SEABED	-318.95	-56.03	0.00	0.000	0.000	404.81	41.63	-4.86	0.00	0.00	44.26	12.30
60	SEABED	-330.95	-56.03	0.00	0.000	0.000	416.81	41.63	-4.86	0.00	0.00	44.26	12.30

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.270	0.00	49.67	0.00	0.00	0.00	49.67	13.80
3	LAYBARGE	71.49	6.16	0.00	0.000	0.960	6.30	49.64	0.00	-119.95	0.95	151.59	42.11
5	LAYBARGE	65.37	5.99	0.00	0.000	2.230	12.42	49.62	0.00	-86.72	0.72	123.34	34.26
7	LAYBARGE	59.91	5.72	0.00	0.000	3.282	17.89	49.58	0.00	-97.97	0.79	132.86	36.90
9	LAYBARGE	53.32	5.27	0.00	0.000	4.501	24.49	49.51	0.00	-94.40	0.78	129.75	36.04
11	LAYBARGE	47.32	4.74	0.00	0.001	5.739	30.51	49.43	0.00	-109.07	0.84	142.14	39.48
13	LAYBARGE	38.21	3.69	0.00	0.001	7.423	39.68	49.27	0.00	-124.86	0.91	155.40	43.17
15	LAYBARGE	29.27	2.39	0.00	0.001	9.100	48.72	49.07	0.00	-108.09	0.90	140.95	39.15
17	LAYBARGE	23.13	1.33	0.00	0.001	10.368	54.95	48.92	0.00	-96.13	-0.91	130.62	36.28
19	LAYBARGE	17.18	0.19	0.00	0.002	11.440	61.01	48.75	0.00	-81.30	1.07	117.83	32.73
21	LAYBARGE	10.63	-1.22	0.00	-0.012	13.036	67.72	48.54	-0.11	-152.53	-6.05	178.24	49.51
24	STINGER	-4.62	-5.11	0.00	0.017	15.532	83.45	48.05	-0.45	-152.33	-5.94	177.76	49.38
26	STINGER	-11.01	-6.99	0.00	-0.006	17.118	90.12	47.82	-0.61	-79.26	-1.66	115.03	31.95
28	STINGER	-17.37	-9.02	0.00	0.021	18.331	96.78	47.56	-0.79	-101.88	7.11	134.61	37.39
30	STINGER	-23.67	-11.18	0.00	-0.072	19.557	103.45	47.29	-0.98	-89.81	-29.35	122.62	34.06
32	STINGER	-29.93	-13.48	0.03	-0.578	20.620	110.12	46.99	-1.18	-85.39	-56.00	133.37	37.05
34	STINGER	-36.16	-15.86	0.12	-1.029	21.096	116.79	46.70	-1.38	8.58	-15.57	60.38	16.77
36	SAGBEND	-47.37	-20.12	0.33	-1.040	20.328	128.79	46.16	-1.75	34.47	5.82	76.52	21.25
37	SAGBEND	-58.67	-24.18	0.52	-0.888	19.230	140.79	45.64	-2.11	37.78	7.05	79.35	22.04
38	SAGBEND	-70.03	-28.02	0.68	-0.721	18.088	152.79	45.15	-2.44	38.66	6.75	79.67	22.13
39	SAGBEND	-81.48	-31.63	0.81	-0.564	16.920	164.79	44.69	-2.75	39.36	6.35	79.75	22.15
40	SAGBEND	-92.99	-35.00	0.91	-0.411	15.740	176.79	44.26	-3.04	39.88	6.07	79.83	22.17
41	SAGBEND	-104.58	-38.14	0.98	-0.265	14.556	188.79	43.86	-3.32	40.28	5.65	79.91	22.20
42	SAGBEND	-116.22	-41.03	1.02	-0.134	13.349	200.79	43.49	-3.57	40.60	5.15	79.97	22.21
43	SAGBEND	-127.92	-43.68	1.03	-0.005	12.132	212.79	43.16	-3.80	40.85	4.67	80.00	22.22
44	SAGBEND	-139.68	-46.07	1.02	0.116	10.907	224.79	42.85	-4.00	41.14	4.21	79.98	22.22
45	SAGBEND	-151.49	-48.22	0.98	0.229	9.674	236.79	42.58	-4.19	41.35	3.91	79.94	22.20
46	SAGBEND	-163.34	-50.11	0.93	0.328	8.432	248.79	42.35	-4.35	41.70	3.69	79.88	22.19
47	SAGBEND	-175.23	-51.74	0.85	0.415	7.179	260.79	42.14	-4.49	41.98	3.42	79.90	22.20
48	SAGBEND	-187.15	-53.10	0.75	0.497	5.917	272.79	41.97	-4.61	42.42	3.20	79.88	22.19
49	SAGBEND	-199.10	-54.21	0.64	0.573	4.653	284.79	41.84	-4.71	42.75	3.24	79.79	22.16
50	SAGBEND	-211.07	-55.05	0.51	0.647	3.384	296.79	41.73	-4.78	42.87	3.30	79.62	22.12
51	SAGBEND	-223.05	-55.63	0.37	0.723	2.115	308.79	41.66	-4.83	42.53	2.94	79.07	21.96
52	SAGBEND	-235.05	-55.94	0.21	0.763	0.891	320.79	41.62	-4.85	38.33	-1.93	75.69	21.02
53	SEABED	-247.04	-56.03	0.07	0.544	0.095	332.79	41.61	-4.86	12.80	-17.12	60.02	16.67
54	SEABED	-259.04	-56.03	0.00	0.086	-0.006	344.79	41.61	-4.86	0.26	-10.50	52.39	14.55
55	SEABED	-271.04	-56.03	0.00	-0.003	-0.001	356.79	41.61	-4.86	-0.13	-0.49	44.53	12.37
56	SEABED	-283.04	-56.03	0.00	-0.001	0.000	368.79	41.61	-4.86	-0.01	0.10	44.31	12.31
57	SEABED	-295.04	-56.03	0.00	0.000	0.000	380.79	41.61	-4.86	0.00	0.01	44.25	12.29
58	SEABED	-307.04	-56.03	0.00	0.000	0.000	392.79	41.61	-4.86	0.00	0.00	44.24	12.29
59	SEABED	-319.04	-56.03	0.00	0.000	0.000	404.79	41.61	-4.86	0.00	0.00	44.24	12.29
60	SEABED	-331.04	-56.03	0.00	0.000	0.000	416.79	41.61	-4.86	0.00	0.00	44.24	12.29

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.270	0.00	49.61	0.00	0.00	0.00	49.61	13.78
3	LAYBARGE	71.49	6.16	0.00	0.000	0.960	6.30	49.58	0.00	-119.92	-0.89	151.52	42.09
5	LAYBARGE	65.37	5.98	0.00	0.000	2.230	12.42	49.56	0.00	-86.71	-0.67	123.26	34.24
7	LAYBARGE	59.91	5.72	0.00	0.000	3.282	17.89	49.52	0.00	-97.95	-0.74	132.78	36.88
9	LAYBARGE	53.32	5.27	0.00	-0.001	4.501	24.49	49.45	0.00	-94.38	-0.73	129.68	36.02
11	LAYBARGE	47.32	4.74	0.00	-0.001	5.739	30.51	49.37	0.00	-109.04	-0.78	142.05	39.46
13	LAYBARGE	38.21	3.69	0.00	-0.001	7.423	39.68	49.21	0.00	-124.83	-0.86	155.31	43.14
15	LAYBARGE	29.27	2.39	0.00	-0.001	9.100	48.72	49.01	0.00	-108.03	-0.81	140.85	39.12
17	LAYBARGE	23.13	1.33	0.00	-0.002	10.369	54.95	48.86	0.00	-96.23	-0.90	130.64	36.29
19	LAYBARGE	17.18	0.18	0.00	0.000	11.438	61.01	48.69	0.00	-80.85	0.98	117.36	32.60
21	LAYBARGE	10.63	-1.23	0.00	-0.015	13.044	67.72	48.48	-0.11	-154.21	-5.79	179.64	49.90
24	STINGER	-4.61	-5.10	0.00	0.012	15.309	83.44	47.99	-0.45	-128.38	-5.67	157.37	43.71
26	STINGER	-11.02	-6.94	0.00	-0.006	16.571	90.11	47.77	-0.61	-58.29	-0.66	97.39	27.05
28	STINGER	-17.40	-8.89	0.00	0.000	17.454	96.77	47.52	-0.78	-76.40	-3.59	112.61	31.28
30	STINGER	-23.74	-10.94	0.00	-0.008	18.418	103.44	47.26	-0.96	-74.08	-12.32	110.21	30.61
32	STINGER	-30.05	-13.10	0.01	-0.225	19.248	110.11	46.99	-1.14	-64.25	-35.07	104.33	28.98
34	STINGER	-36.33	-15.33	0.07	-0.740	19.872	116.77	46.71	-1.34	-50.22	-41.51	102.46	28.46
36	SAGBEND	-47.61	-19.41	0.26	-1.021	19.591	128.77	46.19	-1.69	31.27	3.48	72.63	20.17
37	SAGBEND	-58.95	-23.34	0.45	-0.899	18.536	140.77	45.69	-2.03	37.37	6.72	78.83	21.90
38	SAGBEND	-70.36	-27.04	0.62	-0.737	17.392	152.77	45.22	-2.35	38.60	6.60	79.61	22.12
39	SAGBEND	-81.85	-30.51	0.75	-0.576	16.228	164.77	44.77	-2.65	39.26	6.37	79.86	22.18
40	SAGBEND	-93.40	-33.74	0.85	-0.430	15.051	176.77	44.36	-2.94	39.76	6.05	79.98	22.22
41	SAGBEND	-105.02	-36.74	0.93	-0.282	13.864	188.77	43.98	-3.20	40.17	5.66	80.04	22.23
42	SAGBEND	-116.70	-39.49	0.97	-0.141	12.662	200.77	43.63	-3.43	40.54	5.28	80.07	22.24
43	SAGBEND	-128.44	-42.00	0.99	-0.015	11.449	212.77	43.31	-3.65	40.87	4.95	80.07	22.24
44	SAGBEND	-140.22	-44.26	0.98	0.111	10.224	224.77	43.03	-3.85	41.10	4.52	80.04	22.23
45	SAGBEND	-152.06	-46.26	0.94	0.228	8.989	236.77	42.78	-4.02	41.23	4.19	79.97	22.21
46	SAGBEND	-163.93	-48.01	0.88	0.335	7.745	248.77	42.56	-4.17	41.44	3.93	79.86	22.18
47	SAGBEND	-175.83	-49.49	0.80	0.435	6.495	260.77	42.37	-4.30	41.82	3.75	79.81	22.17
48	SAGBEND	-187.77	-50.72	0.70	0.528	5.241	272.77	42.22	-4.40	42.14	3.57	79.72	22.15
49	SAGBEND	-199.73	-51.68	0.58	0.613	3.978	284.77	42.10	-4.49	42.43	3.39	79.59	22.11
50	SAGBEND	-211.71	-52.38	0.45	0.694	2.716	296.77	42.01	-4.54	42.45	3.12	79.34	22.04
51	SAGBEND	-223.70	-52.82	0.29	0.764	1.468	308.77	41.96	-4.58	41.04	2.05	78.09	21.69
52	SEABED	-235.70	-53.01	0.13	0.734	0.367	320.77	41.93	-4.60	28.74	-7.77	68.64	19.07
53	SEABED	-247.70	-53.03	0.02	0.280	0.007	332.77	41.93	-4.60	2.99	-17.36	58.35	16.21
54	SEABED	-259.70	-53.03	0.00	0.013	-0.004	344.77	41.93	-4.60	-0.22	-2.81	46.43	12.90
55	SEABED	-271.70	-53.03	0.00	-0.003	0.000	356.77	41.93	-4.60	-0.04	0.12	44.50	12.36
56	SEABED	-283.70	-53.03	0.00	0.000	0.000	368.77	41.93	-4.60	0.00	0.03	44.43	12.34
57	SEABED	-295.70	-53.03	0.00	0.000	0.000	380.77	41.93	-4.60	0.00	0.00	44.41	12.34
58	SEABED	-307.70	-53.03	0.00	0.000	0.000	392.77	41.93	-4.60	0.00	0.00	44.41	12.34
59	SEABED	-319.70	-53.03	0.00	0.000	0.000	404.77	41.93	-4.60	0.00	0.00	44.41	12.34

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.266	0.00	37.20	0.00	0.00	0.00	37.20	10.33
3	LAYBARGE	71.49	6.16	0.00	0.000	0.958	6.30	37.17	0.00	-117.06	0.94	136.67	37.96
5	LAYBARGE	65.37	5.99	0.00	0.001	2.232	12.42	37.15	0.00	-84.35	0.71	108.85	30.24
7	LAYBARGE	59.91	5.72	0.00	0.002	3.279	17.89	37.11	0.00	-95.31	0.78	118.13	32.81
9	LAYBARGE	53.32	5.28	0.00	0.002	4.504	24.49	37.04	0.00	-91.80	0.77	115.08	31.97
11	LAYBARGE	47.32	4.74	0.00	0.003	5.732	30.51	36.96	0.00	-104.72	0.81	125.97	34.99
13	LAYBARGE	38.21	3.69	0.00	0.004	7.424	39.68	36.80	0.00	-118.52	0.87	137.53	38.20
15	LAYBARGE	29.27	2.39	0.00	0.005	9.106	48.72	36.61	0.00	-103.81	0.88	124.84	34.68
17	LAYBARGE	23.13	1.34	0.00	0.005	10.365	54.95	36.45	0.00	-93.22	-0.87	115.68	32.13
19	LAYBARGE	17.18	0.19	0.00	0.007	11.450	61.01	36.28	0.00	-81.28	1.11	105.31	29.25
21	LAYBARGE	10.63	-1.22	0.00	-0.008	12.982	67.72	36.07	-0.11	-136.12	-5.85	151.84	42.18
24	STINGER	-4.64	-5.13	0.00	0.022	16.018	83.47	35.56	-0.45	-185.08	-6.34	193.10	53.64
26	STINGER	-11.00	-7.10	0.00	0.006	18.217	90.14	35.33	-0.62	-119.90	1.19	137.40	38.17
28	STINGER	-17.30	-9.29	0.00	0.008	20.061	96.81	35.05	-0.81	-138.08	-6.03	152.76	42.43
30	STINGER	-23.53	-11.68	0.00	0.025	21.965	103.47	34.75	-1.02	-132.94	13.93	148.24	41.18
32	STINGER	-29.67	-14.27	0.01	-0.390	23.773	110.14	34.42	-1.24	-130.42	-63.54	154.56	42.93
34	STINGER	-35.74	-17.03	0.10	-1.031	24.754	116.81	34.08	-1.48	-27.72	-28.11	67.78	18.83
36	SAGBEND	-46.65	-22.02	0.32	-1.158	24.076	128.81	33.45	-1.92	42.78	6.53	70.02	19.45
37	SAGBEND	-57.66	-26.78	0.52	-0.978	22.673	140.81	32.84	-2.33	49.94	8.93	77.04	21.40
38	SAGBEND	-68.80	-31.25	0.70	-0.762	21.141	152.81	32.26	-2.72	52.16	8.74	78.56	21.82
39	SAGBEND	-80.05	-35.42	0.82	-0.544	19.563	164.81	31.73	-3.08	53.65	8.29	79.41	22.06
40	SAGBEND	-91.41	-39.28	0.91	-0.354	17.959	176.81	31.24	-3.42	54.64	7.68	79.79	22.16
41	SAGBEND	-102.87	-42.82	0.97	-0.162	16.325	188.81	30.79	-3.72	55.43	6.99	80.04	22.23
42	SAGBEND	-114.44	-46.03	0.98	0.001	14.664	200.81	30.39	-4.00	56.16	6.23	80.34	22.32
43	SAGBEND	-126.09	-48.90	0.97	0.153	12.976	212.81	30.02	-4.25	56.82	5.41	80.59	22.39
44	SAGBEND	-137.82	-51.42	0.92	0.286	11.263	224.81	29.71	-4.47	57.35	4.74	80.80	22.44
45	SAGBEND	-149.62	-53.59	0.85	0.400	9.531	236.81	29.43	-4.65	57.97	4.41	80.92	22.48
46	SAGBEND	-161.48	-55.39	0.76	0.508	7.786	248.81	29.21	-4.81	58.74	4.41	81.13	22.54
47	SAGBEND	-173.40	-56.84	0.64	0.617	6.025	260.81	29.03	-4.93	59.37	4.44	81.38	22.61
48	SAGBEND	-185.35	-57.91	0.51	0.722	4.251	272.81	28.90	-5.03	59.67	4.32	81.31	22.59
49	SAGBEND	-197.32	-58.62	0.34	0.816	2.489	284.81	28.81	-5.09	58.31	3.26	79.78	22.16
50	SAGBEND	-209.32	-58.96	0.17	0.825	0.856	296.81	28.77	-5.11	47.86	-5.26	71.40	19.83
51	SEABED	-221.32	-59.03	0.03	0.392	0.036	308.81	28.76	-5.12	9.25	-21.53	50.25	13.96
52	SEABED	-233.32	-59.03	0.00	0.015	-0.011	320.81	28.76	-5.12	-0.60	-4.51	34.70	9.64
53	SEABED	-245.32	-59.03	0.00	-0.005	0.000	332.81	28.76	-5.12	-0.12	0.29	31.87	8.85
54	SEABED	-257.32	-59.03	0.00	0.000	0.000	344.81	28.76	-5.12	0.01	0.05	31.66	8.80
55	SEABED	-269.32	-59.03	0.00	0.000	0.000	356.81	28.76	-5.12	0.00	-0.01	31.63	8.79
56	SEABED	-281.32	-59.03	0.00	0.000	0.000	368.81	28.76	-5.12	0.00	0.00	31.63	8.79
57	SEABED	-293.32	-59.03	0.00	0.000	0.000	380.81	28.76	-5.12	0.00	0.00	31.63	8.79
58	SEABED	-305.32	-59.03	0.00	0.000	0.000	392.81	28.76	-5.12	0.00	0.00	31.63	8.79

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.266	0.00	37.42	0.00	0.00	0.00	37.42	10.39
3	LAYBARGE	71.49	6.16	0.00	0.000	0.958	6.30	37.40	0.00	-117.11	-1.00	136.94	38.04
5	LAYBARGE	65.37	5.99	0.00	-0.001	2.232	12.42	37.38	0.00	-84.39	-0.75	109.10	30.31
7	LAYBARGE	59.91	5.72	0.00	-0.002	3.279	17.89	37.33	0.00	-95.36	-0.83	118.39	32.89
9	LAYBARGE	53.32	5.28	0.00	-0.002	4.504	24.49	37.27	0.00	-91.85	-0.81	115.34	32.04
11	LAYBARGE	47.32	4.74	0.00	-0.003	5.732	30.51	37.18	0.00	-104.79	-0.86	126.26	35.07
13	LAYBARGE	38.21	3.69	0.00	-0.004	7.424	39.68	37.02	0.00	-118.64	-0.93	137.86	38.30
15	LAYBARGE	29.27	2.39	0.00	-0.004	9.106	48.72	36.83	0.00	-103.83	-0.89	125.08	34.75
17	LAYBARGE	23.13	1.34	0.00	-0.005	10.367	54.95	36.67	0.00	-93.53	-1.01	116.17	32.27
19	LAYBARGE	17.18	0.19	0.00	-0.004	11.445	61.01	36.50	0.00	-80.12	1.10	104.61	29.06
21	LAYBARGE	10.63	-1.22	0.00	-0.021	13.004	67.72	36.29	-0.11	-140.95	-6.03	156.19	43.39
24	STINGER	-4.62	-5.10	0.00	0.006	15.563	83.45	35.80	-0.45	-140.62	-6.07	155.57	43.21
26	STINGER	-11.01	-6.99	0.00	-0.010	17.115	90.12	35.57	-0.61	-78.22	1.38	102.30	28.42
28	STINGER	-17.37	-9.02	0.00	-0.017	18.320	96.78	35.31	-0.79	-94.29	-3.66	115.79	32.16
30	STINGER	-23.67	-11.18	0.00	0.027	19.607	103.45	35.04	-0.98	-91.57	12.06	112.18	31.16
32	STINGER	-29.93	-13.49	0.00	0.081	20.760	110.12	34.75	-1.18	-79.76	-3.70	102.64	28.51
34	STINGER	-36.13	-15.94	0.01	-0.437	22.664	116.79	34.39	-1.39	-192.05	-87.21	212.70	59.08
36	SAGBEND	-47.10	-20.79	0.19	-1.166	24.131	128.79	33.82	-1.81	19.59	-5.52	51.39	14.27
37	SAGBEND	-58.09	-25.60	0.41	-1.056	23.005	140.79	33.20	-2.23	46.91	9.21	74.48	20.69
38	SAGBEND	-69.19	-30.15	0.60	-0.842	21.520	152.79	32.62	-2.62	51.48	9.76	77.86	21.63
39	SAGBEND	-80.41	-34.40	0.74	-0.623	19.963	164.79	32.08	-2.99	53.05	9.28	78.79	21.89
40	SAGBEND	-91.75	-38.34	0.85	-0.430	18.365	176.79	31.58	-3.34	54.11	8.36	79.38	22.05
41	SAGBEND	-103.19	-41.96	0.92	-0.234	16.742	188.79	31.12	-3.65	54.94	7.77	79.87	22.19
42	SAGBEND	-114.73	-45.25	0.94	-0.071	15.085	200.79	30.70	-3.93	55.79	6.90	80.31	22.31
43	SAGBEND	-126.36	-48.21	0.94	0.087	13.404	212.79	30.33	-4.19	56.53	5.84	80.68	22.41
44	SAGBEND	-138.07	-50.82	0.91	0.225	11.702	224.79	30.00	-4.42	57.32	5.14	80.92	22.48
45	SAGBEND	-149.86	-53.07	0.85	0.340	9.973	236.79	29.71	-4.61	58.13	4.65	81.21	22.56
46	SAGBEND	-161.70	-54.97	0.77	0.450	8.234	248.79	29.47	-4.77	58.90	4.68	81.44	22.62
47	SAGBEND	-173.60	-56.50	0.67	0.562	6.473	260.79	29.28	-4.91	59.48	4.79	81.59	22.66
48	SAGBEND	-185.55	-57.67	0.54	0.669	4.702	272.79	29.14	-5.01	59.67	4.79	81.44	22.62
49	SAGBEND	-197.52	-58.47	0.39	0.769	2.941	284.79	29.04	-5.07	58.98	4.13	80.51	22.36
50	SAGBEND	-209.51	-58.91	0.22	0.830	1.245	296.79	28.98	-5.11	52.58	-1.26	75.00	20.83
51	SEABED	-221.51	-59.03	0.06	0.581	0.124	308.79	28.97	-5.12	18.73	-19.72	52.53	14.59
52	SEABED	-233.51	-59.03	0.00	0.065	-0.015	320.79	28.97	-5.12	-0.44	-10.50	39.48	10.97
53	SEABED	-245.51	-59.03	0.00	-0.007	-0.002	332.79	28.97	-5.12	-0.24	0.24	32.03	8.90
54	SEABED	-257.51	-59.03	0.00	-0.001	0.000	344.79	28.97	-5.12	0.01	0.13	31.92	8.87
55	SEABED	-269.51	-59.03	0.00	0.000	0.000	356.79	28.97	-5.12	0.00	-0.01	31.84	8.85
56	SEABED	-281.51	-59.03	0.00	0.000	0.000	368.79	28.97	-5.12	0.00	0.00	31.84	8.84
57	SEABED	-293.51	-59.03	0.00	0.000	0.000	380.79	28.97	-5.12	0.00	0.00	31.84	8.85
58	SEABED	-305.51	-59.03	0.00	0.000	0.000	392.79	28.97	-5.12	0.00	0.00	31.84	8.84

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.266	0.00	37.23	0.00	0.00	0.00	37.23	10.34
3	LAYBARGE	71.49	6.16	0.00	0.000	0.958	6.30	37.21	0.00	-117.06	-0.94	136.71	37.97
5	LAYBARGE	65.37	5.98	0.00	-0.001	2.232	12.42	37.19	0.00	-84.35	-0.71	108.88	30.25
7	LAYBARGE	59.91	5.72	0.00	-0.001	3.279	17.89	37.15	0.00	-95.32	-0.78	118.16	32.82
9	LAYBARGE	53.32	5.27	0.00	-0.002	4.504	24.49	37.08	0.00	-91.81	-0.77	115.12	31.98
11	LAYBARGE	47.32	4.74	0.00	-0.002	5.732	30.51	36.99	0.00	-104.72	-0.80	126.01	35.00
13	LAYBARGE	38.21	3.69	0.00	-0.003	7.424	39.68	36.83	0.00	-118.54	-0.85	137.60	38.22
15	LAYBARGE	29.27	2.39	0.00	-0.003	9.105	48.72	36.64	0.00	-103.73	-0.82	124.81	34.67
17	LAYBARGE	23.13	1.33	0.00	-0.004	10.367	54.95	36.48	0.00	-93.65	-0.94	116.08	32.24
19	LAYBARGE	17.18	0.18	0.00	-0.003	11.442	61.01	36.31	0.00	-79.50	1.06	103.86	28.85
21	LAYBARGE	10.63	-1.23	0.00	-0.020	13.015	67.72	36.11	-0.11	-143.04	-6.00	157.78	43.83
24	STINGER	-4.61	-5.10	0.00	0.009	15.340	83.44	35.62	-0.45	-118.44	-5.81	136.57	37.94
26	STINGER	-11.02	-6.94	0.00	-0.008	16.560	90.11	35.40	-0.61	-56.44	1.09	83.52	23.20
28	STINGER	-17.40	-8.89	0.00	-0.014	17.475	96.77	35.15	-0.78	-77.98	-5.10	101.82	28.28
30	STINGER	-23.74	-10.94	0.00	0.062	18.318	103.44	34.89	-0.96	-47.21	15.58	77.04	21.40
32	STINGER	-30.05	-13.07	-0.01	0.077	19.101	110.11	34.62	-1.14	-69.77	-15.16	95.65	26.57
34	STINGER	-36.32	-15.36	0.00	-0.487	21.618	116.77	34.24	-1.34	-280.71	-81.78	282.82	78.56
36	SAGBEND	-47.31	-20.16	0.19	-1.193	24.169	128.77	33.72	-1.76	8.50	-4.96	42.28	11.74
37	SAGBEND	-58.29	-24.99	0.42	-1.088	23.182	140.77	33.10	-2.18	45.33	8.88	73.02	20.28
38	SAGBEND	-69.38	-29.58	0.60	-0.861	21.721	152.77	32.51	-2.57	51.16	9.37	77.63	21.56
39	SAGBEND	-80.58	-33.87	0.75	-0.655	20.170	164.77	31.97	-2.95	52.91	8.76	78.78	21.88
40	SAGBEND	-91.90	-37.85	0.86	-0.447	18.577	176.77	31.46	-3.29	53.98	8.24	79.40	22.06
41	SAGBEND	-103.33	-41.51	0.93	-0.253	16.952	188.77	31.00	-3.61	54.89	7.47	79.86	22.18
42	SAGBEND	-114.86	-44.85	0.97	-0.083	15.302	200.77	30.57	-3.90	55.71	6.65	80.19	22.27
43	SAGBEND	-126.48	-47.84	0.97	0.081	13.626	212.77	30.20	-4.16	56.39	5.86	80.45	22.35
44	SAGBEND	-138.18	-50.49	0.93	0.217	11.921	224.77	29.86	-4.39	57.17	5.07	80.67	22.41
45	SAGBEND	-149.96	-52.79	0.88	0.336	10.195	236.77	29.57	-4.59	58.05	4.67	81.02	22.51
46	SAGBEND	-161.80	-54.74	0.80	0.451	8.457	248.77	29.33	-4.75	58.80	4.47	81.29	22.58
47	SAGBEND	-173.69	-56.32	0.69	0.558	6.699	260.77	29.13	-4.89	59.31	4.60	81.53	22.65
48	SAGBEND	-185.63	-57.54	0.57	0.667	4.937	272.77	28.98	-5.00	59.73	4.56	81.50	22.64
49	SAGBEND	-197.60	-58.39	0.42	0.769	3.163	284.77	28.87	-5.07	59.20	4.12	80.71	22.42
50	SAGBEND	-209.59	-58.87	0.25	0.836	1.449	296.77	28.81	-5.11	54.11	1.17	76.22	21.17
51	SEABED	-221.58	-59.02	0.08	0.661	0.200	308.77	28.79	-5.12	24.77	-17.63	55.50	15.42
52	SEABED	-233.58	-59.03	0.00	0.104	-0.015	320.77	28.79	-5.12	0.54	-13.11	41.90	11.64
53	SEABED	-245.58	-59.03	0.00	-0.008	-0.003	332.77	28.79	-5.12	-0.31	-0.27	31.91	8.86
54	SEABED	-257.58	-59.03	0.00	-0.001	0.000	344.77	28.79	-5.12	-0.01	0.16	31.78	8.83
55	SEABED	-269.58	-59.03	0.00	0.000	0.000	356.77	28.79	-5.12	0.00	0.00	31.67	8.80
56	SEABED	-281.58	-59.03	0.00	0.000	0.000	368.77	28.79	-5.12	0.00	0.00	31.66	8.80
57	SEABED	-293.58	-59.03	0.00	0.000	0.000	380.77	28.79	-5.12	0.00	0.00	31.67	8.80
58	SEABED	-305.58	-59.03	0.00	0.000	0.000	392.77	28.79	-5.12	0.00	0.00	31.66	8.80

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

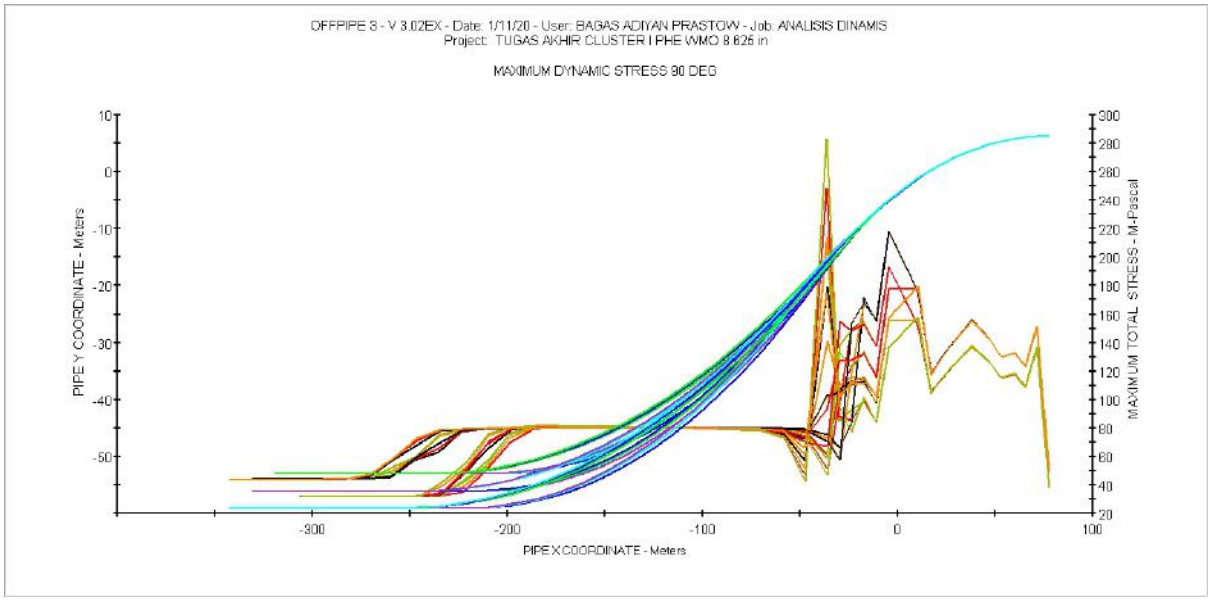
NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.270	0.00	49.72	0.00	0.00	0.00	49.72	13.81
3	LAYBARGE	71.49	6.16	0.00	0.000	0.960	6.30	49.69	0.00	-119.97	-0.96	151.67	42.13
5	LAYBARGE	65.37	5.98	0.00	-0.001	2.230	12.42	49.67	0.00	-86.74	-0.73	123.40	34.28
7	LAYBARGE	59.91	5.72	0.00	-0.001	3.282	17.89	49.63	0.00	-97.99	-0.80	132.93	36.92
9	LAYBARGE	53.32	5.27	0.00	-0.002	4.501	24.49	49.56	0.00	-94.42	-0.78	129.82	36.06
11	LAYBARGE	47.32	4.74	0.00	-0.002	5.739	30.51	49.48	0.00	-109.11	-0.83	142.22	39.51
13	LAYBARGE	38.21	3.69	0.00	-0.003	7.423	39.68	49.32	0.00	-124.91	-0.90	155.48	43.19
15	LAYBARGE	29.27	2.39	0.00	-0.003	9.100	48.72	49.12	0.00	-108.16	0.86	141.06	39.18
17	LAYBARGE	23.13	1.33	0.00	-0.004	10.367	54.95	48.97	0.00	-95.96	-0.95	130.53	36.26
19	LAYBARGE	17.18	0.18	0.00	-0.003	11.443	61.01	48.80	0.00	-82.10	0.96	118.56	32.93
21	LAYBARGE	10.63	-1.23	0.00	-0.017	13.021	67.72	48.59	-0.11	-149.34	-5.77	175.61	48.78
24	STINGER	-4.64	-5.13	0.00	0.002	15.976	83.47	48.07	-0.45	-199.44	-6.65	217.85	60.51
26	STINGER	-11.00	-7.10	0.00	0.008	18.234	90.14	47.85	-0.62	-126.60	7.40	155.80	43.28
28	STINGER	-17.30	-9.29	0.00	-0.078	20.022	96.81	47.57	-0.81	-142.77	-27.46	167.68	46.58
30	STINGER	-23.53	-11.66	0.03	-0.610	21.628	103.47	47.27	-1.02	-108.17	-62.75	153.79	42.72
32	STINGER	-29.71	-14.17	0.13	-1.090	22.251	110.14	46.97	-1.24	4.07	-12.21	57.47	15.96
34	STINGER	-35.89	-16.68	0.25	-1.134	21.954	116.81	46.64	-1.45	28.07	3.18	70.84	19.68
36	SAGBEND	-47.05	-21.07	0.46	-1.008	20.940	128.81	46.08	-1.84	36.30	6.43	78.22	21.73
37	SAGBEND	-58.30	-25.25	0.64	-0.844	19.822	140.81	45.55	-2.20	37.77	6.47	79.05	21.96
38	SAGBEND	-69.63	-29.21	0.79	-0.674	18.679	152.81	45.04	-2.54	38.49	6.15	79.26	22.02
39	SAGBEND	-81.03	-32.94	0.92	-0.521	17.520	164.81	44.57	-2.87	39.10	5.84	79.42	22.06
40	SAGBEND	-92.51	-36.43	1.00	-0.373	16.345	176.81	44.12	-3.17	39.66	5.54	79.57	22.10
41	SAGBEND	-104.06	-39.69	1.06	-0.229	15.154	188.81	43.71	-3.45	40.16	5.16	79.68	22.13
42	SAGBEND	-115.67	-42.71	1.10	-0.100	13.953	200.81	43.32	-3.71	40.57	4.78	79.79	22.16
43	SAGBEND	-127.35	-45.48	1.10	0.023	12.741	212.81	42.97	-3.95	40.88	4.32	79.87	22.19
44	SAGBEND	-139.08	-48.00	1.09	0.136	11.511	224.81	42.65	-4.17	41.16	3.83	79.91	22.20
45	SAGBEND	-150.87	-50.26	1.05	0.233	10.270	236.81	42.36	-4.37	41.44	3.43	79.91	22.20
46	SAGBEND	-162.70	-52.27	0.99	0.322	9.025	248.81	42.11	-4.54	41.82	3.14	79.92	22.20
47	SAGBEND	-174.57	-54.03	0.92	0.404	7.771	260.81	41.89	-4.69	42.21	2.97	79.91	22.20
48	SAGBEND	-186.47	-55.52	0.83	0.481	6.506	272.81	41.71	-4.82	42.52	3.02	79.87	22.19
49	SAGBEND	-198.41	-56.75	0.72	0.558	5.236	284.81	41.55	-4.93	42.86	3.03	79.81	22.17
50	SAGBEND	-210.37	-57.71	0.59	0.636	3.962	296.81	41.43	-5.01	43.09	3.00	79.67	22.13
51	SAGBEND	-222.35	-58.40	0.45	0.715	2.683	308.81	41.35	-5.07	43.01	2.87	79.36	22.04
52	SAGBEND	-234.34	-58.83	0.29	0.781	1.424	320.81	41.29	-5.10	41.44	1.86	77.87	21.63
53	SEABED	-246.34	-59.01	0.13	0.738	0.336	332.81	41.27	-5.12	28.18	-9.74	67.67	18.80
54	SEABED	-258.34	-59.03	0.02	0.260	0.004	344.81	41.27	-5.12	2.80	-17.13	58.08	16.13
55	SEABED	-270.34	-59.03	0.00	0.009	-0.003	356.81	41.27	-5.12	-0.22	-2.60	46.05	12.79
56	SEABED	-282.34	-59.03	0.00	-0.002	0.000	368.81	41.27	-5.12	-0.04	0.14	44.15	12.26
57	SEABED	-294.34	-59.03	0.00	0.000	0.000	380.81	41.27	-5.12	0.00	0.03	44.08	12.24
58	SEABED	-306.34	-59.03	0.00	0.000	0.000	392.81	41.27	-5.12	0.00	0.00	44.06	12.24
59	SEABED	-318.34	-59.03	0.00	0.000	0.000	404.81	41.27	-5.12	0.00	0.00	44.06	12.24
60	SEABED	-330.34	-59.03	0.00	0.000	0.000	416.81	41.27	-5.12	0.00	0.00	44.06	12.24

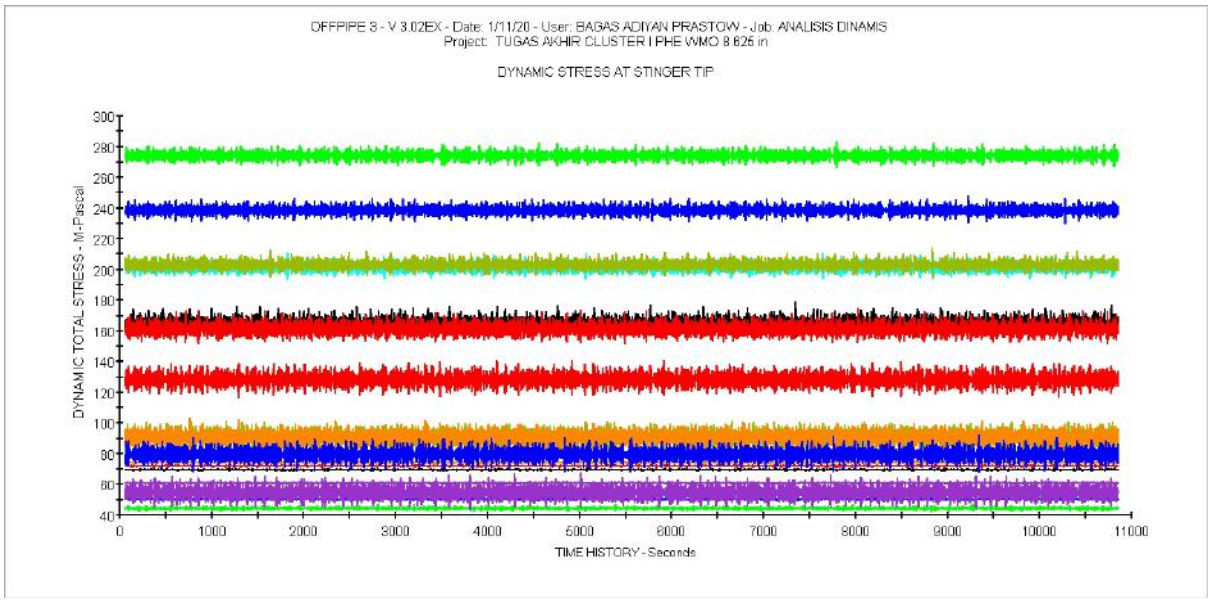
MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.270	0.00	49.62	0.00	0.00	0.00	49.62	13.78
3	LAYBARGE	71.49	6.16	0.00	0.000	0.960	6.30	49.60	0.00	-119.93	-0.84	151.54	42.10
5	LAYBARGE	65.37	5.98	0.00	0.000	2.230	12.42	49.58	0.00	-86.71	-0.63	123.29	34.25
7	LAYBARGE	59.91	5.72	0.00	0.000	3.282	17.89	49.54	0.00	-97.96	-0.69	132.81	36.89
9	LAYBARGE	53.32	5.27	0.00	0.000	4.501	24.49	49.47	0.00	-94.39	-0.68	129.70	36.03
11	LAYBARGE	47.32	4.74	0.00	0.000	5.739	30.51	49.39	0.00	-109.05	-0.74	142.08	39.47
13	LAYBARGE	38.21	3.69	0.00	0.000	7.423	39.68	49.23	0.00	-124.84	-0.82	155.34	43.15
15	LAYBARGE	29.27	2.39	0.00	0.000	9.100	48.72	49.03	0.00	-108.07	0.79	140.89	39.14
17	LAYBARGE	23.13	1.33	0.00	0.000	10.368	54.95	48.88	0.00	-96.13	-0.84	130.58	36.27
19	LAYBARGE	17.18	0.19	0.00	0.002	11.440	61.01	48.71	0.00	-81.31	0.96	117.77	32.71
21	LAYBARGE	10.63	-1.23	0.00	-0.013	13.036	67.72	48.50	-0.11	-152.51	-5.87	178.21	49.50
24	STINGER	-4.62	-5.11	0.00	0.014	15.531	83.45	48.00	-0.45	-152.16	-5.94	177.57	49.33
26	STINGER	-11.01	-6.99	0.00	-0.003	17.121	90.12	47.78	-0.61	-79.68	-0.59	115.62	32.12
28	STINGER	-17.37	-9.02	0.00	0.002	18.321	96.78	47.52	-0.79	-98.62	-4.42	131.44	36.51
30	STINGER	-23.67	-11.19	0.00	0.008	19.599	103.45	47.25	-0.98	-95.11	-10.31	128.13	35.59
32	STINGER	-29.93	-13.49	0.01	-0.291	20.758	110.12	46.95	-1.18	-87.83	-45.75	127.04	35.29
34	STINGER	-36.14	-15.90	0.08	-0.831	21.484	116.79	46.65	-1.39	-39.08	-34.88	91.36	25.38
36	SAGBEND	-47.31	-20.28	0.27	-1.037	21.084	128.79	46.10	-1.77	31.98	4.19	73.37	20.38
37	SAGBEND	-58.55	-24.50	0.47	-0.904	20.024	140.79	45.56	-2.13	37.13	6.56	78.60	21.83
38	SAGBEND	-69.86	-28.50	0.63	-0.738	18.892	152.79	45.05	-2.48	38.29	6.53	79.27	22.02
39	SAGBEND	-81.25	-32.26	0.76	-0.584	17.735	164.79	44.56	-2.81	38.97	6.19	79.42	22.06
40	SAGBEND	-92.72	-35.80	0.87	-0.436	16.562	176.79	44.11	-3.11	39.65	5.82	79.52	22.09
41	SAGBEND	-104.25	-39.10	0.94	-0.291	15.377	188.79	43.69	-3.40	40.16	5.50	79.65	22.12
42	SAGBEND	-115.86	-42.16	0.98	-0.161	14.176	200.79	43.30	-3.67	40.54	5.06	79.76	22.15
43	SAGBEND	-127.52	-44.98	1.01	-0.034	12.963	212.79	42.95	-3.91	40.92	4.56	79.84	22.18
44	SAGBEND	-139.24	-47.55	1.00	0.080	11.739	224.79	42.62	-4.13	41.22	4.12	79.85	22.18
45	SAGBEND	-151.02	-49.86	0.97	0.179	10.503	236.79	42.33	-4.33	41.41	3.64	79.83	22.18
46	SAGBEND	-162.84	-51.92	0.93	0.268	9.255	248.79	42.07	-4.51	41.61	3.25	79.77	22.16
47	SAGBEND	-174.70	-53.73	0.86	0.349	8.000	260.79	41.84	-4.67	41.92	3.09	79.71	22.14
48	SAGBEND	-186.60	-55.26	0.78	0.426	6.738	272.79	41.65	-4.80	42.35	3.09	79.72	22.15
49	SAGBEND	-198.53	-56.54	0.69	0.503	5.473	284.79	41.49	-4.91	42.69	3.11	79.69	22.14
50	SAGBEND	-210.49	-57.55	0.57	0.582	4.196	296.79	41.37	-4.99	42.89	3.10	79.62	22.12
51	SAGBEND	-222.47	-58.30	0.45	0.658	2.918	308.79	41.27	-5.06	42.91	3.03	79.40	22.05
52	SAGBEND	-234.46	-58.77	0.30	0.729	1.650	320.79	41.21	-5.10	41.96	2.27	78.33	21.76
53	SAGBEND	-246.45	-58.99	0.14	0.726	0.492	332.79	41.19	-5.12	32.68	-6.13	71.02	19.73
54	SEABED	-258.45	-59.03	0.03	0.322	0.019	344.79	41.19	-5.12	4.78	-17.61	58.54	16.26
55	SEABED	-270.45	-59.03	0.00	0.020	-0.005	356.79	41.18	-5.12	-0.24	-3.86	46.67	12.96
56	SEABED	-282.45	-59.03	0.00	-0.003	0.000	368.79	41.18	-5.12	-0.06	0.12	44.06	12.24
57	SEABED	-294.45	-59.03	0.00	0.000	0.000	380.79	41.19	-5.12	0.00	0.04	44.00	12.22
58	SEABED	-306.45	-59.03	0.00	0.000	0.000	392.79	41.19	-5.12	0.00	0.00	43.97	12.21
59	SEABED	-318.45	-59.03	0.00	0.000	0.000	404.79	41.19	-5.12	0.00	0.00	43.97	12.21
60	SEABED	-330.45	-59.03	0.00	0.000	0.000	416.79	41.19	-5.12	0.00	0.00	43.97	12.21

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.270	0.00	49.59	0.00	0.00	0.00	49.59	13.78
3	LAYBARGE	71.49	6.16	0.00	0.000	0.960	6.30	49.57	0.00	-119.94	-0.86	151.52	42.09
5	LAYBARGE	65.37	5.99	0.00	0.000	2.230	12.42	49.55	0.00	-86.71	-0.65	123.26	34.24
7	LAYBARGE	59.91	5.72	0.00	-0.001	3.282	17.89	49.51	0.00	-97.97	-0.71	132.78	36.88
9	LAYBARGE	53.32	5.28	0.00	-0.001	4.501	24.49	49.44	0.00	-94.39	-0.70	129.68	36.02
11	LAYBARGE	47.32	4.74	0.00	-0.001	5.739	30.51	49.36	0.00	-109.06	-0.75	142.06	39.46
13	LAYBARGE	38.21	3.69	0.00	-0.002	7.423	39.68	49.20	0.00	-124.85	-0.83	155.32	43.14
15	LAYBARGE	29.27	2.39	0.00	-0.002	9.100	48.72	49.00	0.00	-108.05	-0.78	140.85	39.12
17	LAYBARGE	23.13	1.34	0.00	-0.003	10.369	54.95	48.85	0.00	-96.22	-0.86	130.64	36.29
19	LAYBARGE	17.18	0.19	0.00	-0.001	11.438	61.01	48.68	0.00	-80.84	0.94	117.38	32.61
21	LAYBARGE	10.63	-1.22	0.00	-0.017	13.044	67.72	48.47	-0.11	-154.19	-5.86	179.62	49.89
24	STINGER	-4.61	-5.09	0.00	0.011	15.309	83.44	47.98	-0.45	-128.27	-5.53	157.26	43.68
26	STINGER	-11.02	-6.93	0.00	-0.007	16.572	90.11	47.76	-0.61	-58.38	-0.92	97.66	27.13
28	STINGER	-17.40	-8.88	0.00	-0.003	17.450	96.77	47.51	-0.78	-74.80	-1.63	111.30	30.92
30	STINGER	-23.74	-10.94	0.00	-0.006	18.433	103.44	47.25	-0.95	-74.70	-4.29	110.77	30.77
32	STINGER	-30.05	-13.09	0.00	0.048	19.301	110.11	46.97	-1.14	-64.70	9.98	102.06	28.35
34	STINGER	-36.32	-15.36	0.01	-0.375	20.527	116.77	46.67	-1.34	-127.77	-78.23	174.42	48.45
36	SAGBEND	-47.51	-19.69	0.18	-1.030	21.137	128.77	46.13	-1.71	22.96	-3.57	66.19	18.38
37	SAGBEND	-58.73	-23.93	0.38	-0.929	20.178	140.77	45.59	-2.08	36.34	6.60	77.89	21.63
38	SAGBEND	-70.03	-27.96	0.55	-0.768	19.053	152.77	45.08	-2.43	38.17	6.96	79.08	21.97
39	SAGBEND	-81.41	-31.76	0.69	-0.619	17.897	164.77	44.59	-2.76	38.97	6.56	79.37	22.05
40	SAGBEND	-92.87	-35.33	0.80	-0.463	16.723	176.77	44.14	-3.07	39.54	6.08	79.49	22.08
41	SAGBEND	-104.40	-38.67	0.88	-0.321	15.545	188.77	43.71	-3.36	39.99	5.82	79.58	22.11
42	SAGBEND	-115.99	-41.76	0.93	-0.193	14.343	200.77	43.32	-3.63	40.39	5.37	79.65	22.12
43	SAGBEND	-127.65	-44.61	0.96	-0.063	13.129	212.77	42.95	-3.88	40.71	4.79	79.67	22.13
44	SAGBEND	-139.36	-47.21	0.97	0.051	11.905	224.77	42.62	-4.10	41.06	4.34	79.76	22.15
45	SAGBEND	-151.13	-49.56	0.94	0.150	10.672	236.77	42.33	-4.31	41.44	3.83	79.86	22.18
46	SAGBEND	-162.94	-51.66	0.90	0.242	9.429	248.77	42.06	-4.49	41.70	3.34	79.89	22.19
47	SAGBEND	-174.80	-53.49	0.84	0.323	8.176	260.77	41.83	-4.65	42.03	3.16	79.86	22.18
48	SAGBEND	-186.70	-55.07	0.77	0.399	6.912	272.77	41.63	-4.78	42.35	3.13	79.79	22.16
49	SAGBEND	-198.62	-56.38	0.68	0.479	5.644	284.77	41.47	-4.89	42.67	3.22	79.70	22.14
50	SAGBEND	-210.58	-57.43	0.57	0.556	4.370	296.77	41.34	-4.98	42.95	3.29	79.62	22.12
51	SAGBEND	-222.55	-58.21	0.45	0.632	3.095	308.77	41.24	-5.05	43.05	3.25	79.44	22.07
52	SAGBEND	-234.54	-58.72	0.31	0.703	1.820	320.77	41.18	-5.09	42.28	2.65	78.61	21.84
53	SAGBEND	-246.54	-58.98	0.16	0.722	0.630	332.77	41.15	-5.11	35.50	-3.73	73.22	20.34
54	SEABED	-258.54	-59.03	0.03	0.373	0.037	344.77	41.14	-5.12	7.07	-17.48	58.84	16.34
55	SEABED	-270.54	-59.03	0.00	0.029	-0.006	356.77	41.14	-5.12	-0.22	-5.01	47.52	13.20
56	SEABED	-282.54	-59.03	0.00	-0.003	-0.001	368.77	41.14	-5.12	-0.08	0.10	44.00	12.22
57	SEABED	-294.54	-59.03	0.00	0.000	0.000	380.77	41.14	-5.12	0.00	0.05	43.96	12.21
58	SEABED	-306.54	-59.03	0.00	0.000	0.000	392.77	41.14	-5.12	0.00	0.00	43.93	12.20
59	SEABED	-318.54	-59.03	0.00	0.000	0.000	404.77	41.14	-5.12	0.00	0.00	43.93	12.20
60	SEABED	-330.54	-59.03	0.00	0.000	0.000	416.77	41.14	-5.12	0.00	0.00	43.93	12.20


OFFPIPE 8 - V 8.02EX - Date: 1/11/20 - User: BAGAS ADIYAN PRASTOW - Job: ANALISIS DINAMIS
Project: TUGAS AKHIR CLUSTER I PHE WMO 8.625 in
MAXIMUM DYNAMIC STRESS 90 DEG
PIPE Y COORDINATE - Meters
MAXIMUM TOTAL STRESS - M-Pascal
PIPE X COORDINATE - Meters


OFFPIPE 8 - V 8.02EX - Date: 1/11/20 - User: BAGAS ADIYAN PRASTOW - Job: ANALISIS DINAMIS
Project: TUGAS AKHIR CLUSTER I PHE WMO 8.625 in
DYNAMIC STRESS AT STINGER TIP
DYNAMIC TOTAL STRESS - M-Pascal
TIME HISTORY - Seconds

Output Analisis Dinamis Heading 135°

M A X I M U M D Y N A M I C P I P E F O R C E S A N D S T R E S S E S

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.001	0.268	0.00	37.46	0.00	0.00	0.00	37.46	10.41
3	LAYBARGE	71.49	6.16	0.00	0.001	0.960	6.30	37.44	0.00	-117.17	0.90	136.99	38.05
5	LAYBARGE	65.38	5.99	0.00	0.001	2.234	12.42	37.42	0.00	-84.42	0.68	109.14	30.32
7	LAYBARGE	59.91	5.73	0.00	0.001	3.281	17.89	37.37	0.00	-95.41	0.74	118.43	32.90
9	LAYBARGE	53.32	5.28	0.00	0.001	4.506	24.49	37.30	0.00	-91.89	0.73	115.38	32.05
11	LAYBARGE	47.32	4.74	0.00	0.002	5.734	30.51	37.22	0.00	-104.87	0.76	126.33	35.09
13	LAYBARGE	38.22	3.70	0.00	0.002	7.425	39.68	37.05	0.00	-118.74	0.80	137.95	38.32
15	LAYBARGE	29.27	2.39	0.00	0.002	9.108	48.72	36.86	0.00	-103.93	0.82	125.17	34.77
17	LAYBARGE	23.13	1.34	0.00	0.002	10.367	54.95	36.70	0.00	-93.41	-0.85	116.08	32.24
19	LAYBARGE	17.18	0.19	0.00	0.004	11.452	61.01	36.52	0.00	-81.51	1.12	105.49	29.30
21	LAYBARGE	10.63	-1.22	0.00	-0.015	12.984	67.72	36.33	-0.11	-136.74	-5.47	152.66	42.40
24	STINGER	-4.64	-5.13	0.00	0.017	16.021	83.47	35.81	-0.45	-185.82	-5.43	194.00	53.89
26	STINGER	-11.00	-7.11	0.00	-0.012	18.219	90.14	35.58	-0.63	-119.80	-4.02	137.56	38.21
28	STINGER	-17.30	-9.29	0.00	0.042	20.068	96.81	35.30	-0.82	-140.31	12.92	155.28	43.13
30	STINGER	-23.53	-11.68	0.00	-0.218	21.937	103.47	34.99	-1.02	-132.10	-55.11	148.99	41.39
32	STINGER	-29.68	-14.25	0.06	-0.861	23.154	110.14	34.68	-1.25	-63.18	-46.00	101.37	28.16
34	STINGER	-35.80	-16.89	0.18	-1.195	23.318	116.81	34.35	-1.48	21.35	-10.17	52.72	14.64
36	SAGBEND	-46.86	-21.54	0.41	-1.124	22.207	128.81	33.75	-1.88	46.93	8.12	74.63	20.73
37	SAGBEND	-58.02	-25.94	0.61	-0.921	20.729	140.81	33.19	-2.26	51.41	9.17	78.39	21.78
38	SAGBEND	-69.30	-30.03	0.77	-0.697	19.180	152.81	32.66	-2.62	52.90	8.77	79.38	22.05
39	SAGBEND	-80.69	-33.82	0.89	-0.488	17.596	164.81	32.18	-2.94	53.90	8.22	79.94	22.21
40	SAGBEND	-92.17	-37.28	0.97	-0.288	15.984	176.81	31.74	-3.24	54.92	7.66	80.37	22.33
41	SAGBEND	-103.76	-40.42	1.01	-0.094	14.339	188.81	31.34	-3.52	55.70	7.03	80.78	22.44
42	SAGBEND	-115.42	-43.23	1.01	0.084	12.671	200.81	30.99	-3.76	56.30	6.42	81.04	22.51
43	SAGBEND	-127.17	-45.69	0.98	0.250	10.981	212.81	30.68	-3.97	57.03	5.91	81.22	22.56
44	SAGBEND	-138.98	-47.80	0.91	0.398	9.278	224.81	30.41	-4.15	57.84	5.46	81.49	22.64
45	SAGBEND	-150.85	-49.55	0.81	0.537	7.554	236.81	30.19	-4.31	58.60	5.22	81.56	22.66
46	SAGBEND	-162.77	-50.95	0.69	0.666	5.812	248.81	30.02	-4.43	59.11	4.96	81.43	22.62
47	SAGBEND	-174.72	-51.99	0.54	0.782	4.070	260.81	29.89	-4.51	59.15	4.58	81.19	22.55
48	SAGBEND	-186.70	-52.65	0.36	0.879	2.336	272.81	29.81	-4.57	57.51	3.22	79.39	22.05
49	SAGBEND	-198.70	-52.97	0.18	0.876	0.756	284.81	29.77	-4.59	46.17	-6.67	70.71	19.64
50	SEABED	-210.69	-53.03	0.03	0.399	0.024	296.81	29.77	-4.60	8.39	-22.29	51.19	14.22
51	SEABED	-222.69	-53.03	0.00	0.016	-0.010	308.81	29.77	-4.60	-0.58	-4.93	35.91	9.97
52	SEABED	-234.69	-53.03	0.00	-0.005	0.000	320.81	29.77	-4.60	-0.11	0.30	32.54	9.04
53	SEABED	-246.69	-53.03	0.00	0.000	0.000	332.81	29.77	-4.60	0.01	0.06	32.34	8.98
54	SEABED	-258.69	-53.03	0.00	0.000	0.000	344.81	29.77	-4.60	0.00	-0.01	32.32	8.98
55	SEABED	-270.69	-53.03	0.00	0.000	0.000	356.81	29.77	-4.60	0.00	0.00	32.31	8.98
56	SEABED	-282.69	-53.03	0.00	0.000	0.000	368.81	29.77	-4.60	0.00	0.00	32.31	8.98
57	SEABED	-294.69	-53.03	0.00	0.000	0.000	380.81	29.77	-4.60	0.00	0.00	32.31	8.98

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.002	0.268	0.00	37.63	0.00	0.00	0.00	37.63	10.45
3	LAYBARGE	71.49	6.16	0.00	0.001	0.960	6.30	37.60	0.00	-117.15	-0.90	137.14	38.09
5	LAYBARGE	65.38	5.99	0.00	0.000	2.234	12.42	37.58	0.00	-84.40	-0.64	109.32	30.37
7	LAYBARGE	59.91	5.73	0.00	-0.001	3.281	17.89	37.54	0.00	-95.38	-0.71	118.60	32.95
9	LAYBARGE	53.32	5.28	0.00	-0.001	4.506	24.49	37.47	0.00	-91.87	-0.69	115.56	32.10
11	LAYBARGE	47.32	4.74	0.00	-0.002	5.734	30.51	37.38	0.00	-104.83	-0.75	126.49	35.14
13	LAYBARGE	38.22	3.69	0.00	-0.002	7.426	39.68	37.22	0.00	-118.71	-0.82	138.12	38.37
15	LAYBARGE	29.27	2.39	0.00	-0.002	9.108	48.72	37.02	0.00	-103.87	-0.71	125.31	34.81
17	LAYBARGE	23.13	1.33	0.00	-0.003	10.368	54.95	36.86	0.00	-93.67	-0.82	116.48	32.35
19	LAYBARGE	17.18	0.19	0.00	-0.002	11.447	61.01	36.69	0.00	-80.29	1.09	104.56	29.04
21	LAYBARGE	10.63	-1.22	0.00	-0.021	13.004	67.72	36.50	-0.11	-141.26	-5.13	156.63	43.51
24	STINGER	-4.62	-5.11	0.00	0.005	15.566	83.45	36.00	-0.45	-141.02	-5.22	156.11	43.36
26	STINGER	-11.01	-6.99	0.00	-0.015	17.118	90.12	35.77	-0.61	-78.67	-1.09	102.95	28.60
28	STINGER	-17.37	-9.02	0.00	-0.014	18.320	96.78	35.51	-0.79	-93.01	-2.65	114.55	31.82
30	STINGER	-23.67	-11.19	0.00	-0.009	19.623	103.45	35.23	-0.98	-95.74	5.00	116.75	32.43
32	STINGER	-29.93	-13.49	0.01	-0.026	20.832	110.12	34.94	-1.18	-89.72	-21.19	110.58	30.72
34	STINGER	-36.13	-15.93	0.03	-0.519	22.051	116.79	34.62	-1.39	-106.25	-69.39	141.75	39.37
36	SAGBEND	-47.22	-20.52	0.21	-1.151	22.347	128.79	34.04	-1.79	32.97	-3.93	62.38	17.33
37	SAGBEND	-58.36	-24.96	0.43	-1.024	21.065	140.79	33.47	-2.18	49.44	9.00	76.80	21.33
38	SAGBEND	-69.62	-29.12	0.61	-0.800	19.544	152.79	32.94	-2.54	52.55	9.18	79.07	21.96
39	SAGBEND	-80.98	-32.98	0.75	-0.598	17.957	164.79	32.45	-2.87	53.87	8.66	79.89	22.19
40	SAGBEND	-92.44	-36.52	0.85	-0.386	16.351	176.79	31.99	-3.18	54.76	8.18	80.44	22.34
41	SAGBEND	-104.00	-39.73	0.91	-0.204	14.714	188.79	31.59	-3.46	55.59	7.57	80.81	22.45
42	SAGBEND	-115.65	-42.62	0.93	-0.016	13.053	200.79	31.22	-3.71	56.29	6.80	81.02	22.51
43	SAGBEND	-127.38	-45.15	0.92	0.160	11.373	212.79	30.90	-3.93	56.94	6.18	81.15	22.54
44	SAGBEND	-139.18	-47.34	0.87	0.319	9.663	224.79	30.63	-4.12	57.64	5.81	81.28	22.58
45	SAGBEND	-151.04	-49.18	0.79	0.458	7.948	236.79	30.40	-4.27	58.48	5.46	81.43	22.62
46	SAGBEND	-162.94	-50.66	0.68	0.589	6.214	248.79	30.22	-4.40	59.16	5.10	81.64	22.68
47	SAGBEND	-174.89	-51.78	0.55	0.708	4.477	260.79	30.08	-4.50	59.60	4.76	81.49	22.64
48	SAGBEND	-186.86	-52.53	0.39	0.800	2.730	272.79	29.98	-4.56	58.53	3.93	80.24	22.29
49	SAGBEND	-198.86	-52.93	0.21	0.847	1.086	284.79	29.94	-4.59	50.75	-4.29	74.12	20.59
50	SEABED	-210.85	-53.03	0.05	0.525	0.088	296.79	29.93	-4.60	15.99	-21.12	52.35	14.54
51	SEABED	-222.85	-53.03	0.00	0.049	-0.013	308.79	29.93	-4.60	-0.57	-9.43	39.78	11.05
52	SEABED	-234.85	-53.03	0.00	-0.006	-0.001	320.79	29.93	-4.60	-0.20	0.28	32.65	9.07
53	SEABED	-246.85	-53.03	0.00	-0.001	0.000	332.79	29.93	-4.60	0.01	0.11	32.55	9.04
54	SEABED	-258.85	-53.03	0.00	0.000	0.000	344.79	29.93	-4.60	0.00	-0.01	32.47	9.02
55	SEABED	-270.85	-53.03	0.00	0.000	0.000	356.79	29.93	-4.60	0.00	0.00	32.47	9.02
56	SEABED	-282.85	-53.03	0.00	0.000	0.000	368.79	29.93	-4.60	0.00	0.00	32.47	9.02
57	SEABED	-294.85	-53.03	0.00	0.000	0.000	380.79	29.93	-4.60	0.00	0.00	32.47	9.02

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.20	0.01	0.015	0.275	0.00	37.64	0.00	0.00	0.00	37.64	10.46
3	LAYBARGE	71.49	6.15	0.01	0.017	0.967	6.30	37.62	0.00	-117.16	0.95	137.12	38.09
5	LAYBARGE	65.38	5.97	0.01	0.016	2.241	12.42	37.60	0.00	-84.42	0.69	109.32	30.37
7	LAYBARGE	59.91	5.71	0.01	0.013	3.287	17.89	37.55	0.00	-95.40	0.76	118.60	32.94
9	LAYBARGE	53.32	5.26	0.01	0.011	4.512	24.49	37.48	0.00	-91.90	0.74	115.55	32.10
11	LAYBARGE	47.32	4.73	0.00	0.008	5.741	30.51	37.40	0.00	-104.87	0.80	126.48	35.13
13	LAYBARGE	38.22	3.69	0.00	0.004	7.432	39.68	37.24	0.00	-118.78	0.86	138.12	38.37
15	LAYBARGE	29.27	2.39	0.00	0.001	9.114	48.72	37.04	0.00	-103.87	0.82	125.29	34.80
17	LAYBARGE	23.13	1.33	0.00	-0.001	10.376	54.95	36.88	0.00	-93.82	-0.81	116.60	32.39
19	LAYBARGE	17.18	0.19	0.00	0.001	11.450	61.01	36.71	0.00	-79.69	1.04	104.14	28.93
21	LAYBARGE	10.63	-1.22	0.00	-0.013	13.025	67.72	36.51	-0.11	-143.73	-5.29	158.71	44.08
24	STINGER	-4.61	-5.10	0.00	0.017	15.346	83.44	36.02	-0.45	-118.92	-5.38	137.31	38.14
26	STINGER	-11.02	-6.94	0.00	0.004	16.574	90.11	35.80	-0.61	-57.46	1.50	84.78	23.55
28	STINGER	-17.40	-8.88	0.00	-0.009	17.465	96.77	35.55	-0.78	-73.66	-4.74	98.55	27.37
30	STINGER	-23.74	-10.94	0.00	0.062	18.419	103.44	35.28	-0.96	-68.60	15.33	93.21	25.89
32	STINGER	-30.05	-13.09	-0.01	0.098	19.237	110.11	35.01	-1.15	-58.50	-11.28	85.61	23.78
34	STINGER	-36.32	-15.36	0.00	-0.465	20.964	116.77	34.68	-1.35	-197.37	-86.73	213.91	59.42
36	SAGBEND	-47.43	-19.89	0.19	-1.183	22.387	128.77	34.14	-1.74	22.16	-5.29	53.86	14.96
37	SAGBEND	-58.56	-24.36	0.41	-1.057	21.247	140.77	33.57	-2.13	48.25	9.10	75.70	21.03
38	SAGBEND	-69.80	-28.56	0.59	-0.841	19.750	152.77	33.03	-2.49	52.44	9.51	78.96	21.93
39	SAGBEND	-81.15	-32.46	0.74	-0.627	18.179	164.77	32.54	-2.83	53.73	9.14	79.88	22.19
40	SAGBEND	-92.60	-36.05	0.84	-0.416	16.572	176.77	32.08	-3.14	54.57	8.45	80.39	22.33
41	SAGBEND	-104.15	-39.31	0.91	-0.226	14.943	188.77	31.67	-3.42	55.26	7.67	80.69	22.41
42	SAGBEND	-115.78	-42.24	0.93	-0.038	13.290	200.77	31.30	-3.67	55.95	7.02	80.82	22.45
43	SAGBEND	-127.50	-44.83	0.92	0.131	11.613	212.77	30.98	-3.90	56.77	6.31	81.05	22.52
44	SAGBEND	-139.29	-47.06	0.88	0.289	9.908	224.77	30.70	-4.09	57.56	5.87	81.31	22.59
45	SAGBEND	-151.14	-48.94	0.80	0.436	8.188	236.77	30.46	-4.25	58.50	5.53	81.43	22.62
46	SAGBEND	-163.04	-50.48	0.70	0.566	6.455	248.77	30.27	-4.39	59.27	5.30	81.69	22.69
47	SAGBEND	-174.98	-51.65	0.57	0.688	4.716	260.77	30.13	-4.49	59.64	5.01	81.65	22.68
48	SAGBEND	-186.95	-52.45	0.41	0.796	2.971	272.77	30.03	-4.55	58.82	4.39	80.59	22.39
49	SAGBEND	-198.94	-52.89	0.24	0.860	1.301	284.77	29.97	-4.59	52.57	-1.45	75.53	20.98
50	SEABED	-210.94	-53.03	0.07	0.632	0.153	296.77	29.96	-4.60	22.02	-19.77	54.82	15.23
51	SEABED	-222.94	-53.03	0.00	0.091	-0.014	308.77	29.96	-4.60	-0.41	-13.44	43.03	11.95
52	SEABED	-234.94	-53.03	0.00	-0.007	-0.002	320.77	29.96	-4.60	-0.28	-0.34	32.72	9.09
53	SEABED	-246.94	-53.03	0.00	-0.001	0.000	332.77	29.96	-4.60	0.01	0.16	32.61	9.06
54	SEABED	-258.94	-53.03	0.00	0.000	0.000	344.77	29.96	-4.60	0.00	-0.01	32.50	9.03
55	SEABED	-270.94	-53.03	0.00	0.000	0.000	356.77	29.96	-4.60	0.00	-0.01	32.50	9.03
56	SEABED	-282.94	-53.03	0.00	0.000	0.000	368.77	29.96	-4.60	0.00	0.00	32.50	9.03
57	SEABED	-294.94	-53.03	0.00	0.000	0.000	380.77	29.96	-4.60	0.00	0.00	32.50	9.03

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.22	-0.01	-0.003	0.263	0.00	50.02	0.00	0.00	0.00	50.02	13.89
3	LAYBARGE	71.49	6.16	-0.01	-0.003	0.953	6.30	49.99	0.00	-120.01	-0.87	151.97	42.21
5	LAYBARGE	65.38	5.99	-0.01	-0.004	2.223	12.42	49.97	0.00	-86.78	-0.65	123.70	34.36
7	LAYBARGE	59.91	5.73	-0.01	-0.004	3.274	17.89	49.93	0.00	-98.04	-0.71	133.23	37.01
9	LAYBARGE	53.32	5.28	-0.01	-0.005	4.494	24.49	49.86	0.00	-94.47	-0.70	130.12	36.15
11	LAYBARGE	47.32	4.74	0.00	-0.005	5.731	30.51	49.77	0.00	-109.19	-0.74	142.55	39.60
13	LAYBARGE	38.22	3.70	0.00	-0.005	7.416	39.68	49.61	0.00	-125.04	-0.82	155.86	43.29
15	LAYBARGE	29.27	2.39	0.00	-0.004	9.093	48.72	49.41	0.00	-108.24	-0.79	141.39	39.27
17	LAYBARGE	23.13	1.33	0.00	-0.003	10.360	54.95	49.25	0.00	-96.11	-0.83	130.91	36.37
19	LAYBARGE	17.18	0.18	0.00	0.001	11.436	61.01	49.08	0.00	-82.32	1.06	118.81	33.00
21	LAYBARGE	10.63	-1.23	0.00	-0.012	13.013	67.72	48.88	-0.11	-149.58	-4.68	176.10	48.92
24	STINGER	-4.64	-5.13	0.00	0.009	15.971	83.47	48.36	-0.45	-201.71	-8.16	219.97	61.10
26	STINGER	-11.01	-7.10	0.00	0.032	18.221	90.14	48.14	-0.62	-125.67	15.20	155.30	43.14
28	STINGER	-17.31	-9.28	0.01	-0.340	19.983	96.81	47.85	-0.81	-135.85	-68.00	171.13	47.54
30	STINGER	-23.54	-11.63	0.09	-0.980	21.002	103.47	47.57	-1.02	-33.72	-29.01	84.98	23.61
32	STINGER	-29.77	-14.02	0.21	-1.151	20.931	110.14	47.27	-1.23	24.07	-3.73	66.94	18.60
34	STINGER	-36.00	-16.38	0.33	-1.118	20.453	116.81	46.97	-1.43	33.62	5.60	76.11	21.14
36	SAGBEND	-47.28	-20.47	0.54	-0.959	19.369	128.81	46.44	-1.79	37.60	6.69	79.58	22.11
37	SAGBEND	-58.64	-24.34	0.72	-0.795	18.231	140.81	45.95	-2.12	38.44	6.55	79.94	22.21
38	SAGBEND	-70.07	-27.98	0.86	-0.635	17.082	152.81	45.48	-2.44	38.99	6.33	80.12	22.25
39	SAGBEND	-81.58	-31.39	0.98	-0.473	15.921	164.81	45.05	-2.73	39.54	5.97	80.27	22.30
40	SAGBEND	-93.15	-34.56	1.06	-0.325	14.745	176.81	44.65	-3.01	40.01	5.58	80.39	22.33
41	SAGBEND	-104.79	-37.49	1.11	-0.183	13.551	188.81	44.27	-3.26	40.39	5.35	80.47	22.35
42	SAGBEND	-116.48	-40.18	1.13	-0.041	12.344	200.81	43.94	-3.50	40.72	4.98	80.50	22.36
43	SAGBEND	-128.23	-42.62	1.13	0.089	11.128	212.81	43.63	-3.71	41.05	4.54	80.52	22.37
44	SAGBEND	-140.03	-44.81	1.09	0.208	9.898	224.81	43.35	-3.90	41.37	4.27	80.61	22.39
45	SAGBEND	-151.87	-46.75	1.04	0.321	8.659	236.81	43.11	-4.06	41.84	3.95	80.63	22.40
46	SAGBEND	-163.75	-48.42	0.96	0.426	7.416	248.81	42.90	-4.21	42.29	3.76	80.56	22.38
47	SAGBEND	-175.67	-49.85	0.86	0.524	6.163	260.81	42.73	-4.33	42.58	3.57	80.42	22.34
48	SAGBEND	-187.61	-51.01	0.75	0.614	4.901	272.81	42.58	-4.43	42.94	3.39	80.21	22.28
49	SAGBEND	-199.58	-51.90	0.61	0.700	3.643	284.81	42.47	-4.51	43.19	3.20	79.95	22.21
50	SAGBEND	-211.56	-52.53	0.45	0.780	2.371	296.81	42.39	-4.56	42.93	2.88	79.49	22.08
51	SAGBEND	-223.55	-52.89	0.28	0.840	1.140	308.81	42.34	-4.59	40.11	1.48	77.41	21.50
52	SEABED	-235.55	-53.02	0.11	0.723	0.193	320.81	42.33	-4.60	21.45	-14.43	63.99	17.77
53	SEABED	-247.55	-53.03	0.01	0.201	-0.003	332.81	42.33	-4.60	1.40	-17.01	58.43	16.23
54	SEABED	-259.55	-53.03	0.00	0.003	-0.002	344.81	42.33	-4.60	-0.18	-1.82	46.11	12.81
55	SEABED	-271.55	-53.03	0.00	-0.002	0.000	356.81	42.33	-4.60	-0.02	0.14	44.90	12.47
56	SEABED	-283.55	-53.03	0.00	0.000	0.000	368.81	42.33	-4.60	0.00	0.02	44.82	12.45
57	SEABED	-295.55	-53.03	0.00	0.000	0.000	380.81	42.33	-4.60	0.00	0.00	44.81	12.45
58	SEABED	-307.55	-53.03	0.00	0.000	0.000	392.81	42.33	-4.60	0.00	0.00	44.81	12.45
59	SEABED	-319.55	-53.03	0.00	0.000	0.000	404.81	42.33	-4.60	0.00	0.00	44.81	12.45

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.01	-0.003	0.267	0.00	50.10	0.00	0.00	0.00	50.10	13.92
3	LAYBARGE	71.49	6.16	0.01	-0.002	0.957	6.30	50.08	0.00	-120.03	-0.92	152.08	42.24
5	LAYBARGE	65.38	5.98	0.01	-0.001	2.227	12.42	50.06	0.00	-86.78	-0.66	123.82	34.39
7	LAYBARGE	59.91	5.72	0.01	0.001	3.279	17.89	50.02	0.00	-98.04	-0.74	133.35	37.04
9	LAYBARGE	53.32	5.27	0.01	0.002	4.498	24.49	49.95	0.00	-94.47	-0.71	130.24	36.18
11	LAYBARGE	47.32	4.74	0.01	0.003	5.736	30.51	49.86	0.00	-109.19	-0.79	142.67	39.63
13	LAYBARGE	38.21	3.70	0.01	0.000	7.420	39.68	49.70	0.00	-125.06	-0.88	156.00	43.33
15	LAYBARGE	29.27	2.39	0.00	-0.002	9.097	48.72	49.50	0.00	-108.21	0.78	141.48	39.30
17	LAYBARGE	23.13	1.34	0.00	-0.004	10.366	54.95	49.34	0.00	-96.32	-0.88	131.21	36.45
19	LAYBARGE	17.18	0.19	0.00	-0.004	11.437	61.01	49.17	0.00	-81.47	0.99	117.97	32.77
21	LAYBARGE	10.63	-1.22	0.00	-0.019	13.033	67.72	48.97	-0.11	-153.03	-5.32	178.98	49.72
24	STINGER	-4.62	-5.10	0.00	0.004	15.528	83.45	48.48	-0.45	-152.68	-5.11	178.41	49.56
26	STINGER	-11.02	-6.99	0.00	-0.010	17.119	90.12	48.25	-0.62	-81.27	-3.23	117.19	32.55
28	STINGER	-17.37	-9.02	0.00	-0.004	18.316	96.78	47.99	-0.79	-100.77	-10.74	133.49	37.08
30	STINGER	-23.67	-11.18	0.01	-0.230	19.531	103.45	47.71	-0.98	-86.73	-43.94	123.32	34.26
32	STINGER	-29.94	-13.46	0.07	-0.778	20.312	110.12	47.43	-1.18	-54.10	-43.04	106.27	29.52
34	STINGER	-36.18	-15.79	0.18	-1.067	20.416	116.79	47.13	-1.38	19.61	-7.55	62.97	17.49
36	SAGBEND	-47.46	-19.89	0.39	-1.014	19.521	128.79	46.61	-1.74	36.09	6.27	78.23	21.73
37	SAGBEND	-58.81	-23.79	0.58	-0.855	18.405	140.79	46.11	-2.07	38.32	6.64	79.93	22.20
38	SAGBEND	-70.23	-27.46	0.73	-0.692	17.253	152.79	45.64	-2.39	38.95	6.51	80.18	22.27
39	SAGBEND	-81.72	-30.90	0.85	-0.536	16.090	164.79	45.20	-2.69	39.59	6.19	80.35	22.32
40	SAGBEND	-93.28	-34.11	0.95	-0.384	14.913	176.79	44.79	-2.97	40.15	5.83	80.52	22.37
41	SAGBEND	-104.91	-37.08	1.01	-0.239	13.724	188.79	44.41	-3.23	40.54	5.46	80.64	22.40
42	SAGBEND	-116.60	-39.80	1.04	-0.102	12.517	200.79	44.06	-3.47	40.86	5.11	80.69	22.42
43	SAGBEND	-128.34	-42.28	1.05	0.032	11.300	212.79	43.75	-3.68	41.16	4.70	80.69	22.41
44	SAGBEND	-140.13	-44.50	1.03	0.157	10.073	224.79	43.47	-3.87	41.37	4.36	80.62	22.40
45	SAGBEND	-151.97	-46.47	0.99	0.270	8.842	236.79	43.22	-4.04	41.67	4.04	80.48	22.36
46	SAGBEND	-163.85	-48.19	0.92	0.373	7.597	248.79	43.00	-4.19	42.18	3.82	80.33	22.31
47	SAGBEND	-175.76	-49.65	0.83	0.472	6.342	260.79	42.82	-4.31	42.58	3.68	80.24	22.29
48	SAGBEND	-187.70	-50.85	0.72	0.564	5.094	272.79	42.67	-4.42	42.82	3.56	80.16	22.27
49	SAGBEND	-199.66	-51.78	0.60	0.650	3.832	284.79	42.56	-4.50	43.08	3.42	79.97	22.21
50	SAGBEND	-211.64	-52.45	0.45	0.734	2.564	296.79	42.47	-4.55	43.02	3.12	79.55	22.10
51	SAGBEND	-223.63	-52.85	0.29	0.800	1.317	308.79	42.42	-4.59	41.01	1.97	77.93	21.65
52	SEABED	-235.63	-53.01	0.12	0.737	0.280	320.79	42.40	-4.60	26.66	-11.98	67.29	18.69
53	SEABED	-247.63	-53.03	0.02	0.247	0.002	332.79	42.40	-4.60	2.47	-17.45	58.99	16.39
54	SEABED	-259.63	-53.03	0.00	0.009	-0.003	344.79	42.40	-4.60	-0.22	-2.82	46.86	13.02
55	SEABED	-271.63	-53.03	0.00	-0.002	0.000	356.79	42.40	-4.60	-0.03	0.14	44.98	12.49
56	SEABED	-283.63	-53.03	0.00	0.000	0.000	368.79	42.40	-4.60	0.00	0.03	44.90	12.47
57	SEABED	-295.63	-53.03	0.00	0.000	0.000	380.79	42.40	-4.60	0.00	0.00	44.88	12.47
58	SEABED	-307.63	-53.03	0.00	0.000	0.000	392.79	42.40	-4.60	0.00	0.00	44.88	12.47
59	SEABED	-319.63	-53.03	0.00	0.000	0.000	404.79	42.40	-4.60	0.00	0.00	44.88	12.47

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	-0.01	0.004	0.267	0.00	50.02	0.00	0.00	0.00	50.02	13.89
3	LAYBARGE	71.49	6.16	-0.01	0.003	0.957	6.30	50.00	0.00	-120.04	0.91	152.01	42.22
5	LAYBARGE	65.38	5.99	-0.01	0.001	2.227	12.42	49.98	0.00	-86.78	0.69	123.74	34.37
7	LAYBARGE	59.91	5.73	0.00	0.000	3.279	17.89	49.93	0.00	-98.05	0.76	133.27	37.02
9	LAYBARGE	53.32	5.28	0.00	-0.002	4.499	24.49	49.87	0.00	-94.47	0.75	130.17	36.16
11	LAYBARGE	47.32	4.74	0.00	-0.003	5.736	30.51	49.78	0.00	-109.19	0.79	142.60	39.61
13	LAYBARGE	38.22	3.70	0.00	-0.006	7.420	39.68	49.62	0.00	-125.06	0.86	155.92	43.31
15	LAYBARGE	29.27	2.39	0.00	-0.005	9.097	48.72	49.42	0.00	-108.19	0.86	141.38	39.27
17	LAYBARGE	23.13	1.34	0.00	-0.004	10.366	54.95	49.26	0.00	-96.40	-0.85	131.20	36.44
19	LAYBARGE	17.18	0.19	0.00	-0.001	11.435	61.01	49.09	0.00	-81.07	1.07	117.74	32.71
21	LAYBARGE	10.63	-1.22	0.00	-0.013	13.042	67.72	48.89	-0.11	-154.82	-5.17	180.42	50.12
24	STINGER	-4.61	-5.09	0.00	0.018	15.305	83.44	48.40	-0.45	-129.08	-5.16	158.32	43.98
26	STINGER	-11.02	-6.94	0.00	0.001	16.568	90.11	48.18	-0.61	-58.48	-0.96	97.78	27.16
28	STINGER	-17.40	-8.88	-0.01	0.012	17.452	96.77	47.93	-0.78	-77.27	-3.57	113.75	31.60
30	STINGER	-23.74	-10.93	-0.01	-0.011	18.417	103.44	47.67	-0.96	-74.62	-16.75	110.71	30.75
32	STINGER	-30.05	-13.08	0.00	-0.230	19.257	110.11	47.39	-1.15	-64.23	-37.74	104.22	28.95
34	STINGER	-36.33	-15.32	0.06	-0.743	19.870	116.77	47.11	-1.34	-51.65	-42.91	104.01	28.89
36	SAGBEND	-47.61	-19.40	0.26	-1.032	19.587	128.77	46.59	-1.69	31.38	3.58	73.33	20.37
37	SAGBEND	-58.95	-23.33	0.45	-0.901	18.528	140.77	46.08	-2.04	37.74	6.61	79.27	22.02
38	SAGBEND	-70.36	-27.04	0.61	-0.742	17.390	152.77	45.61	-2.36	38.85	6.59	80.02	22.23
39	SAGBEND	-81.85	-30.51	0.75	-0.581	16.230	164.77	45.16	-2.66	39.44	6.23	80.26	22.29
40	SAGBEND	-93.40	-33.75	0.85	-0.431	15.052	176.77	44.75	-2.94	39.93	5.89	80.46	22.35
41	SAGBEND	-105.02	-36.74	0.92	-0.287	13.864	188.77	44.37	-3.20	40.36	5.57	80.59	22.39
42	SAGBEND	-116.70	-39.49	0.97	-0.146	12.666	200.77	44.02	-3.44	40.72	5.18	80.67	22.41
43	SAGBEND	-128.44	-42.00	0.99	-0.015	11.444	212.77	43.70	-3.65	41.07	4.87	80.71	22.42
44	SAGBEND	-140.22	-44.26	0.98	0.109	10.217	224.77	43.41	-3.85	41.31	4.45	80.68	22.41
45	SAGBEND	-152.05	-46.26	0.94	0.225	8.985	236.77	43.16	-4.02	41.73	4.14	80.57	22.38
46	SAGBEND	-163.93	-48.01	0.88	0.338	7.744	248.77	42.94	-4.17	42.10	3.94	80.38	22.33
47	SAGBEND	-175.83	-49.50	0.81	0.438	6.491	260.77	42.76	-4.30	42.49	3.76	80.23	22.28
48	SAGBEND	-187.77	-50.73	0.70	0.531	5.237	272.77	42.61	-4.41	42.86	3.52	80.10	22.25
49	SAGBEND	-199.73	-51.69	0.58	0.616	3.973	284.77	42.49	-4.49	43.05	3.36	79.92	22.20
50	SAGBEND	-211.71	-52.38	0.45	0.694	2.706	296.77	42.40	-4.55	43.03	3.14	79.57	22.10
51	SAGBEND	-223.70	-52.82	0.29	0.762	1.460	308.77	42.34	-4.58	41.52	2.30	78.30	21.75
52	SEABED	-235.70	-53.01	0.13	0.730	0.367	320.77	42.32	-4.60	30.03	-9.81	69.84	19.40
53	SEABED	-247.70	-53.03	0.02	0.278	0.008	332.77	42.32	-4.60	3.61	-17.70	59.32	16.48
54	SEABED	-259.70	-53.03	0.00	0.013	-0.004	344.77	42.32	-4.60	-0.23	-3.59	47.15	13.10
55	SEABED	-271.70	-53.03	0.00	-0.002	0.000	356.77	42.32	-4.60	-0.04	0.14	44.88	12.47
56	SEABED	-283.70	-53.03	0.00	0.000	0.000	368.77	42.32	-4.60	0.00	0.04	44.82	12.45
57	SEABED	-295.70	-53.03	0.00	0.000	0.000	380.77	42.32	-4.60	0.00	0.00	44.80	12.44
58	SEABED	-307.70	-53.03	0.00	0.000	0.000	392.77	42.32	-4.60	0.00	0.00	44.80	12.44
59	SEABED	-319.70	-53.03	0.00	0.000	0.000	404.77	42.32	-4.60	0.00	0.00	44.80	12.44

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.20	0.00	-0.011	0.258	0.00	37.58	0.00	0.00	0.00	37.58	10.44
3	LAYBARGE	71.49	6.15	0.00	-0.010	0.950	6.30	37.55	0.00	-117.21	0.90	137.09	38.08
5	LAYBARGE	65.38	5.98	0.00	-0.008	2.224	12.42	37.53	0.00	-84.44	0.67	109.27	30.35
7	LAYBARGE	59.91	5.72	0.00	-0.006	3.270	17.89	37.49	0.00	-95.43	0.73	118.55	32.93
9	LAYBARGE	53.32	5.27	0.00	-0.005	4.496	24.49	37.42	0.00	-91.91	0.71	115.51	32.08
11	LAYBARGE	47.32	4.73	0.00	-0.003	5.723	30.51	37.34	0.00	-104.89	0.76	126.44	35.12
13	LAYBARGE	38.22	3.69	0.00	-0.002	7.415	39.68	37.17	0.00	-118.75	0.82	138.06	38.35
15	LAYBARGE	29.27	2.38	0.00	0.000	9.098	48.72	36.98	0.00	-103.96	0.79	125.32	34.81
17	LAYBARGE	23.13	1.33	0.00	0.001	10.357	54.95	36.82	0.00	-93.40	-0.84	116.18	32.27
19	LAYBARGE	17.18	0.19	0.00	0.005	11.442	61.01	36.65	0.00	-81.55	1.10	105.56	29.32
21	LAYBARGE	10.63	-1.22	0.00	-0.011	12.973	67.72	36.45	-0.11	-136.64	-5.28	152.63	42.40
24	STINGER	-4.64	-5.13	0.00	0.024	16.010	83.47	35.93	-0.45	-185.91	-5.65	194.21	53.95
26	STINGER	-11.00	-7.10	0.00	-0.002	18.208	90.14	35.70	-0.62	-119.96	-2.62	137.29	38.13
28	STINGER	-17.30	-9.28	0.00	0.033	20.058	96.81	35.42	-0.81	-140.68	8.10	155.25	43.13
30	STINGER	-23.53	-11.68	0.00	-0.079	21.948	103.47	35.12	-1.02	-135.44	-34.00	148.92	41.37
32	STINGER	-29.67	-14.25	0.03	-0.631	23.505	110.14	34.79	-1.25	-107.04	-64.30	140.31	38.97
34	STINGER	-35.77	-16.96	0.13	-1.152	24.096	116.81	34.46	-1.48	8.12	-15.45	47.58	13.22
36	SAGBEND	-46.75	-21.79	0.36	-1.155	23.161	128.81	33.84	-1.90	44.95	7.45	72.90	20.25
37	SAGBEND	-57.84	-26.37	0.57	-0.956	21.719	140.81	33.25	-2.30	51.06	9.06	77.92	21.64
38	SAGBEND	-69.05	-30.66	0.74	-0.735	20.171	152.81	32.70	-2.67	52.81	8.72	79.04	21.95
39	SAGBEND	-80.36	-34.65	0.86	-0.525	18.592	164.81	32.19	-3.02	53.87	8.24	79.69	22.14
40	SAGBEND	-91.79	-38.31	0.95	-0.326	16.983	176.81	31.72	-3.33	54.78	7.64	80.20	22.28
41	SAGBEND	-103.31	-41.66	0.99	-0.136	15.348	188.81	31.30	-3.62	55.62	6.90	80.54	22.37
42	SAGBEND	-114.93	-44.66	1.00	0.037	13.684	200.81	30.92	-3.88	56.30	6.26	80.84	22.46
43	SAGBEND	-126.63	-47.33	0.98	0.199	11.994	212.81	30.58	-4.11	57.01	5.59	81.10	22.53
44	SAGBEND	-138.40	-49.65	0.92	0.341	10.283	224.81	30.29	-4.32	57.78	5.04	81.29	22.58
45	SAGBEND	-150.24	-51.61	0.84	0.467	8.552	236.81	30.04	-4.48	58.76	4.72	81.45	22.63
46	SAGBEND	-162.13	-53.21	0.73	0.579	6.816	248.81	29.84	-4.62	59.45	4.60	81.61	22.67
47	SAGBEND	-174.07	-54.46	0.60	0.689	5.059	260.81	29.69	-4.73	59.74	4.54	81.63	22.68
48	SAGBEND	-186.03	-55.33	0.45	0.792	3.301	272.81	29.58	-4.80	59.39	4.08	80.97	22.49
49	SAGBEND	-198.02	-55.84	0.27	0.867	1.583	284.81	29.52	-4.84	55.00	1.80	76.96	21.38
50	SEABED	-210.02	-56.02	0.10	0.728	0.262	296.81	29.50	-4.86	29.78	-16.81	58.62	16.28
51	SEABED	-222.02	-56.03	0.01	0.147	-0.013	308.81	29.50	-4.86	1.31	-16.86	45.46	12.63
52	SEABED	-234.02	-56.03	0.00	-0.007	-0.003	320.81	29.50	-4.86	-0.38	-0.82	32.62	9.06
53	SEABED	-246.02	-56.03	0.00	-0.002	0.000	332.81	29.50	-4.86	-0.02	0.21	32.34	8.98
54	SEABED	-258.02	-56.03	0.00	0.000	0.000	344.81	29.50	-4.86	0.00	0.01	32.21	8.95
55	SEABED	-270.02	-56.03	0.00	0.000	0.000	356.81	29.50	-4.86	0.00	-0.01	32.20	8.95
56	SEABED	-282.02	-56.03	0.00	0.000	0.000	368.81	29.50	-4.86	0.00	0.00	32.20	8.95
57	SEABED	-294.02	-56.03	0.00	0.000	0.000	380.81	29.50	-4.86	0.00	0.00	32.20	8.95

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	-0.01	-0.004	0.263	0.00	37.60	0.00	0.00	0.00	37.60	10.44
3	LAYBARGE	71.49	6.16	-0.01	-0.004	0.955	6.30	37.57	0.00	-117.19	0.90	137.14	38.09
5	LAYBARGE	65.37	5.98	-0.01	-0.007	2.228	12.42	37.55	0.00	-84.44	0.66	109.29	30.36
7	LAYBARGE	59.91	5.72	-0.01	-0.008	3.275	17.89	37.51	0.00	-95.42	0.72	118.58	32.94
9	LAYBARGE	53.32	5.28	0.00	-0.008	4.500	24.49	37.44	0.00	-91.91	0.70	115.53	32.09
11	LAYBARGE	47.32	4.74	0.00	-0.008	5.728	30.51	37.35	0.00	-104.90	0.75	126.49	35.14
13	LAYBARGE	38.21	3.69	0.00	-0.009	7.420	39.68	37.19	0.00	-118.81	0.83	138.15	38.37
15	LAYBARGE	29.27	2.39	0.00	-0.009	9.102	48.72	36.99	0.00	-103.92	0.78	125.30	34.80
17	LAYBARGE	23.13	1.34	0.00	-0.009	10.363	54.95	36.83	0.00	-93.73	-0.85	116.48	32.35
19	LAYBARGE	17.18	0.19	0.00	-0.007	11.441	61.01	36.66	0.00	-80.30	1.02	104.66	29.07
21	LAYBARGE	10.63	-1.22	0.00	-0.024	13.000	67.72	36.46	-0.11	-141.50	-5.24	156.76	43.54
24	STINGER	-4.62	-5.11	0.00	0.009	15.560	83.45	35.96	-0.45	-141.17	-5.34	156.11	43.37
26	STINGER	-11.02	-6.99	0.00	-0.008	17.112	90.12	35.73	-0.62	-78.42	-1.24	102.70	28.53
28	STINGER	-17.37	-9.02	0.00	-0.004	18.315	96.78	35.47	-0.79	-94.12	-2.07	115.83	32.17
30	STINGER	-23.67	-11.19	0.00	0.004	19.609	103.45	35.19	-0.98	-91.72	5.30	113.51	31.53
32	STINGER	-29.93	-13.49	0.00	0.082	20.816	110.12	34.90	-1.18	-85.45	9.56	107.67	29.91
34	STINGER	-36.13	-15.94	0.01	-0.387	22.388	116.79	34.56	-1.39	-150.37	-84.67	179.70	49.92
36	SAGBEND	-47.16	-20.67	0.19	-1.137	23.262	128.79	33.98	-1.81	27.44	-5.77	57.80	16.05
37	SAGBEND	-58.23	-25.30	0.41	-1.029	22.049	140.79	33.39	-2.21	48.67	8.94	76.11	21.14
38	SAGBEND	-69.40	-29.66	0.59	-0.822	20.545	152.79	32.83	-2.59	52.27	9.56	78.85	21.90
39	SAGBEND	-80.69	-33.72	0.73	-0.605	18.973	164.79	32.32	-2.94	53.75	8.91	79.69	22.14
40	SAGBEND	-92.09	-37.46	0.84	-0.410	17.383	176.79	31.84	-3.26	54.77	8.39	80.21	22.28
41	SAGBEND	-103.60	-40.88	0.90	-0.218	15.755	188.79	31.41	-3.56	55.54	7.57	80.52	22.37
42	SAGBEND	-115.19	-43.97	0.92	-0.036	14.095	200.79	31.01	-3.83	56.06	6.80	80.85	22.46
43	SAGBEND	-126.87	-46.72	0.92	0.126	12.408	212.79	30.67	-4.06	56.81	6.04	81.12	22.53
44	SAGBEND	-138.63	-49.12	0.88	0.273	10.695	224.79	30.36	-4.27	57.84	5.43	81.25	22.57
45	SAGBEND	-150.45	-51.17	0.81	0.399	8.974	236.79	30.11	-4.45	58.86	4.97	81.61	22.67
46	SAGBEND	-162.33	-52.87	0.71	0.512	7.231	248.79	29.89	-4.59	59.63	4.75	81.88	22.74
47	SAGBEND	-174.25	-54.19	0.60	0.626	5.479	260.79	29.73	-4.71	60.08	4.70	81.87	22.74
48	SAGBEND	-186.21	-55.15	0.46	0.725	3.715	272.79	29.61	-4.79	59.82	4.69	81.36	22.60
49	SAGBEND	-198.20	-55.75	0.30	0.813	1.986	284.79	29.53	-4.84	57.03	3.21	78.50	21.80
50	SEABED	-210.19	-56.00	0.13	0.767	0.494	296.79	29.50	-4.86	40.79	-11.16	66.39	18.44
51	SEABED	-222.19	-56.03	0.02	0.241	-0.002	308.79	29.50	-4.86	4.38	-20.13	48.64	13.51
52	SEABED	-234.19	-56.03	0.00	0.000	-0.006	320.79	29.50	-4.86	-0.52	-2.52	33.71	9.36
53	SEABED	-246.19	-56.03	0.00	-0.003	0.000	332.79	29.50	-4.86	-0.05	0.26	32.38	9.00
54	SEABED	-258.19	-56.03	0.00	0.000	0.000	344.79	29.50	-4.86	0.01	0.03	32.22	8.95
55	SEABED	-270.19	-56.03	0.00	0.000	0.000	356.79	29.50	-4.86	0.00	-0.01	32.21	8.95
56	SEABED	-282.19	-56.03	0.00	0.000	0.000	368.79	29.50	-4.86	0.00	0.00	32.21	8.95
57	SEABED	-294.19	-56.03	0.00	0.000	0.000	380.79	29.50	-4.86	0.00	0.00	32.21	8.95

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.22	0.00	0.000	0.265	0.00	37.58	0.00	0.00	0.00	37.58	10.44
3	LAYBARGE	71.49	6.17	0.00	0.000	0.958	6.30	37.55	0.00	-117.18	-0.91	137.09	38.08
5	LAYBARGE	65.38	5.99	0.00	0.001	2.231	12.42	37.53	0.00	-84.41	-0.63	109.27	30.35
7	LAYBARGE	59.91	5.73	0.00	0.001	3.278	17.89	37.49	0.00	-95.39	-0.71	118.55	32.93
9	LAYBARGE	53.32	5.28	0.00	0.001	4.503	24.49	37.42	0.00	-91.88	-0.68	115.51	32.09
11	LAYBARGE	47.32	4.74	0.00	0.002	5.731	30.51	37.34	0.00	-104.85	-0.75	126.44	35.12
13	LAYBARGE	38.22	3.69	0.00	0.002	7.423	39.68	37.17	0.00	-118.75	-0.82	138.08	38.36
15	LAYBARGE	29.27	2.39	0.00	0.000	9.105	48.72	36.98	0.00	-103.86	0.70	125.24	34.79
17	LAYBARGE	23.13	1.33	0.00	-0.002	10.367	54.95	36.82	0.00	-93.82	-0.78	116.57	32.38
19	LAYBARGE	17.18	0.19	0.00	-0.001	11.442	61.01	36.65	0.00	-79.70	1.07	104.09	28.91
21	LAYBARGE	10.63	-1.22	0.00	-0.016	13.014	67.72	36.46	-0.11	-143.51	-5.37	158.44	44.01
24	STINGER	-4.61	-5.09	0.00	0.009	15.338	83.44	35.97	-0.45	-118.91	-5.42	137.32	38.15
26	STINGER	-11.02	-6.94	0.00	-0.005	16.562	90.11	35.74	-0.61	-56.93	1.55	84.32	23.42
28	STINGER	-17.40	-8.88	0.00	-0.019	17.466	96.77	35.49	-0.78	-75.60	-5.38	100.01	27.78
30	STINGER	-23.74	-10.94	0.00	0.055	18.371	103.44	35.23	-0.96	-59.20	18.22	87.31	24.25
32	STINGER	-30.05	-13.08	-0.01	0.084	19.165	110.11	34.96	-1.15	-61.83	-14.41	88.09	24.47
34	STINGER	-36.32	-15.36	0.01	-0.480	21.285	116.77	34.60	-1.34	-241.93	-82.08	249.66	69.35
36	SAGBEND	-47.37	-20.02	0.19	-1.163	23.292	128.77	34.07	-1.75	15.51	-4.81	48.22	13.39
37	SAGBEND	-58.43	-24.68	0.42	-1.060	22.231	140.77	33.47	-2.15	47.04	9.15	74.62	20.73
38	SAGBEND	-69.59	-29.08	0.60	-0.846	20.749	152.77	32.91	-2.53	52.13	9.67	78.51	21.81
39	SAGBEND	-80.87	-33.18	0.75	-0.619	19.189	164.77	32.39	-2.89	53.60	8.98	79.47	22.07
40	SAGBEND	-92.25	-36.97	0.85	-0.421	17.589	176.77	31.91	-3.22	54.43	8.53	80.00	22.22
41	SAGBEND	-103.74	-40.44	0.92	-0.224	15.964	188.77	31.47	-3.52	55.30	7.84	80.36	22.32
42	SAGBEND	-115.32	-43.57	0.95	-0.051	14.313	200.77	31.07	-3.79	56.02	6.95	80.66	22.41
43	SAGBEND	-126.99	-46.36	0.94	0.114	12.636	212.77	30.72	-4.03	56.72	6.14	80.97	22.49
44	SAGBEND	-138.74	-48.81	0.90	0.264	10.931	224.77	30.41	-4.24	57.56	5.40	81.26	22.57
45	SAGBEND	-150.55	-50.91	0.83	0.392	9.210	236.77	30.15	-4.42	58.59	5.08	81.51	22.64
46	SAGBEND	-162.43	-52.65	0.74	0.508	7.470	248.77	29.93	-4.58	59.36	4.77	81.78	22.72
47	SAGBEND	-174.35	-54.03	0.62	0.620	5.721	260.77	29.76	-4.69	59.94	4.73	81.83	22.73
48	SAGBEND	-186.30	-55.04	0.48	0.722	3.958	272.77	29.63	-4.78	59.85	4.55	81.46	22.63
49	SAGBEND	-198.28	-55.69	0.32	0.816	2.217	284.77	29.55	-4.83	57.70	3.29	79.21	22.00
50	SAGBEND	-210.28	-55.98	0.14	0.799	0.664	296.77	29.51	-4.86	44.74	-9.02	69.46	19.30
51	SEABED	-222.28	-56.03	0.02	0.303	0.013	308.77	29.51	-4.86	6.94	-21.37	50.18	13.94
52	SEABED	-234.28	-56.03	0.00	0.004	-0.008	320.77	29.51	-4.86	-0.58	-3.44	34.66	9.63
53	SEABED	-246.28	-56.03	0.00	-0.004	0.000	332.77	29.51	-4.86	-0.09	0.29	32.42	9.01
54	SEABED	-258.28	-56.03	0.00	0.000	0.000	344.77	29.51	-4.86	0.01	0.04	32.24	8.95
55	SEABED	-270.28	-56.03	0.00	0.000	0.000	356.77	29.51	-4.86	0.00	-0.01	32.22	8.95
56	SEABED	-282.28	-56.03	0.00	0.000	0.000	368.77	29.51	-4.86	0.00	0.00	32.22	8.95
57	SEABED	-294.28	-56.03	0.00	0.000	0.000	380.77	29.51	-4.86	0.00	0.00	32.22	8.95
58	SEABED	-306.28	-56.03	0.00	0.000	0.000	392.77	29.51	-4.86	0.00	0.00	32.22	8.95

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	-0.004	0.271	0.00	50.19	0.00	0.00	0.00	50.19	13.94
3	LAYBARGE	71.49	6.16	0.00	-0.004	0.960	6.30	50.16	0.00	-120.04	0.89	152.17	42.27
5	LAYBARGE	65.37	5.99	0.00	-0.002	2.231	12.42	50.14	0.00	-86.81	0.64	123.90	34.42
7	LAYBARGE	59.91	5.72	0.00	-0.001	3.282	17.89	50.10	0.00	-98.07	0.71	133.43	37.06
9	LAYBARGE	53.32	5.27	0.00	-0.001	4.502	24.49	50.03	0.00	-94.50	0.69	130.32	36.20
11	LAYBARGE	47.32	4.74	0.00	0.000	5.740	30.51	49.94	0.00	-109.24	0.75	142.77	39.66
13	LAYBARGE	38.21	3.69	0.00	0.001	7.424	39.68	49.78	0.00	-125.12	0.83	156.10	43.36
15	LAYBARGE	29.27	2.39	0.00	0.003	9.100	48.72	49.58	0.00	-108.29	0.76	141.61	39.34
17	LAYBARGE	23.13	1.34	0.00	0.004	10.368	54.95	49.42	0.00	-96.15	-0.82	131.15	36.43
19	LAYBARGE	17.18	0.19	0.00	0.006	11.444	61.01	49.25	0.00	-82.32	0.89	118.72	32.98
21	LAYBARGE	10.63	-1.22	0.00	-0.008	13.021	67.72	49.05	-0.11	-150.21	-4.98	176.74	49.09
24	STINGER	-4.64	-5.13	0.00	0.002	15.974	83.47	48.54	-0.45	-200.05	-7.48	218.83	60.79
26	STINGER	-11.00	-7.10	0.00	0.046	18.238	90.14	48.31	-0.63	-127.80	14.39	157.44	43.73
28	STINGER	-17.30	-9.29	0.00	-0.194	20.004	96.81	48.03	-0.82	-140.39	-57.85	167.42	46.51
30	STINGER	-23.54	-11.65	0.05	-0.795	21.320	103.47	47.74	-1.02	-72.54	-48.05	120.72	33.53
32	STINGER	-29.74	-14.10	0.16	-1.128	21.600	110.14	47.43	-1.23	13.91	-8.46	59.40	16.50
34	STINGER	-35.94	-16.54	0.28	-1.132	21.214	116.81	47.12	-1.45	30.94	4.53	74.08	20.58
36	SAGBEND	-47.17	-20.78	0.49	-0.998	20.170	128.81	46.57	-1.81	37.31	6.83	79.36	22.04
37	SAGBEND	-58.47	-24.81	0.68	-0.824	19.040	140.81	46.06	-2.16	38.39	6.77	79.90	22.19
38	SAGBEND	-69.85	-28.61	0.82	-0.652	17.890	152.81	45.57	-2.49	38.94	6.33	80.03	22.23
39	SAGBEND	-81.31	-32.18	0.94	-0.506	16.727	164.81	45.12	-2.80	39.41	5.94	80.14	22.26
40	SAGBEND	-92.83	-35.52	1.02	-0.353	15.553	176.81	44.70	-3.09	39.96	5.61	80.24	22.29
41	SAGBEND	-104.43	-38.61	1.08	-0.209	14.364	188.81	44.30	-3.36	40.39	5.22	80.44	22.34
42	SAGBEND	-116.08	-41.47	1.11	-0.078	13.160	200.81	43.94	-3.61	40.81	4.88	80.58	22.38
43	SAGBEND	-127.79	-44.07	1.11	0.053	11.944	212.81	43.61	-3.84	41.20	4.46	80.67	22.41
44	SAGBEND	-139.56	-46.43	1.08	0.173	10.716	224.81	43.32	-4.04	41.47	4.06	80.67	22.41
45	SAGBEND	-151.37	-48.54	1.04	0.279	9.482	236.81	43.05	-4.22	41.99	3.73	80.61	22.39
46	SAGBEND	-163.23	-50.39	0.97	0.377	8.237	248.81	42.82	-4.38	42.39	3.45	80.58	22.38
47	SAGBEND	-175.12	-51.98	0.88	0.466	6.974	260.81	42.62	-4.52	42.84	3.28	80.47	22.35
48	SAGBEND	-187.05	-53.30	0.78	0.544	5.716	272.81	42.46	-4.63	43.26	3.21	80.33	22.31
49	SAGBEND	-199.00	-54.36	0.66	0.623	4.445	284.81	42.32	-4.72	43.48	3.18	80.15	22.26
50	SAGBEND	-210.97	-55.16	0.52	0.704	3.175	296.81	42.23	-4.79	43.46	3.29	79.83	22.18
51	SAGBEND	-222.96	-55.69	0.36	0.778	1.917	308.81	42.16	-4.83	42.92	2.68	79.07	21.96
52	SAGBEND	-234.95	-55.96	0.20	0.800	0.714	320.81	42.12	-4.85	37.00	-3.89	75.13	20.87
53	SEABED	-246.95	-56.03	0.05	0.490	0.056	332.81	42.12	-4.86	10.31	-18.58	60.40	16.78
54	SEABED	-258.95	-56.03	0.00	0.063	-0.006	344.81	42.12	-4.86	-0.22	-9.21	51.36	14.27
55	SEABED	-270.95	-56.03	0.00	-0.003	-0.001	356.81	42.12	-4.86	-0.11	-0.33	44.86	12.46
56	SEABED	-282.95	-56.03	0.00	-0.001	0.000	368.81	42.12	-4.86	0.00	0.09	44.80	12.44
57	SEABED	-294.95	-56.03	0.00	0.000	0.000	380.81	42.12	-4.86	0.00	0.01	44.75	12.43
58	SEABED	-306.95	-56.03	0.00	0.000	0.000	392.81	42.12	-4.86	0.00	0.00	44.75	12.43
59	SEABED	-318.95	-56.03	0.00	0.000	0.000	404.81	42.12	-4.86	0.00	0.00	44.75	12.43
60	SEABED	-330.95	-56.03	0.00	0.000	0.000	416.81	42.12	-4.86	0.00	0.00	44.75	12.43

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.01	0.009	0.274	0.00	49.99	0.00	0.00	0.00	49.99	13.88
3	LAYBARGE	71.49	6.16	0.00	0.009	0.964	6.30	49.96	0.00	-120.03	0.94	151.97	42.21
5	LAYBARGE	65.37	5.98	0.00	0.007	2.234	12.42	49.94	0.00	-86.78	0.69	123.71	34.36
7	LAYBARGE	59.91	5.72	0.00	0.005	3.286	17.89	49.90	0.00	-98.04	0.77	133.23	37.01
9	LAYBARGE	53.32	5.27	0.00	0.003	4.505	24.49	49.83	0.00	-94.47	0.74	130.13	36.15
11	LAYBARGE	47.32	4.74	0.00	0.001	5.743	30.51	49.75	0.00	-109.19	0.81	142.56	39.60
13	LAYBARGE	38.21	3.69	0.00	-0.002	7.427	39.68	49.59	0.00	-125.04	0.88	155.87	43.30
15	LAYBARGE	29.27	2.39	0.00	-0.004	9.104	48.72	49.39	0.00	-108.19	0.83	141.36	39.27
17	LAYBARGE	23.13	1.34	0.00	-0.005	10.373	54.95	49.24	0.00	-96.30	-0.85	131.07	36.41
19	LAYBARGE	17.18	0.19	0.00	-0.005	11.444	61.01	49.07	0.00	-81.43	1.05	117.93	32.76
21	LAYBARGE	10.63	-1.22	0.00	-0.021	13.039	67.72	48.87	-0.11	-153.00	-5.20	179.01	49.73
24	STINGER	-4.62	-5.11	0.00	0.004	15.537	83.45	48.37	-0.45	-153.05	-5.21	178.72	49.64
26	STINGER	-11.01	-6.99	0.00	-0.018	17.123	90.12	48.15	-0.61	-79.32	-2.09	115.41	32.06
28	STINGER	-17.37	-9.02	0.00	0.009	18.335	96.78	47.89	-0.79	-102.42	6.95	135.31	37.59
30	STINGER	-23.67	-11.18	0.00	-0.077	19.560	103.45	47.62	-0.98	-90.14	-31.40	122.38	34.00
32	STINGER	-29.93	-13.47	0.03	-0.577	20.621	110.12	47.32	-1.18	-86.39	-57.77	134.12	37.26
34	STINGER	-36.16	-15.86	0.12	-1.036	21.091	116.79	47.03	-1.39	9.11	-15.94	60.87	16.91
36	SAGBEND	-47.37	-20.11	0.33	-1.044	20.320	128.79	46.48	-1.76	34.89	5.89	77.05	21.40
37	SAGBEND	-58.66	-24.17	0.53	-0.889	19.225	140.79	45.96	-2.11	38.13	7.01	79.75	22.15
38	SAGBEND	-70.03	-28.01	0.68	-0.723	18.085	152.79	45.47	-2.44	38.96	6.74	80.10	22.25
39	SAGBEND	-81.48	-31.62	0.81	-0.563	16.924	164.79	45.01	-2.75	39.55	6.21	80.12	22.26
40	SAGBEND	-92.99	-35.00	0.91	-0.410	15.745	176.79	44.58	-3.05	40.02	6.00	80.18	22.27
41	SAGBEND	-104.58	-38.14	0.98	-0.266	14.552	188.79	44.19	-3.32	40.38	5.67	80.30	22.30
42	SAGBEND	-116.22	-41.03	1.02	-0.136	13.351	200.79	43.82	-3.57	40.67	5.18	80.38	22.33
43	SAGBEND	-127.93	-43.68	1.03	-0.003	12.139	212.79	43.48	-3.80	41.03	4.64	80.43	22.34
44	SAGBEND	-139.68	-46.07	1.02	0.120	10.913	224.79	43.18	-4.01	41.30	4.23	80.40	22.33
45	SAGBEND	-151.49	-48.22	0.98	0.231	9.677	236.79	42.91	-4.19	41.64	3.89	80.34	22.32
46	SAGBEND	-163.34	-50.10	0.93	0.331	8.433	248.79	42.68	-4.35	42.04	3.65	80.43	22.34
47	SAGBEND	-175.23	-51.74	0.85	0.419	7.180	260.79	42.48	-4.50	42.42	3.43	80.43	22.34
48	SAGBEND	-187.15	-53.11	0.75	0.497	5.919	272.79	42.30	-4.61	42.91	3.22	80.33	22.31
49	SAGBEND	-199.10	-54.21	0.64	0.576	4.651	284.79	42.17	-4.71	43.27	3.35	80.16	22.27
50	SAGBEND	-211.07	-55.05	0.51	0.651	3.383	296.79	42.06	-4.78	43.35	3.44	79.90	22.19
51	SAGBEND	-223.05	-55.63	0.37	0.726	2.113	308.79	41.99	-4.83	42.83	3.00	79.28	22.02
52	SAGBEND	-235.05	-55.94	0.21	0.768	0.894	320.79	41.95	-4.85	38.49	-2.37	76.04	21.12
53	SEABED	-247.04	-56.03	0.07	0.541	0.098	332.79	41.94	-4.86	13.90	-17.45	60.36	16.77
54	SEABED	-259.04	-56.03	0.00	0.088	-0.006	344.79	41.94	-4.86	0.37	-11.35	53.21	14.78
55	SEABED	-271.04	-56.03	0.00	-0.002	-0.001	356.79	41.94	-4.86	-0.14	-0.62	44.90	12.47
56	SEABED	-283.04	-56.03	0.00	-0.001	0.000	368.79	41.94	-4.86	-0.01	0.10	44.64	12.40
57	SEABED	-295.04	-56.03	0.00	0.000	0.000	380.79	41.94	-4.86	0.00	0.01	44.57	12.38
58	SEABED	-307.04	-56.03	0.00	0.000	0.000	392.79	41.94	-4.86	0.00	0.00	44.57	12.38
59	SEABED	-319.04	-56.03	0.00	0.000	0.000	404.79	41.94	-4.86	0.00	0.00	44.57	12.38
60	SEABED	-331.04	-56.03	0.00	0.000	0.000	416.79	41.94	-4.86	0.00	0.00	44.57	12.38

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.22	-0.01	-0.005	0.264	0.00	50.17	0.00	0.00	0.00	50.17	13.94
3	LAYBARGE	71.49	6.16	-0.01	-0.004	0.953	6.30	50.14	0.00	-120.06	-1.01	152.18	42.27
5	LAYBARGE	65.37	5.99	-0.01	-0.004	2.224	12.42	50.12	0.00	-86.81	-0.76	123.91	34.42
7	LAYBARGE	59.91	5.73	-0.01	-0.004	3.275	17.89	50.08	0.00	-98.08	-0.83	133.45	37.07
9	LAYBARGE	53.32	5.28	-0.01	-0.007	4.495	24.49	50.01	0.00	-94.50	-0.82	130.34	36.21
11	LAYBARGE	47.32	4.74	-0.01	-0.009	5.733	30.51	49.93	0.00	-109.25	-0.86	142.79	39.66
13	LAYBARGE	38.21	3.69	-0.01	-0.008	7.417	39.68	49.77	0.00	-125.15	-0.93	156.15	43.37
15	LAYBARGE	29.27	2.39	0.00	-0.006	9.093	48.72	49.57	0.00	-108.25	-0.89	141.59	39.33
17	LAYBARGE	23.13	1.33	0.00	-0.006	10.363	54.95	49.41	0.00	-96.44	-0.97	131.39	36.50
19	LAYBARGE	17.18	0.19	0.00	-0.003	11.432	61.01	49.24	0.00	-81.04	1.05	117.76	32.71
21	LAYBARGE	10.63	-1.22	0.00	-0.017	13.039	67.72	49.04	-0.11	-154.99	-5.46	180.87	50.24
24	STINGER	-4.61	-5.09	0.00	0.013	15.303	83.44	48.55	-0.45	-129.37	-5.43	158.78	44.11
26	STINGER	-11.02	-6.93	0.00	-0.005	16.565	90.11	48.33	-0.61	-58.48	-1.05	97.87	27.19
28	STINGER	-17.40	-8.88	0.00	0.005	17.449	96.77	48.08	-0.78	-77.39	-3.61	114.12	31.70
30	STINGER	-23.74	-10.94	-0.01	-0.009	18.416	103.44	47.82	-0.96	-74.51	-16.86	110.64	30.73
32	STINGER	-30.05	-13.09	0.01	-0.223	19.261	110.11	47.54	-1.15	-64.99	-37.43	104.23	28.95
34	STINGER	-36.33	-15.32	0.06	-0.736	19.871	116.77	47.26	-1.34	-52.38	-43.51	105.73	29.37
36	SAGBEND	-47.61	-19.41	0.25	-1.021	19.586	128.77	46.74	-1.70	31.35	3.64	73.29	20.36
37	SAGBEND	-58.95	-23.33	0.45	-0.902	18.529	140.77	46.24	-2.04	37.75	6.65	79.57	22.10
38	SAGBEND	-70.36	-27.03	0.61	-0.736	17.391	152.77	45.76	-2.36	38.80	6.63	80.42	22.34
39	SAGBEND	-81.85	-30.50	0.75	-0.578	16.232	164.77	45.32	-2.66	39.53	6.29	80.70	22.42
40	SAGBEND	-93.40	-33.74	0.85	-0.432	15.056	176.77	44.91	-2.94	40.10	5.95	80.87	22.46
41	SAGBEND	-105.02	-36.74	0.93	-0.284	13.870	188.77	44.53	-3.20	40.54	5.62	80.95	22.49
42	SAGBEND	-116.70	-39.50	0.97	-0.145	12.659	200.77	44.18	-3.44	40.84	5.26	80.93	22.48
43	SAGBEND	-128.44	-42.01	0.99	-0.012	11.443	212.77	43.86	-3.66	41.03	4.87	80.84	22.45
44	SAGBEND	-140.22	-44.26	0.98	0.116	10.218	224.77	43.58	-3.85	41.42	4.48	80.67	22.41
45	SAGBEND	-152.05	-46.27	0.94	0.232	8.982	236.77	43.33	-4.02	41.71	4.16	80.52	22.37
46	SAGBEND	-163.93	-48.01	0.88	0.340	7.738	248.77	43.11	-4.17	42.08	3.99	80.48	22.36
47	SAGBEND	-175.83	-49.50	0.81	0.439	6.492	260.77	42.93	-4.30	42.49	3.82	80.36	22.32
48	SAGBEND	-187.77	-50.72	0.70	0.530	5.234	272.77	42.78	-4.41	42.86	3.63	80.17	22.27
49	SAGBEND	-199.73	-51.69	0.59	0.615	3.971	284.77	42.66	-4.49	43.07	3.47	79.95	22.21
50	SAGBEND	-211.71	-52.39	0.45	0.695	2.710	296.77	42.57	-4.55	43.15	3.20	79.61	22.12
51	SAGBEND	-223.70	-52.82	0.29	0.764	1.458	308.77	42.51	-4.58	41.48	2.29	78.30	21.75
52	SEABED	-235.70	-53.01	0.13	0.734	0.368	320.77	42.49	-4.60	30.08	-9.70	69.78	19.38
53	SEABED	-247.70	-53.03	0.02	0.274	0.008	332.77	42.49	-4.60	3.58	-17.71	59.29	16.47
54	SEABED	-259.70	-53.03	0.00	0.013	-0.004	344.77	42.49	-4.60	-0.23	-3.50	47.18	13.10
55	SEABED	-271.70	-53.03	0.00	-0.002	0.000	356.77	42.49	-4.60	-0.04	0.14	45.04	12.51
56	SEABED	-283.70	-53.03	0.00	0.000	0.000	368.77	42.49	-4.60	0.00	0.04	44.99	12.50
57	SEABED	-295.70	-53.03	0.00	0.000	0.000	380.77	42.49	-4.60	0.00	0.00	44.97	12.49
58	SEABED	-307.70	-53.03	0.00	0.000	0.000	392.77	42.49	-4.60	0.00	0.00	44.97	12.49
59	SEABED	-319.70	-53.03	0.00	0.000	0.000	404.77	42.49	-4.60	0.00	0.00	44.97	12.49

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.02	0.013	0.272	0.00	37.52	0.00	0.00	0.00	37.52	10.42
3	LAYBARGE	71.49	6.16	0.01	0.014	0.964	6.30	37.50	0.00	-117.18	-1.04	137.10	38.08
5	LAYBARGE	65.38	5.98	0.01	0.014	2.238	12.42	37.48	0.00	-84.44	-0.77	109.25	30.35
7	LAYBARGE	59.91	5.72	0.01	0.013	3.285	17.89	37.44	0.00	-95.42	-0.85	118.55	32.93
9	LAYBARGE	53.32	5.27	0.01	0.012	4.510	24.49	37.37	0.00	-91.91	-0.83	115.49	32.08
11	LAYBARGE	47.33	4.74	0.01	0.010	5.738	30.51	37.29	0.00	-104.90	-0.88	126.45	35.13
13	LAYBARGE	38.22	3.69	0.00	0.006	7.429	39.68	37.12	0.00	-118.78	-0.95	138.09	38.36
15	LAYBARGE	29.27	2.39	0.00	0.002	9.112	48.72	36.93	0.00	-103.99	-0.89	125.32	34.81
17	LAYBARGE	23.13	1.34	0.00	-0.001	10.371	54.95	36.77	0.00	-93.39	-0.99	116.10	32.25
19	LAYBARGE	17.18	0.19	0.00	0.000	11.455	61.01	36.60	0.00	-81.54	1.15	105.43	29.29
21	LAYBARGE	10.63	-1.22	0.00	-0.016	12.989	67.72	36.41	-0.11	-136.58	-5.10	152.36	42.32
24	STINGER	-4.64	-5.13	0.00	0.014	16.023	83.47	35.90	-0.45	-185.64	-5.91	193.77	53.82
26	STINGER	-11.00	-7.10	0.00	-0.004	18.223	90.14	35.66	-0.62	-120.04	1.42	137.86	38.29
28	STINGER	-17.30	-9.29	0.00	-0.004	20.068	96.81	35.38	-0.81	-138.59	-5.96	153.35	42.60
30	STINGER	-23.53	-11.68	0.00	0.023	21.969	103.47	35.08	-1.02	-133.84	14.19	148.53	41.26
32	STINGER	-29.67	-14.27	0.01	-0.393	23.792	110.14	34.74	-1.25	-132.14	-66.49	154.15	42.82
34	STINGER	-35.74	-17.03	0.10	-1.042	24.760	116.81	34.41	-1.49	-28.72	-29.41	69.43	19.29
36	SAGBEND	-46.65	-22.01	0.32	-1.156	24.074	128.81	33.77	-1.92	42.88	6.81	70.56	19.60
37	SAGBEND	-57.67	-26.78	0.53	-0.973	22.663	140.81	33.15	-2.33	50.25	8.87	77.27	21.46
38	SAGBEND	-68.80	-31.25	0.70	-0.753	21.134	152.81	32.58	-2.72	52.48	8.98	78.95	21.93
39	SAGBEND	-80.05	-35.43	0.83	-0.543	19.564	164.81	32.04	-3.08	53.81	8.34	79.63	22.12
40	SAGBEND	-91.41	-39.29	0.92	-0.347	17.968	176.81	31.55	-3.42	54.96	7.66	80.23	22.29
41	SAGBEND	-102.87	-42.82	0.97	-0.163	16.336	188.81	31.10	-3.73	55.89	6.99	80.66	22.41
42	SAGBEND	-114.44	-46.03	0.99	0.003	14.671	200.81	30.69	-4.00	56.42	6.16	80.77	22.44
43	SAGBEND	-126.09	-48.90	0.97	0.155	12.980	212.81	30.32	-4.25	57.05	5.38	81.07	22.52
44	SAGBEND	-137.82	-51.42	0.92	0.286	11.273	224.81	30.01	-4.47	57.87	4.69	81.28	22.58
45	SAGBEND	-149.62	-53.59	0.86	0.397	9.542	236.81	29.73	-4.66	58.62	4.41	81.49	22.64
46	SAGBEND	-161.48	-55.40	0.76	0.510	7.785	248.81	29.51	-4.81	59.30	4.44	81.75	22.71
47	SAGBEND	-173.40	-56.84	0.65	0.618	6.025	260.81	29.33	-4.94	59.87	4.49	81.78	22.72
48	SAGBEND	-185.35	-57.91	0.51	0.722	4.241	272.81	29.19	-5.03	60.10	4.44	81.56	22.66
49	SAGBEND	-197.32	-58.61	0.35	0.819	2.485	284.81	29.11	-5.09	58.76	3.49	79.95	22.21
50	SAGBEND	-209.32	-58.96	0.17	0.829	0.864	296.81	29.07	-5.11	48.20	-5.68	71.89	19.97
51	SEABED	-221.32	-59.03	0.03	0.398	0.039	308.81	29.06	-5.12	10.34	-21.62	50.67	14.08
52	SEABED	-233.32	-59.03	0.00	0.018	-0.011	320.81	29.06	-5.12	-0.61	-5.17	35.54	9.87
53	SEABED	-245.32	-59.03	0.00	-0.005	0.000	332.81	29.06	-5.12	-0.13	0.30	32.16	8.93
54	SEABED	-257.32	-59.03	0.00	0.000	0.000	344.81	29.06	-5.12	0.01	0.06	31.96	8.88
55	SEABED	-269.32	-59.03	0.00	0.000	0.000	356.81	29.06	-5.12	0.00	-0.01	31.93	8.87
56	SEABED	-281.32	-59.03	0.00	0.000	0.000	368.81	29.06	-5.12	0.00	0.00	31.93	8.87
57	SEABED	-293.32	-59.03	0.00	0.000	0.000	380.81	29.06	-5.12	0.00	0.00	31.93	8.87
58	SEABED	-305.32	-59.03	0.00	0.000	0.000	392.81	29.06	-5.12	0.00	0.00	31.93	8.87

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.20	0.00	0.003	0.267	0.00	37.68	0.00	0.00	0.00	37.68	10.47
3	LAYBARGE	71.49	6.15	0.00	0.002	0.959	6.30	37.65	0.00	-117.21	0.93	137.19	38.11
5	LAYBARGE	65.37	5.98	0.00	0.000	2.233	12.42	37.63	0.00	-84.45	0.69	109.36	30.38
7	LAYBARGE	59.91	5.72	0.00	-0.002	3.280	17.89	37.58	0.00	-95.44	0.75	118.65	32.96
9	LAYBARGE	53.32	5.27	0.00	-0.004	4.505	24.49	37.51	0.00	-91.92	0.73	115.60	32.11
11	LAYBARGE	47.32	4.74	0.00	-0.005	5.733	30.51	37.43	0.00	-104.91	0.78	126.54	35.15
13	LAYBARGE	38.22	3.69	0.00	0.000	7.425	39.68	37.26	0.00	-118.82	0.83	138.19	38.39
15	LAYBARGE	29.27	2.39	0.00	0.000	9.106	48.72	37.06	0.00	-103.92	0.80	125.37	34.83
17	LAYBARGE	23.13	1.33	0.00	0.000	10.368	54.95	36.90	0.00	-93.71	-0.83	116.50	32.36
19	LAYBARGE	17.18	0.18	0.00	0.002	11.446	61.01	36.73	0.00	-80.28	1.06	104.65	29.07
21	LAYBARGE	10.63	-1.23	0.00	-0.015	13.005	67.72	36.53	-0.11	-141.61	-5.29	156.92	43.59
24	STINGER	-4.62	-5.11	0.00	0.017	15.564	83.45	36.03	-0.45	-141.45	-5.44	156.45	43.46
26	STINGER	-11.01	-6.99	0.00	0.000	17.116	90.12	35.80	-0.62	-78.39	1.42	102.57	28.49
28	STINGER	-17.37	-9.02	0.00	-0.007	18.322	96.78	35.54	-0.79	-94.75	-3.63	116.46	32.35
30	STINGER	-23.67	-11.19	0.00	0.042	19.607	103.45	35.26	-0.98	-91.33	11.84	111.85	31.07
32	STINGER	-29.93	-13.49	-0.01	0.102	20.760	110.12	34.97	-1.18	-80.88	-4.36	104.30	28.97
34	STINGER	-36.13	-15.93	0.00	-0.426	22.663	116.79	34.62	-1.39	-199.63	-91.59	215.44	59.84
36	SAGBEND	-47.10	-20.79	0.18	-1.164	24.134	128.79	34.04	-1.82	21.11	-6.22	53.03	14.73
37	SAGBEND	-58.09	-25.60	0.39	-1.055	23.006	140.79	33.42	-2.23	47.77	8.96	75.19	20.89
38	SAGBEND	-69.19	-30.15	0.59	-0.849	21.522	152.79	32.84	-2.63	52.23	9.48	78.58	21.83
39	SAGBEND	-80.42	-34.41	0.73	-0.630	19.962	164.79	32.30	-3.00	53.61	8.86	79.47	22.07
40	SAGBEND	-91.75	-38.34	0.84	-0.434	18.365	176.79	31.79	-3.34	54.51	8.36	79.99	22.22
41	SAGBEND	-103.19	-41.97	0.92	-0.244	16.740	188.79	31.33	-3.65	55.26	7.58	80.38	22.33
42	SAGBEND	-114.73	-45.26	0.95	-0.072	15.091	200.79	30.91	-3.94	55.96	6.70	80.64	22.40
43	SAGBEND	-126.36	-48.21	0.94	0.083	13.413	212.79	30.54	-4.19	56.70	5.80	81.02	22.51
44	SAGBEND	-138.07	-50.81	0.91	0.229	11.705	224.79	30.21	-4.42	57.71	5.02	81.35	22.60
45	SAGBEND	-149.86	-53.06	0.86	0.347	9.971	236.79	29.93	-4.61	58.81	4.60	81.57	22.66
46	SAGBEND	-161.70	-54.96	0.77	0.456	8.226	248.79	29.69	-4.78	59.72	4.67	81.90	22.75
47	SAGBEND	-173.60	-56.50	0.67	0.563	6.467	260.79	29.50	-4.91	60.23	4.86	82.22	22.84
48	SAGBEND	-185.55	-57.67	0.54	0.669	4.709	272.79	29.35	-5.01	60.56	4.88	82.08	22.80
49	SAGBEND	-197.52	-58.47	0.39	0.771	2.934	284.79	29.25	-5.08	59.63	4.36	80.81	22.45
50	SAGBEND	-209.51	-58.90	0.22	0.830	1.248	296.79	29.20	-5.11	52.88	-1.62	75.28	20.91
51	SEABED	-221.51	-59.03	0.06	0.585	0.131	308.79	29.19	-5.12	20.68	-20.21	53.50	14.86
52	SEABED	-233.51	-59.03	0.00	0.069	-0.015	320.79	29.18	-5.12	-0.52	-11.44	40.72	11.31
53	SEABED	-245.51	-59.03	0.00	-0.007	-0.002	332.79	29.19	-5.12	-0.26	0.26	32.25	8.96
54	SEABED	-257.51	-59.03	0.00	-0.001	0.000	344.79	29.19	-5.12	0.01	0.14	32.13	8.92
55	SEABED	-269.51	-59.03	0.00	0.000	0.000	356.79	29.19	-5.12	0.00	-0.01	32.06	8.90
56	SEABED	-281.51	-59.03	0.00	0.000	0.000	368.79	29.19	-5.12	0.00	0.00	32.05	8.90
57	SEABED	-293.51	-59.03	0.00	0.000	0.000	380.79	29.19	-5.12	0.00	0.00	32.05	8.90
58	SEABED	-305.51	-59.03	0.00	0.000	0.000	392.79	29.19	-5.12	0.00	0.00	32.05	8.90

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.22	-0.01	-0.015	0.257	0.00	37.69	0.00	0.00	0.00	37.69	10.47
3	LAYBARGE	71.49	6.16	-0.01	-0.016	0.949	6.30	37.67	0.00	-117.20	0.94	137.20	38.11
5	LAYBARGE	65.37	5.99	-0.01	-0.016	2.223	12.42	37.65	0.00	-84.43	0.69	109.39	30.39
7	LAYBARGE	59.91	5.72	-0.01	-0.016	3.270	17.89	37.60	0.00	-95.42	0.76	118.67	32.96
9	LAYBARGE	53.32	5.27	-0.01	-0.014	4.495	24.49	37.53	0.00	-91.90	0.74	115.62	32.12
11	LAYBARGE	47.32	4.74	-0.01	-0.011	5.723	30.51	37.45	0.00	-104.87	0.78	126.55	35.15
13	LAYBARGE	38.21	3.69	-0.01	-0.006	7.414	39.68	37.28	0.00	-118.77	0.84	138.20	38.39
15	LAYBARGE	29.27	2.39	0.00	-0.001	9.096	48.72	37.09	0.00	-103.85	0.81	125.36	34.82
17	LAYBARGE	23.13	1.33	0.00	0.002	10.358	54.95	36.93	0.00	-93.85	-0.85	116.65	32.40
19	LAYBARGE	17.18	0.18	0.00	0.006	11.433	61.01	36.75	0.00	-79.76	1.10	104.15	28.93
21	LAYBARGE	10.63	-1.23	0.00	-0.005	13.004	67.72	36.55	-0.11	-143.81	-5.09	158.89	44.13
24	STINGER	-4.61	-5.09	0.00	0.030	15.331	83.44	36.06	-0.45	-119.24	-5.21	137.70	38.25
26	STINGER	-11.02	-6.93	-0.01	0.017	16.550	90.11	35.84	-0.61	-56.49	1.11	84.02	23.34
28	STINGER	-17.39	-8.88	-0.01	0.011	17.469	96.77	35.58	-0.78	-78.23	-5.43	102.29	28.41
30	STINGER	-23.74	-10.93	-0.01	0.096	18.313	103.44	35.32	-0.96	-48.71	16.55	79.17	21.99
32	STINGER	-30.05	-13.07	-0.03	0.111	19.093	110.11	35.05	-1.14	-71.21	-15.74	96.10	26.70
34	STINGER	-36.32	-15.36	-0.01	-0.472	21.615	116.77	34.67	-1.34	-286.52	-87.78	286.11	79.48
36	SAGBEND	-47.31	-20.16	0.18	-1.217	24.169	128.77	34.14	-1.76	9.86	-5.14	43.82	12.17
37	SAGBEND	-58.29	-24.99	0.40	-1.089	23.181	140.77	33.52	-2.18	46.10	9.32	73.90	20.53
38	SAGBEND	-69.38	-29.58	0.59	-0.875	21.719	152.77	32.93	-2.58	51.91	9.57	78.26	21.74
39	SAGBEND	-80.58	-33.87	0.75	-0.662	20.169	164.77	32.38	-2.95	53.59	9.23	79.28	22.02
40	SAGBEND	-91.90	-37.85	0.85	-0.452	18.580	176.77	31.88	-3.30	54.53	8.40	79.92	22.20
41	SAGBEND	-103.33	-41.51	0.93	-0.268	16.954	188.77	31.41	-3.61	55.29	7.61	80.35	22.32
42	SAGBEND	-114.86	-44.85	0.97	-0.083	15.299	200.77	30.99	-3.90	55.96	6.86	80.76	22.43
43	SAGBEND	-126.48	-47.84	0.96	0.072	13.621	212.77	30.61	-4.16	56.72	5.85	81.02	22.50
44	SAGBEND	-138.18	-50.50	0.93	0.210	11.921	224.77	30.28	-4.39	57.58	5.24	81.26	22.57
45	SAGBEND	-149.96	-52.81	0.88	0.339	10.202	236.77	29.99	-4.59	58.66	4.72	81.69	22.69
46	SAGBEND	-161.80	-54.74	0.80	0.455	8.460	248.77	29.74	-4.76	59.71	4.61	82.00	22.78
47	SAGBEND	-173.69	-56.32	0.69	0.560	6.695	260.77	29.55	-4.89	60.40	4.69	82.06	22.79
48	SAGBEND	-185.63	-57.54	0.56	0.666	4.922	272.77	29.40	-5.00	60.79	4.69	82.10	22.81
49	SAGBEND	-197.60	-58.39	0.41	0.769	3.159	284.77	29.29	-5.07	60.11	4.25	81.14	22.54
50	SAGBEND	-209.59	-58.87	0.24	0.841	1.442	296.77	29.23	-5.11	54.40	1.37	76.39	21.22
51	SEABED	-221.58	-59.02	0.08	0.647	0.201	308.77	29.22	-5.12	26.61	-18.84	56.76	15.77
52	SEABED	-233.58	-59.03	0.00	0.105	-0.015	320.77	29.21	-5.12	0.81	-14.29	43.15	11.99
53	SEABED	-245.58	-59.03	0.00	-0.008	-0.003	332.77	29.21	-5.12	-0.34	-0.45	32.33	8.98
54	SEABED	-257.58	-59.03	0.00	-0.001	0.000	344.77	29.21	-5.12	-0.01	0.18	32.19	8.94
55	SEABED	-269.58	-59.03	0.00	0.000	0.000	356.77	29.21	-5.12	0.00	0.00	32.08	8.91
56	SEABED	-281.58	-59.03	0.00	0.000	0.000	368.77	29.21	-5.12	0.00	0.00	32.08	8.91
57	SEABED	-293.58	-59.03	0.00	0.000	0.000	380.77	29.22	-5.12	0.00	0.00	32.08	8.91
58	SEABED	-305.58	-59.03	0.00	0.000	0.000	392.77	29.22	-5.12	0.00	0.00	32.08	8.91

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

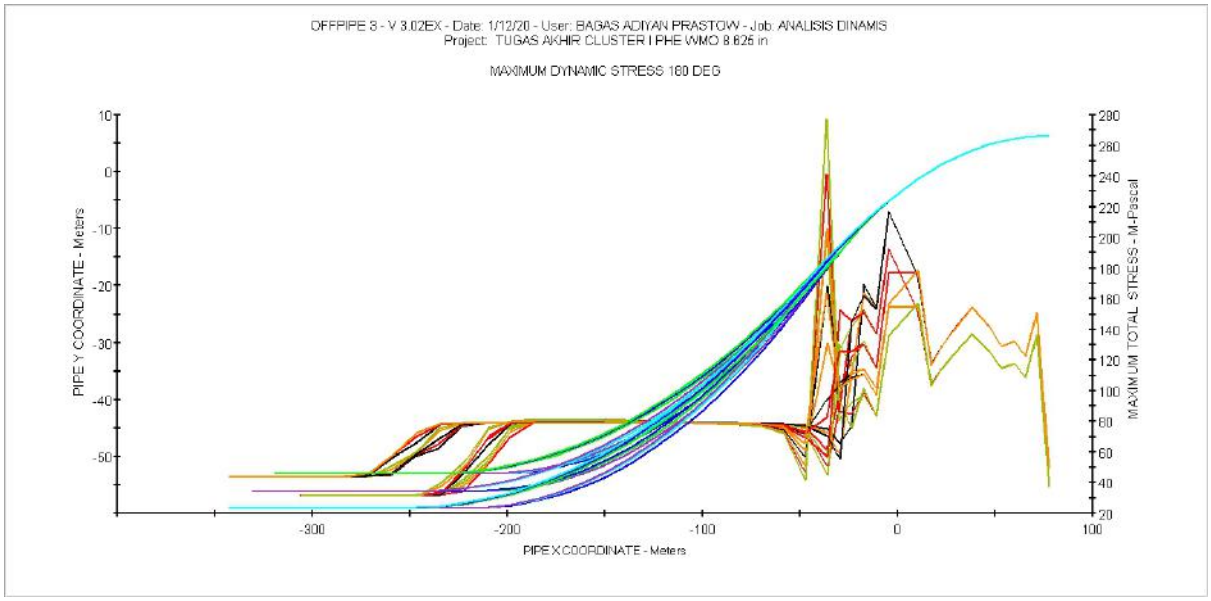
NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	-0.01	0.000	0.271	0.00	50.00	0.00	0.00	0.00	50.00	13.89
3	LAYBARGE	71.49	6.16	-0.01	-0.001	0.960	6.30	49.97	0.00	-120.05	0.96	151.98	42.22
5	LAYBARGE	65.37	5.99	-0.01	-0.002	2.231	12.42	49.95	0.00	-86.78	0.70	123.72	34.37
7	LAYBARGE	59.91	5.73	-0.01	-0.003	3.282	17.89	49.91	0.00	-98.05	0.77	133.24	37.01
9	LAYBARGE	53.32	5.28	0.00	-0.003	4.502	24.49	49.84	0.00	-94.47	0.75	130.14	36.15
11	LAYBARGE	47.32	4.74	0.00	-0.004	5.739	30.51	49.76	0.00	-109.20	0.82	142.57	39.60
13	LAYBARGE	38.21	3.70	0.00	-0.005	7.424	39.68	49.59	0.00	-125.04	0.89	155.87	43.30
15	LAYBARGE	29.27	2.39	0.00	-0.008	9.101	48.72	49.40	0.00	-108.24	0.84	141.40	39.28
17	LAYBARGE	23.13	1.34	0.00	-0.009	10.368	54.95	49.24	0.00	-96.12	-0.85	130.89	36.36
19	LAYBARGE	17.18	0.19	0.00	-0.007	11.444	61.01	49.07	0.00	-82.30	1.03	118.69	32.97
21	LAYBARGE	10.63	-1.22	0.00	-0.022	13.020	67.72	48.87	-0.11	-149.92	-5.04	176.40	49.00
24	STINGER	-4.64	-5.13	0.00	0.001	15.978	83.47	48.35	-0.45	-199.95	-6.16	218.58	60.72
26	STINGER	-11.00	-7.11	0.00	0.004	18.233	90.14	48.13	-0.62	-126.88	7.75	156.40	43.44
28	STINGER	-17.30	-9.29	0.00	-0.073	20.026	96.81	47.85	-0.81	-143.46	-31.66	167.91	46.64
30	STINGER	-23.53	-11.66	0.03	-0.606	21.626	103.47	47.55	-1.02	-111.11	-63.25	156.32	43.42
32	STINGER	-29.71	-14.17	0.13	-1.080	22.248	110.14	47.24	-1.24	4.88	-12.48	57.56	15.99
34	STINGER	-35.89	-16.68	0.25	-1.134	21.950	116.81	46.92	-1.46	28.37	3.51	71.41	19.84
36	SAGBEND	-47.05	-21.07	0.46	-0.995	20.937	128.81	46.36	-1.84	36.86	6.44	78.67	21.85
37	SAGBEND	-58.30	-25.25	0.64	-0.831	19.821	140.81	45.83	-2.20	38.23	6.46	79.41	22.06
38	SAGBEND	-69.63	-29.20	0.80	-0.674	18.680	152.81	45.32	-2.54	38.81	6.15	79.57	22.10
39	SAGBEND	-81.03	-32.93	0.92	-0.514	17.521	164.81	44.85	-2.87	39.33	5.73	79.74	22.15
40	SAGBEND	-92.51	-36.43	1.01	-0.367	16.347	176.81	44.40	-3.17	39.86	5.51	79.89	22.19
41	SAGBEND	-104.06	-39.68	1.07	-0.229	15.154	188.81	43.99	-3.45	40.35	5.17	80.02	22.23
42	SAGBEND	-115.67	-42.70	1.10	-0.097	13.950	200.81	43.60	-3.71	40.72	4.70	80.12	22.25
43	SAGBEND	-127.35	-45.48	1.11	0.025	12.737	212.81	43.25	-3.95	41.01	4.29	80.22	22.28
44	SAGBEND	-139.08	-48.00	1.09	0.138	11.513	224.81	42.93	-4.17	41.37	3.80	80.25	22.29
45	SAGBEND	-150.87	-50.26	1.05	0.239	10.275	236.81	42.65	-4.37	41.80	3.39	80.24	22.29
46	SAGBEND	-162.70	-52.27	0.99	0.327	9.025	248.81	42.40	-4.54	42.17	3.10	80.32	22.31
47	SAGBEND	-174.57	-54.02	0.92	0.407	7.773	260.81	42.18	-4.70	42.67	2.99	80.33	22.31
48	SAGBEND	-186.47	-55.51	0.83	0.483	6.508	272.81	41.99	-4.82	43.05	3.03	80.27	22.30
49	SAGBEND	-198.41	-56.74	0.72	0.561	5.233	284.81	41.84	-4.93	43.27	3.05	80.17	22.27
50	SAGBEND	-210.37	-57.71	0.59	0.639	3.962	296.81	41.72	-5.01	43.42	3.05	79.97	22.21
51	SAGBEND	-222.35	-58.40	0.45	0.717	2.686	308.81	41.63	-5.07	43.37	2.94	79.57	22.10
52	SAGBEND	-234.34	-58.83	0.29	0.781	1.418	320.81	41.58	-5.10	41.65	2.00	78.00	21.67
53	SEABED	-246.34	-59.01	0.13	0.735	0.340	332.81	41.55	-5.12	29.39	-10.84	68.94	19.15
54	SEABED	-258.34	-59.03	0.02	0.259	0.006	344.81	41.55	-5.12	3.29	-17.72	58.46	16.24
55	SEABED	-270.34	-59.03	0.00	0.010	-0.003	356.81	41.55	-5.12	-0.23	-2.96	46.41	12.89
56	SEABED	-282.34	-59.03	0.00	-0.002	0.000	368.81	41.55	-5.12	-0.04	0.14	44.43	12.34
57	SEABED	-294.34	-59.03	0.00	0.000	0.000	380.81	41.55	-5.12	0.00	0.03	44.36	12.32
58	SEABED	-306.34	-59.03	0.00	0.000	0.000	392.81	41.55	-5.12	0.00	0.00	44.34	12.32
59	SEABED	-318.34	-59.03	0.00	0.000	0.000	404.81	41.55	-5.12	0.00	0.00	44.34	12.32
60	SEABED	-330.34	-59.03	0.00	0.000	0.000	416.81	41.55	-5.12	0.00	0.00	44.34	12.32

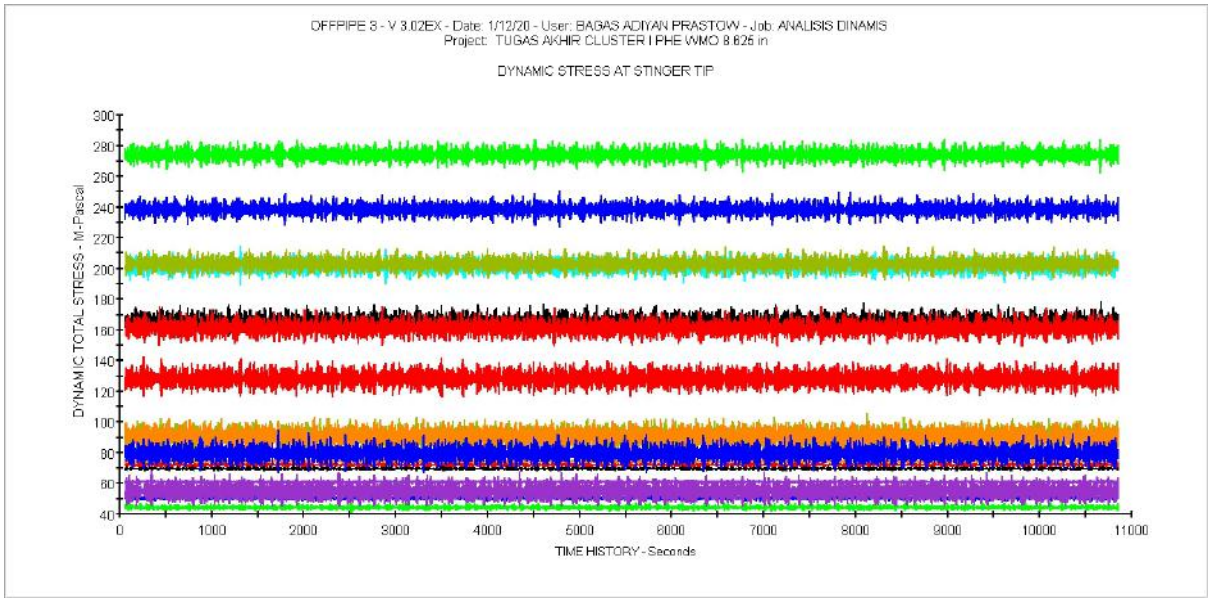
MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.01	0.013	0.278	0.00	50.04	0.00	0.00	0.00	50.04	13.90
3	LAYBARGE	71.49	6.16	0.00	0.011	0.968	6.30	50.01	0.00	-120.00	-0.81	151.94	42.21
5	LAYBARGE	65.37	5.99	0.00	0.007	2.238	12.42	49.99	0.00	-86.77	-0.60	123.71	34.36
7	LAYBARGE	59.91	5.72	0.00	0.005	3.290	17.89	49.94	0.00	-98.03	-0.66	133.23	37.01
9	LAYBARGE	53.32	5.27	0.00	0.004	4.510	24.49	49.87	0.00	-94.46	-0.64	130.13	36.15
11	LAYBARGE	47.32	4.74	0.00	0.004	5.747	30.51	49.79	0.00	-109.17	-0.69	142.53	39.59
13	LAYBARGE	38.22	3.69	0.00	0.006	7.431	39.68	49.62	0.00	-125.02	-0.77	155.82	43.28
15	LAYBARGE	29.27	2.39	0.00	0.008	9.108	48.72	49.42	0.00	-108.17	-0.70	141.35	39.27
17	LAYBARGE	23.13	1.33	0.00	0.008	10.377	54.95	49.26	0.00	-96.31	-0.79	131.06	36.41
19	LAYBARGE	17.18	0.18	0.00	0.010	11.449	61.01	49.09	0.00	-81.50	0.99	118.14	32.82
21	LAYBARGE	10.63	-1.23	0.00	-0.005	13.043	67.72	48.88	-0.11	-153.31	-5.10	179.18	49.77
24	STINGER	-4.62	-5.10	0.00	0.026	15.540	83.45	48.38	-0.45	-153.06	-5.26	178.63	49.62
26	STINGER	-11.02	-6.99	0.00	0.011	17.130	90.12	48.16	-0.61	-79.86	-1.06	115.89	32.19
28	STINGER	-17.37	-9.02	-0.01	0.017	18.329	96.78	47.89	-0.79	-100.24	-4.28	133.45	37.07
30	STINGER	-23.67	-11.18	-0.01	0.019	19.611	103.45	47.62	-0.98	-95.55	-19.11	128.59	35.72
32	STINGER	-29.93	-13.49	0.00	-0.296	20.777	110.12	47.32	-1.18	-88.72	-48.67	127.05	35.29
34	STINGER	-36.14	-15.90	0.06	-0.840	21.480	116.79	47.02	-1.39	-40.66	-35.64	92.71	25.75
36	SAGBEND	-47.31	-20.28	0.26	-1.038	21.086	128.79	46.46	-1.77	32.18	4.42	73.90	20.53
37	SAGBEND	-58.55	-24.50	0.46	-0.902	20.026	140.79	45.92	-2.14	37.59	6.65	79.02	21.95
38	SAGBEND	-69.86	-28.50	0.62	-0.744	18.888	152.79	45.41	-2.48	38.68	6.61	79.60	22.11
39	SAGBEND	-81.25	-32.27	0.76	-0.584	17.733	164.79	44.93	-2.81	39.31	6.24	79.82	22.17
40	SAGBEND	-92.72	-35.81	0.86	-0.436	16.562	176.79	44.47	-3.12	39.81	5.83	80.02	22.23
41	SAGBEND	-104.25	-39.11	0.94	-0.299	15.378	188.79	44.05	-3.40	40.33	5.49	80.15	22.26
42	SAGBEND	-115.86	-42.17	0.99	-0.164	14.178	200.79	43.66	-3.67	40.68	5.09	80.19	22.27
43	SAGBEND	-127.52	-44.98	1.01	-0.040	12.964	212.79	43.31	-3.91	40.99	4.57	80.23	22.29
44	SAGBEND	-139.24	-47.55	1.01	0.076	11.741	224.79	42.98	-4.14	41.36	4.07	80.30	22.31
45	SAGBEND	-151.02	-49.87	0.98	0.181	10.503	236.79	42.69	-4.34	41.74	3.64	80.35	22.32
46	SAGBEND	-162.84	-51.93	0.93	0.273	9.257	248.79	42.43	-4.51	42.13	3.21	80.40	22.33
47	SAGBEND	-174.70	-53.73	0.87	0.353	8.004	260.79	42.21	-4.67	42.47	3.14	80.38	22.33
48	SAGBEND	-186.60	-55.27	0.79	0.431	6.738	272.79	42.01	-4.80	42.83	3.19	80.28	22.30
49	SAGBEND	-198.53	-56.54	0.69	0.508	5.469	284.79	41.85	-4.91	43.17	3.21	80.13	22.26
50	SAGBEND	-210.49	-57.55	0.58	0.582	4.193	296.79	41.73	-5.00	43.47	3.29	79.93	22.20
51	SAGBEND	-222.47	-58.29	0.45	0.661	2.916	308.79	41.64	-5.06	43.51	3.21	79.61	22.11
52	SAGBEND	-234.46	-58.77	0.30	0.733	1.651	320.79	41.58	-5.10	42.38	2.46	78.54	21.82
53	SAGBEND	-246.45	-58.99	0.15	0.726	0.499	332.79	41.55	-5.12	33.65	-6.95	72.02	20.01
54	SEABED	-258.45	-59.03	0.03	0.325	0.021	344.79	41.55	-5.12	5.63	-17.87	58.88	16.35
55	SEABED	-270.45	-59.03	0.00	0.021	-0.005	356.79	41.55	-5.12	-0.25	-4.37	47.34	13.15
56	SEABED	-282.45	-59.03	0.00	-0.003	0.000	368.79	41.55	-5.12	-0.06	0.13	44.41	12.34
57	SEABED	-294.45	-59.03	0.00	0.000	0.000	380.79	41.55	-5.12	0.00	0.05	44.36	12.32
58	SEABED	-306.45	-59.03	0.00	0.000	0.000	392.79	41.55	-5.12	0.00	0.00	44.33	12.31
59	SEABED	-318.45	-59.03	0.00	0.000	0.000	404.79	41.55	-5.12	0.00	0.00	44.33	12.31
60	SEABED	-330.45	-59.03	0.00	0.000	0.000	416.79	41.55	-5.12	0.00	0.00	44.33	12.31

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	-0.02	-0.007	0.273	0.00	50.06	0.00	0.00	0.00	50.06	13.91
3	LAYBARGE	71.49	6.16	-0.01	-0.008	0.963	6.30	50.03	0.00	-120.05	-0.93	151.99	42.22
5	LAYBARGE	65.38	5.98	-0.01	-0.010	2.233	12.42	50.01	0.00	-86.79	-0.65	123.75	34.37
7	LAYBARGE	59.91	5.72	-0.01	-0.012	3.285	17.89	49.97	0.00	-98.06	-0.73	133.27	37.02
9	LAYBARGE	53.32	5.28	-0.01	-0.014	4.505	24.49	49.90	0.00	-94.48	-0.69	130.17	36.16
11	LAYBARGE	47.32	4.74	-0.01	-0.015	5.742	30.51	49.81	0.00	-109.21	-0.78	142.58	39.61
13	LAYBARGE	38.22	3.69	0.00	-0.013	7.426	39.68	49.65	0.00	-125.08	-0.87	155.89	43.30
15	LAYBARGE	29.27	2.39	0.00	-0.010	9.103	48.72	49.45	0.00	-108.18	0.77	141.39	39.27
17	LAYBARGE	23.13	1.33	0.00	-0.007	10.372	54.95	49.30	0.00	-96.42	-0.78	131.18	36.44
19	LAYBARGE	17.18	0.19	0.00	-0.006	11.441	61.01	49.12	0.00	-81.01	0.94	117.77	32.71
21	LAYBARGE	10.63	-1.22	0.00	-0.022	13.046	67.72	48.92	-0.11	-154.96	-5.28	180.67	50.18
24	STINGER	-4.61	-5.10	0.00	0.004	15.312	83.44	48.43	-0.45	-129.08	-5.20	158.36	43.99
26	STINGER	-11.02	-6.94	0.00	-0.014	16.575	90.11	48.21	-0.61	-58.54	-1.01	98.24	27.29
28	STINGER	-17.40	-8.89	0.00	-0.010	17.454	96.77	47.96	-0.78	-75.06	-1.69	111.81	31.06
30	STINGER	-23.74	-10.94	0.00	-0.014	18.435	103.44	47.69	-0.96	-76.95	-4.33	113.56	31.55
32	STINGER	-30.05	-13.10	0.00	0.037	19.316	110.11	47.42	-1.15	-64.92	10.73	102.47	28.47
34	STINGER	-36.32	-15.36	0.01	-0.381	20.537	116.77	47.11	-1.34	-129.69	-80.34	176.43	49.01
36	SAGBEND	-47.51	-19.69	0.18	-1.040	21.136	128.77	46.58	-1.72	23.67	-4.20	67.05	18.62
37	SAGBEND	-58.73	-23.93	0.38	-0.931	20.173	140.77	46.04	-2.09	36.99	6.97	78.51	21.81
38	SAGBEND	-70.03	-27.96	0.56	-0.783	19.051	152.77	45.52	-2.44	38.67	6.96	79.73	22.15
39	SAGBEND	-81.41	-31.76	0.69	-0.621	17.897	164.77	45.03	-2.77	39.30	6.71	79.98	22.22
40	SAGBEND	-92.87	-35.33	0.80	-0.468	16.730	176.77	44.58	-3.08	39.85	6.35	80.18	22.27
41	SAGBEND	-104.40	-38.66	0.89	-0.331	15.550	188.77	44.15	-3.37	40.29	5.79	80.28	22.30
42	SAGBEND	-115.99	-41.76	0.94	-0.194	14.354	200.77	43.76	-3.63	40.67	5.41	80.30	22.31
43	SAGBEND	-127.65	-44.61	0.97	-0.070	13.138	212.77	43.40	-3.88	40.93	4.91	80.27	22.30
44	SAGBEND	-139.36	-47.21	0.97	0.047	11.909	224.77	43.07	-4.11	41.26	4.31	80.32	22.31
45	SAGBEND	-151.13	-49.56	0.95	0.153	10.674	236.77	42.78	-4.31	41.77	3.86	80.45	22.35
46	SAGBEND	-162.94	-51.65	0.91	0.246	9.427	248.77	42.52	-4.49	42.27	3.41	80.52	22.37
47	SAGBEND	-174.80	-53.49	0.85	0.326	8.178	260.77	42.29	-4.65	42.72	3.20	80.50	22.36
48	SAGBEND	-186.70	-55.07	0.78	0.401	6.917	272.77	42.09	-4.79	43.02	3.23	80.40	22.33
49	SAGBEND	-198.63	-56.39	0.69	0.479	5.641	284.77	41.93	-4.90	43.34	3.33	80.23	22.29
50	SAGBEND	-210.58	-57.43	0.58	0.558	4.372	296.77	41.80	-4.99	43.65	3.41	80.08	22.24
51	SAGBEND	-222.55	-58.21	0.45	0.633	3.087	308.77	41.70	-5.05	43.68	3.34	79.76	22.16
52	SAGBEND	-234.54	-58.72	0.31	0.707	1.814	320.77	41.64	-5.10	42.89	2.72	78.85	21.90
53	SAGBEND	-246.54	-58.98	0.16	0.725	0.634	332.77	41.60	-5.12	36.18	-4.91	74.14	20.59
54	SEABED	-258.54	-59.03	0.04	0.376	0.040	344.77	41.60	-5.12	8.35	-17.71	59.51	16.53
55	SEABED	-270.54	-59.03	0.00	0.032	-0.005	356.77	41.60	-5.12	-0.24	-5.81	48.61	13.50
56	SEABED	-282.54	-59.03	0.00	-0.003	-0.001	368.77	41.60	-5.12	-0.09	0.12	44.44	12.35
57	SEABED	-294.54	-59.03	0.00	0.000	0.000	380.77	41.60	-5.12	0.00	0.06	44.42	12.34
58	SEABED	-306.54	-59.03	0.00	0.000	0.000	392.77	41.60	-5.12	0.00	0.00	44.38	12.33
59	SEABED	-318.54	-59.03	0.00	0.000	0.000	404.77	41.60	-5.12	0.00	0.00	44.38	12.33
60	SEABED	-330.54	-59.03	0.00	0.000	0.000	416.77	41.60	-5.12	0.00	0.00	44.38	12.33


OFFPIPE 8 - V 3.02EX - Date: 1/12/20 - User: BAGAS ADIYAN PRASTOW - Job: ANALISIS DINAMIS
Project: TUGAS AKHIR CLUSTER I PHE WMO 8.625 in
MAXIMUM DYNAMIC STRESS 180 DEG
PIPE Y COORDINATE - Meters
MAXIMUM TOTAL STRESS - M-Pascal
PIPE X COORDINATE - Meters


OFFPIPE 8 - V 3.02EX - Date: 1/12/20 - User: BAGAS ADIYAN PRASTOW - Job: ANALISIS DINAMIS
Project: TUGAS AKHIR CLUSTER I PHE WMO 8.625 in
DYNAMIC STRESS AT STINGER TIP
DYNAMIC TOTAL STRESS - M-Pascal
TIME HISTORY - Seconds

Output Analisis Dinamis 180°

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.265	0.00	36.80	0.00	0.00	0.00	36.80	10.22
3	LAYBARGE	71.49	6.16	0.00	0.000	0.957	6.30	36.77	0.00	-116.99	0.00	136.17	37.83
5	LAYBARGE	65.38	5.98	0.00	0.000	2.231	12.42	36.76	0.00	-84.27	0.00	108.37	30.10
7	LAYBARGE	59.91	5.72	0.00	0.000	3.278	17.89	36.71	0.00	-95.23	0.00	117.63	32.68
9	LAYBARGE	53.32	5.27	0.00	0.000	4.503	24.49	36.65	0.00	-91.72	0.00	114.59	31.83
11	LAYBARGE	47.32	4.74	0.00	0.000	5.731	30.51	36.56	0.00	-104.57	0.00	125.42	34.84
13	LAYBARGE	38.22	3.69	0.00	0.000	7.423	39.68	36.40	0.00	-118.28	-0.01	136.91	38.03
15	LAYBARGE	29.27	2.39	0.00	0.000	9.105	48.72	36.21	0.00	-103.63	0.02	124.28	34.52
17	LAYBARGE	23.13	1.33	0.00	0.000	10.364	54.95	36.05	0.00	-93.14	-0.10	115.22	32.00
19	LAYBARGE	17.18	0.18	0.00	0.002	11.449	61.01	35.88	0.00	-81.25	0.43	104.82	29.12
21	LAYBARGE	10.63	-1.22	0.00	-0.015	12.981	67.72	35.69	-0.11	-135.69	-4.20	151.13	41.98
24	STINGER	-4.64	-5.13	0.00	0.019	16.018	83.47	35.18	-0.45	-184.64	-3.58	192.37	53.44
26	STINGER	-11.00	-7.10	0.00	-0.016	18.215	90.14	34.95	-0.62	-119.26	-2.82	136.62	37.95
28	STINGER	-17.30	-9.29	0.00	0.053	20.067	96.81	34.67	-0.81	-138.07	9.99	152.68	42.41
30	STINGER	-23.53	-11.68	0.00	-0.213	21.938	103.47	34.37	-1.02	-121.67	-46.37	145.03	40.29
32	STINGER	-29.68	-14.25	0.06	-0.856	23.155	110.14	34.06	-1.24	-53.45	-37.24	89.73	24.93
34	STINGER	-35.80	-16.89	0.17	-1.190	23.317	116.81	33.73	-1.47	18.90	-6.52	50.99	14.16
36	SAGBEND	-46.86	-21.54	0.40	-1.132	22.209	128.81	33.13	-1.87	46.29	5.60	73.50	20.42
37	SAGBEND	-58.02	-25.93	0.60	-0.923	20.732	140.81	32.58	-2.25	50.80	6.86	77.04	21.40
38	SAGBEND	-69.30	-30.03	0.76	-0.703	19.182	152.81	32.06	-2.61	52.19	6.80	78.00	21.67
39	SAGBEND	-80.69	-33.82	0.88	-0.492	17.598	164.81	31.58	-2.94	53.20	6.53	78.58	21.83
40	SAGBEND	-92.17	-37.29	0.96	-0.291	15.981	176.81	31.14	-3.24	54.10	6.27	79.05	21.96
41	SAGBEND	-103.76	-40.42	1.00	-0.101	14.340	188.81	30.74	-3.51	54.95	5.97	79.52	22.09
42	SAGBEND	-115.42	-43.23	1.00	0.077	12.674	200.81	30.38	-3.75	55.80	5.60	79.94	22.21
43	SAGBEND	-127.17	-45.69	0.97	0.243	10.987	212.81	30.07	-3.97	56.49	5.21	80.29	22.30
44	SAGBEND	-138.98	-47.80	0.90	0.395	9.278	224.81	29.81	-4.15	57.02	4.82	80.51	22.37
45	SAGBEND	-150.85	-49.55	0.81	0.535	7.554	236.81	29.58	-4.30	57.54	4.45	80.68	22.41
46	SAGBEND	-162.77	-50.95	0.68	0.663	5.815	248.81	29.41	-4.42	58.05	4.11	80.82	22.45
47	SAGBEND	-174.72	-51.99	0.53	0.778	4.071	260.81	29.28	-4.51	58.19	3.73	80.70	22.42
48	SAGBEND	-186.70	-52.66	0.36	0.874	2.338	272.81	29.20	-4.57	56.69	2.54	79.18	21.99
49	SAGBEND	-198.70	-52.97	0.17	0.869	0.755	284.81	29.16	-4.59	44.98	-5.75	69.67	19.35
50	SEABED	-210.69	-53.03	0.03	0.390	0.022	296.81	29.15	-4.60	7.01	-21.47	50.42	14.01
51	SEABED	-222.69	-53.03	0.00	0.013	-0.010	308.81	29.15	-4.60	-0.56	-3.65	34.71	9.64
52	SEABED	-234.69	-53.03	0.00	-0.005	0.000	320.81	29.15	-4.60	-0.09	0.29	31.94	8.87
53	SEABED	-246.69	-53.03	0.00	0.000	0.000	332.81	29.15	-4.60	0.01	0.04	31.74	8.82
54	SEABED	-258.69	-53.03	0.00	0.000	0.000	344.81	29.15	-4.60	0.00	0.00	31.71	8.81
55	SEABED	-270.69	-53.03	0.00	0.000	0.000	356.81	29.15	-4.60	0.00	0.00	31.70	8.81
56	SEABED	-282.69	-53.03	0.00	0.000	0.000	368.81	29.15	-4.60	0.00	0.00	31.70	8.81
57	SEABED	-294.69	-53.03	0.00	0.000	0.000	380.81	29.15	-4.60	0.00	0.00	31.70	8.81

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.266	0.00	36.87	0.00	0.00	0.00	36.87	10.24
3	LAYBARGE	71.49	6.16	0.00	0.000	0.958	6.30	36.84	0.00	-116.96	0.00	136.21	37.84
5	LAYBARGE	65.38	5.99	0.00	0.000	2.232	12.42	36.82	0.00	-84.26	0.00	108.43	30.12
7	LAYBARGE	59.91	5.72	0.00	0.000	3.278	17.89	36.78	0.00	-95.21	0.00	117.68	32.69
9	LAYBARGE	53.32	5.28	0.00	0.000	4.504	24.49	36.71	0.00	-91.70	0.00	114.64	31.85
11	LAYBARGE	47.32	4.74	0.00	0.000	5.732	30.51	36.63	0.00	-104.54	0.00	125.46	34.85
13	LAYBARGE	38.21	3.69	0.00	0.000	7.423	39.68	36.47	0.00	-118.25	0.00	136.96	38.05
15	LAYBARGE	29.27	2.39	0.00	0.000	9.105	48.72	36.27	0.00	-103.55	0.02	124.29	34.52
17	LAYBARGE	23.13	1.34	0.00	0.000	10.366	54.95	36.12	0.00	-93.43	-0.10	115.52	32.09
19	LAYBARGE	17.18	0.19	0.00	0.002	11.444	61.01	35.95	0.00	-80.06	0.40	103.84	28.84
21	LAYBARGE	10.63	-1.22	0.00	-0.014	13.004	67.72	35.75	-0.11	-140.36	-4.09	155.15	43.10
24	STINGER	-4.62	-5.11	0.00	0.015	15.562	83.45	35.26	-0.45	-140.04	-4.04	154.56	42.93
26	STINGER	-11.02	-6.99	0.00	-0.003	17.116	90.12	35.03	-0.61	-78.37	-0.13	101.92	28.31
28	STINGER	-17.37	-9.02	0.00	0.000	18.316	96.78	34.77	-0.78	-92.64	-1.45	113.91	31.64
30	STINGER	-23.67	-11.19	0.00	0.005	19.623	103.45	34.50	-0.97	-92.36	0.60	113.49	31.53
32	STINGER	-29.93	-13.49	0.00	-0.019	20.826	110.12	34.21	-1.17	-78.84	-6.87	101.87	28.30
34	STINGER	-36.13	-15.93	0.02	-0.509	22.051	116.79	33.89	-1.38	-98.06	-58.91	131.50	36.53
36	SAGBEND	-47.22	-20.52	0.21	-1.144	22.349	128.79	33.32	-1.78	32.01	-1.13	61.21	17.00
37	SAGBEND	-58.36	-24.96	0.42	-1.020	21.055	140.79	32.76	-2.17	48.80	6.10	75.38	20.94
38	SAGBEND	-69.62	-29.13	0.60	-0.808	19.534	152.79	32.23	-2.53	51.81	6.77	77.70	21.58
39	SAGBEND	-80.98	-32.98	0.74	-0.596	17.959	164.79	31.74	-2.86	53.03	6.59	78.41	21.78
40	SAGBEND	-92.44	-36.52	0.84	-0.393	16.351	176.79	31.29	-3.17	53.93	6.32	78.96	21.93
41	SAGBEND	-104.00	-39.74	0.90	-0.200	14.717	188.79	30.88	-3.45	54.75	6.03	79.46	22.07
42	SAGBEND	-115.65	-42.62	0.92	-0.019	13.055	200.79	30.52	-3.70	55.64	5.69	79.88	22.19
43	SAGBEND	-127.38	-45.16	0.91	0.149	11.375	212.79	30.20	-3.92	56.41	5.30	80.29	22.30
44	SAGBEND	-139.18	-47.35	0.86	0.304	9.671	224.79	29.92	-4.11	56.98	4.92	80.56	22.38
45	SAGBEND	-151.04	-49.19	0.78	0.447	7.951	236.79	29.69	-4.27	57.49	4.53	80.70	22.42
46	SAGBEND	-162.94	-50.67	0.68	0.578	6.211	248.79	29.51	-4.40	57.96	4.19	80.81	22.45
47	SAGBEND	-174.89	-51.78	0.54	0.697	4.465	260.79	29.37	-4.49	58.23	3.85	80.79	22.44
48	SAGBEND	-186.86	-52.53	0.39	0.801	2.726	272.79	29.27	-4.56	57.39	3.12	79.85	22.18
49	SAGBEND	-198.86	-52.93	0.21	0.849	1.082	284.79	29.22	-4.59	49.78	-1.44	73.45	20.40
50	SEABED	-210.85	-53.03	0.05	0.548	0.082	296.79	29.21	-4.60	13.47	-20.16	51.42	14.28
51	SEABED	-222.85	-53.03	0.00	0.049	-0.013	308.79	29.21	-4.60	-0.48	-7.31	37.72	10.48
52	SEABED	-234.85	-53.03	0.00	-0.007	-0.001	320.79	29.21	-4.60	-0.17	0.23	31.97	8.88
53	SEABED	-246.85	-53.03	0.00	-0.001	0.000	332.79	29.21	-4.60	0.01	0.09	31.83	8.84
54	SEABED	-258.85	-53.03	0.00	0.000	0.000	344.79	29.21	-4.60	0.00	0.00	31.77	8.82
55	SEABED	-270.85	-53.03	0.00	0.000	0.000	356.79	29.21	-4.60	0.00	0.00	31.76	8.82
56	SEABED	-282.85	-53.03	0.00	0.000	0.000	368.79	29.21	-4.60	0.00	0.00	31.76	8.82
57	SEABED	-294.85	-53.03	0.00	0.000	0.000	380.79	29.21	-4.60	0.00	0.00	31.76	8.82

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.264	0.00	36.87	0.00	0.00	0.00	36.87	10.24
3	LAYBARGE	71.49	6.16	0.00	0.000	0.956	6.30	36.85	0.00	-116.97	0.00	136.25	37.85
5	LAYBARGE	65.37	5.98	0.00	0.000	2.230	12.42	36.83	0.00	-84.26	0.00	108.45	30.13
7	LAYBARGE	59.91	5.72	0.00	0.000	3.276	17.89	36.79	0.00	-95.22	0.00	117.71	32.70
9	LAYBARGE	53.32	5.27	0.00	0.000	4.502	24.49	36.72	0.00	-91.71	0.00	114.67	31.85
11	LAYBARGE	47.32	4.74	0.00	0.000	5.729	30.51	36.64	0.00	-104.55	0.00	125.50	34.86
13	LAYBARGE	38.22	3.69	0.00	0.000	7.421	39.68	36.48	0.00	-118.29	0.00	137.02	38.06
15	LAYBARGE	29.27	2.39	0.00	0.000	9.103	48.72	36.28	0.00	-103.54	0.02	124.29	34.53
17	LAYBARGE	23.13	1.34	0.00	0.000	10.365	54.95	36.13	0.00	-93.58	-0.10	115.67	32.13
19	LAYBARGE	17.18	0.19	0.00	0.002	11.440	61.01	35.95	0.00	-79.43	0.39	103.31	28.70
21	LAYBARGE	10.63	-1.22	0.00	-0.014	13.012	67.72	35.76	-0.11	-142.76	-4.05	157.21	43.67
24	STINGER	-4.61	-5.09	0.00	0.014	15.336	83.44	35.27	-0.44	-118.00	-4.14	135.86	37.74
26	STINGER	-11.02	-6.94	0.00	0.000	16.563	90.11	35.05	-0.60	-57.25	0.59	83.94	23.32
28	STINGER	-17.40	-8.89	0.00	-0.013	17.453	96.77	34.80	-0.77	-72.67	-4.17	97.06	26.96
30	STINGER	-23.74	-10.94	0.00	0.058	18.414	103.44	34.54	-0.95	-66.55	11.73	92.37	25.66
32	STINGER	-30.05	-13.09	-0.01	0.093	19.230	110.11	34.27	-1.14	-53.82	-9.45	80.76	22.43
34	STINGER	-36.32	-15.36	0.00	-0.462	20.956	116.77	33.94	-1.34	-190.00	-63.28	204.41	56.78
36	SAGBEND	-47.43	-19.89	0.19	-1.162	22.390	128.77	33.41	-1.73	20.42	-1.64	51.53	14.31
37	SAGBEND	-58.56	-24.36	0.41	-1.046	21.246	140.77	32.84	-2.12	47.16	5.98	74.03	20.56
38	SAGBEND	-69.80	-28.57	0.59	-0.835	19.751	152.77	32.31	-2.48	51.49	6.74	77.42	21.51
39	SAGBEND	-81.15	-32.46	0.73	-0.621	18.181	164.77	31.81	-2.82	52.86	6.60	78.29	21.75
40	SAGBEND	-92.60	-36.05	0.84	-0.417	16.578	176.77	31.36	-3.13	53.81	6.38	78.88	21.91
41	SAGBEND	-104.14	-39.31	0.90	-0.222	14.946	188.77	30.94	-3.41	54.66	6.10	79.45	22.07
42	SAGBEND	-115.78	-42.24	0.93	-0.039	13.287	200.77	30.57	-3.67	55.55	5.76	79.93	22.20
43	SAGBEND	-127.50	-44.82	0.92	0.132	11.607	212.77	30.24	-3.89	56.27	5.39	80.31	22.31
44	SAGBEND	-139.29	-47.06	0.88	0.289	9.906	224.77	29.96	-4.09	56.91	5.00	80.55	22.37
45	SAGBEND	-151.14	-48.95	0.80	0.433	8.189	236.77	29.72	-4.25	57.42	4.61	80.67	22.41
46	SAGBEND	-163.04	-50.48	0.70	0.565	6.455	248.77	29.53	-4.38	57.93	4.27	80.84	22.46
47	SAGBEND	-174.98	-51.65	0.57	0.686	4.712	260.77	29.38	-4.48	58.18	3.93	80.84	22.46
48	SAGBEND	-186.95	-52.45	0.41	0.794	2.971	272.77	29.28	-4.55	57.64	3.34	80.10	22.25
49	SAGBEND	-198.94	-52.90	0.24	0.855	1.296	284.77	29.23	-4.59	51.90	-0.51	75.12	20.87
50	SEABED	-210.94	-53.03	0.07	0.631	0.143	296.77	29.22	-4.60	18.85	-18.54	52.99	14.72
51	SEABED	-222.94	-53.03	0.00	0.083	-0.015	308.77	29.21	-4.60	-0.24	-10.32	40.14	11.15
52	SEABED	-234.94	-53.03	0.00	-0.007	-0.002	320.77	29.22	-4.60	-0.24	0.08	31.95	8.87
53	SEABED	-246.94	-53.03	0.00	-0.001	0.000	332.77	29.22	-4.60	0.00	0.13	31.86	8.85
54	SEABED	-258.94	-53.03	0.00	0.000	0.000	344.77	29.22	-4.60	0.00	0.00	31.77	8.82
55	SEABED	-270.94	-53.03	0.00	0.000	0.000	356.77	29.22	-4.60	0.00	0.00	31.77	8.82
56	SEABED	-282.94	-53.03	0.00	0.000	0.000	368.77	29.22	-4.60	0.00	0.00	31.77	8.82
57	SEABED	-294.94	-53.03	0.00	0.000	0.000	380.77	29.22	-4.60	0.00	0.00	31.77	8.82

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.270	0.00	49.16	0.00	0.00	0.00	49.16	13.65
3	LAYBARGE	71.49	6.16	0.00	0.000	0.960	6.30	49.13	0.00	-119.81	0.00	150.95	41.93
5	LAYBARGE	65.37	5.99	0.00	0.000	2.230	12.42	49.11	0.00	-86.61	0.00	122.71	34.09
7	LAYBARGE	59.91	5.72	0.00	0.000	3.282	17.89	49.07	0.00	-97.84	0.00	132.22	36.73
9	LAYBARGE	53.32	5.28	0.00	0.000	4.502	24.49	49.01	0.00	-94.27	0.00	129.12	35.87
11	LAYBARGE	47.32	4.74	0.00	0.000	5.739	30.51	48.92	0.00	-108.85	0.00	141.43	39.29
13	LAYBARGE	38.21	3.69	0.00	0.000	7.424	39.68	48.76	0.00	-124.53	0.00	154.59	42.94
15	LAYBARGE	29.27	2.39	0.00	0.000	9.100	48.72	48.57	0.00	-107.89	0.01	140.25	38.96
17	LAYBARGE	23.13	1.34	0.00	0.000	10.368	54.95	48.41	0.00	-95.83	-0.06	129.85	36.07
19	LAYBARGE	17.18	0.19	0.00	0.001	11.444	61.01	48.24	0.00	-82.03	0.25	117.86	32.74
21	LAYBARGE	10.63	-1.22	0.00	-0.011	13.021	67.72	48.04	-0.11	-148.70	-3.57	174.53	48.48
24	STINGER	-4.64	-5.13	0.00	-0.005	15.976	83.47	47.53	-0.45	-198.90	-6.52	216.90	60.25
26	STINGER	-11.00	-7.10	0.00	0.060	18.235	90.14	47.30	-0.62	-125.22	14.28	154.43	42.90
28	STINGER	-17.30	-9.29	0.00	-0.321	19.989	96.81	47.02	-0.81	-128.53	-65.27	169.66	47.13
30	STINGER	-23.54	-11.64	0.08	-0.982	21.003	103.47	46.75	-1.01	-25.42	-23.90	76.53	21.26
32	STINGER	-29.77	-14.03	0.20	-1.154	20.927	110.14	46.44	-1.22	22.11	-1.97	65.48	18.19
34	STINGER	-36.00	-16.38	0.32	-1.123	20.448	116.81	46.14	-1.42	33.10	3.83	74.98	20.83
36	SAGBEND	-47.28	-20.47	0.53	-0.969	19.369	128.81	45.62	-1.78	37.18	5.30	78.20	21.72
37	SAGBEND	-58.64	-24.34	0.71	-0.801	18.236	140.81	45.13	-2.11	38.04	5.28	78.62	21.84
38	SAGBEND	-70.07	-27.98	0.85	-0.637	17.086	152.81	44.67	-2.43	38.54	5.13	78.77	21.88
39	SAGBEND	-81.58	-31.39	0.96	-0.480	15.921	164.81	44.24	-2.73	38.99	4.93	78.92	21.92
40	SAGBEND	-93.15	-34.56	1.04	-0.330	14.740	176.81	43.84	-3.00	39.43	4.74	79.07	21.96
41	SAGBEND	-104.79	-37.50	1.10	-0.186	13.545	188.81	43.47	-3.26	39.82	4.56	79.19	22.00
42	SAGBEND	-116.48	-40.18	1.12	-0.049	12.339	200.81	43.13	-3.49	40.26	4.36	79.29	22.02
43	SAGBEND	-128.23	-42.62	1.12	0.081	11.122	212.81	42.82	-3.70	40.65	4.14	79.39	22.05
44	SAGBEND	-140.03	-44.81	1.09	0.203	9.896	224.81	42.54	-3.89	40.97	3.89	79.46	22.07
45	SAGBEND	-151.87	-46.75	1.03	0.317	8.660	236.81	42.30	-4.06	41.26	3.62	79.47	22.07
46	SAGBEND	-163.75	-48.42	0.96	0.423	7.412	248.81	42.09	-4.20	41.52	3.38	79.49	22.08
47	SAGBEND	-175.67	-49.84	0.86	0.521	6.162	260.81	41.91	-4.33	41.77	3.17	79.52	22.09
48	SAGBEND	-187.61	-51.00	0.74	0.611	4.907	272.81	41.76	-4.43	41.99	2.97	79.50	22.08
49	SAGBEND	-199.58	-51.89	0.60	0.696	3.643	284.81	41.65	-4.50	42.16	2.81	79.40	22.06
50	SAGBEND	-211.56	-52.52	0.45	0.775	2.383	296.81	41.57	-4.56	42.03	2.56	79.08	21.97
51	SAGBEND	-223.55	-52.89	0.28	0.834	1.146	308.81	41.53	-4.59	39.52	1.06	76.87	21.35
52	SEABED	-235.55	-53.02	0.11	0.724	0.187	320.81	41.51	-4.60	18.85	-12.83	62.33	17.31
53	SEABED	-247.55	-53.03	0.01	0.195	-0.004	332.81	41.51	-4.60	0.93	-15.53	56.90	15.81
54	SEABED	-259.55	-53.03	0.00	0.002	-0.002	344.81	41.51	-4.60	-0.17	-1.30	45.04	12.51
55	SEABED	-271.55	-53.03	0.00	-0.002	0.000	356.81	41.51	-4.60	-0.02	0.13	44.09	12.25
56	SEABED	-283.55	-53.03	0.00	0.000	0.000	368.81	41.51	-4.60	0.00	0.02	44.00	12.22
57	SEABED	-295.55	-53.03	0.00	0.000	0.000	380.81	41.51	-4.60	0.00	0.00	43.99	12.22
58	SEABED	-307.55	-53.03	0.00	0.000	0.000	392.81	41.51	-4.60	0.00	0.00	43.99	12.22
59	SEABED	-319.55	-53.03	0.00	0.000	0.000	404.81	41.51	-4.60	0.00	0.00	43.99	12.22

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.268	0.00	49.13	0.00	0.00	0.00	49.13	13.65
3	LAYBARGE	71.49	6.16	0.00	0.000	0.957	6.30	49.10	0.00	-119.81	0.00	150.94	41.93
5	LAYBARGE	65.37	5.98	0.00	0.000	2.228	12.42	49.09	0.00	-86.61	0.00	122.70	34.08
7	LAYBARGE	59.91	5.72	0.00	0.000	3.279	17.89	49.04	0.00	-97.84	0.00	132.21	36.73
9	LAYBARGE	53.32	5.27	0.00	0.000	4.499	24.49	48.98	0.00	-94.27	0.00	129.11	35.86
11	LAYBARGE	47.32	4.74	0.00	0.000	5.737	30.51	48.89	0.00	-108.85	0.00	141.42	39.28
13	LAYBARGE	38.21	3.69	0.00	0.000	7.421	39.68	48.73	0.00	-124.54	0.00	154.59	42.94
15	LAYBARGE	29.27	2.39	0.00	0.000	9.097	48.72	48.54	0.00	-107.85	0.02	140.21	38.95
17	LAYBARGE	23.13	1.33	0.00	0.000	10.366	54.95	48.38	0.00	-96.03	-0.09	130.00	36.11
19	LAYBARGE	17.18	0.18	0.00	0.001	11.437	61.01	48.21	0.00	-81.22	0.38	117.12	32.53
21	LAYBARGE	10.63	-1.22	0.00	-0.014	13.034	67.72	48.01	-0.11	-152.02	-4.07	177.30	49.25
24	STINGER	-4.62	-5.11	0.00	0.016	15.529	83.45	47.52	-0.45	-151.80	-3.67	176.81	49.11
26	STINGER	-11.01	-6.99	0.00	-0.012	17.117	90.12	47.30	-0.61	-79.19	-2.25	114.74	31.87
28	STINGER	-17.37	-9.02	0.00	0.036	18.328	96.78	47.04	-0.79	-100.13	7.67	132.68	36.86
30	STINGER	-23.67	-11.19	0.00	-0.211	19.528	103.45	46.76	-0.97	-77.78	-41.08	121.65	33.79
32	STINGER	-29.94	-13.46	0.06	-0.779	20.314	110.12	46.48	-1.17	-44.40	-36.51	95.42	26.51
34	STINGER	-36.18	-15.79	0.16	-1.074	20.412	116.79	46.19	-1.37	17.30	-5.31	61.77	17.16
36	SAGBEND	-47.46	-19.90	0.37	-1.019	19.514	128.79	45.67	-1.73	35.59	4.53	76.82	21.34
37	SAGBEND	-58.80	-23.80	0.56	-0.860	18.399	140.79	45.17	-2.07	37.83	5.24	78.52	21.81
38	SAGBEND	-70.23	-27.47	0.71	-0.696	17.251	152.79	44.70	-2.39	38.46	5.16	78.82	21.90
39	SAGBEND	-81.72	-30.91	0.84	-0.538	16.087	164.79	44.27	-2.68	38.96	4.98	78.97	21.94
40	SAGBEND	-93.28	-34.12	0.93	-0.387	14.911	176.79	43.86	-2.96	39.41	4.79	79.07	21.96
41	SAGBEND	-104.91	-37.09	1.00	-0.242	13.720	188.79	43.48	-3.22	39.80	4.60	79.14	21.98
42	SAGBEND	-116.60	-39.81	1.03	-0.104	12.515	200.79	43.14	-3.46	40.23	4.41	79.27	22.02
43	SAGBEND	-128.34	-42.29	1.04	0.027	11.299	212.79	42.82	-3.67	40.61	4.20	79.38	22.05
44	SAGBEND	-140.13	-44.51	1.02	0.149	10.074	224.79	42.54	-3.86	40.94	3.95	79.43	22.06
45	SAGBEND	-151.97	-46.48	0.98	0.265	8.840	236.79	42.29	-4.03	41.23	3.68	79.48	22.08
46	SAGBEND	-163.84	-48.20	0.91	0.372	7.597	248.79	42.08	-4.18	41.46	3.45	79.49	22.08
47	SAGBEND	-175.76	-49.65	0.82	0.471	6.346	260.79	41.89	-4.31	41.70	3.23	79.48	22.08
48	SAGBEND	-187.69	-50.85	0.72	0.563	5.087	272.79	41.74	-4.41	41.92	3.03	79.44	22.07
49	SAGBEND	-199.66	-51.78	0.59	0.649	3.825	284.79	41.63	-4.49	42.09	2.87	79.37	22.05
50	SAGBEND	-211.64	-52.45	0.44	0.729	2.564	296.79	41.54	-4.55	42.05	2.64	79.13	21.98
51	SAGBEND	-223.63	-52.86	0.29	0.793	1.318	308.79	41.49	-4.58	40.27	1.52	77.52	21.53
52	SEABED	-235.63	-53.01	0.12	0.728	0.275	320.79	41.47	-4.60	23.96	-10.31	65.09	18.08
53	SEABED	-247.63	-53.03	0.02	0.231	0.001	332.79	41.47	-4.60	1.79	-16.74	57.88	16.08
54	SEABED	-259.63	-53.03	0.00	0.005	-0.003	344.79	41.47	-4.60	-0.20	-1.85	45.41	12.61
55	SEABED	-271.63	-53.03	0.00	-0.002	0.000	356.79	41.47	-4.60	-0.03	0.13	44.06	12.24
56	SEABED	-283.63	-53.03	0.00	0.000	0.000	368.79	41.47	-4.60	0.00	0.02	43.97	12.21
57	SEABED	-295.63	-53.03	0.00	0.000	0.000	380.79	41.47	-4.60	0.00	0.00	43.95	12.21
58	SEABED	-307.63	-53.03	0.00	0.000	0.000	392.79	41.47	-4.60	0.00	0.00	43.95	12.21
59	SEABED	-319.63	-53.03	0.00	0.000	0.000	404.79	41.47	-4.60	0.00	0.00	43.95	12.21

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.268	0.00	49.19	0.00	0.00	0.00	49.19	13.66
3	LAYBARGE	71.49	6.16	0.00	0.000	0.958	6.30	49.17	0.00	-119.82	0.00	150.98	41.94
5	LAYBARGE	65.38	5.98	0.00	0.000	2.228	12.42	49.15	0.00	-86.61	0.00	122.76	34.10
7	LAYBARGE	59.91	5.72	0.00	0.000	3.280	17.89	49.10	0.00	-97.84	0.00	132.26	36.74
9	LAYBARGE	53.32	5.27	0.00	0.000	4.499	24.49	49.04	0.00	-94.27	0.00	129.16	35.88
11	LAYBARGE	47.32	4.74	0.00	0.000	5.737	30.51	48.95	0.00	-108.84	0.00	141.47	39.30
13	LAYBARGE	38.22	3.69	0.00	0.000	7.421	39.68	48.79	0.00	-124.53	0.00	154.64	42.96
15	LAYBARGE	29.27	2.39	0.00	0.000	9.098	48.72	48.60	0.00	-107.83	0.02	140.25	38.96
17	LAYBARGE	23.13	1.33	0.00	0.000	10.367	54.95	48.44	0.00	-96.13	-0.09	130.15	36.15
19	LAYBARGE	17.18	0.19	0.00	0.001	11.436	61.01	48.27	0.00	-80.75	0.36	116.79	32.44
21	LAYBARGE	10.63	-1.22	0.00	-0.013	13.042	67.72	48.07	-0.11	-153.80	-3.98	178.90	49.69
24	STINGER	-4.61	-5.10	0.00	0.014	15.307	83.44	47.59	-0.44	-127.99	-3.95	156.66	43.52
26	STINGER	-11.02	-6.94	0.00	-0.003	16.570	90.11	47.37	-0.60	-58.18	-0.17	97.10	26.97
28	STINGER	-17.39	-8.89	0.00	-0.002	17.450	96.77	47.12	-0.77	-74.81	-1.93	110.98	30.83
30	STINGER	-23.74	-10.94	0.00	0.010	18.426	103.44	46.86	-0.95	-72.24	2.72	108.40	30.11
32	STINGER	-30.05	-13.10	0.01	-0.223	19.267	110.11	46.59	-1.14	-56.31	-34.07	102.77	28.55
34	STINGER	-36.33	-15.33	0.06	-0.736	19.872	116.77	46.31	-1.33	-42.10	-36.68	94.05	26.13
36	SAGBEND	-47.61	-19.41	0.25	-1.032	19.591	128.77	45.79	-1.69	30.46	1.85	72.31	20.09
37	SAGBEND	-58.95	-23.34	0.44	-0.905	18.536	140.77	45.29	-2.03	37.37	5.01	78.00	21.67
38	SAGBEND	-70.36	-27.04	0.61	-0.744	17.392	152.77	44.82	-2.35	38.48	5.16	78.69	21.86
39	SAGBEND	-81.85	-30.51	0.74	-0.586	16.230	164.77	44.38	-2.65	38.97	5.00	78.88	21.91
40	SAGBEND	-93.40	-33.74	0.84	-0.434	15.054	176.77	43.97	-2.93	39.41	4.80	79.04	21.96
41	SAGBEND	-105.02	-36.74	0.92	-0.289	13.865	188.77	43.59	-3.19	39.78	4.62	79.18	21.99
42	SAGBEND	-116.70	-39.49	0.96	-0.150	12.662	200.77	43.24	-3.43	40.16	4.43	79.30	22.03
43	SAGBEND	-128.44	-42.00	0.98	-0.018	11.447	212.77	42.93	-3.65	40.57	4.21	79.39	22.05
44	SAGBEND	-140.22	-44.25	0.97	0.107	10.224	224.77	42.64	-3.84	40.88	3.96	79.46	22.07
45	SAGBEND	-152.06	-46.26	0.94	0.223	8.988	236.77	42.39	-4.01	41.20	3.70	79.55	22.10
46	SAGBEND	-163.93	-48.00	0.88	0.331	7.748	248.77	42.17	-4.17	41.46	3.46	79.60	22.11
47	SAGBEND	-175.83	-49.49	0.80	0.431	6.498	260.77	41.98	-4.29	41.67	3.22	79.59	22.11
48	SAGBEND	-187.77	-50.72	0.70	0.523	5.241	272.77	41.83	-4.40	41.90	3.01	79.53	22.09
49	SAGBEND	-199.73	-51.68	0.58	0.610	3.980	284.77	41.71	-4.48	42.11	2.84	79.45	22.07
50	SAGBEND	-211.71	-52.38	0.44	0.691	2.717	296.77	41.62	-4.54	42.09	2.64	79.23	22.01
51	SAGBEND	-223.70	-52.82	0.29	0.759	1.465	308.77	41.56	-4.58	40.76	1.75	77.95	21.65
52	SEABED	-235.70	-53.01	0.13	0.730	0.366	320.77	41.54	-4.60	28.19	-7.51	68.11	18.92
53	SEABED	-247.70	-53.03	0.02	0.277	0.007	332.77	41.54	-4.60	2.82	-16.50	57.89	16.08
54	SEABED	-259.70	-53.03	0.00	0.012	-0.004	344.77	41.54	-4.60	-0.21	-2.53	46.06	12.79
55	SEABED	-271.70	-53.03	0.00	-0.003	0.000	356.77	41.54	-4.60	-0.04	0.11	44.11	12.25
56	SEABED	-283.70	-53.03	0.00	0.000	0.000	368.77	41.54	-4.60	0.00	0.03	44.04	12.23
57	SEABED	-295.70	-53.03	0.00	0.000	0.000	380.77	41.54	-4.60	0.00	0.00	44.02	12.23
58	SEABED	-307.70	-53.03	0.00	0.000	0.000	392.77	41.54	-4.60	0.00	0.00	44.02	12.23
59	SEABED	-319.70	-53.03	0.00	0.000	0.000	404.77	41.54	-4.60	0.00	0.00	44.02	12.23

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.267	0.00	36.81	0.00	0.00	0.00	36.81	10.23
3	LAYBARGE	71.49	6.16	0.00	0.000	0.959	6.30	36.79	0.00	-116.96	0.00	136.19	37.83
5	LAYBARGE	65.38	5.99	0.00	0.000	2.233	12.42	36.77	0.00	-84.26	0.00	108.39	30.11
7	LAYBARGE	59.91	5.72	0.00	0.000	3.280	17.89	36.73	0.00	-95.21	0.00	117.65	32.68
9	LAYBARGE	53.32	5.28	0.00	0.000	4.505	24.49	36.66	0.00	-91.71	0.00	114.61	31.83
11	LAYBARGE	47.32	4.74	0.00	0.000	5.733	30.51	36.58	0.00	-104.55	0.00	125.43	34.84
13	LAYBARGE	38.21	3.69	0.00	0.000	7.425	39.68	36.42	0.00	-118.26	0.00	136.92	38.03
15	LAYBARGE	29.27	2.39	0.00	0.000	9.107	48.72	36.23	0.00	-103.62	0.02	124.30	34.53
17	LAYBARGE	23.13	1.34	0.00	0.000	10.366	54.95	36.07	0.00	-93.13	-0.10	115.22	32.01
19	LAYBARGE	17.18	0.19	0.00	0.002	11.451	61.01	35.90	0.00	-81.25	0.42	104.82	29.12
21	LAYBARGE	10.63	-1.22	0.00	-0.014	12.984	67.72	35.70	-0.11	-135.67	-4.14	151.13	41.98
24	STINGER	-4.64	-5.13	0.00	0.016	16.019	83.47	35.19	-0.45	-184.62	-3.86	192.38	53.44
26	STINGER	-11.00	-7.10	0.00	-0.009	18.218	90.14	34.96	-0.62	-119.42	-1.24	136.75	37.99
28	STINGER	-17.30	-9.29	0.00	0.021	20.066	96.81	34.68	-0.81	-137.39	3.40	151.88	42.19
30	STINGER	-23.53	-11.68	0.00	-0.081	21.953	103.47	34.38	-1.02	-124.52	-19.39	141.67	39.35
32	STINGER	-29.67	-14.26	0.03	-0.635	23.508	110.14	34.06	-1.24	-95.99	-53.32	127.83	35.51
34	STINGER	-35.77	-16.96	0.13	-1.144	24.098	116.81	33.73	-1.47	5.46	-11.53	44.78	12.44
36	SAGBEND	-46.75	-21.79	0.36	-1.154	23.162	128.81	33.11	-1.89	44.27	4.94	71.71	19.92
37	SAGBEND	-57.84	-26.37	0.57	-0.952	21.712	140.81	32.53	-2.29	50.22	6.75	76.64	21.29
38	SAGBEND	-69.05	-30.66	0.73	-0.734	20.173	152.81	31.99	-2.66	51.97	6.74	77.79	21.61
39	SAGBEND	-80.36	-34.65	0.86	-0.523	18.592	164.81	31.48	-3.01	53.09	6.47	78.38	21.77
40	SAGBEND	-91.79	-38.31	0.94	-0.324	16.984	176.81	31.02	-3.33	54.00	6.15	78.86	21.90
41	SAGBEND	-103.31	-41.65	0.99	-0.137	15.348	188.81	30.60	-3.62	54.86	5.81	79.36	22.04
42	SAGBEND	-114.93	-44.66	1.00	0.037	13.682	200.81	30.21	-3.88	55.72	5.39	79.77	22.16
43	SAGBEND	-126.63	-47.33	0.97	0.195	11.993	212.81	29.88	-4.11	56.48	4.93	80.10	22.25
44	SAGBEND	-138.40	-49.65	0.92	0.338	10.286	224.81	29.59	-4.31	57.18	4.43	80.40	22.33
45	SAGBEND	-150.24	-51.61	0.83	0.464	8.556	236.81	29.34	-4.48	57.77	3.97	80.67	22.41
46	SAGBEND	-162.13	-53.22	0.73	0.577	6.814	248.81	29.14	-4.62	58.28	3.73	80.87	22.46
47	SAGBEND	-174.07	-54.46	0.59	0.686	5.058	260.81	28.98	-4.72	58.58	3.64	80.94	22.48
48	SAGBEND	-186.03	-55.33	0.44	0.789	3.301	272.81	28.87	-4.80	58.36	3.33	80.48	22.35
49	SAGBEND	-198.02	-55.84	0.27	0.861	1.590	284.81	28.81	-4.84	54.18	1.05	76.78	21.33
50	SEABED	-210.02	-56.02	0.09	0.715	0.260	296.81	28.79	-4.86	27.03	-15.49	56.89	15.80
51	SEABED	-222.02	-56.03	0.01	0.134	-0.014	308.81	28.79	-4.86	0.84	-13.77	42.88	11.91
52	SEABED	-234.02	-56.03	0.00	-0.007	-0.003	320.81	28.79	-4.86	-0.34	-0.41	31.89	8.86
53	SEABED	-246.02	-56.03	0.00	-0.002	0.000	332.81	28.79	-4.86	-0.01	0.17	31.64	8.79
54	SEABED	-258.02	-56.03	0.00	0.000	0.000	344.81	28.79	-4.86	0.00	0.00	31.50	8.75
55	SEABED	-270.02	-56.03	0.00	0.000	0.000	356.81	28.79	-4.86	0.00	0.00	31.50	8.75
56	SEABED	-282.02	-56.03	0.00	0.000	0.000	368.81	28.79	-4.86	0.00	0.00	31.50	8.75
57	SEABED	-294.02	-56.03	0.00	0.000	0.000	380.81	28.79	-4.86	0.00	0.00	31.50	8.75

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.267	0.00	36.83	0.00	0.00	0.00	36.83	10.23
3	LAYBARGE	71.49	6.16	0.00	0.000	0.959	6.30	36.80	0.00	-116.97	0.00	136.20	37.83
5	LAYBARGE	65.37	5.98	0.00	0.000	2.232	12.42	36.78	0.00	-84.26	0.00	108.39	30.11
7	LAYBARGE	59.91	5.72	0.00	0.000	3.279	17.89	36.74	0.00	-95.22	0.00	117.66	32.68
9	LAYBARGE	53.32	5.27	0.00	0.000	4.504	24.49	36.68	0.00	-91.71	0.00	114.62	31.84
11	LAYBARGE	47.32	4.74	0.00	0.000	5.732	30.51	36.59	0.00	-104.55	0.00	125.45	34.85
13	LAYBARGE	38.21	3.69	0.00	0.000	7.424	39.68	36.43	0.00	-118.28	0.00	136.96	38.04
15	LAYBARGE	29.27	2.39	0.00	0.000	9.106	48.72	36.24	0.00	-103.57	0.02	124.26	34.52
17	LAYBARGE	23.13	1.33	0.00	0.000	10.367	54.95	36.08	0.00	-93.44	-0.10	115.50	32.08
19	LAYBARGE	17.18	0.18	0.00	0.002	11.445	61.01	35.91	0.00	-80.03	0.40	103.82	28.84
21	LAYBARGE	10.63	-1.23	0.00	-0.014	13.004	67.72	35.72	-0.11	-140.33	-4.09	155.10	43.08
24	STINGER	-4.62	-5.11	0.00	0.015	15.564	83.45	35.22	-0.45	-140.04	-4.03	154.53	42.92
26	STINGER	-11.01	-6.99	0.00	-0.003	17.116	90.12	35.00	-0.61	-78.20	-0.10	101.74	28.26
28	STINGER	-17.37	-9.02	0.00	-0.001	18.321	96.78	34.74	-0.78	-93.34	-1.53	114.48	31.80
30	STINGER	-23.67	-11.18	0.00	0.006	19.611	103.45	34.47	-0.97	-89.51	0.95	111.04	30.84
32	STINGER	-29.93	-13.49	0.00	0.086	20.821	110.12	34.18	-1.17	-82.91	8.24	105.33	29.26
34	STINGER	-36.13	-15.94	0.00	-0.378	22.409	116.79	33.85	-1.39	-142.49	-67.49	168.02	46.67
36	SAGBEND	-47.15	-20.67	0.18	-1.145	23.258	128.79	33.27	-1.80	26.26	-2.22	56.31	15.64
37	SAGBEND	-58.22	-25.30	0.39	-1.037	22.044	140.79	32.68	-2.20	47.73	5.85	74.45	20.68
38	SAGBEND	-69.40	-29.66	0.58	-0.827	20.546	152.79	32.13	-2.58	51.42	6.64	77.31	21.48
39	SAGBEND	-80.69	-33.71	0.72	-0.615	18.977	164.79	31.62	-2.93	52.77	6.49	78.16	21.71
40	SAGBEND	-92.09	-37.46	0.82	-0.414	17.373	176.79	31.14	-3.25	53.77	6.21	78.71	21.86
41	SAGBEND	-103.60	-40.88	0.88	-0.223	15.743	188.79	30.71	-3.55	54.68	5.88	79.22	22.01
42	SAGBEND	-115.19	-43.97	0.91	-0.046	14.086	200.79	30.32	-3.82	55.55	5.47	79.72	22.14
43	SAGBEND	-126.87	-46.72	0.90	0.115	12.401	212.79	29.97	-4.06	56.33	5.01	80.12	22.26
44	SAGBEND	-138.63	-49.12	0.86	0.261	10.697	224.79	29.67	-4.26	57.01	4.52	80.42	22.34
45	SAGBEND	-150.45	-51.17	0.80	0.391	8.974	236.79	29.41	-4.44	57.65	4.05	80.65	22.40
46	SAGBEND	-162.33	-52.86	0.70	0.507	7.232	248.79	29.20	-4.59	58.15	3.74	80.83	22.45
47	SAGBEND	-174.25	-54.19	0.59	0.617	5.478	260.79	29.03	-4.70	58.60	3.62	80.96	22.49
48	SAGBEND	-186.21	-55.15	0.45	0.722	3.720	272.79	28.91	-4.78	58.52	3.42	80.73	22.43
49	SAGBEND	-198.20	-55.75	0.29	0.807	1.987	284.79	28.84	-4.84	56.01	1.96	78.35	21.77
50	SEABED	-210.19	-56.00	0.12	0.751	0.491	296.79	28.81	-4.86	38.28	-9.84	64.36	17.88
51	SEABED	-222.19	-56.03	0.01	0.211	-0.004	308.79	28.80	-4.86	3.24	-17.66	46.42	12.89
52	SEABED	-234.19	-56.03	0.00	-0.004	-0.006	320.79	28.80	-4.86	-0.49	-1.09	32.47	9.02
53	SEABED	-246.19	-56.03	0.00	-0.003	0.000	332.79	28.80	-4.86	-0.04	0.22	31.70	8.81
54	SEABED	-258.19	-56.03	0.00	0.000	0.000	344.79	28.80	-4.86	0.01	0.01	31.53	8.76
55	SEABED	-270.19	-56.03	0.00	0.000	0.000	356.79	28.80	-4.86	0.00	0.00	31.52	8.75
56	SEABED	-282.19	-56.03	0.00	0.000	0.000	368.79	28.80	-4.86	0.00	0.00	31.51	8.75
57	SEABED	-294.19	-56.03	0.00	0.000	0.000	380.79	28.80	-4.86	0.00	0.00	31.51	8.75

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.266	0.00	36.86	0.00	0.00	0.00	36.86	10.24
3	LAYBARGE	71.49	6.16	0.00	0.000	0.958	6.30	36.84	0.00	-116.96	0.00	136.21	37.84
5	LAYBARGE	65.37	5.99	0.00	0.000	2.231	12.42	36.82	0.00	-84.27	0.00	108.43	30.12
7	LAYBARGE	59.91	5.72	0.00	0.000	3.278	17.89	36.78	0.00	-95.22	0.00	117.69	32.69
9	LAYBARGE	53.32	5.28	0.00	0.000	4.503	24.49	36.71	0.00	-91.71	0.00	114.65	31.85
11	LAYBARGE	47.32	4.74	0.00	0.000	5.731	30.51	36.63	0.00	-104.56	0.00	125.46	34.85
13	LAYBARGE	38.21	3.69	0.00	0.000	7.423	39.68	36.47	0.00	-118.30	0.00	136.97	38.05
15	LAYBARGE	29.27	2.39	0.00	0.000	9.105	48.72	36.28	0.00	-103.54	0.02	124.26	34.52
17	LAYBARGE	23.13	1.34	0.00	0.000	10.367	54.95	36.12	0.00	-93.58	-0.10	115.63	32.12
19	LAYBARGE	17.18	0.19	0.00	0.002	11.442	61.01	35.95	0.00	-79.44	0.39	103.35	28.71
21	LAYBARGE	10.63	-1.23	0.00	-0.014	13.013	67.72	35.75	-0.11	-142.77	-4.06	157.20	43.67
24	STINGER	-4.61	-5.09	0.00	0.013	15.339	83.44	35.27	-0.44	-118.09	-4.15	135.93	37.76
26	STINGER	-11.02	-6.94	0.00	0.000	16.562	90.11	35.04	-0.60	-56.69	0.63	83.46	23.18
28	STINGER	-17.40	-8.88	0.00	-0.015	17.466	96.77	34.79	-0.77	-75.10	-4.36	99.04	27.51
30	STINGER	-23.74	-10.94	0.00	0.063	18.372	103.44	34.54	-0.95	-57.49	12.47	84.74	23.54
32	STINGER	-30.05	-13.08	-0.01	0.094	19.165	110.11	34.26	-1.14	-60.45	-10.53	86.56	24.04
34	STINGER	-36.32	-15.36	0.00	-0.472	21.283	116.77	33.92	-1.34	-234.83	-63.03	240.92	66.92
36	SAGBEND	-47.37	-20.02	0.19	-1.172	23.299	128.77	33.39	-1.74	14.33	-1.62	46.32	12.87
37	SAGBEND	-58.43	-24.68	0.41	-1.056	22.233	140.77	32.80	-2.14	46.10	5.97	73.20	20.33
38	SAGBEND	-69.59	-29.08	0.59	-0.844	20.752	152.77	32.24	-2.53	51.14	6.71	77.15	21.43
39	SAGBEND	-80.87	-33.18	0.74	-0.630	19.193	164.77	31.72	-2.88	52.65	6.53	78.12	21.70
40	SAGBEND	-92.25	-36.97	0.84	-0.426	17.596	176.77	31.24	-3.21	53.68	6.26	78.67	21.85
41	SAGBEND	-103.74	-40.43	0.91	-0.234	15.970	188.77	30.80	-3.51	54.53	5.93	79.18	21.99
42	SAGBEND	-115.32	-43.57	0.94	-0.056	14.315	200.77	30.41	-3.78	55.40	5.53	79.61	22.11
43	SAGBEND	-126.99	-46.36	0.93	0.107	12.633	212.77	30.05	-4.02	56.20	5.08	79.97	22.21
44	SAGBEND	-138.74	-48.81	0.89	0.255	10.932	224.77	29.74	-4.24	56.96	4.60	80.36	22.32
45	SAGBEND	-150.55	-50.91	0.83	0.387	9.211	236.77	29.48	-4.42	57.56	4.12	80.66	22.41
46	SAGBEND	-162.43	-52.65	0.73	0.506	7.473	248.77	29.26	-4.57	58.10	3.79	80.84	22.46
47	SAGBEND	-174.35	-54.03	0.62	0.615	5.723	260.77	29.09	-4.69	58.51	3.65	80.97	22.49
48	SAGBEND	-186.30	-55.04	0.48	0.722	3.964	272.77	28.96	-4.77	58.57	3.49	80.79	22.44
49	SAGBEND	-198.28	-55.69	0.32	0.813	2.223	284.77	28.88	-4.83	56.78	2.37	79.00	21.94
50	SAGBEND	-210.28	-55.98	0.14	0.795	0.660	296.77	28.84	-4.86	43.14	-6.86	68.03	18.90
51	SEABED	-222.28	-56.03	0.02	0.306	0.010	308.77	28.84	-4.86	5.55	-19.49	48.44	13.45
52	SEABED	-234.28	-56.03	0.00	0.004	-0.008	320.77	28.84	-4.86	-0.55	-2.50	33.65	9.35
53	SEABED	-246.28	-56.03	0.00	-0.004	0.000	332.77	28.84	-4.86	-0.07	0.26	31.77	8.82
54	SEABED	-258.28	-56.03	0.00	0.000	0.000	344.77	28.84	-4.86	0.01	0.03	31.58	8.77
55	SEABED	-270.28	-56.03	0.00	0.000	0.000	356.77	28.84	-4.86	0.00	0.00	31.55	8.77
56	SEABED	-282.28	-56.03	0.00	0.000	0.000	368.77	28.84	-4.86	0.00	0.00	31.55	8.76
57	SEABED	-294.28	-56.03	0.00	0.000	0.000	380.77	28.84	-4.86	0.00	0.00	31.55	8.76
58	SEABED	-306.28	-56.03	0.00	0.000	0.000	392.77	28.84	-4.86	0.00	0.00	31.55	8.76

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.271	0.00	49.13	0.00	0.00	0.00	49.13	13.65
3	LAYBARGE	71.49	6.16	0.00	0.000	0.961	6.30	49.10	0.00	-119.79	0.00	150.91	41.92
5	LAYBARGE	65.37	5.98	0.00	0.000	2.231	12.42	49.09	0.00	-86.60	0.00	122.68	34.08
7	LAYBARGE	59.91	5.72	0.00	0.000	3.282	17.89	49.04	0.00	-97.83	0.00	132.18	36.72
9	LAYBARGE	53.32	5.27	0.00	0.000	4.502	24.49	48.98	0.00	-94.26	0.00	129.08	35.86
11	LAYBARGE	47.32	4.74	0.00	0.000	5.740	30.51	48.89	0.00	-108.83	0.00	141.38	39.27
13	LAYBARGE	38.22	3.69	0.00	0.000	7.424	39.68	48.73	0.00	-124.50	0.00	154.54	42.93
15	LAYBARGE	29.27	2.39	0.00	0.000	9.101	48.72	48.54	0.00	-107.87	0.01	140.22	38.95
17	LAYBARGE	23.13	1.33	0.00	0.000	10.369	54.95	48.38	0.00	-95.82	-0.07	129.81	36.06
19	LAYBARGE	17.18	0.19	0.00	0.001	11.444	61.01	48.21	0.00	-82.03	0.28	117.85	32.74
21	LAYBARGE	10.63	-1.23	0.00	-0.012	13.022	67.72	48.01	-0.11	-148.73	-3.69	174.48	48.47
24	STINGER	-4.64	-5.13	0.00	0.001	15.976	83.47	47.50	-0.45	-198.82	-5.67	216.78	60.22
26	STINGER	-11.00	-7.11	0.00	0.042	18.238	90.14	47.27	-0.62	-124.81	9.52	153.93	42.76
28	STINGER	-17.30	-9.29	0.00	-0.186	20.012	96.81	46.99	-0.81	-130.85	-42.64	163.91	45.53
30	STINGER	-23.54	-11.65	0.05	-0.786	21.323	103.47	46.71	-1.01	-63.74	-39.57	110.61	30.72
32	STINGER	-29.74	-14.10	0.16	-1.116	21.599	110.14	46.40	-1.23	12.25	-5.95	58.13	16.15
34	STINGER	-35.94	-16.54	0.28	-1.126	21.211	116.81	46.09	-1.44	30.47	2.73	72.60	20.17
36	SAGBEND	-47.17	-20.78	0.49	-0.983	20.166	128.81	45.55	-1.81	36.79	5.15	77.87	21.63
37	SAGBEND	-58.47	-24.81	0.67	-0.817	19.042	140.81	45.04	-2.15	37.91	5.23	78.50	21.80
38	SAGBEND	-69.85	-28.61	0.82	-0.653	17.895	152.81	44.56	-2.48	38.46	5.08	78.68	21.86
39	SAGBEND	-81.30	-32.18	0.93	-0.496	16.732	164.81	44.11	-2.79	38.90	4.87	78.82	21.89
40	SAGBEND	-92.83	-35.51	1.01	-0.347	15.553	176.81	43.69	-3.08	39.33	4.68	78.93	21.93
41	SAGBEND	-104.42	-38.61	1.07	-0.205	14.363	188.81	43.30	-3.35	39.76	4.48	79.02	21.95
42	SAGBEND	-116.08	-41.47	1.10	-0.070	13.159	200.81	42.94	-3.60	40.23	4.25	79.10	21.97
43	SAGBEND	-127.79	-44.08	1.10	0.056	11.943	212.81	42.61	-3.83	40.65	3.99	79.19	22.00
44	SAGBEND	-139.56	-46.43	1.08	0.173	10.716	224.81	42.31	-4.03	41.00	3.68	79.27	22.02
45	SAGBEND	-151.37	-48.54	1.03	0.280	9.477	236.81	42.04	-4.21	41.29	3.38	79.34	22.04
46	SAGBEND	-163.23	-50.38	0.96	0.377	8.231	248.81	41.81	-4.37	41.58	3.07	79.40	22.05
47	SAGBEND	-175.12	-51.97	0.87	0.464	6.977	260.81	41.61	-4.51	41.81	2.80	79.42	22.06
48	SAGBEND	-187.05	-53.30	0.77	0.544	5.716	272.81	41.44	-4.62	42.11	2.69	79.47	22.08
49	SAGBEND	-199.00	-54.36	0.65	0.622	4.451	284.81	41.31	-4.72	42.33	2.68	79.46	22.07
50	SAGBEND	-210.97	-55.16	0.51	0.699	3.180	296.81	41.21	-4.79	42.39	2.64	79.34	22.04
51	SAGBEND	-222.96	-55.69	0.36	0.770	1.915	308.81	41.14	-4.83	41.84	2.23	78.69	21.86
52	SAGBEND	-234.95	-55.97	0.19	0.791	0.714	320.81	41.11	-4.85	36.05	-2.94	73.87	20.52
53	SEABED	-246.95	-56.03	0.05	0.470	0.052	332.81	41.10	-4.86	8.17	-17.71	59.58	16.55
54	SEABED	-258.95	-56.03	0.00	0.051	-0.006	344.81	41.10	-4.86	-0.15	-6.54	48.91	13.59
55	SEABED	-270.95	-56.03	0.00	-0.003	-0.001	356.81	41.10	-4.86	-0.09	-0.09	43.82	12.17
56	SEABED	-282.95	-56.03	0.00	-0.001	0.000	368.81	41.10	-4.86	0.00	0.06	43.79	12.16
57	SEABED	-294.95	-56.03	0.00	0.000	0.000	380.81	41.10	-4.86	0.00	0.00	43.74	12.15
58	SEABED	-306.95	-56.03	0.00	0.000	0.000	392.81	41.10	-4.86	0.00	0.00	43.74	12.15
59	SEABED	-318.95	-56.03	0.00	0.000	0.000	404.81	41.10	-4.86	0.00	0.00	43.74	12.15
60	SEABED	-330.95	-56.03	0.00	0.000	0.000	416.81	41.10	-4.86	0.00	0.00	43.74	12.15

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.271	0.00	49.17	0.00	0.00	0.00	49.17	13.66
3	LAYBARGE	71.49	6.16	0.00	0.000	0.961	6.30	49.14	0.00	-119.80	0.00	150.96	41.93
5	LAYBARGE	65.37	5.98	0.00	0.000	2.231	12.42	49.12	0.00	-86.60	0.00	122.73	34.09
7	LAYBARGE	59.91	5.72	0.00	0.000	3.283	17.89	49.08	0.00	-97.84	0.00	132.24	36.73
9	LAYBARGE	53.32	5.27	0.00	0.000	4.502	24.49	49.01	0.00	-94.26	0.00	129.14	35.87
11	LAYBARGE	47.32	4.74	0.00	0.000	5.740	30.51	48.93	0.00	-108.84	0.00	141.44	39.29
13	LAYBARGE	38.21	3.69	0.00	0.000	7.424	39.68	48.77	0.00	-124.52	0.00	154.61	42.95
15	LAYBARGE	29.27	2.39	0.00	0.000	9.101	48.72	48.58	0.00	-107.85	0.02	140.24	38.96
17	LAYBARGE	23.13	1.33	0.00	0.000	10.370	54.95	48.42	0.00	-96.01	-0.09	130.03	36.12
19	LAYBARGE	17.18	0.19	0.00	0.001	11.441	61.01	48.25	0.00	-81.19	0.36	117.19	32.55
21	LAYBARGE	10.63	-1.22	0.00	-0.014	13.037	67.72	48.05	-0.11	-152.06	-4.02	177.40	49.28
24	STINGER	-4.62	-5.11	0.00	0.015	15.533	83.45	47.55	-0.45	-151.86	-3.78	176.89	49.14
26	STINGER	-11.01	-6.99	0.00	-0.008	17.120	90.12	47.33	-0.61	-78.85	-1.16	114.65	31.85
28	STINGER	-17.37	-9.02	0.00	0.018	18.334	96.78	47.07	-0.78	-99.87	3.03	132.38	36.77
30	STINGER	-23.67	-11.19	0.00	-0.072	19.554	103.45	46.80	-0.97	-79.77	-18.16	116.51	32.37
32	STINGER	-29.93	-13.48	0.03	-0.582	20.639	110.12	46.51	-1.17	-84.14	-52.82	131.11	36.42
34	STINGER	-36.16	-15.86	0.12	-1.038	21.102	116.79	46.22	-1.38	7.16	-9.52	56.47	15.69
36	SAGBEND	-47.37	-20.12	0.33	-1.034	20.320	128.79	45.68	-1.75	34.51	4.08	75.80	21.05
37	SAGBEND	-58.66	-24.18	0.52	-0.880	19.221	140.79	45.16	-2.10	37.60	5.16	78.20	21.72
38	SAGBEND	-70.03	-28.02	0.68	-0.715	18.078	152.79	44.68	-2.43	38.34	5.10	78.56	21.82
39	SAGBEND	-81.48	-31.63	0.81	-0.557	16.917	164.79	44.22	-2.75	38.84	4.92	78.74	21.87
40	SAGBEND	-92.99	-35.00	0.91	-0.407	15.741	176.79	43.79	-3.04	39.30	4.74	78.89	21.91
41	SAGBEND	-104.57	-38.14	0.97	-0.264	14.552	188.79	43.40	-3.31	39.70	4.53	79.02	21.95
42	SAGBEND	-116.22	-41.03	1.01	-0.129	13.350	200.79	43.03	-3.56	40.13	4.34	79.14	21.98
43	SAGBEND	-127.92	-43.67	1.03	-0.002	12.137	212.79	42.70	-3.79	40.54	4.09	79.26	22.02
44	SAGBEND	-139.68	-46.07	1.01	0.116	10.910	224.79	42.40	-4.00	40.93	3.81	79.33	22.04
45	SAGBEND	-151.49	-48.21	0.98	0.224	9.676	236.79	42.13	-4.19	41.27	3.52	79.38	22.05
46	SAGBEND	-163.34	-50.10	0.92	0.323	8.433	248.79	41.89	-4.35	41.56	3.23	79.45	22.07
47	SAGBEND	-175.23	-51.73	0.84	0.413	7.179	260.79	41.68	-4.49	41.77	2.97	79.52	22.09
48	SAGBEND	-187.15	-53.10	0.75	0.494	5.922	272.79	41.51	-4.61	42.05	2.84	79.53	22.09
49	SAGBEND	-199.10	-54.21	0.64	0.573	4.657	284.79	41.37	-4.70	42.28	2.87	79.50	22.08
50	SAGBEND	-211.07	-55.05	0.51	0.652	3.386	296.79	41.27	-4.78	42.36	2.88	79.39	22.05
51	SAGBEND	-223.05	-55.63	0.37	0.725	2.117	308.79	41.19	-4.83	42.05	2.58	78.91	21.92
52	SAGBEND	-235.05	-55.94	0.21	0.766	0.894	320.79	41.16	-4.85	38.02	-1.77	75.43	20.95
53	SEABED	-247.04	-56.03	0.06	0.542	0.094	332.79	41.15	-4.86	12.13	-16.67	59.80	16.61
54	SEABED	-259.04	-56.03	0.00	0.082	-0.006	344.79	41.15	-4.86	0.19	-9.54	51.66	14.35
55	SEABED	-271.04	-56.03	0.00	-0.003	-0.001	356.79	41.15	-4.86	-0.12	-0.37	44.10	12.25
56	SEABED	-283.04	-56.03	0.00	-0.001	0.000	368.79	41.15	-4.86	-0.01	0.09	43.85	12.18
57	SEABED	-295.04	-56.03	0.00	0.000	0.000	380.79	41.15	-4.86	0.00	0.01	43.78	12.16
58	SEABED	-307.04	-56.03	0.00	0.000	0.000	392.79	41.15	-4.86	0.00	0.00	43.78	12.16
59	SEABED	-319.04	-56.03	0.00	0.000	0.000	404.79	41.15	-4.86	0.00	0.00	43.78	12.16
60	SEABED	-331.04	-56.03	0.00	0.000	0.000	416.79	41.15	-4.86	0.00	0.00	43.78	12.16

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.270	0.00	49.11	0.00	0.00	0.00	49.11	13.64
3	LAYBARGE	71.49	6.16	0.00	0.000	0.960	6.30	49.09	0.00	-119.81	0.00	150.91	41.92
5	LAYBARGE	65.37	5.98	0.00	0.000	2.230	12.42	49.07	0.00	-86.60	0.00	122.68	34.08
7	LAYBARGE	59.91	5.72	0.00	0.000	3.281	17.89	49.03	0.00	-97.84	0.00	132.18	36.72
9	LAYBARGE	53.32	5.27	0.00	0.000	4.501	24.49	48.96	0.00	-94.27	0.00	129.08	35.86
11	LAYBARGE	47.32	4.74	0.00	0.000	5.739	30.51	48.88	0.00	-108.84	0.00	141.38	39.27
13	LAYBARGE	38.21	3.69	0.00	0.000	7.423	39.68	48.72	0.00	-124.52	0.00	154.55	42.93
15	LAYBARGE	29.27	2.39	0.00	0.000	9.099	48.72	48.52	0.00	-107.81	0.02	140.16	38.93
17	LAYBARGE	23.13	1.34	0.00	0.000	10.369	54.95	48.37	0.00	-96.14	-0.08	130.06	36.13
19	LAYBARGE	17.18	0.19	0.00	0.001	11.438	61.01	48.20	0.00	-80.75	0.35	116.75	32.43
21	LAYBARGE	10.63	-1.22	0.00	-0.013	13.044	67.72	47.99	-0.11	-153.84	-3.99	178.85	49.68
24	STINGER	-4.61	-5.09	0.00	0.014	15.308	83.44	47.51	-0.44	-128.00	-3.95	156.59	43.50
26	STINGER	-11.02	-6.94	0.00	-0.003	16.571	90.11	47.29	-0.60	-58.19	-0.16	97.01	26.95
28	STINGER	-17.40	-8.88	0.00	-0.001	17.452	96.77	47.04	-0.77	-74.77	-1.88	110.92	30.81
30	STINGER	-23.74	-10.94	0.00	0.009	18.427	103.44	46.78	-0.95	-72.08	2.50	108.40	30.11
32	STINGER	-30.05	-13.09	0.01	-0.224	19.267	110.11	46.51	-1.14	-56.29	-34.04	102.68	28.52
34	STINGER	-36.33	-15.33	0.06	-0.736	19.874	116.77	46.23	-1.33	-41.83	-36.46	93.63	26.01
36	SAGBEND	-47.61	-19.41	0.25	-1.033	19.589	128.77	45.71	-1.69	30.50	1.84	72.23	20.06
37	SAGBEND	-58.95	-23.33	0.44	-0.906	18.534	140.77	45.21	-2.03	37.35	5.00	77.95	21.65
38	SAGBEND	-70.36	-27.04	0.61	-0.744	17.392	152.77	44.74	-2.35	38.41	5.16	78.66	21.85
39	SAGBEND	-81.85	-30.51	0.74	-0.586	16.231	164.77	44.30	-2.65	38.94	5.00	78.90	21.92
40	SAGBEND	-93.40	-33.74	0.84	-0.434	15.054	176.77	43.89	-2.93	39.37	4.80	79.06	21.96
41	SAGBEND	-105.02	-36.74	0.92	-0.288	13.862	188.77	43.51	-3.19	39.79	4.62	79.19	22.00
42	SAGBEND	-116.70	-39.49	0.96	-0.149	12.661	200.77	43.16	-3.43	40.16	4.43	79.28	22.02
43	SAGBEND	-128.44	-42.00	0.98	-0.018	11.447	212.77	42.85	-3.65	40.55	4.21	79.35	22.04
44	SAGBEND	-140.22	-44.25	0.97	0.107	10.223	224.77	42.56	-3.84	40.90	3.97	79.42	22.06
45	SAGBEND	-152.06	-46.26	0.94	0.223	8.991	236.77	42.31	-4.02	41.21	3.70	79.46	22.07
46	SAGBEND	-163.93	-48.00	0.88	0.331	7.748	248.77	42.09	-4.17	41.44	3.46	79.49	22.08
47	SAGBEND	-175.83	-49.49	0.80	0.431	6.498	260.77	41.90	-4.29	41.69	3.22	79.46	22.07
48	SAGBEND	-187.77	-50.72	0.70	0.524	5.241	272.77	41.75	-4.40	41.91	3.02	79.47	22.08
49	SAGBEND	-199.73	-51.68	0.58	0.610	3.980	284.77	41.63	-4.48	42.08	2.84	79.43	22.06
50	SAGBEND	-211.71	-52.38	0.44	0.691	2.717	296.77	41.54	-4.54	42.08	2.65	79.23	22.01
51	SAGBEND	-223.70	-52.82	0.29	0.759	1.465	308.77	41.49	-4.58	40.79	1.74	77.94	21.65
52	SEABED	-235.70	-53.01	0.13	0.730	0.366	320.77	41.46	-4.60	28.13	-7.50	68.01	18.89
53	SEABED	-247.70	-53.03	0.02	0.276	0.007	332.77	41.46	-4.60	2.82	-16.49	57.93	16.09
54	SEABED	-259.70	-53.03	0.00	0.012	-0.004	344.77	41.46	-4.60	-0.22	-2.51	46.02	12.78
55	SEABED	-271.70	-53.03	0.00	-0.003	0.000	356.77	41.46	-4.60	-0.04	0.11	44.03	12.23
56	SEABED	-283.70	-53.03	0.00	0.000	0.000	368.77	41.46	-4.60	0.00	0.03	43.96	12.21
57	SEABED	-295.70	-53.03	0.00	0.000	0.000	380.77	41.46	-4.60	0.00	0.00	43.94	12.21
58	SEABED	-307.70	-53.03	0.00	0.000	0.000	392.77	41.46	-4.60	0.00	0.00	43.94	12.21
59	SEABED	-319.70	-53.03	0.00	0.000	0.000	404.77	41.46	-4.60	0.00	0.00	43.94	12.21

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.20	0.00	0.000	0.267	0.00	36.83	0.00	0.00	0.00	36.83	10.23
3	LAYBARGE	71.49	6.15	0.00	0.000	0.959	6.30	36.81	0.00	-116.96	0.00	136.18	37.83
5	LAYBARGE	65.38	5.98	0.00	0.000	2.232	12.42	36.79	0.00	-84.26	0.00	108.39	30.11
7	LAYBARGE	59.91	5.72	0.00	0.000	3.279	17.89	36.75	0.00	-95.22	0.00	117.64	32.68
9	LAYBARGE	53.32	5.27	0.00	0.000	4.504	24.49	36.68	0.00	-91.71	0.00	114.60	31.83
11	LAYBARGE	47.32	4.74	0.00	0.000	5.732	30.51	36.60	0.00	-104.56	0.00	125.43	34.84
13	LAYBARGE	38.22	3.69	0.00	0.000	7.424	39.68	36.44	0.00	-118.27	0.00	136.92	38.03
15	LAYBARGE	29.27	2.39	0.00	0.000	9.106	48.72	36.24	0.00	-103.63	0.02	124.30	34.53
17	LAYBARGE	23.13	1.33	0.00	0.000	10.366	54.95	36.09	0.00	-93.15	-0.10	115.23	32.01
19	LAYBARGE	17.18	0.18	0.00	0.002	11.450	61.01	35.91	0.00	-81.26	0.40	104.82	29.12
21	LAYBARGE	10.63	-1.23	0.00	-0.014	12.983	67.72	35.72	-0.11	-135.69	-4.08	151.13	41.98
24	STINGER	-4.64	-5.13	0.00	0.014	16.018	83.47	35.21	-0.45	-184.56	-4.12	192.34	53.43
26	STINGER	-11.00	-7.10	0.00	-0.001	18.218	90.14	34.98	-0.62	-119.76	0.39	137.05	38.07
28	STINGER	-17.30	-9.29	0.00	-0.008	20.059	96.81	34.70	-0.81	-136.17	-3.35	150.81	41.89
30	STINGER	-23.53	-11.68	0.00	0.039	21.976	103.47	34.40	-1.02	-130.59	8.32	146.04	40.57
32	STINGER	-29.67	-14.27	0.01	-0.389	23.805	110.14	34.07	-1.24	-124.21	-62.09	152.43	42.34
34	STINGER	-35.74	-17.03	0.09	-1.043	24.766	116.81	33.74	-1.48	-17.03	-21.00	57.22	15.90
36	SAGBEND	-46.65	-22.02	0.31	-1.167	24.069	128.81	33.10	-1.91	41.70	4.02	69.41	19.28
37	SAGBEND	-57.66	-26.78	0.52	-0.979	22.663	140.81	32.50	-2.33	49.69	6.64	75.98	21.11
38	SAGBEND	-68.80	-31.26	0.69	-0.762	21.137	152.81	31.93	-2.71	51.73	6.72	77.39	21.50
39	SAGBEND	-80.05	-35.43	0.82	-0.551	19.565	164.81	31.41	-3.08	52.88	6.45	78.05	21.68
40	SAGBEND	-91.41	-39.29	0.91	-0.353	17.962	176.81	30.92	-3.41	53.85	6.09	78.57	21.83
41	SAGBEND	-102.87	-42.83	0.96	-0.169	16.327	188.81	30.47	-3.72	54.77	5.67	79.12	21.98
42	SAGBEND	-114.44	-46.04	0.98	-0.002	14.665	200.81	30.06	-4.00	55.71	5.16	79.61	22.11
43	SAGBEND	-126.09	-48.90	0.96	0.148	12.978	212.81	29.70	-4.24	56.55	4.59	80.04	22.23
44	SAGBEND	-137.82	-51.42	0.92	0.278	11.265	224.81	29.38	-4.46	57.32	4.03	80.45	22.35
45	SAGBEND	-149.62	-53.59	0.85	0.394	9.533	236.81	29.11	-4.65	57.95	3.72	80.75	22.43
46	SAGBEND	-161.48	-55.40	0.75	0.503	7.786	248.81	28.88	-4.81	58.47	3.69	80.93	22.48
47	SAGBEND	-173.40	-56.84	0.64	0.613	6.019	260.81	28.70	-4.93	58.90	3.69	81.10	22.53
48	SAGBEND	-185.35	-57.91	0.50	0.719	4.248	272.81	28.57	-5.02	59.13	3.60	81.01	22.50
49	SAGBEND	-197.32	-58.62	0.34	0.813	2.487	284.81	28.48	-5.08	57.77	2.66	79.66	22.13
50	SAGBEND	-209.32	-58.96	0.17	0.819	0.859	296.81	28.43	-5.11	47.34	-4.95	71.08	19.74
51	SEABED	-221.32	-59.03	0.03	0.382	0.036	308.81	28.43	-5.12	8.79	-20.79	49.87	13.85
52	SEABED	-233.32	-59.03	0.00	0.013	-0.011	320.81	28.43	-5.12	-0.58	-3.70	34.25	9.51
53	SEABED	-245.32	-59.03	0.00	-0.005	0.000	332.81	28.43	-5.12	-0.11	0.29	31.55	8.76
54	SEABED	-257.32	-59.03	0.00	0.000	0.000	344.81	28.43	-5.12	0.01	0.04	31.34	8.70
55	SEABED	-269.32	-59.03	0.00	0.000	0.000	356.81	28.43	-5.12	0.00	0.00	31.31	8.70
56	SEABED	-281.32	-59.03	0.00	0.000	0.000	368.81	28.43	-5.12	0.00	0.00	31.30	8.70
57	SEABED	-293.32	-59.03	0.00	0.000	0.000	380.81	28.43	-5.12	0.00	0.00	31.30	8.70
58	SEABED	-305.32	-59.03	0.00	0.000	0.000	392.81	28.43	-5.12	0.00	0.00	31.30	8.70

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.267	0.00	36.81	0.00	0.00	0.00	36.81	10.23
3	LAYBARGE	71.49	6.16	0.00	0.000	0.959	6.30	36.79	0.00	-116.98	0.00	136.21	37.84
5	LAYBARGE	65.37	5.98	0.00	0.000	2.233	12.42	36.77	0.00	-84.28	0.00	108.40	30.11
7	LAYBARGE	59.91	5.72	0.00	0.000	3.279	17.89	36.73	0.00	-95.23	0.00	117.66	32.68
9	LAYBARGE	53.32	5.27	0.00	0.000	4.504	24.49	36.66	0.00	-91.72	0.00	114.62	31.84
11	LAYBARGE	47.32	4.74	0.00	0.000	5.732	30.51	36.58	0.00	-104.57	0.00	125.45	34.85
13	LAYBARGE	38.21	3.69	0.00	0.000	7.424	39.68	36.42	0.00	-118.31	0.00	136.96	38.05
15	LAYBARGE	29.27	2.39	0.00	0.000	9.106	48.72	36.23	0.00	-103.58	0.02	124.26	34.52
17	LAYBARGE	23.13	1.33	0.00	0.000	10.367	54.95	36.07	0.00	-93.44	-0.10	115.48	32.08
19	LAYBARGE	17.18	0.18	0.00	0.002	11.445	61.01	35.90	0.00	-80.04	0.39	103.84	28.84
21	LAYBARGE	10.63	-1.23	0.00	-0.014	13.004	67.72	35.70	-0.11	-140.41	-4.07	155.15	43.10
24	STINGER	-4.62	-5.11	0.00	0.014	15.564	83.45	35.21	-0.45	-140.10	-4.10	154.57	42.94
26	STINGER	-11.02	-6.99	0.00	-0.001	17.116	90.12	34.99	-0.61	-78.18	0.32	101.68	28.24
28	STINGER	-17.37	-9.02	0.00	-0.008	18.321	96.78	34.73	-0.79	-93.46	-3.05	114.60	31.83
30	STINGER	-23.67	-11.19	0.00	0.036	19.608	103.45	34.45	-0.97	-88.99	7.15	110.75	30.76
32	STINGER	-29.93	-13.49	-0.01	0.090	20.761	110.12	34.16	-1.17	-75.88	-2.53	98.99	27.50
34	STINGER	-36.13	-15.94	0.00	-0.430	22.666	116.79	33.82	-1.39	-191.18	-65.21	205.96	57.21
36	SAGBEND	-47.10	-20.80	0.18	-1.167	24.133	128.79	33.24	-1.81	19.74	-1.96	50.81	14.11
37	SAGBEND	-58.09	-25.61	0.40	-1.056	23.005	140.79	32.63	-2.22	46.60	5.88	73.51	20.42
38	SAGBEND	-69.19	-30.16	0.59	-0.845	21.524	152.79	32.05	-2.62	51.07	6.61	76.98	21.38
39	SAGBEND	-80.41	-34.41	0.73	-0.634	19.964	164.79	31.51	-2.99	52.59	6.43	77.88	21.63
40	SAGBEND	-91.75	-38.35	0.83	-0.433	18.366	176.79	31.01	-3.33	53.63	6.12	78.46	21.79
41	SAGBEND	-103.19	-41.97	0.90	-0.245	16.740	188.79	30.55	-3.64	54.56	5.74	79.00	21.94
42	SAGBEND	-114.73	-45.26	0.93	-0.073	15.084	200.79	30.14	-3.93	55.45	5.26	79.51	22.09
43	SAGBEND	-126.36	-48.21	0.93	0.081	13.404	212.79	29.76	-4.18	56.31	4.72	79.94	22.21
44	SAGBEND	-138.07	-50.82	0.90	0.217	11.699	224.79	29.43	-4.41	57.03	4.16	80.27	22.30
45	SAGBEND	-149.86	-53.08	0.84	0.336	9.975	236.79	29.15	-4.61	57.71	3.78	80.64	22.40
46	SAGBEND	-161.70	-54.97	0.76	0.447	8.228	248.79	28.91	-4.77	58.34	3.67	80.89	22.47
47	SAGBEND	-173.60	-56.51	0.66	0.556	6.470	260.79	28.72	-4.90	58.82	3.67	81.07	22.52
48	SAGBEND	-185.55	-57.68	0.53	0.664	4.697	272.79	28.57	-5.00	59.07	3.64	81.11	22.53
49	SAGBEND	-197.52	-58.47	0.38	0.765	2.929	284.79	28.47	-5.07	58.37	3.17	80.30	22.31
50	SAGBEND	-209.51	-58.91	0.21	0.821	1.239	296.79	28.42	-5.11	51.95	-0.88	74.73	20.76
51	SEABED	-221.51	-59.03	0.06	0.568	0.122	308.79	28.40	-5.12	17.17	-19.04	51.92	14.42
52	SEABED	-233.51	-59.03	0.00	0.059	-0.015	320.79	28.40	-5.12	-0.36	-8.34	38.08	10.58
53	SEABED	-245.51	-59.03	0.00	-0.007	-0.002	332.79	28.40	-5.12	-0.22	0.20	31.49	8.75
54	SEABED	-257.51	-59.03	0.00	-0.001	0.000	344.79	28.40	-5.12	0.01	0.10	31.36	8.71
55	SEABED	-269.51	-59.03	0.00	0.000	0.000	356.79	28.40	-5.12	0.00	0.00	31.28	8.69
56	SEABED	-281.51	-59.03	0.00	0.000	0.000	368.79	28.40	-5.12	0.00	0.00	31.28	8.69
57	SEABED	-293.51	-59.03	0.00	0.000	0.000	380.79	28.40	-5.12	0.00	0.00	31.28	8.69
58	SEABED	-305.51	-59.03	0.00	0.000	0.000	392.79	28.40	-5.12	0.00	0.00	31.28	8.69

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.268	0.00	36.82	0.00	0.00	0.00	36.82	10.23
3	LAYBARGE	71.49	6.16	0.00	0.000	0.960	6.30	36.80	0.00	-116.95	0.00	136.19	37.83
5	LAYBARGE	65.37	5.98	0.00	0.000	2.234	12.42	36.78	0.00	-84.26	0.00	108.40	30.11
7	LAYBARGE	59.91	5.72	0.00	0.000	3.281	17.89	36.74	0.00	-95.20	0.00	117.66	32.68
9	LAYBARGE	53.32	5.27	0.00	0.000	4.506	24.49	36.67	0.00	-91.70	0.00	114.62	31.84
11	LAYBARGE	47.32	4.74	0.00	0.000	5.734	30.51	36.59	0.00	-104.54	0.00	125.44	34.84
13	LAYBARGE	38.21	3.69	0.00	0.000	7.426	39.68	36.43	0.00	-118.27	0.00	136.95	38.04
15	LAYBARGE	29.27	2.39	0.00	0.000	9.107	48.72	36.23	0.00	-103.53	0.02	124.23	34.51
17	LAYBARGE	23.13	1.33	0.00	0.000	10.369	54.95	36.08	0.00	-93.57	-0.10	115.60	32.11
19	LAYBARGE	17.18	0.19	0.00	0.002	11.444	61.01	35.90	0.00	-79.44	0.39	103.33	28.70
21	LAYBARGE	10.63	-1.22	0.00	-0.014	13.016	67.72	35.71	-0.11	-142.63	-4.05	157.02	43.62
24	STINGER	-4.61	-5.09	0.00	0.013	15.343	83.44	35.22	-0.44	-118.11	-4.16	135.89	37.75
26	STINGER	-11.02	-6.94	0.00	0.000	16.561	90.11	35.00	-0.60	-56.02	0.64	82.89	23.03
28	STINGER	-17.40	-8.88	0.00	-0.015	17.481	96.77	34.75	-0.77	-77.82	-4.38	101.32	28.15
30	STINGER	-23.74	-10.94	0.00	0.064	18.324	103.44	34.50	-0.95	-46.49	12.57	75.75	21.04
32	STINGER	-30.05	-13.07	-0.01	0.094	19.103	110.11	34.22	-1.14	-69.46	-10.63	94.19	26.16
34	STINGER	-36.32	-15.36	0.00	-0.477	21.615	116.77	33.85	-1.34	-278.01	-63.79	276.75	76.87
36	SAGBEND	-47.31	-20.16	0.19	-1.190	24.171	128.77	33.33	-1.75	8.65	-1.73	41.63	11.56
37	SAGBEND	-58.29	-24.99	0.41	-1.075	23.187	140.77	32.71	-2.17	45.07	5.94	72.27	20.07
38	SAGBEND	-69.38	-29.58	0.60	-0.863	21.723	152.77	32.13	-2.57	50.73	6.66	76.73	21.31
39	SAGBEND	-80.59	-33.87	0.75	-0.649	20.168	164.77	31.59	-2.94	52.40	6.46	77.81	21.61
40	SAGBEND	-91.91	-37.85	0.85	-0.447	18.577	176.77	31.09	-3.29	53.52	6.15	78.43	21.79
41	SAGBEND	-103.33	-41.51	0.92	-0.257	16.955	188.77	30.62	-3.60	54.43	5.78	78.92	21.92
42	SAGBEND	-114.86	-44.85	0.96	-0.082	15.304	200.77	30.20	-3.89	55.32	5.32	79.36	22.05
43	SAGBEND	-126.48	-47.85	0.96	0.074	13.628	212.77	29.82	-4.15	56.16	4.77	79.83	22.17
44	SAGBEND	-138.18	-50.50	0.93	0.212	11.924	224.77	29.49	-4.38	56.95	4.21	80.24	22.29
45	SAGBEND	-149.96	-52.80	0.87	0.333	10.200	236.77	29.20	-4.58	57.68	3.78	80.60	22.39
46	SAGBEND	-161.80	-54.75	0.79	0.445	8.459	248.77	28.95	-4.75	58.26	3.63	80.89	22.47
47	SAGBEND	-173.69	-56.33	0.69	0.554	6.697	260.77	28.76	-4.89	58.77	3.63	81.07	22.52
48	SAGBEND	-185.63	-57.55	0.56	0.662	4.927	272.77	28.60	-4.99	59.12	3.60	81.12	22.53
49	SAGBEND	-197.60	-58.39	0.41	0.766	3.157	284.77	28.50	-5.07	58.62	3.24	80.50	22.36
50	SAGBEND	-209.59	-58.87	0.24	0.834	1.444	296.77	28.44	-5.11	53.60	0.63	76.09	21.13
51	SEABED	-221.58	-59.02	0.08	0.655	0.194	308.77	28.42	-5.12	22.80	-16.96	54.41	15.11
52	SEABED	-233.58	-59.03	0.00	0.097	-0.015	320.77	28.42	-5.12	0.29	-11.13	40.51	11.25
53	SEABED	-245.58	-59.03	0.00	-0.008	-0.002	332.77	28.42	-5.12	-0.29	-0.08	31.54	8.76
54	SEABED	-257.58	-59.03	0.00	-0.001	0.000	344.77	28.42	-5.12	0.00	0.14	31.41	8.72
55	SEABED	-269.58	-59.03	0.00	0.000	0.000	356.77	28.42	-5.12	0.00	0.00	31.30	8.69
56	SEABED	-281.58	-59.03	0.00	0.000	0.000	368.77	28.42	-5.12	0.00	0.00	31.29	8.69
57	SEABED	-293.58	-59.03	0.00	0.000	0.000	380.77	28.42	-5.12	0.00	0.00	31.29	8.69
58	SEABED	-305.58	-59.03	0.00	0.000	0.000	392.77	28.42	-5.12	0.00	0.00	31.29	8.69

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

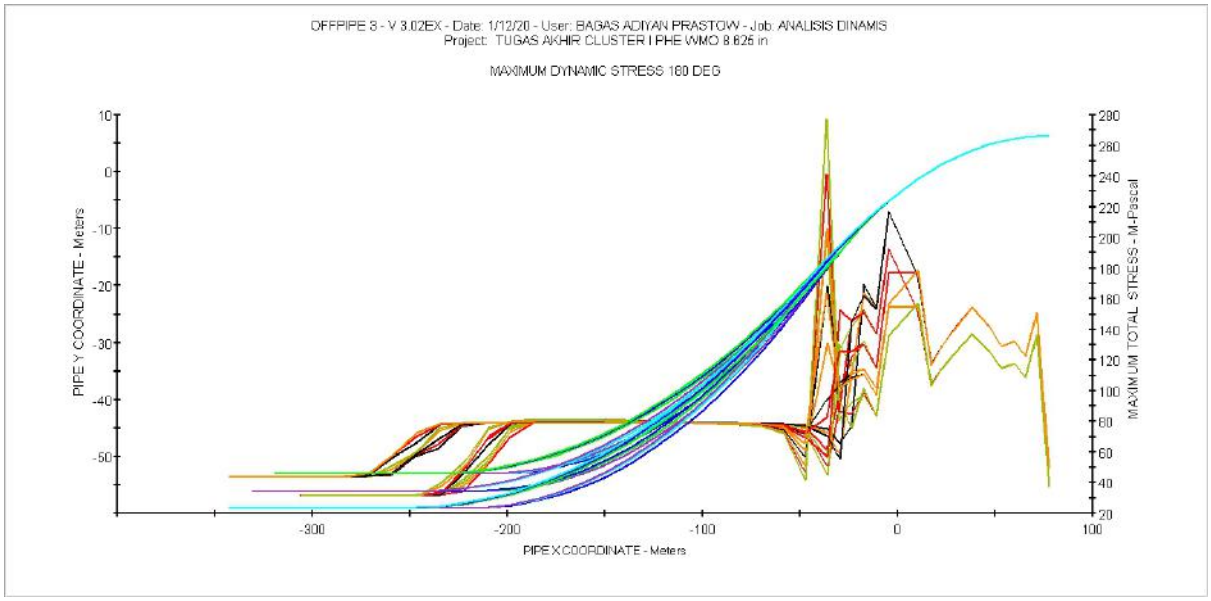
NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.270	0.00	49.12	0.00	0.00	0.00	49.12	13.64
3	LAYBARGE	71.49	6.16	0.00	0.000	0.960	6.30	49.09	0.00	-119.80	0.00	150.92	41.92
5	LAYBARGE	65.38	5.98	0.00	0.000	2.230	12.42	49.08	0.00	-86.60	0.00	122.69	34.08
7	LAYBARGE	59.91	5.72	0.00	0.000	3.282	17.89	49.03	0.00	-97.84	0.00	132.19	36.72
9	LAYBARGE	53.32	5.27	0.00	0.000	4.502	24.49	48.97	0.00	-94.27	0.00	129.09	35.86
11	LAYBARGE	47.32	4.74	0.00	0.000	5.739	30.51	48.88	0.00	-108.84	0.00	141.40	39.28
13	LAYBARGE	38.22	3.69	0.00	0.000	7.424	39.68	48.72	0.00	-124.52	0.00	154.56	42.93
15	LAYBARGE	29.27	2.39	0.00	0.000	9.100	48.72	48.53	0.00	-107.88	0.02	140.23	38.95
17	LAYBARGE	23.13	1.34	0.00	0.000	10.368	54.95	48.38	0.00	-95.83	-0.08	129.83	36.06
19	LAYBARGE	17.18	0.19	0.00	0.001	11.444	61.01	48.21	0.00	-82.03	0.32	117.78	32.72
21	LAYBARGE	10.63	-1.22	0.00	-0.013	13.021	67.72	48.01	-0.11	-148.63	-3.89	174.41	48.45
24	STINGER	-4.64	-5.13	0.00	0.009	15.977	83.47	47.50	-0.45	-198.96	-4.67	216.88	60.24
26	STINGER	-11.00	-7.10	0.00	0.014	18.235	90.14	47.27	-0.62	-124.16	3.89	153.11	42.53
28	STINGER	-17.30	-9.29	0.00	-0.073	20.023	96.81	46.99	-0.81	-133.64	-18.58	161.78	44.94
30	STINGER	-23.53	-11.66	0.03	-0.605	21.629	103.47	46.70	-1.01	-101.15	-54.88	144.78	40.22
32	STINGER	-29.71	-14.17	0.13	-1.087	22.250	110.14	46.39	-1.23	2.50	-9.89	55.38	15.38
34	STINGER	-35.89	-16.68	0.25	-1.136	21.953	116.81	46.07	-1.45	27.78	1.69	70.26	19.52
36	SAGBEND	-47.05	-21.07	0.46	-1.005	20.938	128.81	45.52	-1.83	36.34	5.04	77.38	21.49
37	SAGBEND	-58.30	-25.25	0.64	-0.839	19.822	140.81	44.99	-2.19	37.68	5.20	78.16	21.71
38	SAGBEND	-69.63	-29.21	0.79	-0.676	18.680	152.81	44.49	-2.54	38.28	5.04	78.35	21.76
39	SAGBEND	-81.03	-32.93	0.91	-0.519	17.520	164.81	44.01	-2.86	38.78	4.81	78.50	21.81
40	SAGBEND	-92.51	-36.43	1.00	-0.371	16.345	176.81	43.57	-3.16	39.25	4.60	78.66	21.85
41	SAGBEND	-104.06	-39.69	1.06	-0.231	15.156	188.81	43.16	-3.45	39.72	4.38	78.81	21.89
42	SAGBEND	-115.67	-42.70	1.09	-0.099	13.954	200.81	42.78	-3.71	40.13	4.11	78.95	21.93
43	SAGBEND	-127.35	-45.47	1.10	0.023	12.739	212.81	42.42	-3.95	40.57	3.79	79.07	21.96
44	SAGBEND	-139.08	-47.99	1.08	0.133	11.513	224.81	42.11	-4.17	40.95	3.44	79.16	21.99
45	SAGBEND	-150.87	-50.26	1.05	0.233	10.273	236.81	41.82	-4.36	41.30	3.07	79.21	22.00
46	SAGBEND	-162.70	-52.27	0.99	0.320	9.027	248.81	41.57	-4.54	41.64	2.75	79.27	22.02
47	SAGBEND	-174.57	-54.03	0.91	0.400	7.771	260.81	41.35	-4.69	41.92	2.61	79.30	22.03
48	SAGBEND	-186.47	-55.52	0.82	0.480	6.507	272.81	41.16	-4.82	42.16	2.61	79.33	22.04
49	SAGBEND	-198.41	-56.75	0.72	0.558	5.236	284.81	41.00	-4.92	42.40	2.63	79.35	22.04
50	SAGBEND	-210.37	-57.71	0.59	0.636	3.961	296.81	40.88	-5.01	42.57	2.64	79.32	22.03
51	SAGBEND	-222.35	-58.40	0.45	0.713	2.683	308.81	40.80	-5.07	42.52	2.55	79.11	21.97
52	SAGBEND	-234.34	-58.83	0.29	0.779	1.422	320.81	40.74	-5.10	41.02	1.65	77.67	21.58
53	SEABED	-246.34	-59.01	0.13	0.737	0.332	332.81	40.72	-5.12	26.76	-8.55	66.55	18.49
54	SEABED	-258.34	-59.03	0.02	0.265	0.004	344.81	40.72	-5.12	2.37	-16.45	57.33	15.92
55	SEABED	-270.34	-59.03	0.00	0.010	-0.003	356.81	40.72	-5.12	-0.22	-2.35	45.44	12.62
56	SEABED	-282.34	-59.03	0.00	-0.002	0.000	368.81	40.72	-5.12	-0.03	0.12	43.60	12.11
57	SEABED	-294.34	-59.03	0.00	0.000	0.000	380.81	40.72	-5.12	0.00	0.03	43.53	12.09
58	SEABED	-306.34	-59.03	0.00	0.000	0.000	392.81	40.72	-5.12	0.00	0.00	43.51	12.09
59	SEABED	-318.34	-59.03	0.00	0.000	0.000	404.81	40.72	-5.12	0.00	0.00	43.51	12.09
60	SEABED	-330.34	-59.03	0.00	0.000	0.000	416.81	40.72	-5.12	0.00	0.00	43.51	12.09

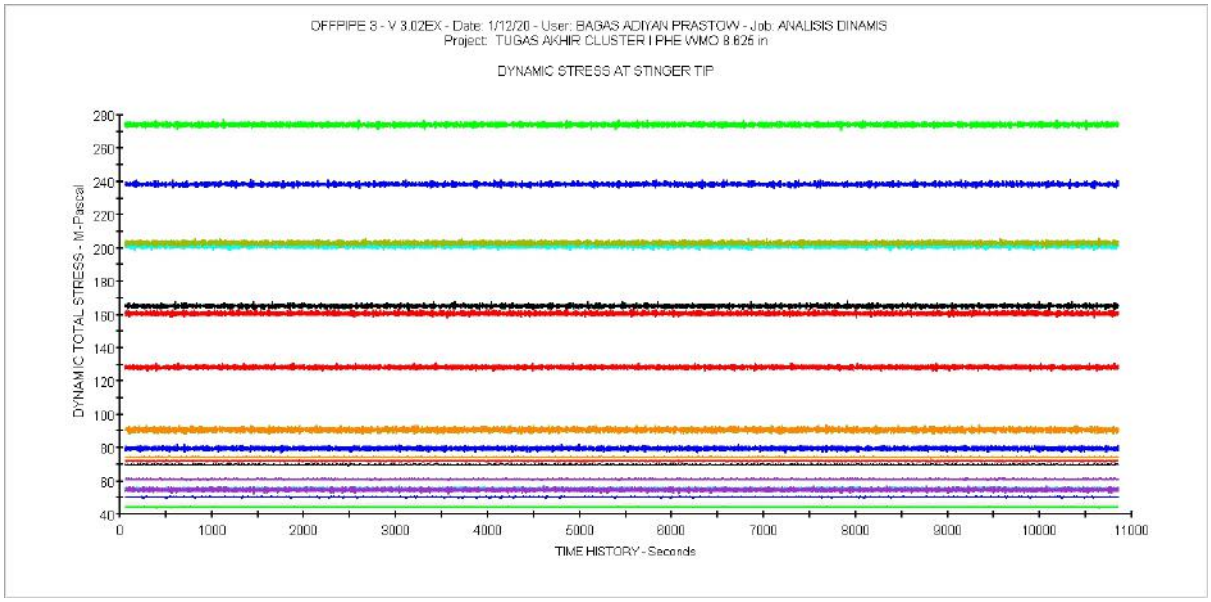
MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.270	0.00	49.08	0.00	0.00	0.00	49.08	13.63
3	LAYBARGE	71.49	6.16	0.00	0.000	0.960	6.30	49.06	0.00	-119.81	0.00	150.87	41.91
5	LAYBARGE	65.37	5.98	0.00	0.000	2.230	12.42	49.04	0.00	-86.60	0.00	122.64	34.07
7	LAYBARGE	59.91	5.72	0.00	0.000	3.282	17.89	49.00	0.00	-97.84	0.00	132.14	36.71
9	LAYBARGE	53.32	5.27	0.00	0.000	4.501	24.49	48.93	0.00	-94.26	0.00	129.04	35.84
11	LAYBARGE	47.32	4.74	0.00	0.000	5.739	30.51	48.85	0.00	-108.83	0.00	141.34	39.26
13	LAYBARGE	38.21	3.69	0.00	0.000	7.423	39.68	48.69	0.00	-124.51	0.00	154.51	42.92
15	LAYBARGE	29.27	2.39	0.00	0.000	9.100	48.72	48.50	0.00	-107.83	0.02	140.14	38.93
17	LAYBARGE	23.13	1.34	0.00	0.000	10.369	54.95	48.34	0.00	-96.02	-0.09	129.94	36.09
19	LAYBARGE	17.18	0.19	0.00	0.001	11.440	61.01	48.17	0.00	-81.19	0.36	117.10	32.53
21	LAYBARGE	10.63	-1.22	0.00	-0.013	13.036	67.72	47.97	-0.11	-152.05	-3.99	177.31	49.25
24	STINGER	-4.62	-5.11	0.00	0.014	15.531	83.45	47.48	-0.45	-151.65	-3.97	176.64	49.07
26	STINGER	-11.02	-6.99	0.00	-0.002	17.122	90.12	47.26	-0.61	-79.56	0.09	115.16	31.99
28	STINGER	-17.37	-9.02	0.00	-0.003	18.320	96.78	47.00	-0.78	-97.00	-2.29	129.81	36.06
30	STINGER	-23.67	-11.19	0.00	0.018	19.608	103.45	46.72	-0.97	-92.69	4.20	125.93	34.98
32	STINGER	-29.93	-13.49	0.01	-0.287	20.778	110.12	46.43	-1.17	-80.83	-44.77	125.27	34.80
34	STINGER	-36.14	-15.90	0.07	-0.831	21.482	116.79	46.13	-1.38	-30.78	-29.06	82.54	22.93
36	SAGBEND	-47.31	-20.28	0.27	-1.041	21.083	128.79	45.58	-1.76	31.21	2.50	72.87	20.24
37	SAGBEND	-58.55	-24.50	0.46	-0.907	20.024	140.79	45.04	-2.13	37.18	5.02	77.73	21.59
38	SAGBEND	-69.86	-28.50	0.62	-0.745	18.890	152.79	44.54	-2.47	38.20	5.10	78.36	21.77
39	SAGBEND	-81.25	-32.27	0.76	-0.588	17.733	164.79	44.06	-2.80	38.76	4.89	78.55	21.82
40	SAGBEND	-92.72	-35.80	0.86	-0.438	16.563	176.79	43.61	-3.11	39.23	4.69	78.67	21.85
41	SAGBEND	-104.25	-39.11	0.93	-0.296	15.377	188.79	43.19	-3.40	39.65	4.45	78.79	21.89
42	SAGBEND	-115.86	-42.17	0.98	-0.163	14.178	200.79	42.81	-3.66	40.07	4.18	78.91	21.92
43	SAGBEND	-127.52	-44.98	1.00	-0.039	12.965	212.79	42.45	-3.90	40.50	3.87	79.00	21.95
44	SAGBEND	-139.24	-47.55	0.99	0.074	11.739	224.79	42.12	-4.13	40.92	3.54	79.13	21.98
45	SAGBEND	-151.02	-49.86	0.97	0.176	10.503	236.79	41.83	-4.33	41.30	3.17	79.23	22.01
46	SAGBEND	-162.84	-51.92	0.92	0.265	9.258	248.79	41.57	-4.51	41.59	2.82	79.28	22.02
47	SAGBEND	-174.70	-53.72	0.86	0.345	8.002	260.79	41.35	-4.66	41.85	2.65	79.33	22.04
48	SAGBEND	-186.60	-55.26	0.78	0.423	6.740	272.79	41.15	-4.80	42.10	2.65	79.33	22.04
49	SAGBEND	-198.53	-56.54	0.68	0.502	5.471	284.79	40.99	-4.91	42.35	2.68	79.34	22.04
50	SAGBEND	-210.49	-57.55	0.57	0.579	4.198	296.79	40.86	-4.99	42.57	2.70	79.33	22.04
51	SAGBEND	-222.47	-58.30	0.44	0.656	2.919	308.79	40.77	-5.06	42.62	2.65	79.18	21.99
52	SAGBEND	-234.46	-58.77	0.30	0.727	1.651	320.79	40.71	-5.10	41.63	2.01	78.18	21.72
53	SAGBEND	-246.45	-58.99	0.14	0.723	0.494	332.79	40.68	-5.12	32.25	-5.55	70.58	19.60
54	SEABED	-258.45	-59.03	0.03	0.317	0.019	344.79	40.68	-5.12	4.45	-17.15	58.15	16.15
55	SEABED	-270.45	-59.03	0.00	0.018	-0.005	356.79	40.68	-5.12	-0.23	-3.30	46.00	12.78
56	SEABED	-282.45	-59.03	0.00	-0.003	0.000	368.79	40.68	-5.12	-0.05	0.11	43.56	12.10
57	SEABED	-294.45	-59.03	0.00	0.000	0.000	380.79	40.68	-5.12	0.00	0.04	43.50	12.08
58	SEABED	-306.45	-59.03	0.00	0.000	0.000	392.79	40.68	-5.12	0.00	0.00	43.47	12.07
59	SEABED	-318.45	-59.03	0.00	0.000	0.000	404.79	40.68	-5.12	0.00	0.00	43.47	12.07
60	SEABED	-330.45	-59.03	0.00	0.000	0.000	416.79	40.68	-5.12	0.00	0.00	43.47	12.07

MAXIMUM DYNAMIC PIPE FORCES AND STRESSES

NODE NO.	PIPE SECTION	X COORD (M)	Y COORD (M)	Z COORD (M)	HORIZ ANGLE (DEG)	VERT ANGLE (DEG)	PIPE LENGTH (M)	TENSILE STRESS (MPA)	HOOP STRESS (MPA)	BENDING STRESSES VERT (MPA)	BENDING STRESSES HORIZ (MPA)	TOTAL STRESS (MPA)	PERCNT YIELD (PCT)
1	TENSIONR	77.79	6.21	0.00	0.000	0.273	0.00	49.13	0.00	0.00	0.00	49.13	13.65
3	LAYBARGE	71.49	6.16	0.00	0.000	0.962	6.30	49.11	0.00	-119.81	0.00	150.94	41.93
5	LAYBARGE	65.38	5.98	0.00	0.000	2.233	12.42	49.09	0.00	-86.61	0.00	122.70	34.08
7	LAYBARGE	59.91	5.72	0.00	0.000	3.284	17.89	49.05	0.00	-97.85	0.00	132.21	36.72
9	LAYBARGE	53.32	5.27	0.00	0.000	4.504	24.49	48.98	0.00	-94.28	0.00	129.11	35.86
11	LAYBARGE	47.32	4.74	0.00	0.000	5.741	30.51	48.90	0.00	-108.86	0.00	141.41	39.28
13	LAYBARGE	38.22	3.69	0.00	0.000	7.426	39.68	48.74	0.00	-124.56	0.00	154.60	42.94
15	LAYBARGE	29.27	2.39	0.00	0.000	9.102	48.72	48.55	0.00	-107.84	0.02	140.19	38.94
17	LAYBARGE	23.13	1.33	0.00	0.000	10.372	54.95	48.39	0.00	-96.15	-0.08	130.10	36.14
19	LAYBARGE	17.18	0.18	0.00	0.001	11.441	61.01	48.22	0.00	-80.76	0.35	116.74	32.43
21	LAYBARGE	10.63	-1.23	0.00	-0.013	13.047	67.72	48.02	-0.11	-153.82	-3.99	178.86	49.68
24	STINGER	-4.61	-5.10	0.00	0.014	15.311	83.44	47.54	-0.45	-128.00	-3.93	156.61	43.50
26	STINGER	-11.02	-6.94	0.00	-0.003	16.574	90.11	47.32	-0.60	-58.17	-0.21	97.01	26.95
28	STINGER	-17.40	-8.88	0.00	0.000	17.455	96.77	47.07	-0.77	-74.75	-1.27	110.99	30.83
30	STINGER	-23.74	-10.94	0.00	0.001	18.430	103.44	46.81	-0.95	-71.51	-1.11	107.71	29.92
32	STINGER	-30.05	-13.10	0.00	0.075	19.325	110.11	46.54	-1.14	-64.13	9.20	102.05	28.35
34	STINGER	-36.32	-15.36	0.00	-0.358	20.557	116.77	46.23	-1.34	-120.59	-67.78	163.75	45.49
36	SAGBEND	-47.50	-19.69	0.17	-1.037	21.134	128.77	45.70	-1.71	22.96	-1.48	65.85	18.29
37	SAGBEND	-58.73	-23.93	0.36	-0.945	20.169	140.77	45.17	-2.08	36.34	4.65	77.06	21.41
38	SAGBEND	-70.03	-27.96	0.54	-0.787	19.048	152.77	44.66	-2.43	38.09	5.05	78.28	21.74
39	SAGBEND	-81.41	-31.77	0.68	-0.629	17.896	164.77	44.17	-2.76	38.68	4.89	78.59	21.83
40	SAGBEND	-92.87	-35.34	0.79	-0.478	16.726	176.77	43.72	-3.07	39.19	4.68	78.80	21.89
41	SAGBEND	-104.40	-38.67	0.87	-0.335	15.541	188.77	43.30	-3.36	39.67	4.47	78.96	21.93
42	SAGBEND	-115.99	-41.77	0.92	-0.200	14.342	200.77	42.91	-3.63	40.11	4.21	79.06	21.96
43	SAGBEND	-127.65	-44.62	0.95	-0.075	13.131	212.77	42.55	-3.87	40.49	3.90	79.13	21.98
44	SAGBEND	-139.36	-47.22	0.95	0.040	11.907	224.77	42.22	-4.10	40.91	3.57	79.19	22.00
45	SAGBEND	-151.13	-49.56	0.93	0.143	10.670	236.77	41.92	-4.30	41.26	3.21	79.27	22.02
46	SAGBEND	-162.94	-51.66	0.90	0.234	9.426	248.77	41.66	-4.48	41.56	2.84	79.32	22.03
47	SAGBEND	-174.80	-53.49	0.84	0.316	8.175	260.77	41.43	-4.64	41.85	2.65	79.32	22.03
48	SAGBEND	-186.70	-55.07	0.76	0.395	6.914	272.77	41.23	-4.78	42.10	2.63	79.34	22.04
49	SAGBEND	-198.62	-56.38	0.67	0.473	5.645	284.77	41.07	-4.89	42.36	2.63	79.38	22.05
50	SAGBEND	-210.58	-57.43	0.57	0.551	4.372	296.77	40.94	-4.98	42.59	2.65	79.34	22.04
51	SAGBEND	-222.55	-58.21	0.44	0.629	3.095	308.77	40.84	-5.05	42.63	2.61	79.21	22.00
52	SAGBEND	-234.54	-58.72	0.31	0.700	1.822	320.77	40.77	-5.09	41.91	2.11	78.49	21.80
53	SAGBEND	-246.54	-58.98	0.16	0.714	0.630	332.77	40.74	-5.11	35.01	-3.45	72.81	20.23
54	SEABED	-258.54	-59.03	0.03	0.366	0.037	344.77	40.74	-5.12	6.58	-16.93	58.50	16.25
55	SEABED	-270.54	-59.03	0.00	0.028	-0.006	356.77	40.74	-5.12	-0.20	-4.23	47.01	13.06
56	SEABED	-282.54	-59.03	0.00	-0.003	-0.001	368.77	40.74	-5.12	-0.07	0.08	43.59	12.11
57	SEABED	-294.54	-59.03	0.00	0.000	0.000	380.77	40.74	-5.12	0.00	0.04	43.56	12.10
58	SEABED	-306.54	-59.03	0.00	0.000	0.000	392.77	40.74	-5.12	0.00	0.00	43.52	12.09
59	SEABED	-318.54	-59.03	0.00	0.000	0.000	404.77	40.74	-5.12	0.00	0.00	43.52	12.09
60	SEABED	-330.54	-59.03	0.00	0.000	0.000	416.77	40.74	-5.12	0.00	0.00	43.52	12.09


OFFPIPE 8 - V 3.02EX - Date: 1/12/20 - User: BAGAS ADIYAN PRASTOW - Job: ANALISIS DINAMIS
Project: TUGAS AKHIR CLUSTER I PHE WMO 8.625 in
MAXIMUM DYNAMIC STRESS 180 DEG
PIPE Y COORDINATE - Meters
MAXIMUM TOTAL STRESS - M-Pascal
PIPE X COORDINATE - Meters


OFFPIPE 8 - V 3.02EX - Date: 1/12/20 - User: BAGAS ADIYAN PRASTOW - Job: ANALISIS DINAMIS
Project: TUGAS AKHIR CLUSTER I PHE WMO 8.625 in
DYNAMIC STRESS AT STINGER TIP
DYNAMIC TOTAL STRESS - M-Pascal
TIME HISTORY - Seconds

BIODATA PENULIS

Penulis tugas akhir ini bernama Bagas Adiyan Prastowo lahir di Surabaya, 5 November 1996. Penulis merupakan anak pertama dari dua bersaudara. Penulis mempunyai orang tua yang bernama Hari Prastowo dan Ifa Noorlaili selain itu penulis juga mempunya adik bernama Mikella Ratya Prastowo. Riwayat pendidikan penulis, SD Negeri Kertajaya Surabaya, Selain itu penulis melanjutkan pada jenjang pendidikan menengah pertama dan atas di SMP Negeri 29 Surabaya dan SMA Negeri 2 Surabaya. Setelah menyelesaikan pendidikan menengah atas penulis diterima di Jurusan Teknik Kelautan Institut Teknologi Sepuluh Nopember di Surabaya. Masuk dalam salah satu perguruan favorit di Indonesia, penulis menjadi salah satu mahasiswa angkatan tahun 2015 melalui jalur Seleksi Bersama Masuk Perguruan Tinggi Negeri (SBMPTN). Selain daripada itu penulis telah memiliki pengalaman kerja bersama salah satu perusahaan *owner* yang bergerak di bidang minyak dan gas yaitu PT. Pertamina Hulu Energi West Madura Offshore (PHE WMO) di Jakarta selama kurang lebih 2 bulan pada tahun 2019. Penulis juga pernah mengikuti Latihan Dasar Keterampilan Manajemen Mahasiswa Tingkat Pra-Dasar (LKMM Pra TD). Selain itu Penulis pernah berkompetisi mengikuti *Oil Rig Design Competition* pada acara Petroleum Festival (Petrofest) tahun 2016 di Universitas Diponegoro. Pada semester ke-9 penulis mengambil tugas akhir dalam bidang Perencanaan dan Perancangan Perpipaan Bawah Laut dengan judul tugas akhir "Analisis Menghitung Total Tegangan Instalasi Pipa Bawah Laut. Studi Kasus : Cluster I PT. PHE WMO". selama pengerjaan tugas akhir tersebut, penulis dibimbing oleh Bapak Ir. Imam Rochani dan Bapak Ir. Handayanu, M.Sc., Ph.D. Dalam rangka menyelesaikan pendidikan jenjang Sarjana, maka penulis telah menulis tugas akhir ini sebagai kelengkapan sistem kredit siswa.