TUGAS AKHIR - MO141326

ANALISA TEGANGAN KRITIS SKID FRAME SAAT SKIDDING LOAD OUT STRUKTUR WELLHEAD PLATFORM

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FINAL PROJECT - MO141326

SKID FRAME CRITICAL STRESS ANALYSIS WHILE SKIDDING LOADOUT OF WELLHEAD PLATFORM STRUCTURE

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TUGAS AKHIR

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

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Surabaya, Juli 2018

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ABSTRAK

Sebuah perusahaan fabrikasi merekonstruksi *support frame* dan fasilitas *loadout* untuk digunakan pada *loadout* struktur *wellhead platform*. *Support frame* yang sebelumnya digunakan untuk *trailer loadout* struktur *jacket* (421,30 ton) direkonstruksi ulang menjadi *skid frame* untuk pelaksanaan *loadout* struktur *wellhead platform* (1.564,53 ton). Dilakukan analisa reaksi dan uji integritas struktur *wellhead platform* dan *skid frame* pada kondisi fase fabrikasi, fase *weighing*, dan fase *loadout* dengan mensimulasikan kondisi *support displacement*, kondisi *loss of support*, dan kondisi *pulling*. Diperoleh reaksi maksimum terhadap sumbu-z (*global coordinate system*) pada fase fabrikasi dan *weighing* sebesar 619.30 ton akibat pergeseran titik berat. Sedangkan pada fase *load out*, diperoleh reaksi maksimum dari setiap arah pada *local coordinate system* Fx=929.69 ton, Fy = 146.ton , dan Fz = 138.28 ton. Dari pengujian integritas, lokasi kritis terjadi pada *cross beam* dibawah *dummy can* kaki B2 (*member LB16-GB02*) dengan nilai UC=4.1 yang pada saat *skid shoe* kaki A2 kehilangan tumpuannya (*Load Condition 3435*). Dengan menformulasikan reaksi yang bekerja dari kaki *wellhead platform* dapat dihitung dimensi *stiffener* yang diperlukan dan dilakukan analisa menggunakan metode elemen hingga pada lokasi kritis, yaitu *skid frame* pada kaki B2. Pada analisa tegangan dan deformasi menggunakan elemen hingga, lokasi kritis yang dilakukan penambahan *stiffener* mampu menahan beban yang terjadi (UC=0.92). Deformasi maksimum terjadi pada ujung potongan *cross beam* (11.29 mm) dan tegangan maksimum terjadi *tension pipe* yang tersambung pada *skidshoe* (418.19 MPa, UC=1.29).

Kata Kunci: Tegangan Kritis, *Load out, Skid Frame*

SKID FRAME CRITICAL STRESS ANALYSIS WHILE SKIDDING LOADOUT OF WELLHEAD PLATFORM STRUCTURE

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ABSTRACT

The fabrication company reconstructs support frame and loadout facilities to load out wellhead platform structure. Support frame previously used for trailer loadout of jacket structure (421,30 tons) were reconstructed into skid frame for the implementation of wellhead platform loadout (1.564,53 tons). Reaction analysis and integrity test between wellhead platform structure with skid frame in fabrication phase, weighing phase, and loadout phase by simulating support displacement condition, loss of support condition, and pulling condition. Maximum reaction to the z-axus (global coordinate system) in the fabrication and weighing phase is 619,30 tons due to center of gravity shifting. In the loadout phase, the maximum reaction of each direction in local coordinate system Fx=929,69 tons, Fy=146 tons, and Fz=138,28 tons. From the integrity test, the critical location occurs in cross beam under the dummy can at leg B2 (member LB16-GB02) with the value of UC=4.1 at loss of support condition on A2 (Load Condition 3435). By the formulating reaction of the wellhead platform legs, required stiffener dimensions can be calculated and analyzed using finite element method at the critical location, that is skid frame on leg B2. In stress and deformation analysis using finite element, the critical location with addition stiffener is able to withstand the load (UC=0.92). Maximum deformation occurs at the end of the cross beam (11,29 mm) and the maximum stress occurs at connection beetween tension pipe to the skidshoe (418.19 Mpa, UC=1.29).

Keyword: Critical Stress, *Load out*, *Skid Frame*

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Tugas Akhir ini disusun guna memenuhi persyaratan dalam menyelesaikan Studi Kesarjanaan (S-1) di Departemen Teknik Kelautan, Fakultas Teknologi Kelautan (FTK), Institut Teknologi Sepuluh Nopember Surabaya (ITS).

Penulis sangat mengharapkan agar karya tulis ini dapat memberikan ilmu pengetahuan dalam lingkup rekayasa kelautan serta dapat dikembangkan kedalam penelitian yang lebih intensif dan ekstensif.

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Surabaya, 23 Juli 2018

Fajri Karim Abidin

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DAFTAR ISI

DAFTAR GAMBAR

DAFTAR TABEL

BAB I
PENDAHULUAN

1.1. Latar Belakang Masalah

Struktur lepas pantai yang akan beroperasi memiliki tahapan-tahapan yang perlu dilakukan sebelum struktur lepas pantai diinstalasi dan dioperasikan. Umumnya, struktur lepas pantai difabrikasi di darat dan kemudian ditransportasikan ke lokasi struktur akan beroperasi. Pada proses pemindahan dari fabrikasi ke laut, digunakan *barge* sebagai alat transportasi struktur yang akan diinstalasi. Taapan pemindahan suatu bangunan, modul, pipa, atau komponen ke *barge* ini yang disebut dengan proses *loadout* (DNVGL-ST-N001).

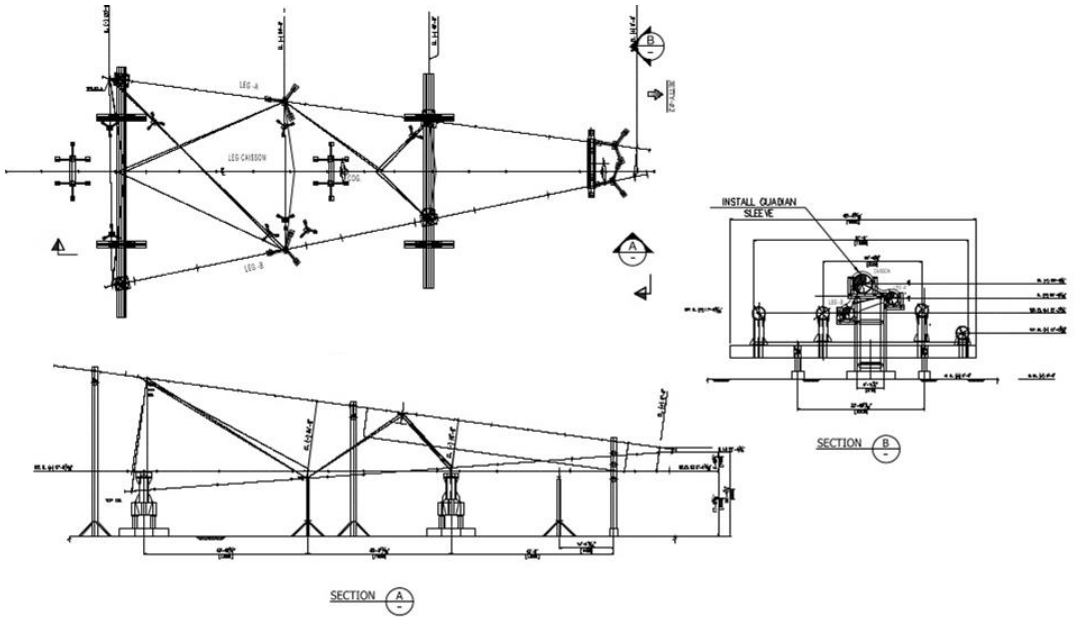
API RP 2A menklasifikasikan metode *load out* menjadi 3 metode, salah satunya ada metode *launching*/*skidding* yaitu dengan mengkontruksi struktur diatas *skid way*. Struktur yang dikonstruksi ditumpu oleh struktur pendukung yang akan ditarik menggunakan *winch* saat proses *loadout*. Struktur pendukung pada metode ini biasa disebut *temporary support frame* atau *skid frame*. *Skidding loadout* Struktur *topside* menggunakan *winch* dapat dilihat pada **Gambar 1.1.**.

Gambar 1.1. *Skidding Loadout* Struktur *Topside* Menggunakan *Winch*

Sebelum dilakukan proses *loadout*, perlu dilakukan perencanaan dengan tujuan pencapaian proses *loadout*. Ketika proses *loadout* berjalan, harus dipastikan integrasi dari struktur yang akan dipindah dengan *skid frame* supaya tidak mengalami kerusakan dan menghambat proses *loadout.*

Fabrikasi bangunan lepas pantai pada umumnya melakukan *loadout* dengan menyewa fasilitas *loadout* atau fabrikasi menkonstruksi sendiri *skid frame* dan fasilitas *loadout*. Proses konstruksi atau sewa mengeluarkan biaya yang cukup mahal untuk melakukan proses *loadout*, sehingga perusaaan fabrikasi mengambil strategi dengan merekonstruksi struktur *skid frame* yang pernah digunakan untuk digunakan kembali dengan kemungkinan melakukan penambahan bagian atau penggantian bagian jika diperlukan.

Pada penilitian tugas akhir ini, *skid frame* pada *skidding loadout* struktur *wellhead platform* menjadi objek penilitian. Fabrikasi akan melakukan proses *skidding loadout* struktur *wellhead platform* menggunakan *skid frame* yang pernah digunakan pada *loadout* struktur *jacket*. *Skid frame* yang digunakan pada *loadout* struktur *wellhead platform* seberat 1.564,53 ton, sebelumnya digunakan untuk *loadout* struktur *jacket* seberat 421,30 ton. tentunya kondisi *skid frame* yang akan digunakan kembali perlu pengecekan ulang terhadap tegangan yang akan terjadi pada struktur. Desain awal *support frame* pada *trailer loadout* struktur *jacket* dapat dilihat pada **Gambar 1.2.**.



Gambar 1.2. Desain Awal *Support Frame* Pada *Trailer Loadout* Struktur *Jacket*

Saat dilakukan proses *loadout* dengan metode *skidding loadout*, akan timbul variasi pembebanan akibat proses penarikan dan gerakan dari struktur *wellhead platform* yang mempengaruhi tegangan yang terjadi pada *skid frame*. Kondisi-kondisi yang perlu dilakukan pengujian diatur berdasar *design basic* yang diberikan oleh pihak *client* pada perusahasaan fabrikasi. Dari kondisi-kondisi tersebut, struktur *skid frame* perlu dilakukan pengecekan dari pengaruh tegangan yang berlebih (*overstress*) pada lokasi kritis dari berbagai skenario *skidding*.

Dengan melakukan analisa pada *skid frame* saat *loadout*, dapat diketahui lokasi kritis yang perlu dilakukan penguatan menggunakan komponen yang meningkatkan kekuatan dari struktur *skid frame* untuk mencegah kerusakan pada struktur. Dengan menformulasikan beberapa parameter dari data dan perhitungan secara teoritis, studi kasus mengenai prediksi tegangan kritis pada modifikasi struktur *skid frame* pada proses *loadout* perlu dikaji lebih lanjut.

1.2. Rumusan Masalah

Permasalahan yang di bahas pada penelitian tugas akhir ini adalah

1. Bagaimana reaksi pada setiap tumpuan struktur *topside wellhead platform*?
2. Dimanakah terjadinya tegangan kritis pada *skid frame* ketika skenario proses *load out*?
3. Berapa tegangan maksimum dan deformasi maksimum pada lokasi kritis struktur *skid frame* saat proses *load out* struktur *topside wellhead platform*?

1.3. Tujuan Penelitian

Adapun tujuan yang dicapai dalam penelitian tugas akhir ini adalah

1. Diperoleh reaksi pada setiap tumpuan struktur *topside wellhead platform*
2. Diperoleh terjadinya tegangan kritis pada *skid frame* ketika skenario proses *load out*
3. Diperoleh besar tegangan maksimum dan deformasi maksimum pada lokasi kritis struktur *skid frame* saat proses *load out* struktur *topside wellhead platform*

1.4. Manfaat

Setelah hasil dari analisa diperoleh, diharapkan dapat memberikan pemahaman tentang analisa desain *skid frame* dengan pendekatan statis dan memberikan pemahaman mengenai kondisi-kondisi yang akan dihadapi ketika proses *skidding loadout* berlangsung. Hasil analisa pun dapat dijadikan pertimbangan bagi perusahaan ketika akan melakukan *skidding loadout* dan modifikasi *skid frame*.

1.5. Batasan Masalah

Untuk memfokuskan ruang lingkup dari permasalahan yang telah dijabarkan di atas, maka permasalahan akan dibatasi pada hal-hal berikut:

1. Kondisi *skid frame* yang akan digunakan kembali dianggap baik seperti desain pada rencana awal sebelum digunakan
2. Beban yang dijadikan pertimbangan redesain *skid frame* hanya beban pada fase fabrikasi, fase *weighing*, dan fase *load out*
3. Perilaku *barge* tidak dibahas pada saat *load out* dan *barge* dianggap mampu menahan struktur *topside wellhead platform*

BAB II
TINJAUAN PUSTAKA DAN DASAR TEORI

2.1. Tinjauan Pustaka

Beberapa penilitian sebelumnya, Adi, N. Karunia (1992) menyatakan bahwa penyebab utama kerusakan struktur yang akan dilakukan *load out* adalah karena tegangan-tegangan yang berlebih pada bagian-bagian tertentu dari struktur dan kegagalan yang terjadi pada fasilitas pendukung dalam proses *load out* disebabkan kurang telitinya perhitungan kekuatan dan pemilihan material yang digunakan.

Pada penilitian tugas akhir ini, dilakukan analisa *loadout* dengan pendekatan statis. Struktur akan disimulasikan pada kondisi-kondisi yang mungkin terjadi. Cahya, Susanto M. (1994) menjelaskan bahwa ketika proses *load out* dilaksanakan, kondisi *barge* diusahakan tidak mengalami *trim* (*even keel*) dengan cara merencanakan *ballasting* pada *barge*. Sehingga beban saat penarikan dan *overhanging* pada sisi *barge* maupun *overhanging* pada sisi *jetty* dapat dihindarkan. Kondisi tersebut menjadi batasan ketika melakukan analisa pada struktur yang akan dilakukan *loadout*.

Noble Denton menyusun *guidelines* yang berisi mengenai skema *loadout*. Struktur dan *support* pada kondisi *skidding loadout* harus menanggung *subsidence* sebesar 25 mm pada salah satu *support*. Skema tersebut dijadikan acuan pada analisa yang dilakukan tugas akhir ini dan disesuaikan dengan *design basic* yang diberikan perusahaan.

Pada analisa *loadout* yang akan dilakukan terdapat kondisi *loss of support* yang digolongkan ke kondisi ekstrim. Fauzan, Dian (2007) menyatakan kondisi *loss of support* disimulasikan dengan menghilangkan tumpuan pada salah satu kaki dan kaki lainnya menumpu.

El-Reedy,Mohamed A. (2015) mensimulasikan kondisi penarikan saat *loadout* dengan mengaplikasikan gaya lateral pada bagian *skidshoe*. Gaya lateral yang diaplikasikan setara dengan total berat dari struktur yang dipindahkan dikalikan dengan koefisien gesek dan gaya gesek diaplikasikan pada setiap *skidshoe* ketika kondisi penarikan.

Carden, Lyle P. (2007) mengaplikasikan penguatan sebuah jembatan dengan menggunakan plat-plat *stiffener* dengan metode elemen hingga. Dengan penambahan *stiffener* pada struktur jembatan, metode ini dapat meningkatkan 50% kapasitas dari struktur. Metode yang sama akan diberlakukan pada struktur *skid frame* saat menerima beban-beban yang terjadi saat *loadout*.

2.2. Dasar Teori

2.2.1. *Load Out*

Tahapan pemindahan suatu bangunan, modul, pipa, atau komponen ke barge ini yang disebut dengan load out (DNVGL-ST-N001). Dalam merencanakan *load out*, harus dilakukan analisa untuk mengetahui apakah struktur *jacket* atau *deck* cukup kuat saat mengalami kondisi kritis. Apabila tidak cukup kuat, maka dilakukan tindakan seperti menambah *temporary support* pada bagian tertentu (Ferguson, N. et al.,1983).

Menurut API RP 2A, *load out* dapat dilakukan dengan 3 metode:

1. *Launching / Skidding Method*

   Skidding merupakan teknik *loadout* dengan membangun lintasan (*skidtrack/skidway*) yang terkoneksi dari posisi awal struktur (fabrikasi) sampai posisi akhir struktur (diatas *barge*). Struktur akan ditumpu oleh *skidshoe* dan diluncurkan menuju *barge*.

   Pada *skidding loadout*, gaya gesek menjadi pertimbangan yang penting. Titik-titik kontak harus dilakukan pengecekan terhadap gesekan yang terjadi. Untuk mengurangi gesekan yang terjadi, *skidway* akan diberi pelumas dan dilakukan penarikan terhadap struktur diatas *skidway*. *Skidding loadout* menggunakan *self propelled skidding system* dapat dilihat pada **Gambar 2.1.**.

Gambar 2.1. *Skidding Loadout* Menggunakan *Self Propelled Skidding System*
(Sumber: www.mammoet.com)

Bagian *skidshoe* akan ditarik menggunakan *winch* hingga mencapai posisi yang ditentukan diatas *barge*. Namun metode *skidding loadout* sudah berkembang menggunakan teknologi SPSS (*Self Propelled Skidding System*). Berbeda dengan metode lama yang perlu sistem *rigging* untuk menarik bagian *skidshoe*. SPSS bergerak menggunakan pompa hidrolik yang mendorong secara pertahap dan perpindahan dapat diatur sesuai dengan perpindahan yang dibutuhkan.

2. *Dolly / Trailer Method*

   Struktur ditarik ke atas *barge* dengan menggunakan *dollies*, sehingga dapat dilakukan dari berbagai lokasi karena tidak tertumpu pada konstruksi *skid way*. Cara ini memerlukan *winch* baik di darat maupun di atas *barge*. Metode ini berkembang menjadi menggunakan SPMT (*Self Propelled Modular Transporter*). Pada SPMT diterapkan sistem hidrolik sehingga mampu mempertahankan stabilitas dari struktur yang dipindahkan. *Loadout* menggunakan *self propelled modular transporter* dilihat pada **Gambar 2.2.**.

Gambar 2.2. *Loadout* Menggunakan *Self Propelled Modular Transporter*

3. *Lifting Method*

   Struktur diangkat dan diletakan oleh *crane*, sehingga metode ini dipakai khusus untuk konstruksi yang kecil seperti *flare bridge*, *jacket* untuk *flare*, dimana berat angkat masih di bawah kapasitas angkat dan radius *crane*. *Lifting loadout* pada struktur *topside* dapat dilihat pada **Gambar 2.3.**.

Gambar 2.3. *Lifting Loadout* Pada Struktur *Topside*

2.2.2. Kekuatan Material

Pada semua konstruksi teknik bagian-bagian pelengkap suatu bangunan haruslah memiliki dimensi fisik tertentu. Bagian-bagian tersebut haruslahh diukur dengan tepat untuk dapat menahan gaya-gaya yang mungkin bekerja pada struktur. Dalam praktek keteknikan, kebutuhan-kebutuhan tersebut haruslah disesuaikan dengan pengeluaran minimal untuk suatu bahan tertentu.. Salah satu masalah utama mekanika bahan adalah menyelediki tahan dalam dari sebuah struktur, yaitu hakikat gaya-gaya yang ada di dalam suatu benda yang mengimbangi gaya-gaya luar yang bekerja. Untuk itu, perlu dilakukan metode pendekatan yang seragam (Popov, E.P.,1984).

2.2.2.1. Elastisitas

Dalam memilih material untuk pembuatan batang penghubung, yang harus diperhatikan adalah sifat-sifat material, antara lain kekuatan (strength), keliatan (*ductility*), kekerasan (*hardness*), dan kekuatan lelah (*fatigue strength*). Sifat mekanik material didefinisikan sebagai ukuran kemampuan material untuk menahan gaya atau tegangan. Pada saat menahan beban, struktur molekul berada dalam keseimbangan. Gaya luar pada proses penarikan tekanan, pemotongan, penempaan, pengecoran dan pembengkokan mengakibatkan material mengalami tegangan. Hampir semua benda teknik memiliki sifat elastisitas. Suatu sistem struktur diperuntukan mengemban fungsi tertentu, sekaligus menahan pengaruh gaya luar yang ada.

2.2.2.2. Deformasi

Deformasi terjadi bila struktur mengalami gaya. Selama deformasi, struktur akan menyerap energi sebagai akibat adanya gaya yang bekerja sepanjang deformasi. Sekecil apapun gaya yang bekerja, maka benda akan mengalami perubahan bentuk dan ukuran. Perubahan ukuran secara fisik ini disebut sebagai deformasi. Deformasi ada dua macam, yaitu deformasi elastis dan deformasi plastis. Deformasi elastis adalah deformasi yang terjadi akibat adanya beban yang jika beban ditiadakan, maka material akan kembali seperti ukuran dan bentuk semula, sedangkan deformasi plastis adalah deformasi yang bersifat permanen jika bebannya dilepas.

Penambahan beban pada bahan yang telah mengalami kekuatan tertinggi tidak dapat dilakukan, karena pada kondisi ini bahan telah mengalami deformasi total. Jika beban tetap diberikan maka regangan akan bertambah dimana material seakan menguat yang disebut dengan penguatan regangan (*strain hardening*) yang selanjutnya benda akan mengalami putus pada kekuatan patah.

2.2.2.3.Batas Luluh (*Yield Point*)

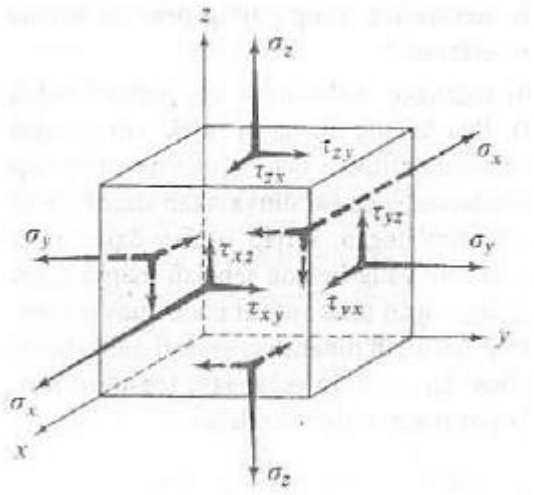
Jika beban yang bekerja pada material diteruskan hingga diluar batas elastis akan terjadi perpanjangan atau perpendekan permanen secara tiba–tiba. Sifat elastis pada kenyataannya masih terjadi sedikit di atas batas proporsional, namun hubungan antara tegangan dan regangan tidak linear dan umumnya batas daerah elastis dan daerah plastis sulit untuk ditentukan.

Kekuatan luluh adalah harga tegangan terendah dimana material mulai mengalami deformasi plastis. Ini disebut *yield point* atau batas luluh dimana regangan meningkat sekalipun tiada peningkatan tegangan (hanya terjadi pada baja lunak). Setelah melewati titik ini, material tidak akan kembali ke bentuk semula, atau material sedang berada dalam daerah plastis. Karena itu didefinisikan kekuatan luluh (*yield strength*).

2.2.3. Tegangan

Pada dasarnya tegangan dapat didefinisikan sebagai besaran gaya yang bekerja pada suatu satuan luas. Pada suatu bidang yang dikenal suatu gaya akan

terdapat dua jenis tegangan yang mempengaruhi bidang tersebut, yaitu tegangan normal dan tegangan geser. Jika suatu elemen kubus mengalami gaya yang mengakibatkan tegangan, maka tegangan yang terjadi dapat dilihat pada **Gambar 2.4.**.



Gambar 2.4. Tegangan Normal dan Tegangan Geser Elemen Kubus

(Sumber: Popov, 1984)

2.2.3.1.Tegangan Normal (*Normal Stress*)

Tegangan normal merupakan tegangan yang tegak lurus terhadap permukaan benda yang ditimbulkan oleh gaya aksial dan momen lentur, sedangkan tegangan geser adalah tegangan yang sejajar terhadap permukaan benda yang ditimbulkan oleh gaya geser dan gaya puntir dan torsi. Suatu tegangan normal, secara matematis dapat didefinisikan sebagai:

$$\sigma = lim \frac{\Delta F}{\Delta A} \tag{2.1}$$

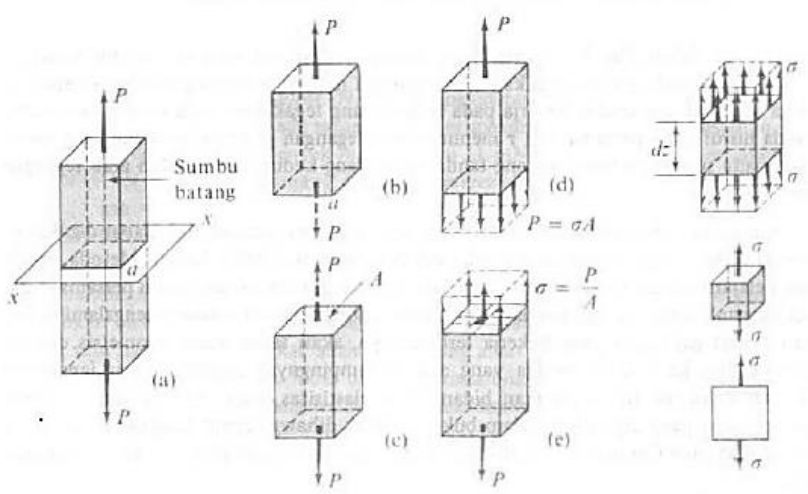
Dimana:

σ = Tegangan Normal (N/m^2)

F = Gaya yang bekerja tegak lurus pada suatu satuan luas (N)

A = Luas penampang (m^2)

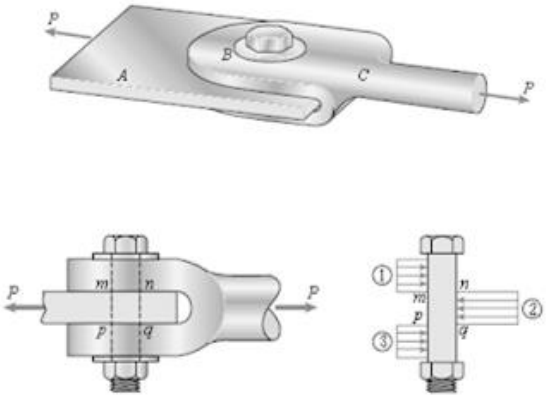
Tegangan normal terbagi menjadi dua macam, yaitu Tegangan normal yang menghasilkan suatu tarikan (*tension*) pada permukaan suatu benda dan tegangan normal yang menghasilkan suatu dorongan (*compression*) pada permukaan benda. Sebagai contoh, sebuah batang yang mengalami gaya axial dan mengakibatkan terjadinya tegangan normal dapat dilihat pada **Gambar 2.5.**.



Gambar 2.5. Tegangan Normal Pada Sumbu Batang Akibat Gaya Axial

(Sumber: Popov, 1984)

2.2.3.2.Tegangan Geser (*Shear Stress*)



Gambar 2.6. Tegangan Geser Pada Sambungan Baut

(Sumber: SNI 03-1729-2002,2002)

Komponen lain dari intensitas gaya yang bekerja sejajar dengan bidang dari luas elemen (seperti pada **Gambar 2.6.**) merupakan tegangan geser yang dilambangkan dengan τ. Menurut Frick (1978) Tegangan geser adalah tegangan yang terjadi akibat ada dua arah gaya yang berlawanan dan tidak lurus bidang suatu benda. Tegangan geser didefinisikan sebagai :

$$\tau = lim \frac{\Delta V}{\Delta A} \tag{2.2}$$

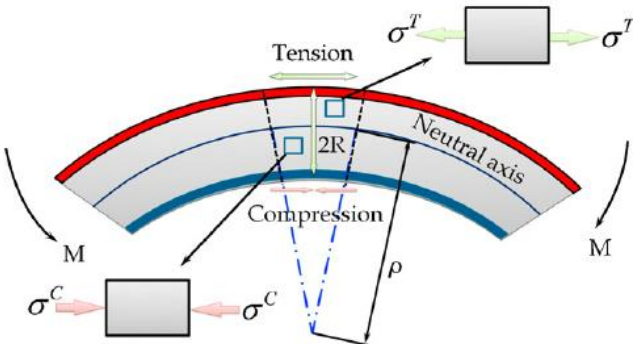
Dimana:

τ = Tegangan Geser (N/m^2)

F = Gaya yang bekerja tegak sejajar pada suatu satuan luas (N)

A = Luas penampang geser (m^2)

2.2.3.3.*Bending Stress*



Gambar 2.7. Tegangan Lentur Pada Pontongan Balok

Tegangan lentur merupakan pengaruh beban-beban yang bekerja secara transversal terhadap sumbu axial. Beban-beban ini menciptakan aksi internal atau resultan tegangan yang menyebabkan suatu struktur terdeformasi menjadi suatu garis lengkung, seperti yang diilustrasikan pada **Gambar 2.7.** Tegangan Lentur dapat didefinisikan dalam persamaan matematis sebagai:

$$\sigma_B = \frac{M.y}{I} \tag{2.3}$$

Dimana:

σ_B = *Bending Stress* (N/m^2)

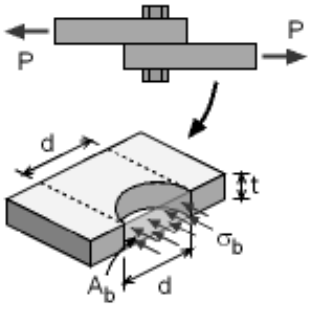
M = Momen lentur (N.m)

y = Jarak vertikal dari sumbu netral (m)

I = Momen inersia pada sumbu netral (m^3)

2.2.3.4.*Bearing Stress*

Bearing stress adalah tekanan yang terjadi akibat kontak antara dua bagian yang terpisah. Hal ini berbeda dengan tegangan tekan, sebab *bearing stress* merupakan tegangan internal yang disebabkan oleh gaya tekan. Sebagai contoh, *bearing stress* pada sambungan baut dapat dilihat pada **Gambar 2.8.**.



Gambar 2.8. *Bearing Stress* Pada Sambungan Baut

$$\sigma_b = \frac{F}{A_b} \tag{2.4}$$

Dimana:

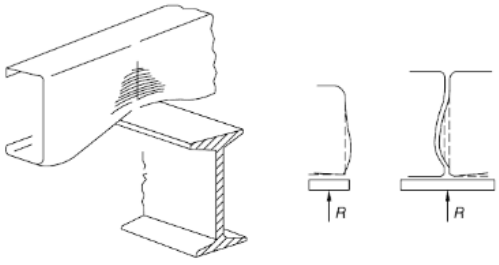
σ_b = *Bearing Stress* (N/m^2)

F = Gaya yang bekerja (N)

A_b = Luas penampang (m^2)

2.2.4. Plat Pengaku (*Stiffener*)

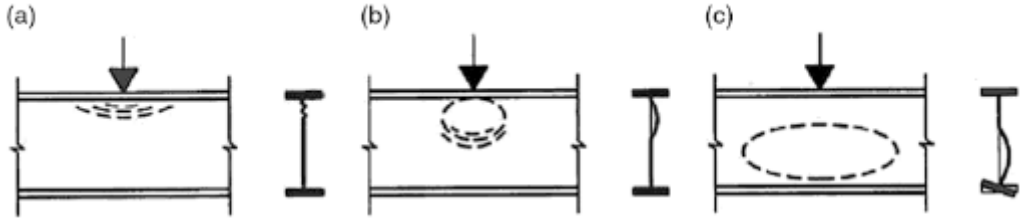
Pada dasarnya untuk menentukan profil suatu struktur, aspek kekuatan menjadi hal yang sangat penting. Namun, dalam konstruksi suatu struktur terdapat aspek-aspek lain dalam menentukan profil. Tidak hanya aspek kekuatan, tetapi aspek ekonomi juga menjadi yang perlu diperhatikan. *Stiffener* transversal atau plat *web* ganda diperlukan ketika terjadi konsentrasi gaya yang melebihi kekuatan dari suatu profil. Dengan melakukan penambahan *stiffener*, seringkali lebih ekonomis untuk melakukan penguatan pada suatu profil dibandingkan memilih profil yang lebih besar (Carter dan Troup, 1999). Contoh kerusakan profil dapat dilihat pada **Gambar 2.9.**.



Gambar 2.9. Contoh Kerusakan Profil Pada Bagian *Web*

(Sumber: Bernuzzi *et all*,2016)

Dalam banyak kasus, konsentrasi beban terjadi pada ujung profil yang tersambung satu dengan yang lainnya dan konsentrasi beban juga bisa terjadi pada bagian tengah profil akibat sambungan profil lainnya. Jenis kerusakan pada *web* dapat dilihat pada **Gambar 2.10.**. Gaya yang terjadi pada *flange*, dapat ditahan oleh gaya geser di *web* atau ditransfer menuju ke *flange* lainnya. Ketika kapasitas dari suatu profil tidak mampu menahan gaya yang terjadi, dapat dilakukan peningkatan kapasitas dengan menambahkan satu atau lebih *stiffener*. *Stiffener* akan meningkatkan ketahanan secara signifikan dibanding dengan profil yang sebenarnya (Bernuzzi *et all,*2016).



Gambar 2.10. Jenis Kerusakan Pada *Web*: (a) *Web Yielding*; (b) *Web Cripling*; (c) *Web Buckling* (Sumber: Bernuzzi *et all,*2016)

2.2.4.1.*Flange Local Bending*

Ketika terjadi gaya tarik atau gaya tekan pada sebuah plat *flange*, *flange* harus cukup kaku untuk mencegah deformasi dan konsentrasi tegangan tinggi pada bagian las yang sejajar dengan *web*. Untuk meningkatkan kekuatan pada bagian *flange* dapat dilakukan dengan menambahkan plat transversal untuk meningkatkan kekakuan pada bagian *flange*. Kekuatan dari *stiffener* terhadap *flange local bending* dapat dihitung menggunakan persamaan yang disusun oleh ANSI/AISC 360-10, sebagai berikut:

$$\frac{R_n}{1.67} = 6.25 \times F_y . {t_f}^2 \qquad (2.5)$$

Dimana:

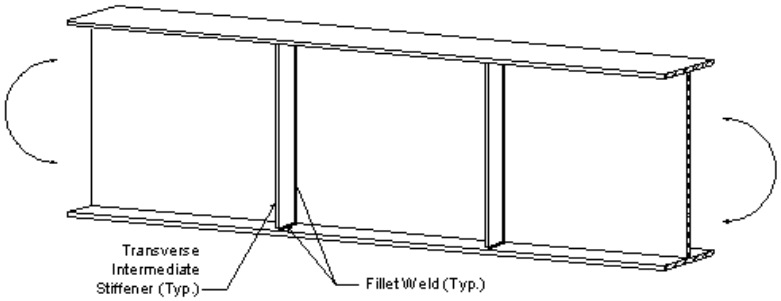
R_n = Kekuatan plat (MPa)

F_y = Tegangan ijin (MPa)

t_f = tebal plat *flange* (mm)

Ketika konsentrasi gaya yang akan ditahan terjadi pada ujung profil kurang dari 10 kali tebal *flange* ($10t_f$), maka kekuatan plat (R_n) harus dikurangi 50%.Jika pada kondisi tersebut diperlukan, maka dilakukan penguatan menggunakan sepasang *stiffener*

transversal. *Stiffener* tranversal untuk mencegah *local flange bending* dapat dilihat pada **Gambar 2.11.**.



Gambar 2.11. *Stiffener* Tranversal Untuk Mencegah *Local Flange Bending*
(Sumber: *LRFD Design Example for Steel Girder Superstructure Bridge*,2003)

2.2.4.2.*Web Local Yielding*

Bagian *web* akan mengalami tegangan tekan ketika *flange* diberikan beban terkonsentrasi. Jika tegangan tekan yang diterima oleh *web* berlebihan, maka memungkinkan terjadi *web local yielding* pada bagian ujung sambungan dari sebuah profil atau pada persimpangan dari sebuah profil. *Stiffener* tranversal untuk mencegah *web local yielding* dapat dilihat pada **Gambar 2.11.**.

ANSI/AISC 360-10 mensyaratkan desain *stiffener* pada dua kondisi, yaitu pada kondisi ujung dan pada persimpangan sebuah profil, ketika gaya terkonsentrasi pada *web* yang akan ditahan memiliki jarak dari ujung profil yang lebih besar dari pada tinggi profil (diantara *flange*) maka dapat digunakan persamaan berikut:

$$\frac{R_n}{1.5} = F_y . t_w (5k + l_b) \quad (2.6)$$

Ketika gaya terkonsetrasi pada *web* yang akan ditahan memiliki jarak dari ujung profil yang lebih pendek atau sama dengan tinggi profil (diantara *flange*) maka persamaan berikut diberlakukan:

$$\frac{R_n}{1.5} = F_y . t_w (2.5k + l_b) \quad (2.7)$$

Dimana:

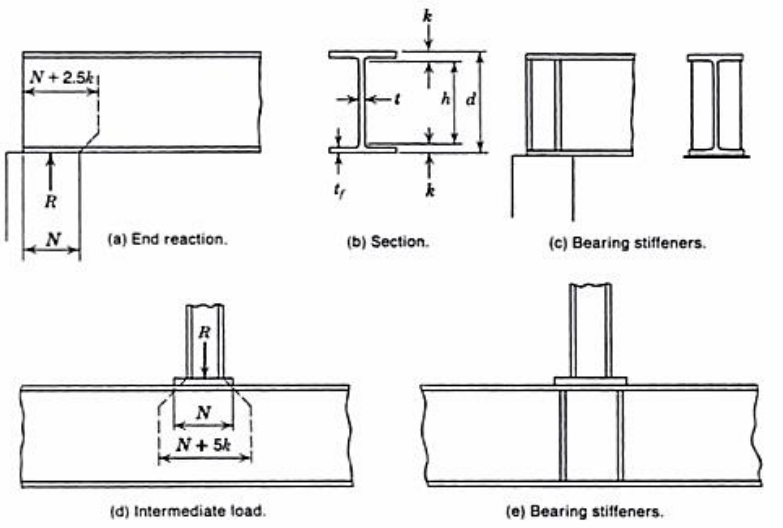
R_n = Kekuatan plat (MPa)

F_y = Tegangan ijin (MPa)

t_w = tebal plat *web* (mm)

k = jarak terjauh dari sambungan *web* ke *flange* (mm)

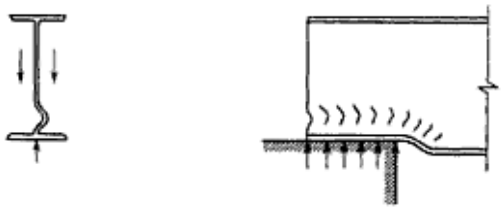
l_b = lebar plat *stiffener* (mm)



Gambar 2.12. *Stiffener* Transversal Untuk Mencegah *Local Web Yielding*

(Sumber: Crawley *et all*,1993)

2.2.4.3.*Web Local Cripling*



Gambar 2.13. Fenomena *Web Local Cripling*

(Sumber: Crawley *et all*,1993)

Web local cripling didefinisikan sebagai fenomena *web* yang tertekuk pada suatu segmen dari *web*. Fenomena *web local crippling* dapat dilihat pada **Gambar 2.13.**. Untuk mencegah kerusakan pada *web*, dapat diatasi dengan menambahkan *bearing stiffener* dengan posisi vertikal. Pada penilitian-penilitian sebelumnya, tinggi *web* dan tebal *flange* serta tegangan ijin dari profil merupakan faktor yang mempengaruhi *web local cripling* (Robert, 1989). Ketika gaya terkonsentrasi pada *web* yang akan ditahan memiliki jarak dari ujung profil yang lebih besar daripada tinggi profil (diantara *flange*) digunakan persamaan berikut:

$$\frac{R_n}{2.00} = 0.8{t_w}^2 \left\{1 + 3\left(\frac{l_b}{d}\right)\left(\frac{t_w}{t_f}\right)^{1.5}\right\}\sqrt{\frac{F_y.t_f}{t_w}} \quad (2.8)$$

Ketika gaya terkonsetrasi pada *web* yang akan ditahan memiliki jarak dari ujung profil yang lebih pendek daripada tinggi profil (diantara *flange*), maka berlaku dua syarat sebagaimana yang disusun pada persamaan berikut:

- Jika ${l_b}/{d} \leq 0.2$

$$\frac{R_n}{2.00} = 0.4{t_w}^2 \left\{1 + 3\left(\frac{l_b}{d}\right)\left(\frac{t_w}{t_f}\right)^{1.5}\right\}\sqrt{\frac{F_y.t_f}{t_w}} \quad (2.9)$$

- Jika ${l_b}/{d} > 0.2$

$$\frac{R_n}{2.00} = 0.4{t_w}^2 \left\{1 + \left(\frac{4l_b}{d} - 0.2\right)\left(\frac{t_w}{t_f}\right)^{1.5}\right\}\sqrt{\frac{F_y.t_f}{t_w}} \quad (2.10)$$

Dimana:

R_n = Kekuatan plat (MPa)

F_y = Tegangan ijin (MPa)

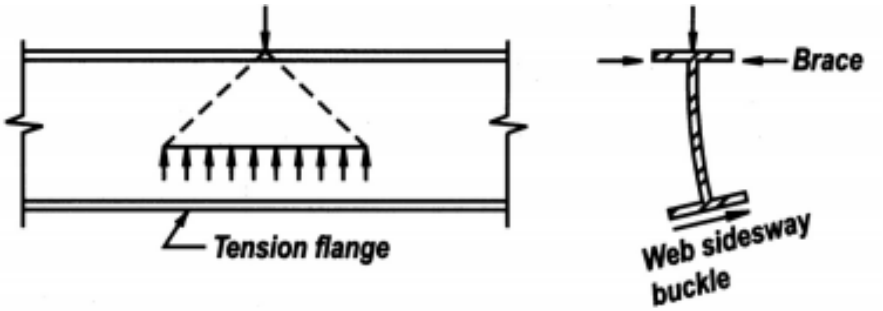
t_f = tebal plat *flange* (mm)

t_w = tebal plat *web* (mm)

l_b = lebar plat *stiffener* (mm)

d = tinggi nominal pada segmen profil (mm)

2.2.4.4.*Web Local Sidesway Buckling*



Gambar 2.14. Fenomena *Web Local Sidesway Buckling*

(Sumber: ANSI/AISC 360-10,2010)

Ketika perpindahan lateral relatif yang disebabkan oleh beban kompresi pada *flange* dan *flange* tidak dapat menahan beban yang terjadi , *web* akan mengalami puntiran akibat adanya konsetrasi tegangan tarik. Fenomena *web local sidesway buckling* dapat dilihat pada **Gambar 2.14.**. Hal ini dapat dicegah dengan memberikan *bracing* lateral pada titik beban dan mencegah rotasi akibat beban kompresi. *Bracing* lateral yang akan disambung pada bagian *flange*, didesain 1% dari konsentrasi beban yang terjadi pada titik tersebut. Ketika desain *stiffener* yang digunakan menahan gerakan rotasi, ANSI/AISC 360-10 memberi syarat $\frac{h/t_w}{L_b/b_f} \leq 2.3$ dengan persamaan kekuatan *stiffener* sebagai berikut:

$$\frac{R_n}{1.76} = \frac{C_r . {t_w}^3 . t_f}{h}\left[1 + 0.4\left(\frac{h/t_w}{L_b/b_f}\right)^3\right] \quad (2.11)$$

Ketika nilai $\frac{h/t_w}{L_b/b_f} > 2.3$, maka tidak perlu dilakukan penguatan menggunakan *stiffener*. Ketika desain *stiffener* yang digunakan tidak didesain untuk menahan gerakan rotasi, disyaratkan $\frac{h/t_w}{L_b/b_f} \leq 1.7$ dengan persamaan kekuatan *stiffener* sebagai berikut:

$$\frac{R_n}{1.76} = \frac{C_r . {t_w}^3 . t_f}{h}\left[0.4\left(\frac{h/t_w}{L_b/b_f}\right)^3\right] \quad (2.12)$$

Dimana:

R_n = Kekuatan plat (MPa)

C_r = 6.62 x 10^6 (MPa)

t_f = tebal plat *flange* (mm)

t_w = tebal plat *web* (mm)

h = jarak antar *flange* (mm)

L_b = panjang yang tidak tertahan (mm)

b_f = lebar *flange* (mm)

2.2.4.5.*Web Compression Buckling*

Ketika struktur mengalami tegangan tekan, *compression buckling* dapat terjadi. *Buckling* ditandai dengan defleksi mendadak dari suatu profil. Hal ini dapat terjadi

meskipun tegangan yang terjadi masih jauh dibawah tegangan ijin dari suatu profil. Beban yang terjadi pada suatu profil akan meningkat ketika profil sudah mengalami *buckling*. Pembebanan lebih lanjut akan menyebabkan deformasi yang signifikan dan tidak dapat diprediksi, yang mungkin menyebabkan hilangnya *load-carrying capacity*. Jika deformasi yang terjadi setelah *buckling* tidak menyebabkan *collapse* pada profil tersebut, profil tersebut akan tetap menumpu beban yang terjadi. Profil yang sudah mengalami *buckling* merupakan bagian dari komponen struktur yang lebih besar, beban apa pun yang diterapkan pada bagian tersebut dari luar struktur didistribusikan kembali ke profil lainnya pada suatu struktur (Bernuzzi *et all*,2016).

Kekuatan dari *stiffener* terhadap *web local compression buckling* dapat dihitung menggunakan persamaan yang disusun oleh ANSI/AISC 360-10, sebagai berikut:

$$\frac{R_n}{1.67} = \frac{24 t_w{}^3 \sqrt{F_y}}{h} \tag{2.13}$$

Dimana:

R_n = Kekuatan plat (MPa)

t_w = tebal plat *web* (mm)

h = jarak antar *flange* (mm)

F_y = panjang yang tidak tertahan (mm)

Ketika lokasi gaya yang terjadi pada ujung profil kurang dari setengah tinggi dari ujung profil, maka R_n harus dikurangi 50%. Jika diperlukan, maka *stiffener* transversal setinggi *web* ditambahkan untuk mencegah terjadinya *web compression buckling*.

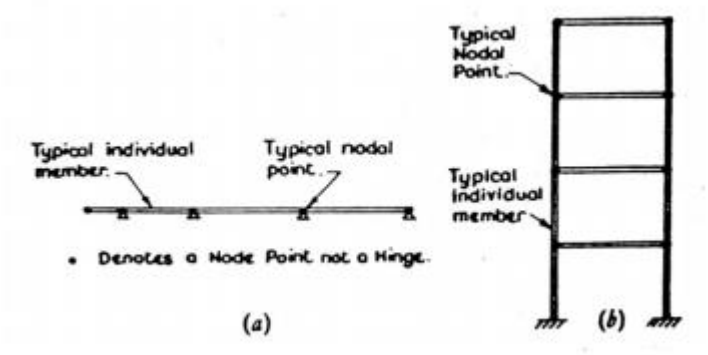
2.2.4.6. Metode Elemen Hingga

Analisa kekuatan sebuah struktur telah menjadi bagian penting dalam alur kerja pengembangan desain dan produk. Pada awalnya analisa kekuatan dilakukan dengan menggunakan rumusan-rumusan teoritis yang telah banyak tercantuk pada buku-buku panduang mekanika struktur dan teknik. Tetapi hal tersebut memiliki banyak kekurangan, salah satunya adalah harus dilakukan penyerderhanaan-penyederhanaan serta pengidealisasian kondisi-kondisi yang akan dianalisa agar dapat ke suatu persamaan dalam rumusan teoritis tersebut. Hal ini dapat menyebabkan berkurangnya

akuras dan ketepatan hasil analisa yang dihasilkan serta akan sangat sulit diaplikasikan pada bentuk struktur yang kompleks.

Untuk mengatasi hal tersebut dikembangkan berbagai macam metode analisa yang dapat mengatas hal tersebut. Salah satu metode tersebut adalah metode elemen hingga. Metode elemen hingga adalah sebuah metode yang menggunakan pendekatan numerik untuk menganalisa sebuah struktur untuk mendapatkan solusi pendekatan dari suatu permasalahan.

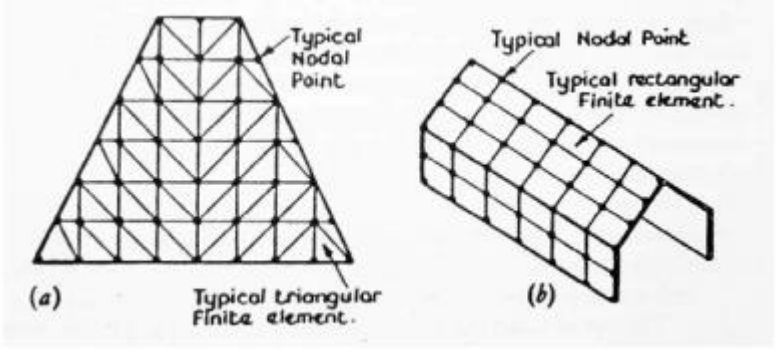
Untuk dapat memahami dengan mudah konsep dasar dari metode elemen hingga dapat diambil contoh sederhana dari salah satu bentuk struktur mekanika sebagaimana yang terlihat pada **Gambar 2.15.**. Seperti yang sudah diketahui, banyak struktur mekanika terbuat dari beberapa batang yang terhubung dengan menggunakan sambungan-sambungan sehingga membentuk sebuah struktur. Setiap titik penghubung batang-batang tersebut adalah yang disebut sebagai titik nodal.



Gambar 2.15. Tipikal Struktur Mekanika: (a) Struktur Batang;
(b) Struktur Bertingkat

Metode elemen hingga menggunakan prinsip yang sama dengan struktur sederhana tersebut dimana setiap struktur yang akan dianalisa dibagi terlebih dahulu menjadi elemen-elemen kecil seperti. Layaknya struktur yang ditunjukkan pada **Gambar 2.16.**. Analisa untuk struktur tersebut dapat dilkaukan dengan mengetahui terlebih dahulu bagaimana perilaku setiap elemen individual tersebut, kemudian elemen-elemen tersebut dihubungkan sedemikian rupa sehingga gaya-gaya kesetimbangannya dan kompabilitas dari perubahan posisi-posisi struktur tersebut sesuai pada setiap titik nodalnya.

Setelah kedua hal tesebut dipenuhi, analisa dapat dilakukan dengan menerapkan perhitungan-perhitungan numerik yang berdasarkan analisa struktur sederhana pada setiap elemen-elemen struktur tersebut. Perhitungan-perhitungan numerik tersebut direpresentasikan dengan menggunakan metode matriks untuk menganalisis struktur secara kesinambungan. Karena analisa yang dilakukan pada setiap elemen pada kedekatan hasil analisa terhadap kondisi sebenarnya sangat bergantung pada jumlah elemen yang dibagi pada struktur yang dianalisa tersebut. **Gambar 2.16.** menunjukkan contoh model metode elemen hingga yang diterapkan pada sebuah struktur konstruksi sederhana.



Gambar 2.16. Contoh Idealisasi Metode Elemen Hingga Pada Struktur:
(a) Tembok Dam; (b) Plat Lipat

Setelah mengetahui kondisi-kondisi dasar yang perlu diketahui dalam melakukan analisa struktur, hal lain yang perlu dilakukan adalah melakukan permodelan. Pada saat ini permodelan elemen hingga telah dilakukan bantuan perangkat lunak dan komputer. Adapun tahapan yang perlu dilakukan secara garis besar menjadi sebagai berikut:

1. Pembuatan geometri awal struktur yang akan dianalisa
2. Penentuan jumlah elemen yang akan diberikan pada model geometri tersebut
3. Pembuatan elemen dari hasil permodelan geometri struktur yang akan dianalisa (*mesh generation*)
4. Pengaturan kondisi batas (*constraint*/*boundary condition*)\
5. Penentuan jenis material dan properti dari material yang digunakan, hal ini berkenaan dengan massa jenis dan material tersebut
6. Pemberian kode pembebanan (*loading condition*). Kondisi pembebanan yang diberikan pada model struktur bergantung dengan kondisi nyatanya. Hal ini

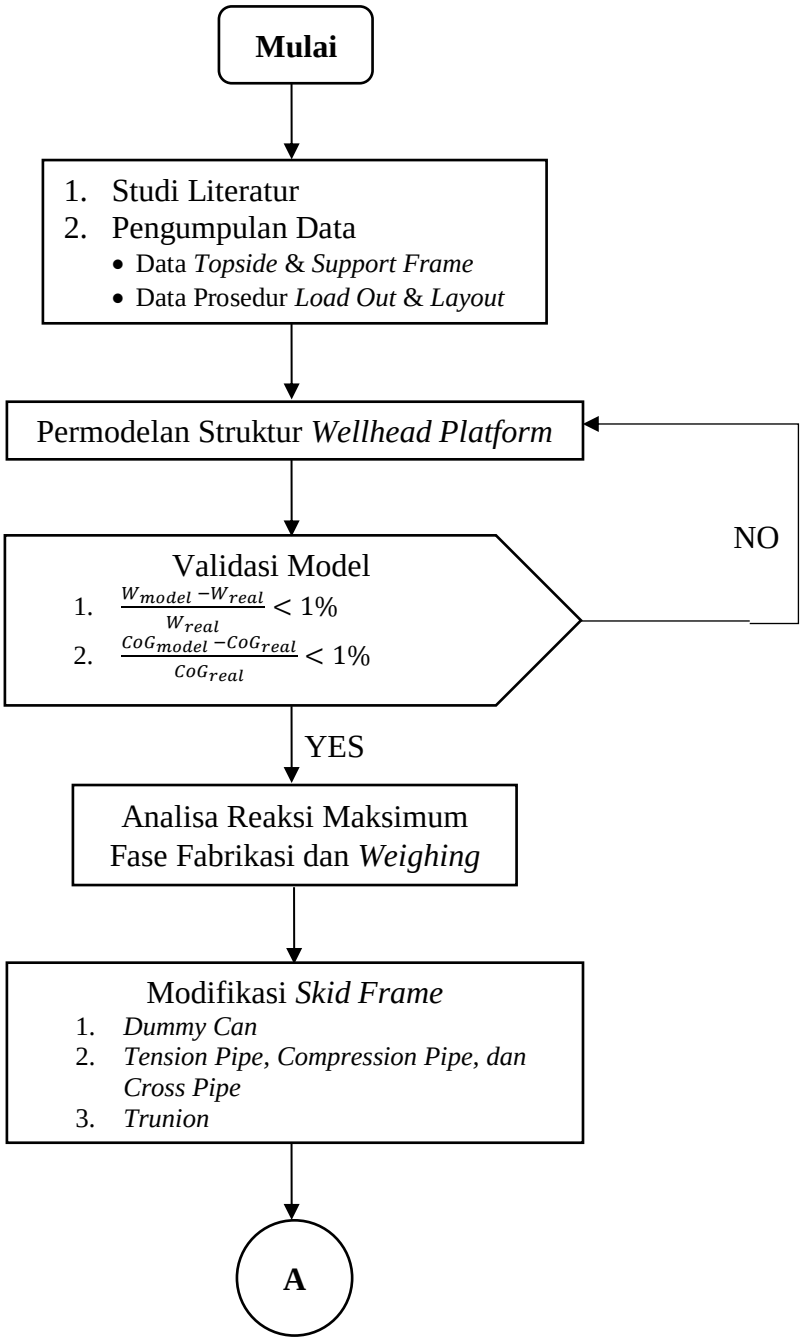
dilakukan untuk mendapatkan hasil yang sedekat mungkin dengan kondisi kenyataannya.

7. Analisa merupakan langkah terakhir dalam tahapan analisa metode elemen hingga. Analisa dilakukan dengan bantuan perangkat lunak *FEM* (*Finite Element Method*). Jenis analisa yang dapat dilakukan juga bervariasi dari jenis analisa statik, dinamis maupun perpindahan panas

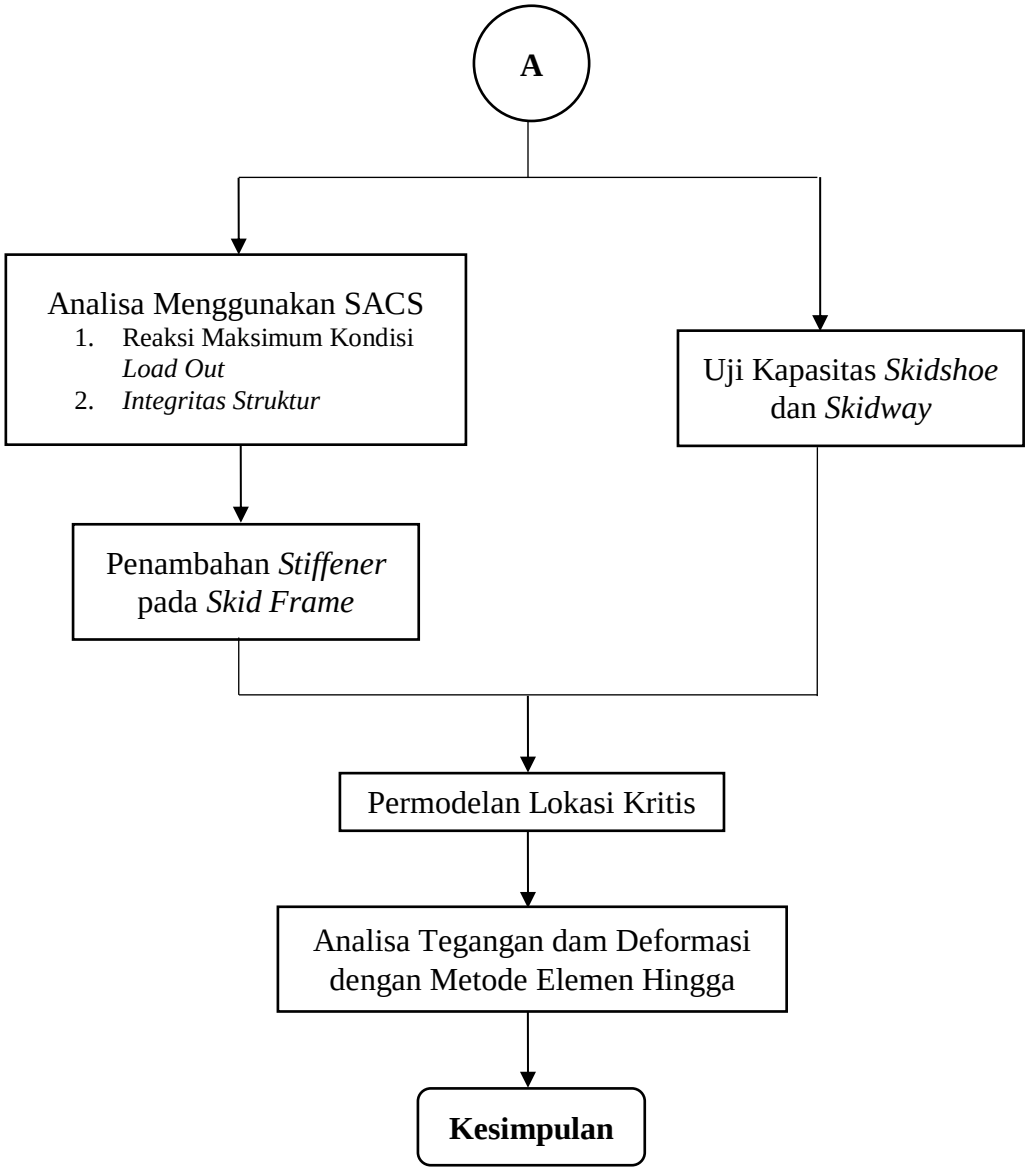
BAB III
METODOLOGI PENELITIAN

3.1. Metodologi Penelitian

Langkah-langah pengeraan tugas akhir disajikan dalam bentuk diagram alir sebagai berikut:



Gambar 3.1. Diagram Alir Pengerjaan Tugas Akhir



Gambar 3.1. Diagram Alir Pengerjaan Tugas Akhir (Lanjutan)

3.2. Prosedur Penelitian

Penjelasan mengenai diagram alir pengerjaan tugas akhir dapat dilihat pada uraian berikut :

1. Studi Literatur dan Pengumpulan Data

   Pada tahap ini, dilakukan proses pencarian, pengkajian, dan pengumpulan materi serta informasi yang relevan dan terpercaya yang dapat dijadikan acuan dalam pengerjaan tugas akhir ini. Diperlukan data mengenai struktur yang akan dilakukan *loadout* dan prosedur *loadout* yang akan dilakukan

2. Permodelan Struktur *Wellhead Platform*

   Dilakukan permodelan global menggunakan program SACS. Model SACS akan divalidasi menggunakan rasio selisih berat dan rasio selisih titik berat pada model dibandingkan dengan keadaan nyata. Data berat dan titik berat pada kondisi nyata, terdapat pada data *weight control report* dari perusaaan

3. Analisa Reaksi Maksimum pada Fase Fabrikasi dan Fase *Weighing*

   Model yang sudah divalidasi, dilakukan analisa reaksi dengan kondisi pembebanan pada fase fabrikasi dan fase *weighing*. Struktur akan divariasikan berdasarkan pergeseran titik berat yang mungkin terjadi akibat ketidaktepatan pada saat fabrikasi struktur *wellhead platform*

4. Modifikasi *Skid Frame*

   Desain *support frame* yang sebelumnya digunakan untuk *trailer loadout*, perlu dilakukan penggantian bagian yang sebelumnya tidak ada, atau dilakukan penggantian karena ketidaksesuaian dengan struktur yang baru. Pada tahap ini, *dummy can*, *tension pipe*, *compression pipe*, dan *cross pipe* akan dilakukan *unity check* untuk mengetahui desain awal dari komponen tersebut

5. Analisa Menggunakan SACS

   Struktur yang sudah dimodifikasi akan diuji denga kondisi pembebanan saat *load out*. Kondisi yang disimulasikan terbagi menjadi 3 kondisi, yaitu kondisi normal, kondisi ekstrim, dan kondisi penarikan. Kemudian dari setiap kondisi akan diketahui reaksi disetiap tumpuan *skid frame* dan lokasi yang mengalami kondisi kritis.

6. Uji Kapasitas *Skidshoe* dan *Skidway*

   Pada proses *loadout*, kondisi kritis tidak hanya muncul pada *skid frame*, namun bisa terjadi pada fasilitas lain, seperti *skidshoe* dan *skidway*. Pada tahap ini, dilakukan pengujian kapasitas dari struktur *skidshoe* dan *skidway*. Dimana *skidshoe* dan *skidway* juga pernah digunakan pada proyek lain.

7. Penambahan *Stiffener* pada *Skid Frame*

   Dari simulasi yang sudah dilakukan, diketahui lokasi kritis dan pembebanan yang terjadi pada *skid frame*. Untuk mengurangi kerusakan pada *skid frame* dan terutama pada struktur *wellhead platform*, *skid frame* diberikan penambahan *stiffener* jika diperlukan

8. Permodelan Lokasi Kritis

   Setelah ditentukan lokasi kritis skid frame, dilakukan permodelan pada lokasi kritis dengan bagian yang cukup mewakilkan struktur tersebut. Permodelan 3D dilakukan dengan SolidWorks sebagai input untuk analisa elemen hingga.

9. Analisa Tegangan dan Deformasi dengan Metode Elemen Hingga

   Pada tahapan ini, dilakukan analisa pada lokasi kritis skid frame yang telah ditentukan. Sehingga diketahui deformasi maksimum dan tegangan maksimum yang terjadi.

BAB IV
ANALISA HASIL DAN PEMBAHASAN

4.1. Pengumpulan Data

Pada penelitian tugas ini, digunakan struktur *wellhead platform* dengan kriteria desain sebagai berikut:

Tabel 4.1. Data Berat *Service Condition*

Category	Cont (%)	Factored Weight (T)	
		Dry	Operating
Topside Structure	7%	953,58	953,20
Architectural	7%	7,44	7,44
Piping	7%	222,33	243,29
Mechanical	7%	95,85	123,61
Intrument	7%	76,88	76,88
Telecomunication	10%	0,67	0,67
Electrical	10%	30,98	30,98
Safety	10%	4,53	4,53
Live Load	-50%	0,00	857,35
Subtotal Weight	**-**	**1.392,26**	**2.297,96**
Instalation Aids	-	0,00	0,00
Future	25%	159,75	173,24
Total Weight	**-**	**1.552,01**	**2.471,2**

Tabel 4.2. Data Berat *Pre-Service Condition*

Category	Cont (%)	Factored Weight (T)		
		Load Out	Transportation	Lifting
Topside Structure	7%	953,58	953,58	953,58
Architectural	7%	7,44	7,44	7,44
Piping	7%	210,66	210,66	210,66
Mechanical	7%	108,04	108,04	108,04
Intrument	7%	76,88	76,88	76,88
Telecomunication	10%	0,67	0,67	0,67
Electrical	10%	30,98	30,98	30,98
Safety	10%	4,53	4,53	4,53
Subtotal Weight	**-**	**1.392,26**	**1.392,26**	**1.392,26**
Instalation Aids	-	63,25	240,75	63,25
Total Weight	**-**	**1.456,03**	**1.633,53**	**1.456,03**

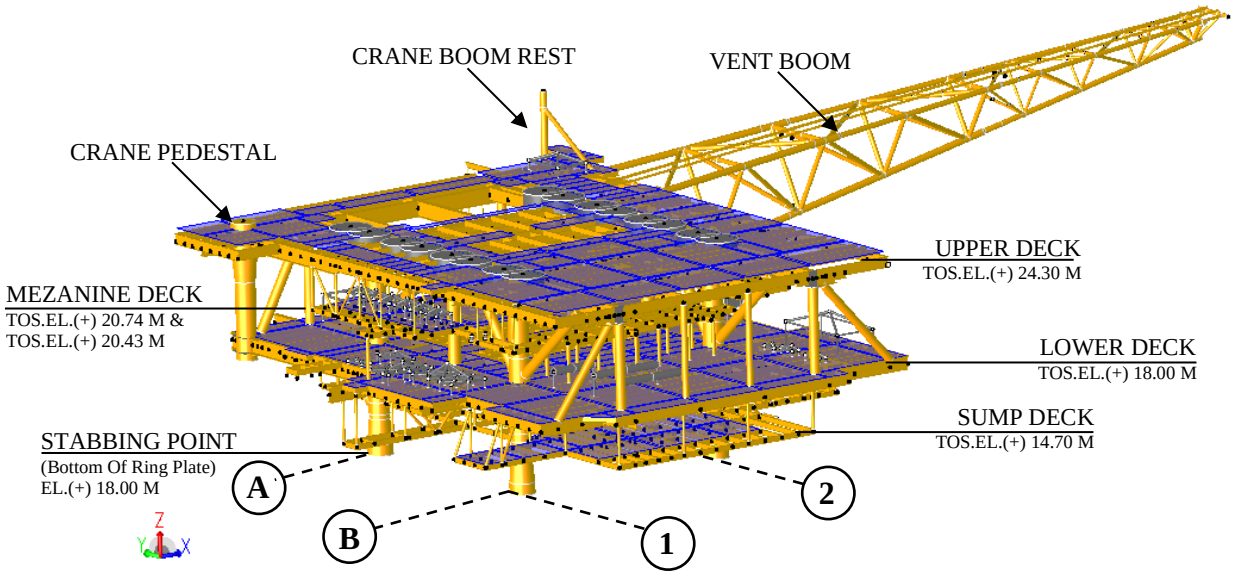
Tabel 4.3. Data Titik Berat

Category	Fact. Weight (T)	Center Of Gravity (m)		
		X	Y	Z
Dry	1.552	1.76	0.31	20.35
Operating	1.471	1.35	0.05	20.90
Load Out	1456	1.69	0.16	20.50
Transportation	1634	1.51	0.14	19.59
Lifting	1456	1.69	0.16	20.50

Dari data yang dilampirkan diatas, digunakan data-data yang berhubungan dengan *load out* sebagai penunjang penyelesaian tugas akhir. Berat dan titik berat dari struktur yang akan dimodelkan mengacu pada baris dan kolom yang ditandai. Data-data yang berhubungan dengan desain dari *platform*, *skid frame*, *skidshoe*, dan *skidways* yang akan dilakukan *loadout* dapat dilihat pada **Lampiran A**.

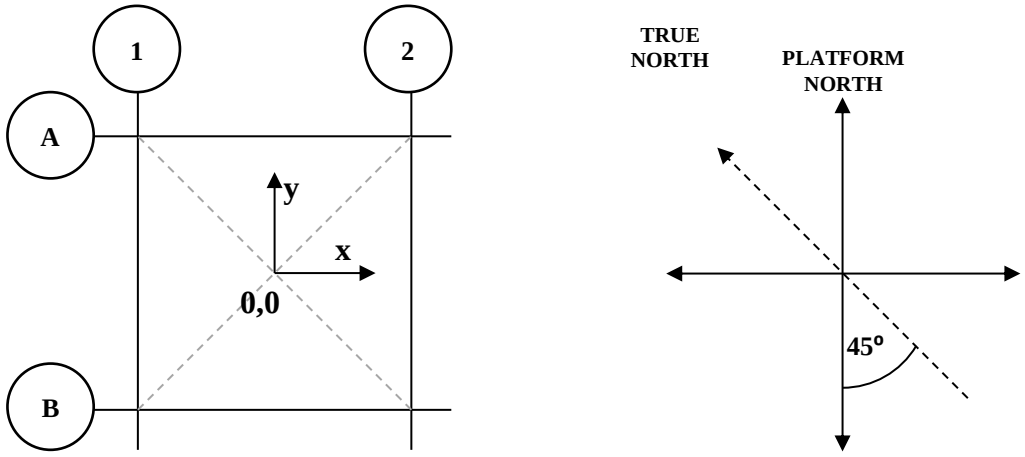
4.2. Permodelan Struktur *Wellhead Platform*

Setelah diperoleh data mengenai beban dan *layout* dari beban yang ada pada *wellhead topside* dilakukan permodelan menggunakan SACS 5.7 V8.1 Series 4. Dengan melakukan permodelan *topside*, dapat dilakukan analisa reaksi setiap tumpuan yang akan ditumpu oleh *temporary support frame* atau *skid frame*. Hasil dari permodelan *topside* pada SACS dapat dilihat pada **Gambar 4.1.**.



Gambar 4.1. Model *Topside* pada SACS (*Isometric*)

Pada permodelan *topside wellhead platform*, model dimodelkan menggunakan satuan SI dan pusat koordinat (x=0 dan y=0) berada pada pusat geometri dari *gridlines* A & B dan *gridlines* 1 & 2, sedangkan EL(±) 0.00 berada pada *chart datum* dan *chart datum* mengacu pada LAT (*Lowest Astronomical Tide*). Ilustrasi pusat koordinat dan orientasi *platform* dapat dilihat pada **Gambar 4.2.**.



Gambar 4.2. Pusat Koordinat dan Orientasi Platform

Struktur *topside wellhed platform* yang sudah dimodelkan dilakukan validasi. Validasi dilakukan dengan membandingkan total berat model dengan total berat struktur yang sebenarnyadan perbandingan titik berat dari model dengan struktur yang sebenarnya. Posisi titik berat akan mempengaruhi lengan beban terhadap setiap tumpuan dan total berat sebagai beban yang akan didistribusikan ke setiap tumpuan.

Tabel 4.4. Validasi Perbandingan Berat Model dengan Berat Struktur

Description	**Load Case**	**SACS (T)**	***Weight Control Report* (T)**
Topside	104	953.90	953.58
	201		
	202		
Architectural	205	6.82	7.44
Piping	404	192.90	210.66
Mechanical	401	46.56	108.04
Intrument	403	68.59	76.88
Electrical	402	27.63	30.98
Telecomunication	406	0.59	0.67
Safety	405	4.05	4.53
Installation Aids	207	53.96	63.25
Difference	**6.94%**	**1355.00**	**1456.03**

Tabel 4.4. Validasi Perbandingan Berat Model dengan Berat Struktur (lanjutan)

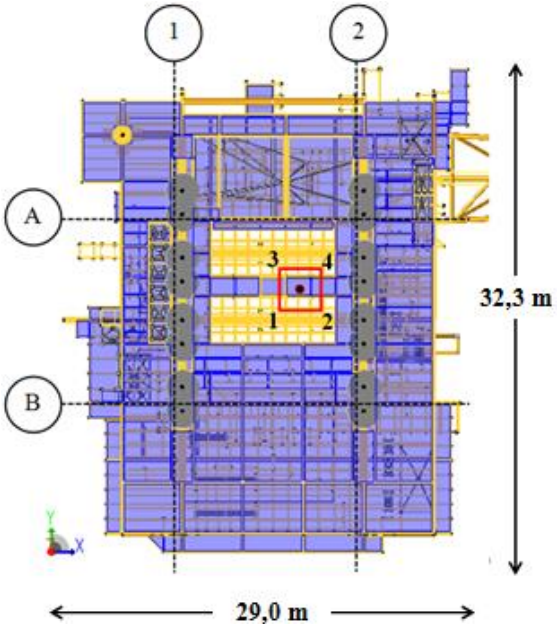
Description	Load Case	SACS (T)	Weight Control Report (T)
Weight Adjustment	621	99.99	-
Difference	**0.07%**	**1454.99**	**1456.03**

Tabel 4.5. Titik Berat Model dengan Titik Berat Struktur

Description	Weight (T)	Coordinate (m) - 0,0 = Platform Geometrical Center		
		X	Y	Z
Weight Control Report	1456	1.69	0.16	20.50
SACS	1455	1.69	0.16	19.81

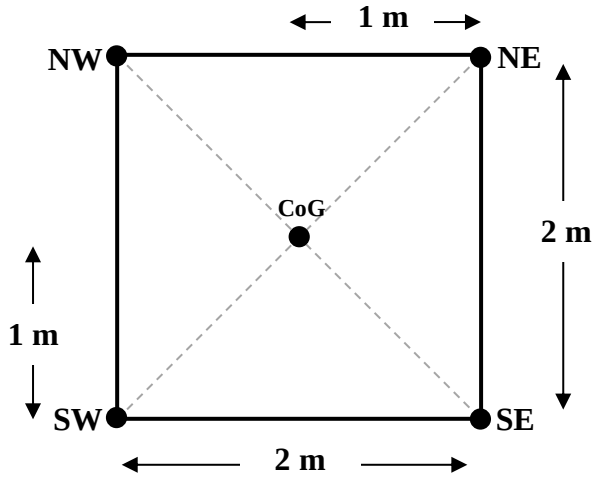
4.3. Analisa Reaksi Tumpuan Struktur *Wellhead Platform* Pada Fase Fabrikasi dan Fase *Weighing*

Pada konstruksi struktur, struktur memiliki kemungkinan pergeseran titik berat akibat proses-proses fabrikasi. Sehingga perlu dilakukan pula perhitungan pergeseran titik berat. Berdasarkan *ISO 19901-5 part 5*, *CoG envelope* berpusat pada titik berat yang sesuai dengan perencanaan awal struktur dan *CoG envelope* memiliki panjang setiap sisinya adalah 5% dari seluruh lebar dan tinggi pada struktur utama (pada kasus ini *vent boom* dan *crane* tidak masuk sebagai struktur utama). Sedangkan pada *design basic* mensyaratkan ukuran *CoG envelope* tidak kurang dari 2m x 2m.



Gambar 4.3. Ukuran *Deck* Tampak Atas

Pada **Gambar 4.3**, dapat dilihat dimensi dari *deck* tampak atas. *Deck* memiliki 5% dari panjang sebesar **1,61 m** dan 5% dari lebar sebesar **1,45 m**. Seperti yang disyaratkan pada *design basic*, ukuran *CoG envelope* tidak boleh kurang dari 2 m x 2 m, maka ditentukan *CoG envelope* berukuran 2 m x 2m. Titik berat akan bergeser ke 4 titik lainnya sejauh ±1 m ke ujung setiap *envelope* seperti yang ditunjukkan **Gambar 4.4**.



Gambar 4.4. Ukuran *CoG Envelope*

Untuk mengetahui reaksi maksimum yang terjadi pada setiap kaki struktur *wellhead platform*, dilakukan perhitungan reaksi dengan menggunakan *MS Excel*. Reaksi yang terjadi akan dijadikan pertimbangan untuk merencanakan desain dari *skid frame*, terutama pada fase fabrikasi dan fase *weighing*. Pada fase fabrikasi dan fase *weighing* digunakan data berat struktur pada kondisi *dry* (dilihat pada **Tabel 4.1**). Diketahui pula pergeseran titik berat yang terjadi pada struktur, dilihat pada **Tabel 4.6.**.

Tabel 4.6. Koordinat pada *CoG Envelope*

Description	**Weight (T)**	**Coordinate (m) - 0,0 = Platform Geometrical Center**		
		X	**Y**	**Z**
COG	1455	1.76	0.31	20.35
SW	1455	0.76	-0.69	20.35
SE	1455	2.76	-0.69	20.35
NW	1455	0.76	1.31	20.35
NE	1455	2.76	1.31	20.35

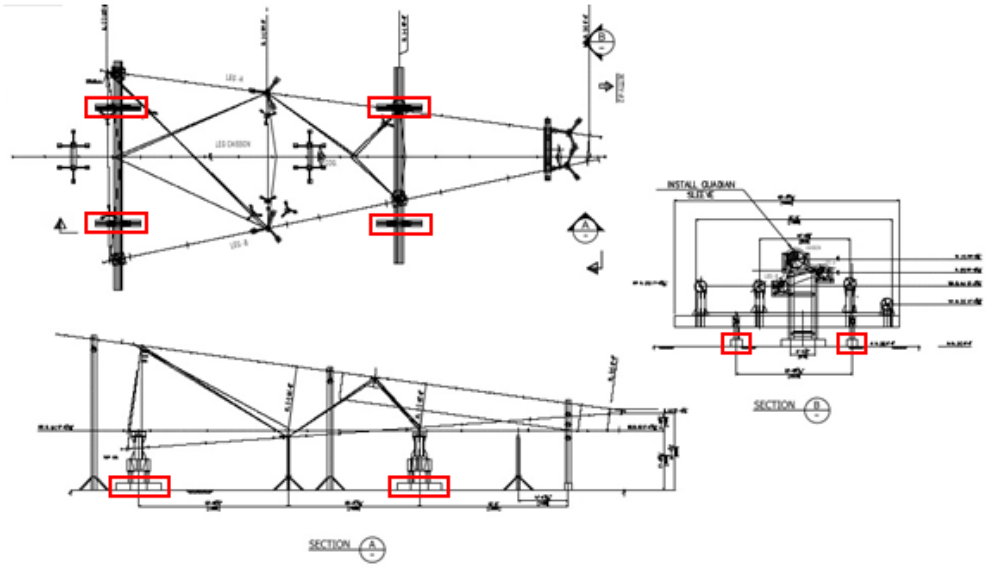
Setelah dilakukan perhitungan yang dapat dilihat pada **Lampiran B**, diperoleh reaksi maksimum yang terjadi disetiap kaki struktur *wellhead platform*. Hasil perhitungan reaksi pada fase fabrikasi dan fase *weighing* dapat dilihat pada **Tabel 4.7.**. Reaksi maksimum dari seluruh kaki akan dijadikan acuan untuk merencanakan dimensi *dummy leg* atau *support can* yang akan menumpu setiap kaki dari struktur *wellhead platform*.

Tabel 4.7. Reaksi pada Fase Fabrikasi dan Fase *Weighing*

Support	***Centre Of Gravity Location***					***Max Reaction***
	Initial CoG	***Shift-1***	***Shift-2***	***Shift-3***	***Shift-4***	
	MT	**MT**	**MT**	**MT**	**MT**	**MT**
A1	301.46	208.52	310.29	276.14	**410.90**	**410.90**
A2	509.61	489.40	387.63	**648.09**	513.33	**648.09**
B1	275.39	255.18	**379.71**	187.56	279.10	**379.71**
B2	465.53	**598.90**	474.36	440.21	348.67	**598.90**

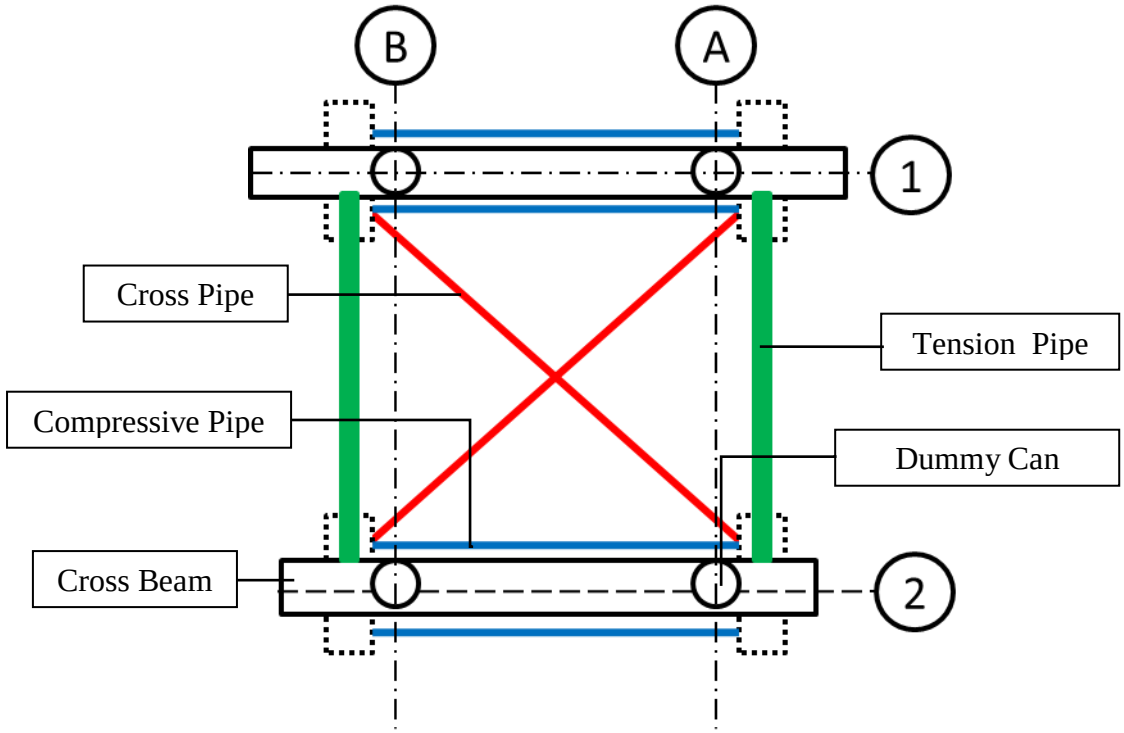
4.4. Modifikasi *Skid Frame*

Pada perencanaan *loadout wellhead platform*, digunakan *skid frame* yang sebelumnya digunakan sebagai *support frame* dari *trailer loadout jacket*. *Support frame* dilakukan modifikasi dengan melakukan penggantian pada bagian *support beam* yang menjadi tumpuan pada *trailer*, perlu diganti menjadi *skidshoe* seperti yang terlihat pada **Gambar 4.5.**. Desain awal dari *skid frame* dan *skidshoe* dilihat pada **Lampiran A**.



Gambar 4.5. Bagian *Support Frame* yang Akan Dimodifikasi Menjadi *Skid Frame*

Struktur *skid frame* akan ditarik pada setiap *skidshoe* di barisan yang sama. Ketika penarikan berlangsung, *skidshoe* dipertahankan supaya berjalan bersamaan untuk mengurangi kerusakan yang ditanggung oleh struktur. Apabila *skidshoe* yang ditarik tidak berjalan bersamaan, maka struktur *wellhead platform* yang akan menanggung beban yang terjadi akibat perubahan posisi setiap tumpuannya. Struktur *skid frame* yang sebelumnya tidak memiliki koneksi antara satu *skid shoe* dengan *skidshoe* lainnya, perlu didesain *properties* dari koneksi ini. Desain dari koneksi antar *skidshoe* dapat dilihat pada **Gambar 4.6.**.



Gambar 4.6. Koneksi Antar *Skid Shoe*

Struktur *skid frame* yang sebelumnya digunakan untuk *loadout* struktur *jacket* pula tentu memiliki perbedaan posisi dan ukuran *dummy can*, sehingga bagian ini perlu diganti dengan ukuran yang sesuai dan mampu menahan beban diatasnya.

4.4.1. Desain *Dummy Can*

Setelah diketahui reaksi yang terjadi, dapat ditentukan desain dari *dummy leg* yang akan digunakan. Diketahui reaksi maksimum pada fase fabrikasi dan *fase weighing* terjadi pada kaki A2, desain dari kaki lainnya akan mengikuti ukuran dari kaki B2.

Tabel 4.8. Reaksi Maksimum pada Fase Fabrikasi dan Fase *Weighing*

LEG	**B1**	**B2**	**A1**	**A2**
Max. Reaction (MT)	379.714	598.899	410.904	**648.093**

Dengan menggunakan perhitungan yang telah diatur pada API RP 2A LRFD ditentukan desain awal dari *dummy can* dengan *properties* seperti yang terlihat pada **Tabel 4.9.** dan perhitungan menggunakan MS Excel dapat dilihat pada **Lampiran C**.

Tabel 4.9. Desain *Dummy Can*

Outside Diameter	OD	=	150	cm
Wall Thickness	t	=	5.08	cm
Area	A	=	2312.82	cm^2
Material	**S355 Steel**			
Yield Strength	F_y	=	355	MPa
Young Modulus	E	=	200000	MPa
Effective Length Factor	K	=	1.00	
Unbraced Length	l	=	1535.5	cm
Radius of Gyration	r	=	542.88	cm

Tabel 4.10. *Unity Check* Desain Awal *Dummy Can*

	Allowable (MPa)	***Actual (MPa)***	***UC***	***Note***
Tension	294.95	3.90	0.0133	***SECURE!***
Compression (Buckling)	203.67	3.90	0.0192	***SECURE!***

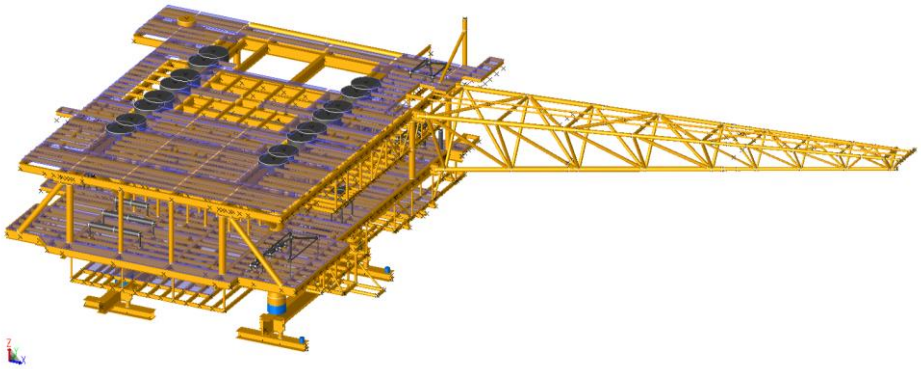
4.4.2. Desain *Tension Pipe, Compression Pipe, Cross Pipe* dan *Trunion Skidshoe*

Setelah perubahan pada bagian-bagian yang diperlukan, seperti *dummy can* dan penggantian *skidshoe*, dapat diketahui berat struktur sementara. Berat struktur sementara ini digunakan untuk mencari gaya tarik yang diperlukan untuk menggerakkan struktur. Pada kondisi penarikkan, satu kaki dengan kaki yang lain akan bergerak masing-masing karena tidak ada koneksi antar struktur *skid frame*. Namun, pada kondisi

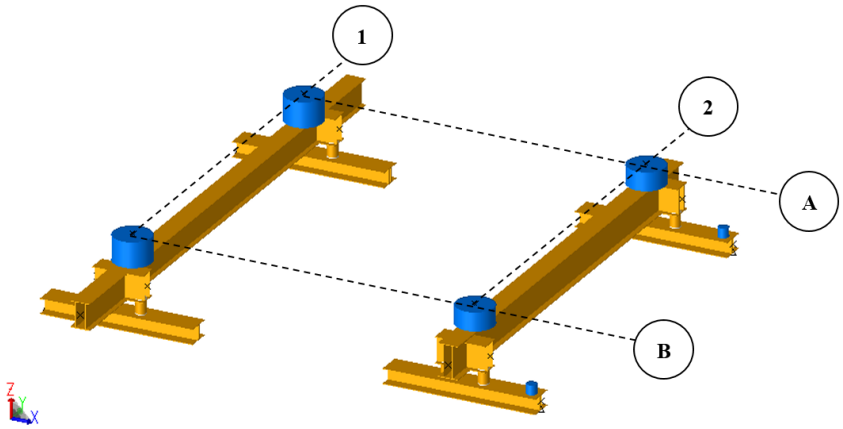
tersebut struktur *wellhead* menjadi konektor antara 1 bagian *skid frame* dengan bagian lainnya, akibatnya struktur *wellhead platform* menanggung beban yang terjadi.

Untuk mencegah kerusakan pada struktur yang akan dilakukan *loadout*, didesain koneksi antar bagian *skid frame*, sehingga *skid frame* memiliki integritas antara 1 bagian dengan bagian lainnya.

Struktur *wellhead platform* yang sudah dimodelkan, dilakukan penambahan *skid frame* awal untuk mengetahui reaksi tiap kaki. Model *wellhead platform* dan *skid frame* awal dapat dilihat pada **Gambar 4.7.** dan detail dari bagian *skid frame* dapat dilihat pada **Gambar 4.8.**.



Gambar 4.7. Struktur *Wellhead Platform* dan *Skid Frame* Awal (SACS)



Gambar 4.8. Detail *Skid Frame* Awal (SACS)

Model tersebut disimulasikan pada kondisi-kondisi yang mungkin terjadi saat *load out*. Selain struktur memiliki kemungkinan pergeseran titik berat akibat proses fabrikasi, struktur maupun *skid frame* memiliki kemungkinan mengalami perpindahan ke atas maupun ke bawah. Berdasarkan *GL0013/ND*, struktur harus mampu mengatasi subsidence pada tumpuan setidaknya 25 mm, sedangkan *design basic* mensyaratkan

sebesar 30 mm ke arah atas dan bawah untuk kondisi normal dan 60 mm ke arah atas dan bawah untuk kondisi ekstrim.

Setelah mengetahui kondisi yang mungkin terjadi saat proses *loadout*, disusun kondisi-kondisi yang akan disimulasikan pada model. Untuk struktur yang akan dilakukan *loadout*, kondisi normal terbagi menjadi 2 yaitu kondisi *fully support* dan *support displacement*. *Fully support* merupakan kondisi ketika seluruh kaki tertumpu secara penuh dan tumpuan tidak mengalami kemiringan atau pergeseran, pada kondisi ini hanya divariasikan berdasarkan letak titik berat. Sedangkan kondisi *support displacement* merupakan kondisi ketika salah satu tumpuan mengalami pergeseran. Variasi kondisi pembebanan saat kondisi normal dapat dilihat pada **Tabel 4.11.**.

Pada *design basic*, kondisi ekstrim disyaratkan pada 2 kondisi, yaitu *support displacement* sebesar 60 mm dan kondisi *loss of support*. Pada kondisi *loss of support*, salah satu kaki dianggap kehilangan tumpuannya dan kaki lainnya menumpu struktur. Variasi kondisi pembebanan saat kondisi ekstrim dapat dilihat pada **Tabel 4.12.**.

Tabel 4.11. Kondisi Normal Analisa Reaksi *Wellhead Platform* dan *Skid Frame*

Load Case	***Description***	***COG Shift***
	Normal Condition: Fully Support Case At Different COG Condition	
3101	*Fully Support for COG Shift to Center of Envelope*	-
3102	*Fully Support for COG Shift to SW Corner of Envelope*	*SW*
3103	*Fully Support for COG Shift to SE Corner of Envelope*	*SE*
3104	*Fully Support for COG Shift to NW Corner of Envelope*	*NW*
3105	*Fully Support for COG Shift to NE Corner of Envelope*	*NE*
	Normal Condition: *+/-30MM Vertical Support Displacement*	
3201-3208	*Normal Case +/-30mm Vertical Support Displacement (No COG Shift)*	-
3211-3218	*Normal Case +/-30mm Vertical Support Displacement (COG Shift To SW At Leg B1)*	*SW*
3221-3228	*Normal Case +/-30mm Vertical Support Displacemen (COG Shift To SE At Leg B2)*	*SE*
3231-3238	*Normal Case +/-30mm Vertical Support Displacement (COG Shift To NW At Leg A1)*	*NW*
3241-3248	*Normal Case +/-30mm Vertical Support Displacement (COG Shift To NE At Leg A2)*	*NE*

Tabel 4.12. Kondisi Ekstrim Analisa Reaksi *Wellhead Platform* dan *Skid Frame*

Load Case	***Description***	***COG Shift***
	Extreme Condition : +/-60MM Vertical Support Displacement	
3301-3308	*Extreme Case +/-60mm Vertical Support Displacement (No COG Shift)*	-
3311-3318	*Extreme Case +/-60mm Vertical Support Displacement (COG Shift To SW At Leg B1)*	*SW*
3321-3328	*Extreme Case +/-60mm Vertical Support Displacement (COG Shift To SE At Leg B2)*	*SE*
3331-3338	*Extreme Case +/-60mm Vertical Support Displacement (COG Shift To NW At Leg A1)*	*NW*
3341-3348	*Extreme Case +/-60mm Vertical Support Displacement (COG Shift To NE At Leg A2)*	*NE*
	Extreme Condition: Loss Of Support at 1 Leg	
3401-3405	*Extreme Case Loss Of Support at Leg B1*	
3411-3415	*Extreme Case Loss Of Support at Leg B2*	
3421-3425	*Extreme Case Loss Of Support at Leg A1*	
3431-3435	*Extreme Case Loss Of Support at Leg A2*	

Dengan mengetahui hasil reaksi maksimum dari setiap kaki, dapat dilakukan perhitungan beban tarik minimum pada struktur yang akan dilakukan *loadout*. Kondisi penarikan saat *skidding loadout* terbagi menjadi 2 kondisi pembebanan, yaitu *even skidding* dan *uneven skidding. Even skidding* dilakukan dengan menarik kedua baris dari *skid frame* secara bersamaan. *Uneven skidding* dilakukan dengan menarik salah satu baris dari *skid frame*, kondisi ini biasanya ditujukan untuk menyesuaikan posisi salah satu baris. Variasi kondisi pembebanan saat kondisi normal dilihat pada **Tabel 4.13.**.

Tabel 4.13. Kondisi Penarikan Analisa Reaksi *Wellhead Platform* dan *Skid Frame*

Load Case	***Description***	***COG Shift***
	Skidding Condition : Even Skidding Condition (Pulling At Leg A2 & B2)	
3501-3505	*Fully Support Even Skidding*	-
3511-3518	*+/-30mm Vertical Displacement (No COG Shift) While Even Skidding*	-
3521-3528	*+/-30mm Vertical Displacement (COG Shift to SW) While Even Skidding*	*SW*
3531-3538	*+/-30mm Vertical Displacement (COG Shift to SE) While Even Skidding*	*SE*
3541-3548	*+/-30mm Vertical Displacement (COG Shift to NW) While Even Skidding*	*NW*
3551-3558	*+/-30mm Vertical Displacement (COG Shift to SE) While Even Skidding*	*NE*

Tabel 4.13. Kondisi Penarikan Analisa Reaksi *Wellhead Platform* dan *Skid Frame* (lanjutan)

Load Case	***Description***	***COG Shift***
	Skidding Condition : Uneven Skidding Condition (Pulling At Leg A2)	
3601-3605	*Fully Support Even Skidding*	-
3611-3618	*+/-30mm Vertical Displacement (No COG Shift) While Even Skidding*	-
3621-3628	*+/-30mm Vertical Displacement (COG Shift to SW) While Even Skidding*	*SW*
3631-3638	*+/-30mm Vertical Displacement (COG Shift to SE) While Even Skidding*	*SE*
3641-3648	*+/-30mm Vertical Displacement (COG Shift to NW) While Even Skidding*	*NW*
3651-3658	*+/-30mm Vertical Displacement (COG Shift to SE) While Even Skidding*	*NE*
	Skidding Condition: Uneven Skidding Condition (Pulling At Leg B2)	
3701-3705	*Fully Support Even Skidding*	-
3711-3718	*+/-30mm Vertical Displacement (No COG Shift) While Even Skidding*	-
3721-3728	*+/-30mm Vertical Displacement (COG Shift to SW) While Even Skidding*	*SW*
3731-3738	*+/-30mm Vertical Displacement (COG Shift to SE) While Even Skidding*	*SE*
3741-3748	*+/-30mm Vertical Displacement (COG Shift to NW) While Even Skidding*	*NW*
3751-3758	*+/-30mm Vertical Displacement (COG Shift to SE) While Even Skidding*	*NE*

Untuk menentukan beban tarik yang bekerja saat *loadout*, dilakukan perhitungan minimal beban tarik yang diberikan pada struktur supaya struktur mulai bergerak. Gaya tarik yang diberikan akan berlawanan dengan gaya gesek yang terjadi pada struktur, dimana gaya gesek dipengaruhi oleh gaya normal. Pada kasus ini, gaya normal sama dengan gaya berat. Diketahui gesekan saat *skidding load out* terjadi antara besi yang dilapisi teflon dengan kayu, koefisien gesek yang terjadi tergolong *teflon – waxed wood* berdasarkan *DNV GL – ST – N001* seperti yang terlihat pada **Tabel 4.14.**.

Tabel 4.14. Tabel Koefisien Gesek (tabel 10-2. DNV GL-ST-N001)

Sliding surfaces	*Break-out*	*Moving*
Steel/Steel	0.30	0.20
Steel/Teflon	0.25	0.10
Stainless steel/Teflon	0.20	0.07
Teflon/Unwaxed wood	0.40	0.10
Teflon/Waxed wood	0.25	0.08
Steel/Waxed wood	0.28	0.15

Setelah mengetahui koefisien gesek yang terjadi dapat dilakukan perhitungan gaya gesek statis untuk menentukan besar beban tarik minimal penggerak struktur menggunakan persamaan gaya gesek berdasarkan *DNV GL – ST – N001*. Perhitungan dilakukan dengan menggunakan MS Excel, dapat dilihat pada **Lampiran C**.

$F = \mu(W + W_{eq}) + P$

Dimana :

F = Gaya minimal penggerak struktur (T)

μ = Koefisien gesek

W = Berat struktur (T)

W_{eq} = Berat peralatan (T)

P = Gaya lain yang diberikan pada struktur (T)

Tabel 4.15. Tabel Hasil Perhitungan Gaya Gesek di Setiap Tumpuan

	Max Load (T)	***Condition***	***Friction Coefficient***	***Friction Load (T)***
LEG B1	6762.115	*Break-out*	0.25	1690.52875
		Moving	0.08	540.9692
LEG A1	6368.836	*Break-out*	0.25	1592.209
		Moving	0.08	509.50688
LEG B2	8031.827	*Break-out*	0.25	2007.95675
		Moving	0.08	642.54616
LEG A2	8493.429	*Break-out*	0.25	2123.35725
		Moving	0.08	679.47432
ROW-A	8551.64	*Break-out*	0.25	2137.909
		Moving	0.08	684.131
ROW-B	8249.46	*Break-out*	0.25	2062.365
		Moving	0.08	659.957
ROW-A & ROW-B	14941.08	*Break-out*	0.25	3735.270
		Moving	0.08	1195.286

Pada kondisi-kondisi penarikan saat *skidding* loadout, desain dari *tension pipe*, *compression pipe*, dan *cross pipe* diasumsi harus dapat menahan beban sebesar gaya tarik saat *loadout*. Ditentukan desain awal dari *tension pipe*, *compression pipe*, dan *cross pipe* pada **Tabel 4.16.** dan hasil dari perhitungan *unity check* dapat dilihat pada **Tabel 4.17.** seperti pada **Lampiran C**.

Tabel 4.16. Desain *Tension Pipe, Compression Pipe,* dan *Cross Pipe*

Outside Diameter	O_D	=	18	in	=	45.72	cm
Wall Thickness	t	=	0.625	in	=	1.5875	cm
Area	A	=	220.101	cm^2			
Material	**API 5L X52**						
Yield Strength	Fy	=	360	MPa			
Young Modulus	E	=	200000	MPa			
Radius	r	=	22.86	cm			

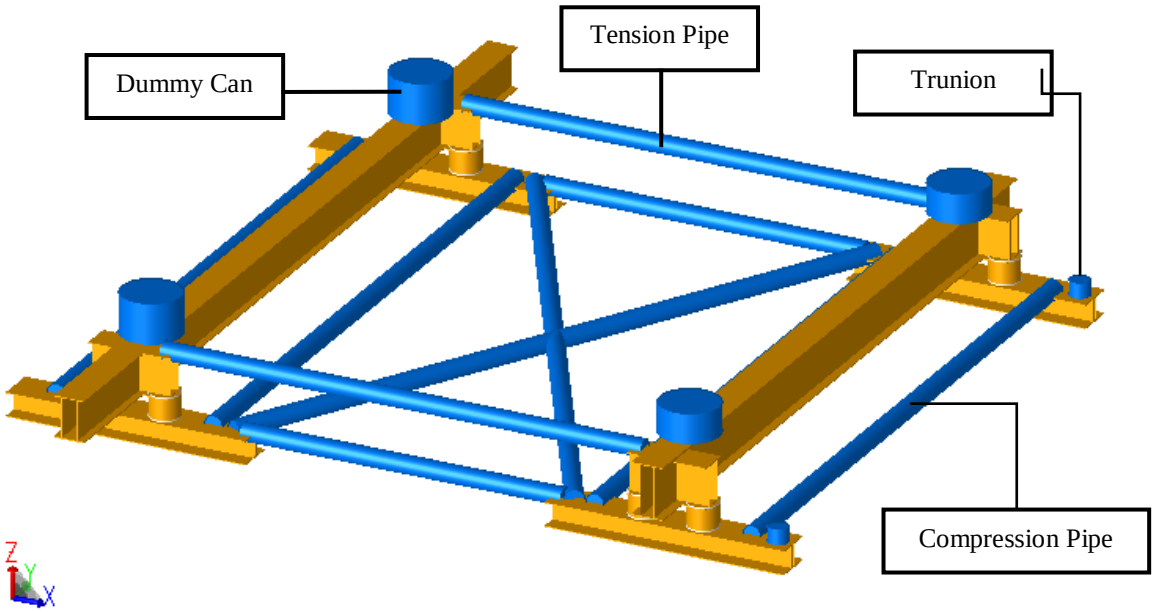
Tabel 4.17. *Unity Check* Desain Awal *Tension Pipe*, *Compression Pipe*, dan *Cross Pipe*

	Allowable (MPa)	***Actual (MPa)***	***UC***	***Note***
Axial Tension	19.885	30.600	0.650	***SECURE!***

4.5. Analisa Menggunakan SACS

Desain dari *skid frame* yang telah direncanakan pada kondisi-kondisi yang telah disusun, perlu dilakukan pengujian integritas dari *skid frame*. Pada tahap desain, masih dilakukan asumsi-asumsi mengenai beban yang akan bekerja pada struktur yang didesain. Tujuan dari pengujian integritas *skid frame* adalah supaya diketahui letak lokasi kritis dari berbagai kondisi pembebanan. Sehingga dapat diketahui perlakuan yang perlu diberikan pada struktur *skid frame,* jika lokasi tersebut melewati batas tegangannya.

Pada pengujian integritas dari desain *skid frame* digunakan model yang sudah dimodifikasi seperti yang terlihat pada **Gambar 4.9.** dan digunakan kondisi pembebanan yang sama seperti pada tahap desain *tension pipe*, *compression pipe*, dan *cross pipe* (**Tabel 4.11.**, **Tabel 4.12.**, dan **Tabel 4.13.**).

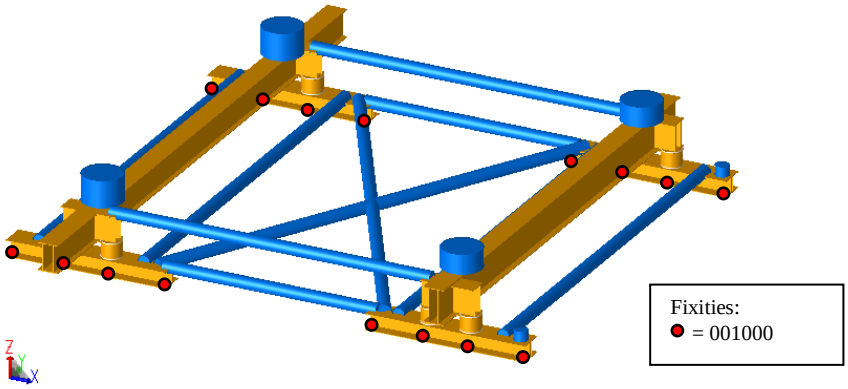


Gambar 4.9. *Skid Frame* Setelah Dimodifikasi

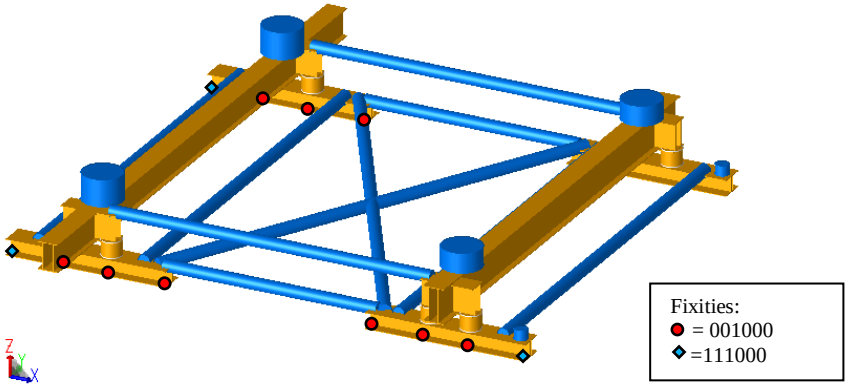
Dari ketiga kondisi *loadout*, setiap kondisi memiliki kondisi batas yang berbeda beda. Tegangan ijin yang diberlakukan pada simulasi ini mengacu pada *AISC 13th Edition sec*tion. 6.1.9., yaitu 100% untuk kondisi normal dan 75% untuk kondisi ekstrim. Pada kasus ini, dengan persamaan *unity check* yang merupakan perbandingan antara tegangan aktual dibandingkan dengan tegangan ijin. Maka pada kondisi ekstrim, dapat disimulasikan dengan tegangan ijin yang ditingkat 1/3 dari tegangan ijinnya.

Selain faktor tegangan ijin, setiap kondisi *loadout* diberikan kondisi batas yang berbeda-beda. Pada kondisi normal dan *support displacement* , *joint* pada *skid shoe* menahan beban arah vertikal (sumbu-Z) dan dapat bergerak kearah horizontal (sumbu-X dan sumbu-Y) seperti yang terlihat pada **Gambar 4.10.**. Sedangkan pada kondisi penarikan, *joint* pada bagian paling belakang *skidshoe* (kaki B1 dan A1) dapat menahan translasi ke arah horizontal maupun vertikal dan *joint* pada *skidshoe* lainnya hanya dapat menahan arah vertical seperti yang terlihat pada **Gambar 4.11.**.

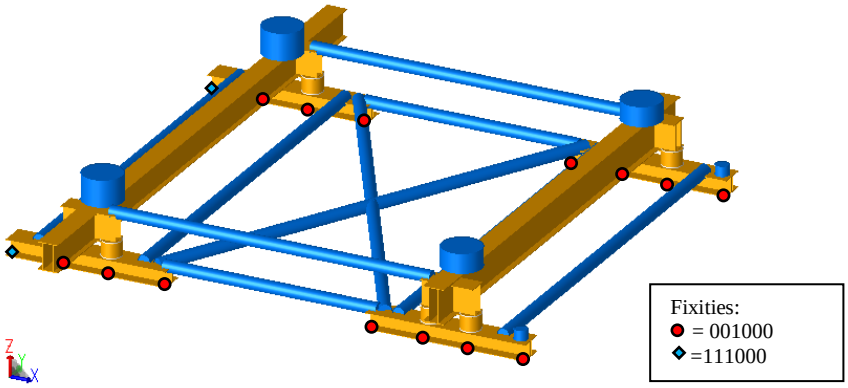
Pada kondisi ekstrim *loss of support*, salah satu dari empat *skidshoe* kehilangan tumpuannya, sehingga tiga *skidshoe* lainnya menahan beban terhadap arah vertikal. *Joint* terluar pada setiap *skidshoe* yang masih menumpu akan menahan gerakan translasi ke arah vertikal dan arah horizontal seperti yang terlihat pada **Gambar 4.12.**.



Gambar 4.10. Kondisi Batas Pergeseran Titik Berat dan *Support Displacement* (*Load Combination* 3101-3348)



Gambar 4.11. Kondisi Batas *Loss of Support* (*Load Combination* 3301)

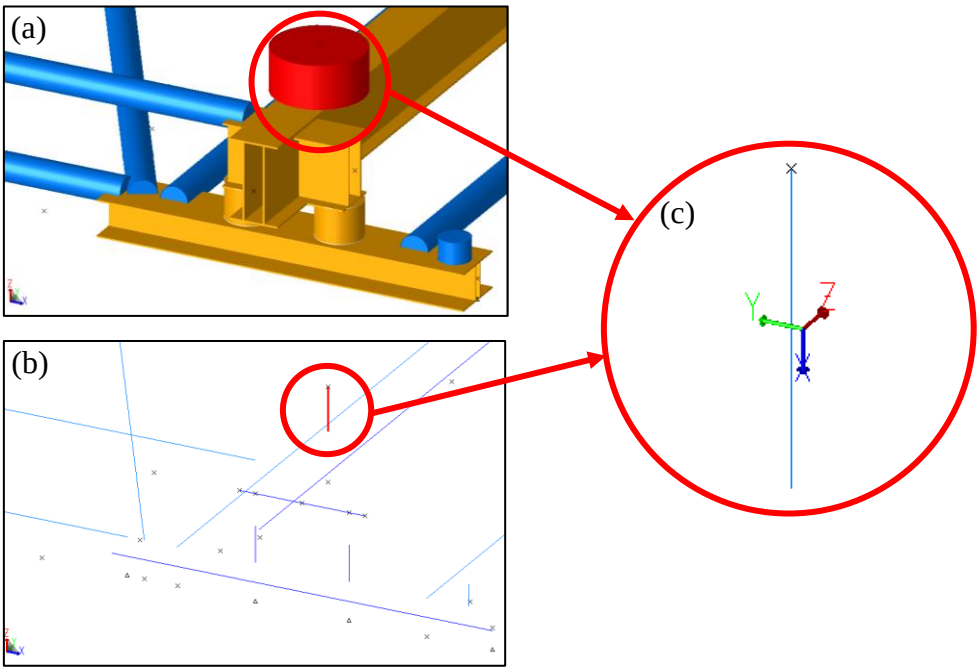


Gambar 4.12. Kondisi Batas Penarikan saat *Skidding Loadout* (*Load Combination* 3501-3758)

4.5.1. Analisa Reaksi Maksimum Struktur *Wellhead Platform* Pada Fase *Loadout*

Dengan melakukan simulasi yang telah disusun, dapat diketahui gaya-gaya yang terjadi pada setiap *member* pada struktur *wellhead platform*. Saat akan dilakukan *load out*, akan dilakukan fase *weighing*. Pada fase *weighing*, dilakukan validasi terhadap perhitungan reaksi pada setiap tumpuan. Maka dari itu, perlu diketahui reaksi dengan menggunakan kalkulasi manual dan simulasi *software*, sehingga diketahui batasan reaksi saat akan dilakukan proses *loadout*.

Dari hasil analisa menggunakan *SACS*, diperoleh reaksi maksimum pada arah sumbu-x, sumbu-y, dan sumbu-z pada sistem koordinat lokal pada *member*. Sistem koordinat lokal pada *member* dapat dilihat pada **Gambar 4.13.** dan hasil reaksi maksimum pada kaki struktur *wellhead platform* dapat dilihat pada **Tabel 4.18.** dan **Tabel 4.19.**.



Gambar 4.13. Sistem Koordinat Lokal *Member* pada Analisa Reaksi (a) *Solid Element View*; (b) *Wireframe View*; (c) *Local Coordinate System*

Tabel 4.18. Reaksi Maksimum Arah Sumbu-X (*Load Condition* 3415)

MEMBER	***END***	**Fx** ***(T)***	**Fy** ***(T)***	**Fz** ***(T)***	**Mx** ***(T-mm)***	**My** ***(T-mm)***	**Mz** ***(T-mm)***
1172- GB01	1172	-587.25	59.22	-86.83	-73.47	-378.54	-145.53
	GB01	-588.84	59.22	-86.83	-73.47	-463.20	-87.78
1272- GB02	1272	-27.29	65.71	40.50	-86.71	104.91	-71.48
	GB02	-28.43	65.71	40.50	-86.71	133.47	-25.15
1372- GA01	1372	114.72	-76.17	-58.91	-73.81	-63.56	-135.85
	GA01	113.14	-76.17	-58.91	-73.81	-121.00	-210.12
1472- GA02	1472	**-928.54**	-48.76	105.24	-51.47	627.79	-174.85
	GA02	**-929.69**	-48.76	105.24	-51.47	701.98	-209.23

Tabel 4.19. Reaksi Maksimum Arah Sumbu-Y dan Sumbu-Z (*Load Condition* 3435)

MEMBER	***END***	***Fx*** ***(T)***	***Fy*** ***(T)***	***Fz*** ***(T)***	***Mx*** ***(T-mm)***	***My*** ***(T-mm)***	***Mz*** ***(T-mm)***
1172- GB01	1172	294.64	-94.89	83.32	87.20	239.68	-150.34
	GB01	293.05	-94.89	83.32	87.20	320.91	-242.86
1272- GB02	1272	-892.00	-103.93	-137.32	76.66	-608.27	-156.29
	GB02	-893.15	-103.93	-137.32	76.66	-705.07	-229.56
1372- GA01	1372	-780.27	52.83	**138.28**	45.82	543.10	-200.17
	GA01	-781.85	52.83	**138.28**	45.82	677.93	-148.67
1472- GA02	1472	-50.73	**146.00**	-84.28	102.64	-119.47	-200.59
	GA02	-51.87	**146.00**	-84.28	102.64	-178.89	-97.67

4.5.2. Uji Integritas Desain *Skid Frame*

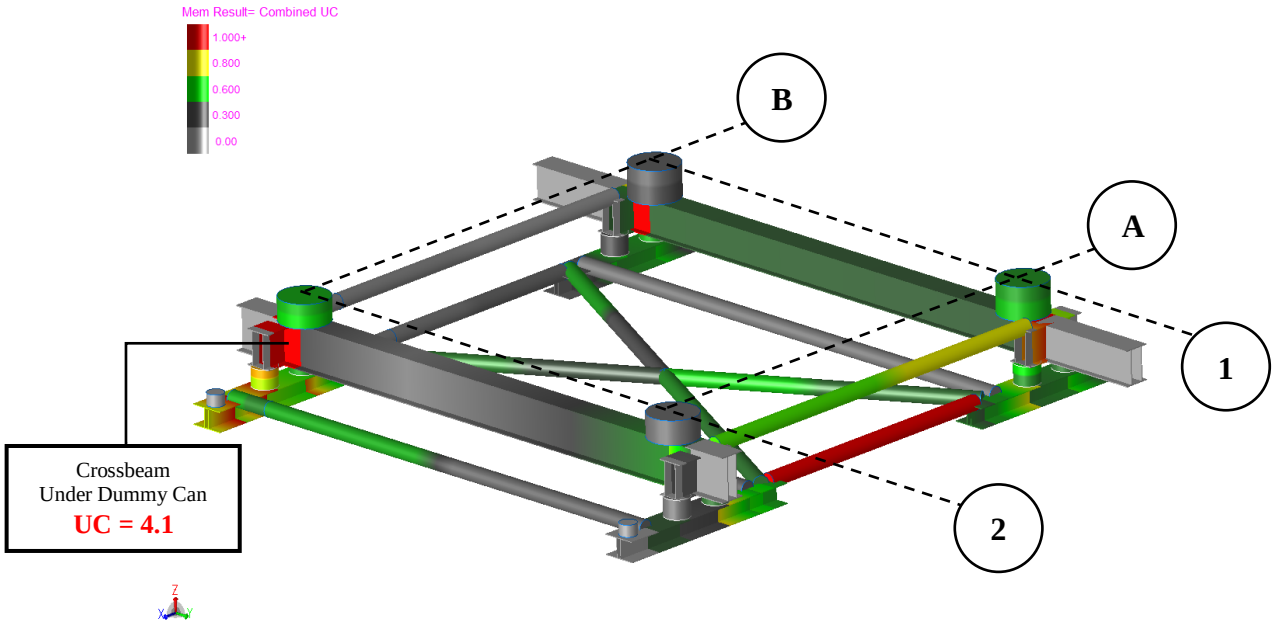
Dengan melakukan simulasi yang telah disusun, diketahui *unity check* dari setiap *member* pada *skid frame*. Lokasi kritis dan kondisi kritis dapat diketahui dengan mengetahui nilai *member unity check* paling tinggi. Dari **Tabel 4.20.**, diketahui *crossbeam* yang menghubungkan kaki B2 dan kaki A2 mengalami tegangan yang berlebih, tepatnya dibawah *dummy can* kaki B2. Lokasi dari tegangan kritis dapat dilihat pada **Gambar 4.14.** dan defleksi yang terjadi dapat dilihat pada **Gambar 4.15.**.

Tabel 4.20. *Unity Check* Tertinggi pada Analisa Integritas (SACS)

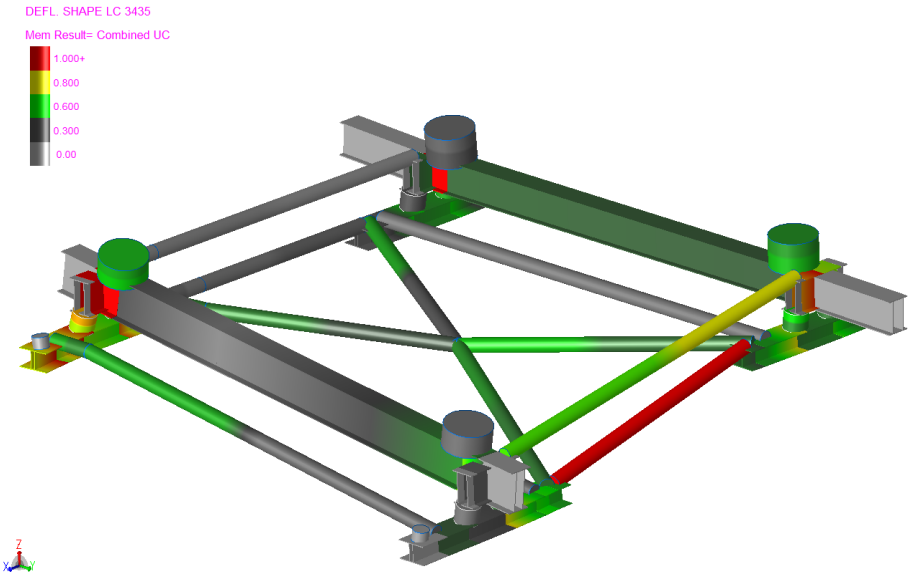
No.	***Load Case***	***Max. Unity Check***	***Member***		***Member Location***
			Joint A	***Joint B***	
1	3435	4.1	LB16	GB02	*Cross Beam Leg B2 (Under Dummy Can)*

Tabel 4.20. *Unity Check* Tertinggi pada Analisa Integritas Menggunakan SACS (Lanjutan)

No.	*Load Case*	*Max. Unity Check*	*Member*		*Member Location*
			Joint A	*Joint B*	
2	3413	3.94	GA02	LB42	*Cross Beam Leg A2 (Under Dummy Can)*
3	3435	2.86	GA01	LB29	*Cross Beam Leg A1 (Under Dummy Can)*
4	3413	2.24	GB01	LB03	*Cross Beam Leg B1 (Under Dummy Can)*
5	3346	2.19	GA02	LB42	*Cross Beam Leg A2 (Under Dummy Can)*
6	3424	2.18	GB01	LB03	*Cross Beam Leg B1 (Under Dummy Can)*
7	3435	2.14	LB16	LB17	*Weighing Beam Leg B2 (Fore)*
8	3435	2.11	GB01	LB03	*Cross Beam Leg B1 (Under Dummy Can)*
9	3402	1.99	GA01	LB29	*Cross Beam Leg A1 (Under Dummy Can)*
10	3402	1.99	LB20	LB13	*Bottom Tension Pipe Row B*



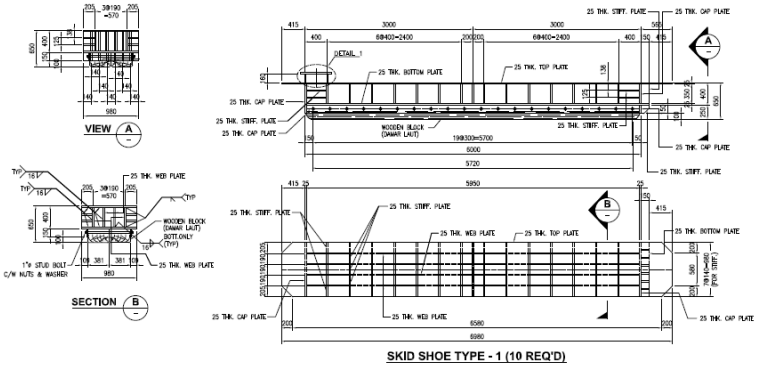
Gambar 4.14. *Member Unity Check* pada Kondisi Kritis (*Load Combination* 3435)



Gambar 4.15. Defleksi Akibat *Load Combination* 3435 pada Struktur *Skid Frame*

4.6. Uji Kapasitas *Skidshoe*

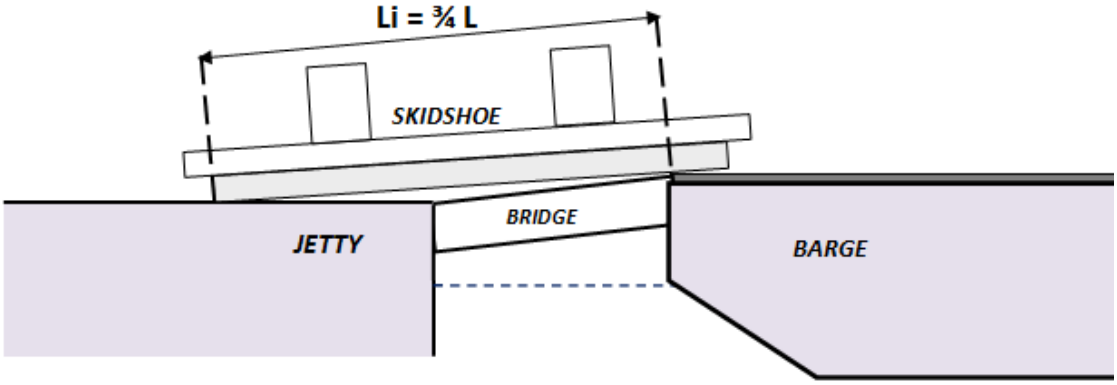
Saat pengujian integritas pada struktur *skid frame*, *skidshoe* yang dianalisa dilakukan pendekatan. Dengan menggunakan profil yang serupa dan menginput beberapa parameter lain seperti axial area dan momen inersia. Namun, *skidshoe* yang digunakan saat *skidding loadout* memiliki geometri yang berbeda. *Skidshoe* yang digunakan sudah memiliki *stiffener*, karena *skidshoe* yang digunakan pada *skidding loadout* struktur *wellhead platform* pernah digunakan dalam *loadout* lainnya. Desain dari *skidshoe* dapat dilihat pada **Gambar 4.16.** dan lebih jelasnya dapat dilihat pada **Lampiran A**.



Gambar 4.16. *Skidshoe* pada *Skidding Loadout* Struktur *Wellhead Platform*

Pengujian kapasitas pada *skidshoe* dilakukan pada fase fabrikasi, fase *weighing*, dan fase *loadout*. Pada fase fabrikasi, struktur *wellhead platform* sudah terkonstruksi penuh dan digunakan berat pada kondisi belum beroperasi (*dry*). Beban dari struktur akan ditanggung oleh *weighing pipe* dan disalurkan ke *skidshoe*. Berbeda dengan fase *weighing*, meskipun berat yang digunakan sama dengan fase fabrikasi, pada fase *weighing* dilakukan proses *weighing* menggunakan *weighing jack*. Sehingga diasumsikan beban yang terjadi ditransfer melalui *weighing jack*.

Pada fase *loadout*, *skidshoe* tertumpu secara sempurna diatas *skidway* pada kondisi normal. Namun, *skidshoe* memiliki keadaan yang cukup rawan ketika *skidshoe* melewati *transition bridge*. Kondisi ketika terdapat kesalahan pada sistem ballas dan menyebabkan ketidakserasian antara level *jetty* dengan level *barge* seperti yang terlihat pada **Gambar 4.17.**. Kondisi tersebut dijadikan kondisi terburuk saat fase *loadout*. Pada kasus ini, *skidshoe* akan dicek pada kondisi memiliki 2 tumpuan dengan panjang total ¾ dari panjang *skidshoe* dan kemiringan pada *skidshoe* diabaikan.



Gambar 4.17. Ilustrasi Kondisi Terburuk pada *Skidshoe* saat Fase *Loadout*

Beban yang digunakan pada *skidshoe* adalah *skidshoe* yang menerima beban paling besar dari setiap fase. Beban yang akan digunakan pada analisa disajikan pada **Tabel 4.21.** dan *properties* dari *skidshoe* dapat dilihat pada **Tabel 4.22.**.

Tabel 4.21. *Design Load* Uji Kapasitas *Skidshoe*

	Maximum Reaction
	(T)
Fabrication	681.23
Weighing	681.23
Load Out	929.69

Kemudian dilakukan perhitungan sesuai dengan **Lampiran E** dengan desain *skidshoe* pada **Tabel 4.22.** dan diperoleh hasil perhitungan uji kapasitas *skidshoe* seperti yang terlihat pada **Tabel 4.23.**.

Tabel 4.22. *Properties* dari *Skidshoe*

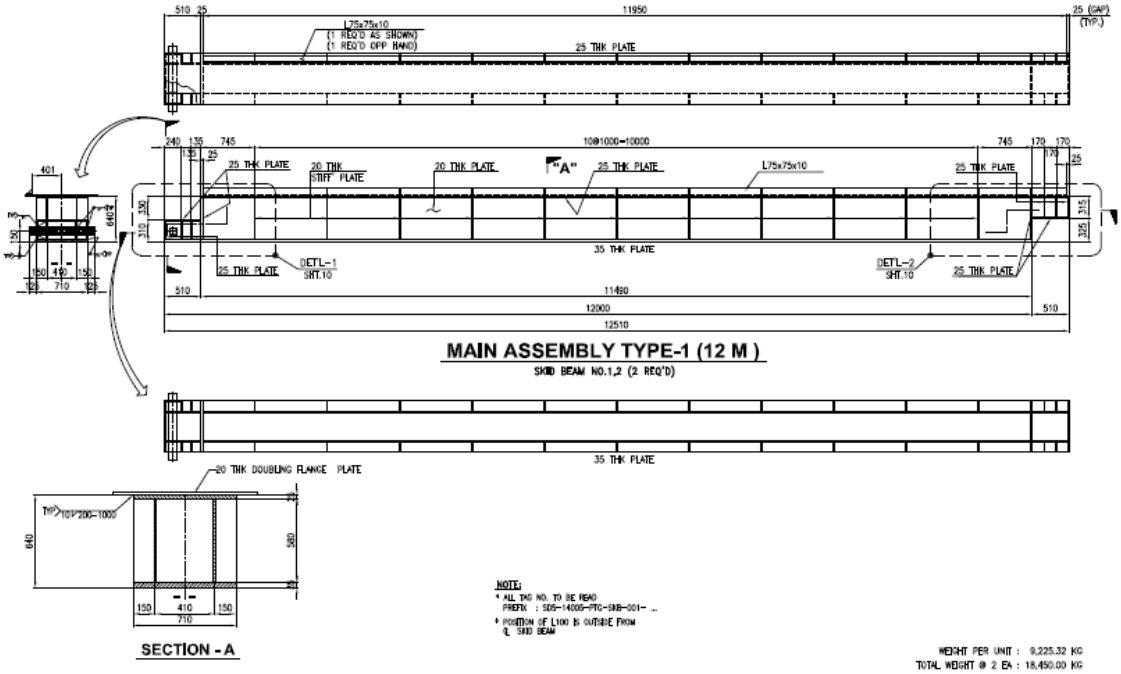
Shoe Frame Properties						
Material Grade	F_y	=	36 Ksi	=	2531.05	kg/cm^2
Allowable Bending Stress	F_b	=	0.66 x F_y	=	1670.49	kg/cm^2
Allowable Shear Stress	F_s	=	0.40 x F_y	=	1012.42	kg/cm^2
Allowable Bearing Stress	F_{Br}	=	0.90 x F_y	=	2277.95	kg/cm^2
Shoe Timber Properties						
Timber Material	Damar Laut Class-1					
Proven Compressive Stress	σ_{max}	=	646.25	kg/cm^2		
Allowable Compressive Stress	σ_{all}	=	40.00	kg/cm^2		
Allowable Shear Stress	τ_{all}	=	20.00	kg/cm^2		

Tabel 4.23. Hasil Perhitungan Uji Kapasitas *Skidshoe*

	Allowable	***Actual***	***Safety Factor***	***Remarks***
Fabrication Phase				
Shear Check - Shoe Frame	1012.42	327.51	3.09	***SECURE!***
Bending Check - Shoe Frame	1670.49	715.77	2.33	***SECURE!***
Web Crippling Check - Shoe Frame	82.50	37.5	2.20	***SECURE!***
Bearing Check - Shoe Frame	2277.95	713.25	3.19	***SECURE!***
Bearing Check - Timber	40.00	16.00	2.50	***SECURE!***
Weighing Phase				
Shear Check - Shoe Frame	1012.42	655.03	1.55	***SECURE!***
Bending Check - Shoe Frame	1670.49	751.47	2.22	***SECURE!***
Web Crippling Check - Shoe Frame	82.50	37.5	2.20	***SECURE!***
Bearing Check - Shoe Frame	2277.95	1110.62	2.05	***SECURE!***
Bearing Check - Timber	40.00	26.13	1.53	***SECURE!***
Load Out Phase - Normal Case				
Shear Check - Shoe Frame	1012.42	446.96	2.27	***SECURE!***
Bending Check - Shoe Frame	1670.49	278.23	6.00	***SECURE!***
Web Crippling Check - Shoe Frame	82.50	37.5	2.20	***SECURE!***
Bearing Check - Shoe Frame	2277.95	973.39	2.34	***SECURE!***
Bearing Check - Timber	40.00	21.84	1.83	***SECURE!***
Shear Check - Timber	20.00	3.95	5.06	***SECURE!***
Shear Check - Roundbar	1012.42	900.64	1.12	***SECURE!***
Load Out Phase - Worst Case				
Shear Check - Shoe Frame	1012.42	356.30	2.84	***SECURE!***
Bending Check - Shoe Frame	1670.49	486.85	3.43	***SECURE!***

4.7. Uji Kapasitas *Skidway*

Ketika *skidding loadout* berlangsung, lokasi kritis tidak hanya terjadi pada *skid frame*. Namun, lokasi kritis juga dapat terjadi pada fasilitas pendukung seperti *skidway*. *Skidway* yang akan digunakan pada *skidding loadout* disimulasikan dengan mengaplikasikan reaksi yang bekerja pada setiap *skidshoe*. Desain dari *skidway* dapat dilihat pada **Gambar 4.18.** dan lebih jelasnya dapat dilihat pada **Lampiran A**.

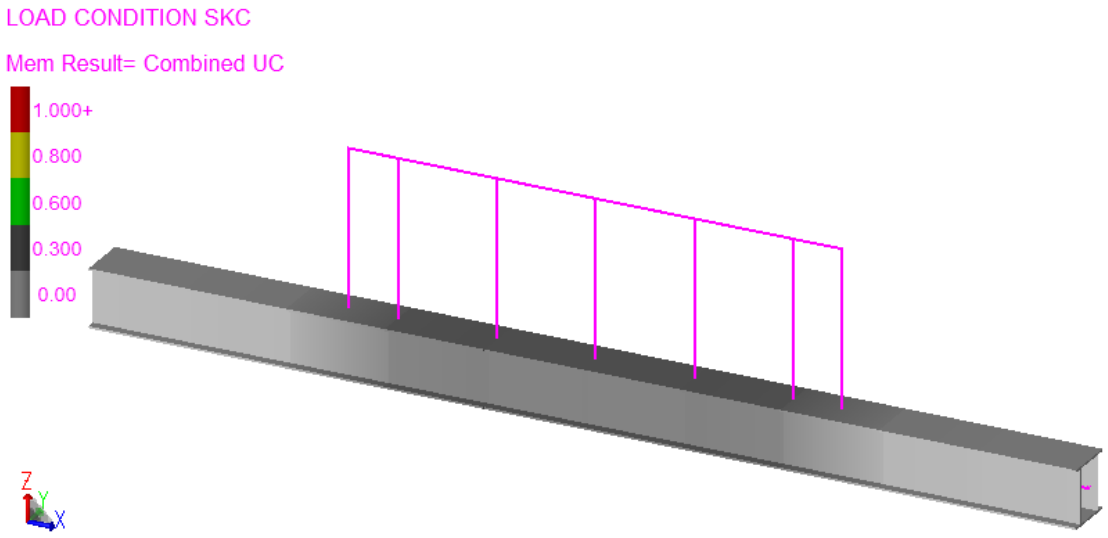


Gambar 4.18. *Skidway* pada *Skidding Loadout* Struktur *Wellhead Platform*

Desain *skidway* yang digunakan, dianalisa dengan memodelkan 1 *section* dari *skidway* sebagai *simple beam* sepanjang 12 m dan *skidway* ditumpu dengan interval sepanjang 1,8 m. *Skidway* diberi beban terdistribusi akibat beban dari *skidshoe* sebesar reaksi maksimum pada bagian tengah dari *skidway* seperti yang terlihat pada **Gambar 4.19.** dan beban yang terjadi dapat dilihat pada **Tabel 4.24.** sesuai **Lampiran F**.

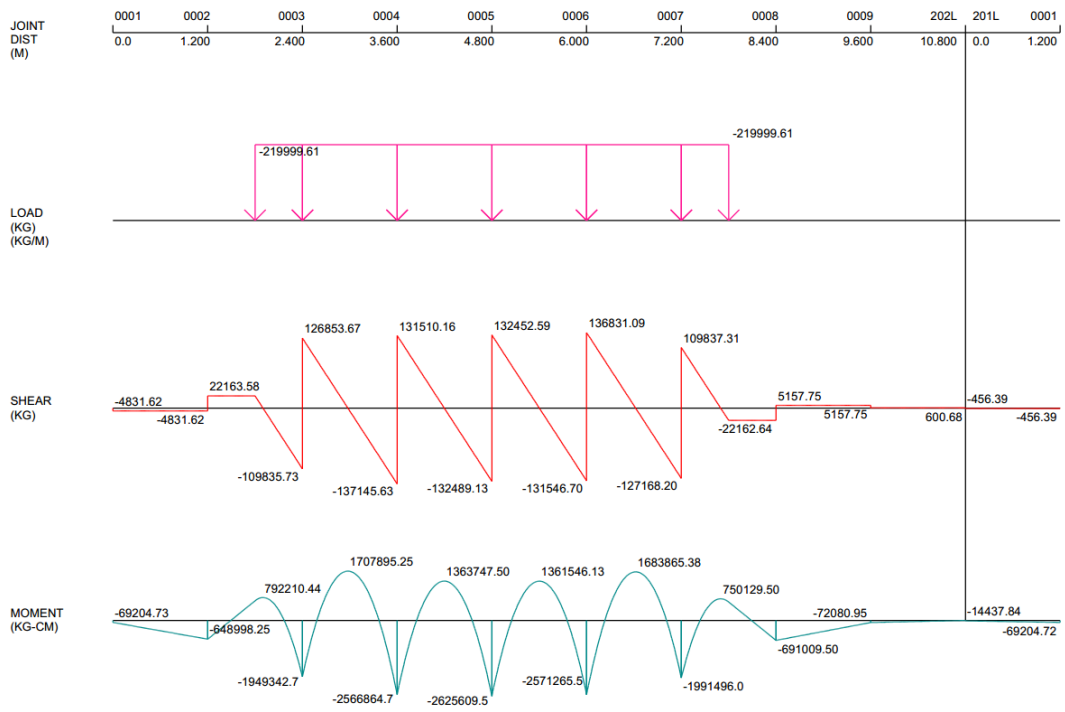
Tabel 4.24. Beban Terdistribusi pada *Skidway* Akibat Reaksi Maksimum

Maximum reaction load	=	978,56	T
Weight of skid frame at one support location	=	13,67	T
Length of distributed load	=	6	m
Width of distributed load	=	0,762	m
Applied pressure load on skidbeam	**=**	**0,00022**	**MPa**



Gambar 4.19. Kondisi Pengujian Kapasitas *Skidway*

Analisa pada *skidway* dibantu menggunakan SACS, untuk mendapatkan gaya geser dan momen yang terjadi pada *skidway* dan diperoleh hasil seperti yang terlihat pada **Gambar 4.20.** dan gaya maksimum serta momen maksimum dapat dilihat pada **Tabel 4.25.**. Dengan menggunakan gaya dan momen yang diketahui, dapat diketahui tegangan yang terjadi pada *skidway* seperti pada **Tabel 4.26.** sesuai perhitungan pada **Lampiran F**.



Gambar 4.20. Diagram Geser dan Diagram Momen pada *Skidway* (SACS)

Tabel 4.25. Hasil Analisa Diagram Gaya Maksimum dan Momen Maksimum (SACS)

	V maj	***M maj***	***V min***	***M min***	***Pv (bearing)***
	kg	***kg . cm***	***kg***	***kg . cm***	***kg***
Skidway	137188.70	1711452.13	137503.17	2632761.50	978560.10

Tabel 4.26. Hasil Perhitungan Uji Kapasitas *Skidway*

Description	***Allowable***	***Actual***	***Safety Factor***	***Remarks***
GLOBAL CHECK				
Bearing Stress	2277.95	346.53	6.57	***SECURE!***
Shear Stress	1012.42	535.89	1.89	***SECURE!***
Bending Stress	1670.49	135.45	12.33	***SECURE!***
LOCAL CHECK				
Local Flange Bending Check	1.77	1.50	1.18	***SECURE!***
Local Web Yielding Check	13519.75	2156.75	6.27	***SECURE!***
Web Cripling (≤ d/2 … K1.5)	74160.10	2156.75	34.39	***SECURE!***
Sidesway Web Buckling	50.41	1.70	29.65	***SECURE!***
Compression buckling of the web	46.95	22.92	2.05	***SECURE!***

4.8. Penambahan *Stiffener* pada Lokasi Kritis *Skid Frame*

Dengan mensimulasikan kondisi *loadout* pada *skid frame*, *skid shoe*, dan *skidway*, diketahui kondisi paling kritis terdapat pada *skid frame* tepatnya pada *cross beam* dibawah *dummy can* kaki B2. (Berbeda dengan *skidshoe* dan *skidway* yang sudah dilakukan penguatan dengan penambahan plat-plat *stiffener* sehingga mampu menahan beban saat beroperasi.

Skid frame harus mampu menahan beban yang terjadi dari fase fabrikasi hingga fase *loadout* selesai. Kebutuhan *skid frame* pada fase fabrikasi hingga fase *loadout* pun berbeda, sehingga penguatan yang dilakukan pada setiap fase akan mengeluarkan dimensi yang berbeda-beda. *Skid frame* yang akan dilakukan penguatan, perlu ditinjau penyebab terjadinya kerusakan pada struktur.

Pada fase fabrikasi, *skid frame* didesain hanya untuk menahan beban dari struktur yang dibangun. Setelah melewati fabrikasi, struktur yang akan dilakukan *loadout* akan melalui fase *weighing*. Pada fase *weighing*, *weighing beam* yang sebelumnya ditumpu oleh 2 *weighing pipe* akan ditumpu oleh *weighing jack*. Sedangkan pada fase *loadout*, ditentukan berdasarkan 3 arah gaya yang paling tinggi. Sehingga

pada fase *loadout* terbagi atas 3 kondisi, *stiffener* didesain dengan memberikan reaksi maksimum pada kaki struktur *wellhead platform* pada sumbu-x, sumbu-y, dan sumbu-z.

Dengan mensimulasikan kondisi-kondisi yang akan dialami oleh *skid frame* seperti pada **Lampiran G**, diketahui kebutuhan dimensi minimal dari *stiffener*. Penambahan *stiffener* dan dimensi dari *stiffener* dapat dilihat pada **Tabel 4.27.**

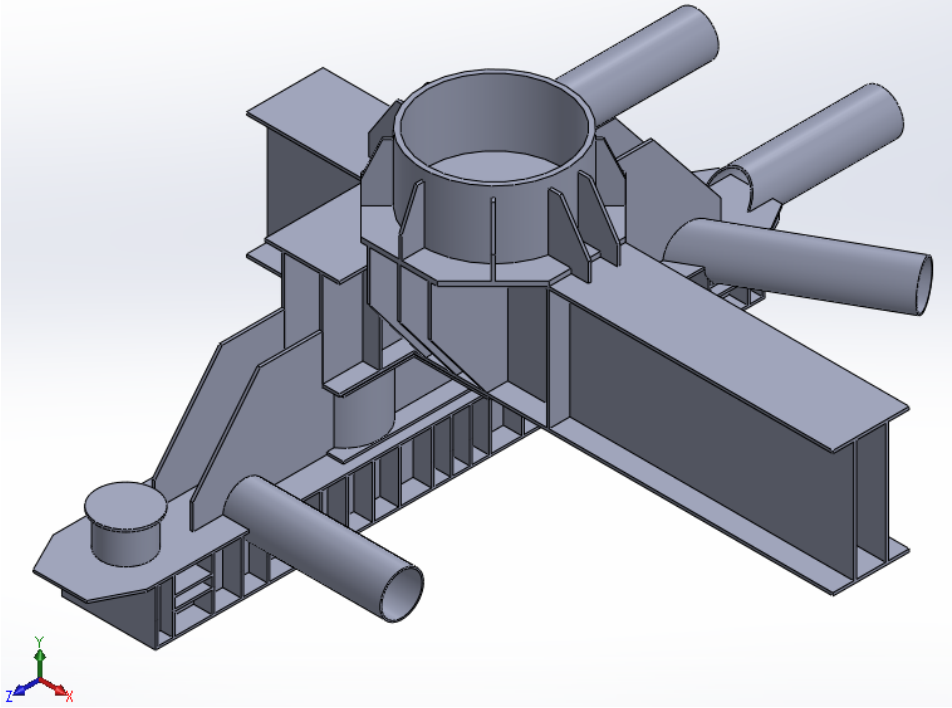
Tabel 4.27. Penambahan *Stiffener* dan Dimensi *Stiffener*

Member to Retained	***Condition to Retained***	***Initial Thickness* (mm)**	***Stiffener Plate Added* (mm)**				
			F	***W***	***L_x***	***L_{yz}***	***Max***
Cross Beam	Flange Bending	30	30	30	**55**	50	**50**
	Web Yielding	30	-	-	**30**	**30**	**30**
	Web Cripling	30	-	-	**30**	**30**	**30**
	Web Sidesway Buckling	30	-	-	-	-	-
	Web Compression Buckling	30	10	10	**30**	**30**	**30**
Weighing Beam	Flange Bending	30	15	**30**	**30**	**30**	**30**
	Web Yielding	30	-	-	-	-	-
	Web Cripling	30	-	-	-	-	-
	Web Sidesway Buckling	30	-	-	-	-	-
	Web Compression Buckling	30	-	-	**30**	**30**	**30**

Keterangan: F = Fase Fabrikasi
W = Fase *Weighing*
L_x = Fase *Loadout* pada kondisi maksimum Fx
L_{yz} = Fase *Loadout* pada kondisi maksimum Fy dan Fz

4.9. Permodelan Lokasi Kritis *Skid Frame*

Setelah diketahui lokasi kritis akibat kondisi kritis yang terjadi, dilakukan permodelan *skidframe* pada daerah lokasi kritis. *Skid frame* dimodelkan dengan program *SolidWorks*. *Skid frame* yang dimodelkan adalah *skid frame* pada potong kaki B2 dan geometri yang akan dijadikan sebagai input gaya dan momen. Hasil dari permodelan dapat dilihat pada **Gambar 4.21.**.



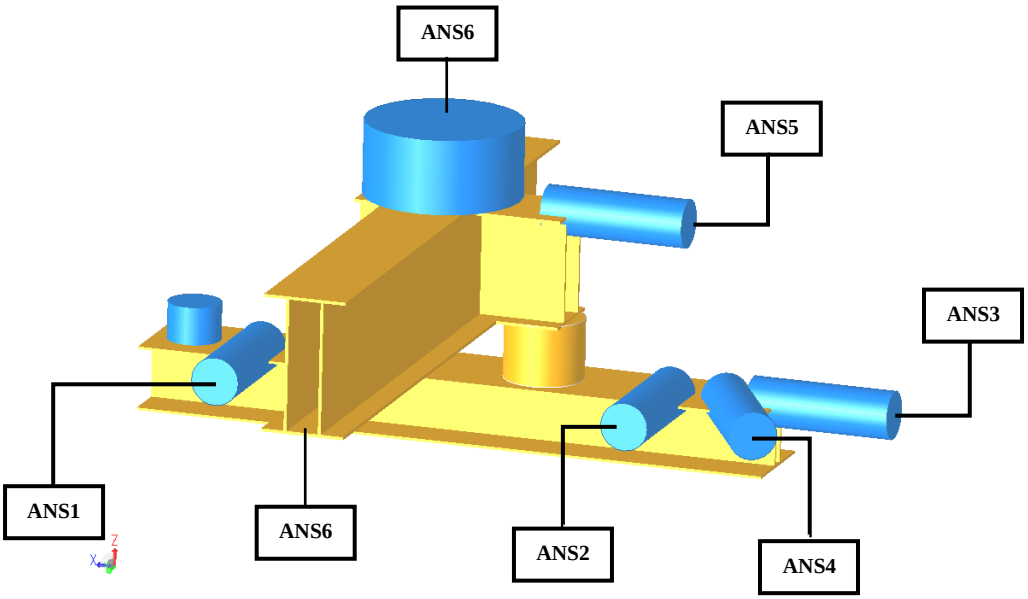
Gambar 4.21. *Skid Frame* Setelah Penambahan *Stiffener* (*SolidWorks*)

4.10. Analisa Lokasi Kritis Menggunakan Metode Elemen Hingga

Dari *skidshoe* yang telah dimodelkan, disimulasikan beban yang diperoleh dari *SACS*. Gaya dan momen yang bekerja pada *member* SACS dapat dilihat pada **Tabel 4.28.** dan posisi dari *joint* pada daerah yang dianalisa dapat dilihat pada **Gambar 4.22.**.

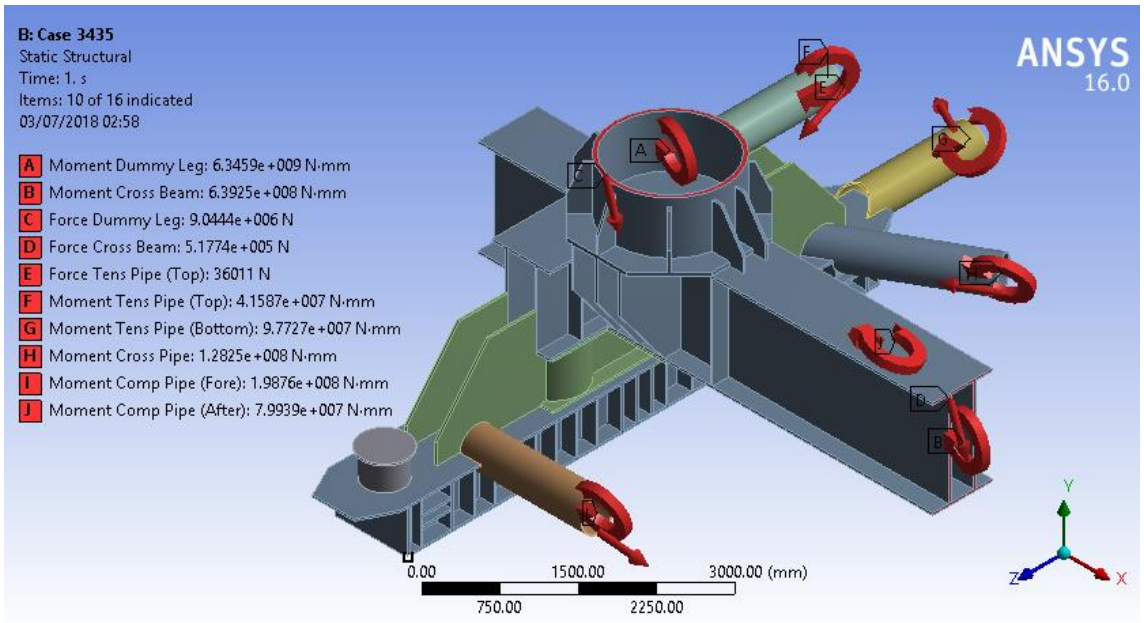
Tabel 4.28. Gaya dan Momen Ujung *Member* SACS (Kondisi 3435)

Member	***Joint***	***Load Condition***	***Force (kN)***			***Moment(kN.m)***		
			x	***y***	***z***	***x***	***y***	***z***
1272-GB02	1272	3435	-8873.70	-1067.82	-1385.38	748.99	-6083.72	-1642.73
CPP1-ANS1	ANS1	3435	-343.77	4.97	28.25	9.97	-189.89	-57.87
LB20-ANS3	ANS3	3435	-15.00	-26.66	4.22	-65.97	1.32	72.09
CPP3-ANS2	ANS2	3435	282.23	-11.85	9.77	22.02	23.39	73.20
CRP1-ANS4	ANS4	3435	821.46	-6.28	2.27	8.95	116.30	53.30
LB14-ANS5	ANS5	3435	32.81	0.74	14.82	-16.78	-37.52	-6.35
GB02-ANS6	ANS6	3435	-160.85	-22.80	491.59	-122.58	-627.37	-4.57



Gambar 4.22. Posisi *Joint* Potongan *Skid Frame* Kaki B2

Selain gaya dan momen yang bekerja, diinputkan kondisi batas (*boundary condition*) pada struktur *skidshoe*, dapat dilihat pada **Gambar 4.23.**. Kondisi yang disimulasikan pada kondisi penyebab lokasi kritis, yaitu kondisi ekstrim akibat hilangnya tumpuan *skidshoe* pada kaki A2 dan titik berat bergeser ke arah A2. Pada kondisi ini, luasan bawah *skidshoe* dapat menahan beban dari arah vertikal dan diberi 2 titik untuk menahan gerak translasi, sehingga gerak yang dianalisa terbatas.

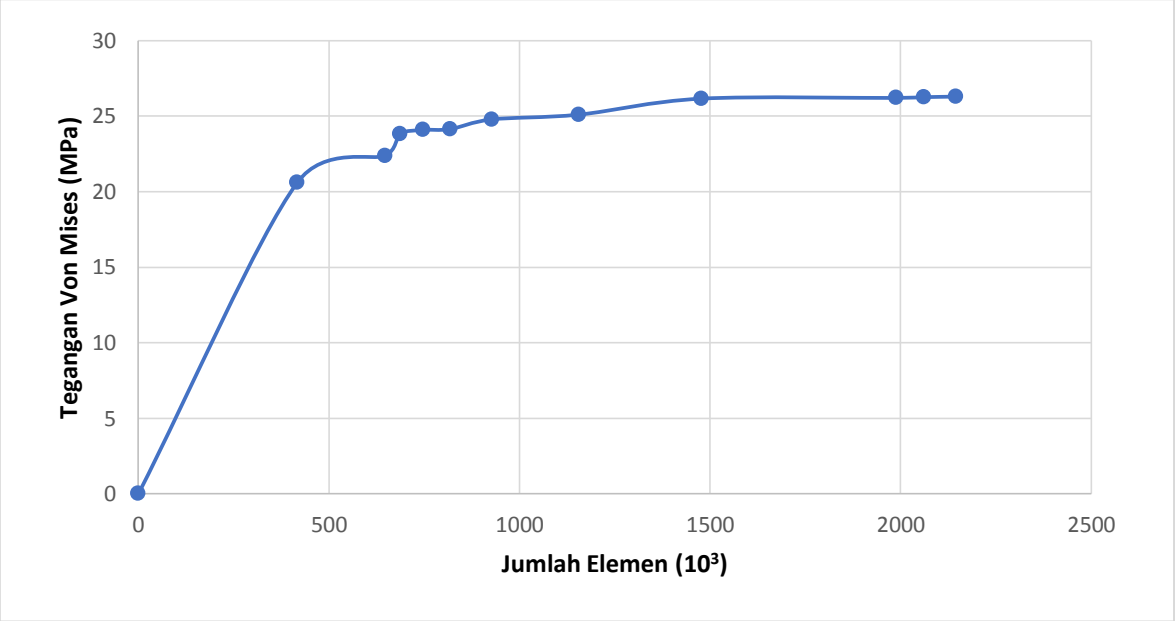


Gambar 4.23. *Boundary Condition* Analisa Elemen Hingga

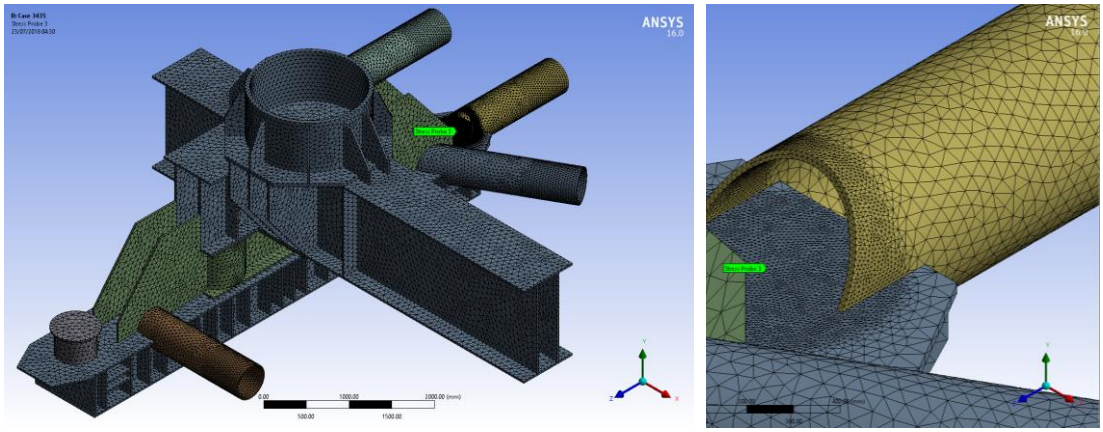
Analisa *meshing sensitivity* dilakukan untuk mengukur keakuratan output dari pemodelan ANSYS akibat dari penggunaan jumlah elemen. Dalam melakukan analisa model *skidshoe* pada kaki B2 dilakukan dengan membagi model menjadi elemen-elemen kecil. Elemen yang digunakan adalah jenis elemen *solid*. Nilai pembebanan pada analisa menjadi variabel tetap namun penggunaan jumlah elemen divariasikan. Pada model *skidshoe*, jumlah elemen yang digunakan bervariasi dengan nilai pembebanan yang sama. Hasil perbandingan antara ukuran elemen, jumlah elemen dan tegangan yang terjadi pada *skidshoe* dapat dilihat pada **Tabel 4.29.** disajikan dalam bentuk grafik (**Gambar 4.24.**) pada lokasi yang ditunjukkan **Gambar 4.25.**.

Tabel 4.29. *Mesh Sensitivity*

Jumlah Elemen	Tegangan Von Mises (MPa)	Difference (%)
214093	20.603796	-
359991	22.371293	7.90%
385203	23.807897	6.03%
423906	24.081098	1.13%
469753	24.136421	0.23%
539037	24.777737	2.59%
685731	25.096298	1.27%
897841	**26.153448**	**4.04%**
1246171	**26.199493**	**0.18%**
1295492	**26.287654**	**0.21%**



Gambar 4.24. Grafik *Mesh Sensitivity*



Gambar 4.25. Lokasi *Stress Probe* dan *Meshing* Pada Model *Skidshoe* (B2)

Dalam penentuan tegangan yang terjadi digunakan analisa tegangan *von mises* untuk mengetahui distribusi tegangan pada seluruh bagian *skidshoe* akibat pembebanan yang diberikan. Pengertian tegangan *von mises* sendiri adalah tegangan gabungan terhadap semua arah bidang elemen dengan pendekatan matriks.

Validasi diperlukan untuk mengetahui keakuratan perhitungan yang ada pada *software* ANSYS, maka dari itu diperlukan perhitungan secara manual dan disesuaikan dengan hasil perhitungan pada ANSYS menggunakan persamaan berikut:

$$\sigma_{VM} = \sqrt{\frac{(\sigma_{xx} - \sigma_{yy})^2 + (\sigma_{yy} - \sigma_{zz})^2 + (\sigma_{zz} - \sigma_{xx})^2 + 6(\tau_{xy} + \tau_{xz} + \tau_{yz})^2}{2}}$$

Dimana:

σ_{VM} = Tegangan Von Mises (MPa)

σ = Tegangan normal (MPa)

τ = Tegangan geser (MPa)

Dari hasil pemodelan menggunakan ANSYS, struktur *skidshoe* pada kaki B2 memiliki *equivalent von mises stress* sebesar **26,288 MPa** disalah satu sisi dari *gusset plate* pada sambungan *tension pipe* dengan *weighing beam*. Kemudian komponen tegangan yang terjadi diketahui seperti yang terlihat pada **Tabel 4.30.** dan hasil perbandingan antara perhitungan manual dan ANSYS dapat dilihat pada **Tabel 4.31.**.

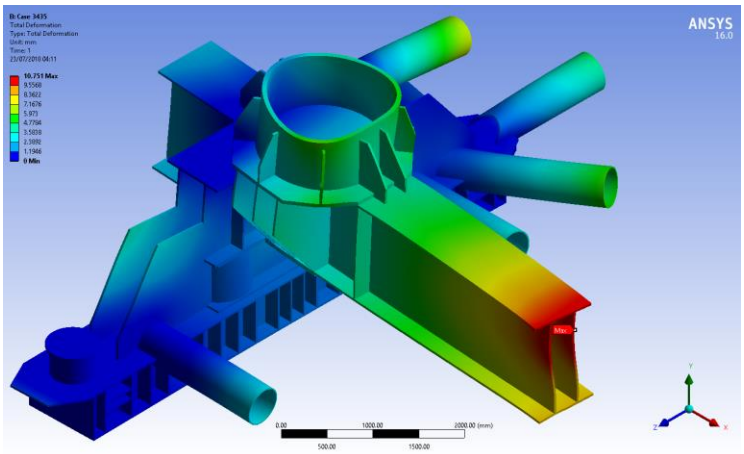
Tabel 4.30. Tegangan Normal dan Tegangan Geser Pada *Stress Probe*

	(MPa)
Normal X	-0,2552
Normal Y	0,055486
Normal Z	-25,813
Shear XY	0,423480
Shear YZ	-0,786860
Shear XZ	-3,023100

Tabel 4.31. Perbandingan Hasil Tegangan *Von Mises*

Von Mises Manual (MPa)	**Von Mises ANSYS (MPa)**	**Difference**
26,288	26,288	0.02986%

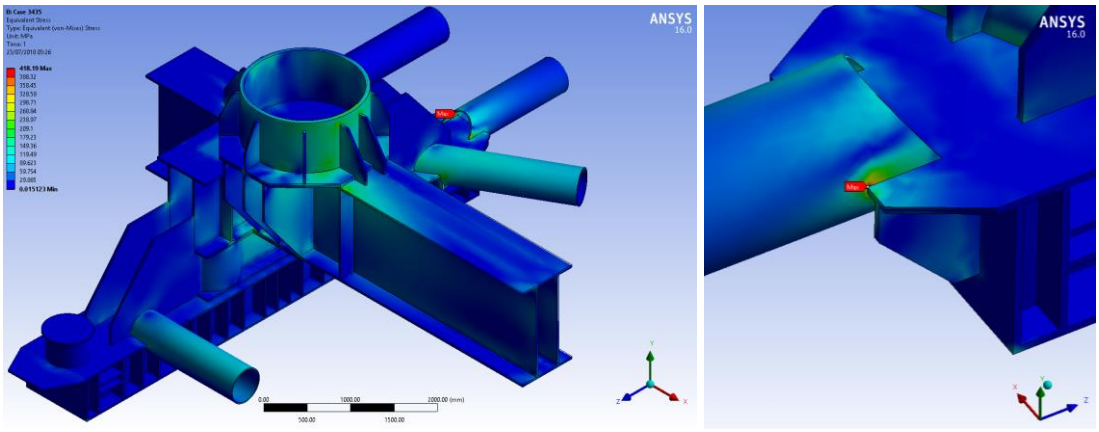
Tujuan dari analisa elemen hingga ini adalah untuk menentukan deformasi dan tegangan kritis yang terjadi setelah penguatan yang diberikan pada *skid frame*. Dengan adanya penambahan *stiffener* diharapkan tegangan yang terjadi tidak lebih besar dari tegangan ijin material.



Gambar 4.26. Deformasi Pada *Skid Frame* Akibat Kondisi *Loss of Support*

Dari analisa yang telah dilakukan, diketahui deformasi maksimum akibat beban saat kondisi *loss of support* sebesar **11.297 mm** pada *cross beam* yang menghubungkan kaki B2 dengan kaki A2. Deformasi terjadi akibat kaki A2 mengalami keruntuhan, sehingga *cross beam* yang menghubungkan kedua kaki tertarik searah dengan gaya gravitasi (sumbu Y negatif pada ANSYS).

Pada **Gambar 4.27.** diketahui tegangan maksimum terjadi pada sambungan *tension pipe* bagian bawah, **418.19 MPa**. Dari analisa yang telah dilakukan, tegangan yang sebelumnya kritis pada bagian *cross beam*, berpindah ke bagian yang tidak diberi perlakuan penguatan. Tegangan maksimum partisi lainnya diklasifikasikan menjadi 3 komponen, yaitu *cross beam* yang terdiri dari *cross beam* dan *dummy leg*, *weighing pipe* yang terdiri *weighing pipe* dan *bearing stiffener*, dan yang terakhir adalah bagian *skidshoe*.



Gambar 4.27. Tegangan Von Mises Pada *Skid Frame* Akibat Kondisi *Loss of Support*

Pada **Gambar 4.28**, **Gambar 4.29**, **dan Gambar 4.30.** diketahui tegangan maksimum yang terjadi pada komponen *crossbeam* sebesar **293,59 MPa**, pada komponen *skidshoe* sebesar **270,83 MPa,** dan pada komponen *weighing pipe* sebesar **221,78 MPa**. Dengan mengetahui tegangan terendah hingga tertinggi, dapat dilakukan *unity check* untuk mengetahui kemampuan struktur menahan tegangan maksimum yang terjadi. Dimana *unity check* merupakan rasio antara tegangan yang terjadi dengan tegangan ijin dan dapat ditulis persamaan sebagai berikut:

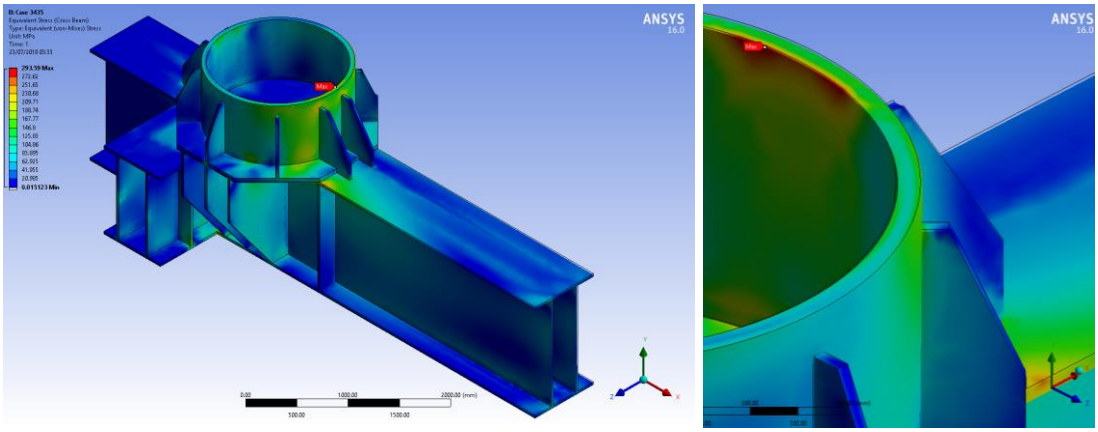
$$UC = \frac{\sigma_{act}}{\sigma_{allVM}} = \frac{\sigma_{actual}}{0.67 \times \sigma_{yield}}$$

Dimana :

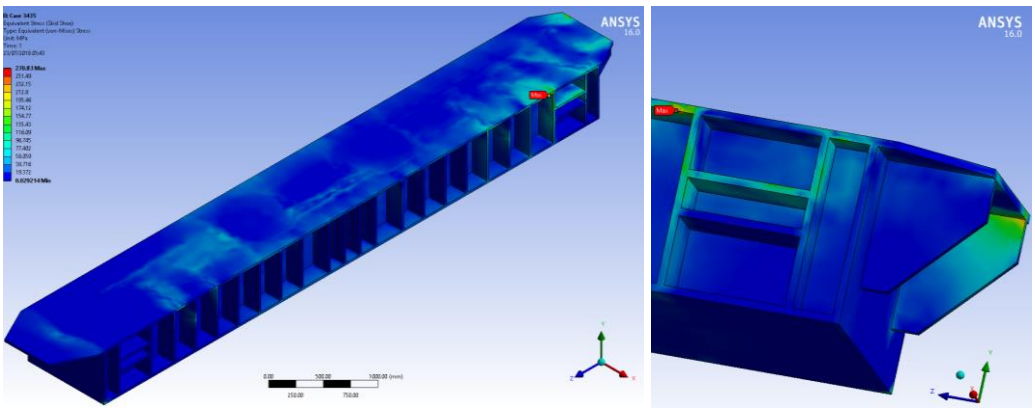
σ_{act} = Tegangan yang terjadi (MPa)

σ_{allVM} = Tegangan ijin untuk tegangan Von Mises (MPa)

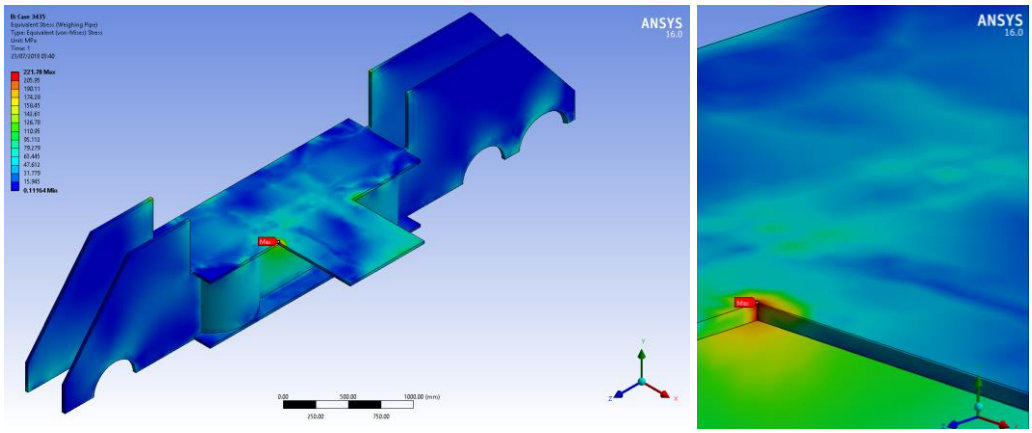
Dengan mensimulasikan persmaan diatas diperoleh hasil dari perhitungan *unity check* yang dapat dilihat pada **Tabel 4.32.**.



Gambar 4.28. Tegangan Von Mises Pada *Cross Beam* Akibat Kondisi *Loss of Support*



Gambar 4.29. Tegangan Von Mises Pada *Skid Shoe* Akibat Kondisi *Loss of Support*



Gambar 4.30. Tegangan Von Mises Pada *Weighing Pipe* Akibat Kondisi *Loss of Support*

Tabel 4.32. *Unity Check* Pada Lokasi Tegangan Maksimum

Description	***Material***	σ_y ***(Mpa)***	***Von Mises Factor***	***Allowable Stress Factor***	σ_{max} ***(Mpa)***	***UC***
Tension Pipe (Bottom)	API 5L X52	360,00	0,67	1,33	418,19	**1.29**
Cross Beam	S355	355,00	0,67	1,33	293,59	**0.92**
Reinforcement Weighing Pipe	S355	355,00	0,67	1,33	221,78	**0.70**
Skid Shoe	S355	355,00	0,67	1,33	270,83	**0.85**

Dari hasil analisa yang dilakukan, *tension pipe* mengalami kegagalan akibat beban pada kondisi kritis. *Tension pipe* mengalami tekanan dan puntiran pada bagian sambung pipa dengan *gusset plate*. Kegagalan yang terjadi pada *tension pipe* tidak merusak struktur utama yaitu bagian *skid shoe*. Meskipun kondisi *loss of support* pada proses *loadout* jarang terjadi, hal tersebut tetap harus dilakukan untuk antisipasi dari tegangan berlebih.

Kerusakan pada bagian *tension pipe* dapat dicegah dengan meningkatkan *properties* dari *tension pipe*. Seperti memilih material yang memiliki batas luluh yang lebih tinggi, namun pada kondisi ini tegangan yang terjadi cukup besar. Sehingga lebih direkomendasikan untuk merubah dimensi dari *tension pipe*. Untuk mengurangi kerusakan akibat kondisi kritis dapat dilakukan dengan memperbesar luasan penampang dari *tension pipe*, yaitu dengan cara memperbesar ketebalan atau memperbesar diameter dari pipa. Selain memperbesar bagian *tension pipe* memungkin juga untuk mempertebal sambungan antara *tension pipe* dan *skidshoe*, yaitu mempertebal ketebalan pada daerah *gusset plate* dengan tujuan memperbesar luas permukaan yang saling berkontak antara *gusset plate* dengan *tension pipe*.

Rekomendasi lain seperti penambahan *brace* sebagai koneksi antar *skid frame* juga mungkin dilakukan untuk meningkatkan kekakuan dari struktur *skid frame* dan meningkatkan kemampuan struktur untuk mendistribusikan beban yang terjadi dari satu kompartemen ke kompartemen yang lainnya. Dengan melakukan penambahan *brace*, tegangan berlebih (*over stress*) akan didistribusikan ke daerah yang tegangannya lebih kecil, sehingga persebaran dari tegangan yang terjadi akan lebih merata dan tidak melewati batas dari kemampuan material.

BAB V
KESIMPULAN

5.1. Kesimpulan

Berdasarkan hasil penelitian tentang analisa lokasi kritis pada modifikasi struktur *skid frame* saat *skidding load out* struktur *wellhead platform*, dapat ditarik kesimpulan sebagai berikut:

1. Reaksi maksimum yang terjadi pada struktur *wellhead platform*, diperoleh 4 kondisi reaksi maksimum, yaitu kondisi reaksi maksimum pada fase fabrikasi dan fase *weighing*, kemudian pada fase *loadout* diperoleh reaksi maksimum dari arah Fx, Fy, dan Fz. Kondisi ketika fase fabrikasi dan fase *weighing* disimulasikan berdasarkan pergeseran titik berat, sedangkan pada fase *loadout* disimulasikan juga kondisi *support displacement*, *loss of support*, dan kondisi *pulling*. Dari fase fabrikasi hingga fase *loadout*, reaksi maksimum tertinggi terjadi pada arah Fx sebesar **929.69 T**. Ketika struktur akan dilakukan *loadout*, struktur akan dilakukan pengecekan pada setiap kaki *skid frame* dan diketahui batas maksimum reaksi dari setiap kaki yang diijinkan sebelum *loadout* dioperasikan. Dengan kata lain, reaksi maksimum Fx menjadi batas dari reaksi yang diijinkan pada salah satu kaki. Ketika hasil pengecekan melebihi nilai reaksi maksimum, maka akan dilakukan peninjauan kembali dilapangan.
2. Lokasi kritis terjadi pada ***cross beam* pada kaki B2 (dibawah *dummy can*)** akibat kondisi ekstrim yaitu kehilangan tumpuan pada kaki A2 dan variasi titik berat condong ke arah kaki A2 (***load case* 3435**). Berdasarkan analisa yang dilakukan, kerusakan pada *cross beam* (**UC=4.1**) terjadi akibat tegangan geser berlebih dan terkonsentrasi. Tegangan yang terjadi berpeluang menyebabkan terjadinya fenomena *flange bending*, *web yielding*, dan *web cripling*. Setelah dilakukan penambahan *transverse stiffener* dan *bearing stiffener* pada bagian *cross beam*, *cross beam* mampu menahan beban yang terjadi (**UC=0.92**).
3. Deformasi maksimum terjadi pada *cross beam* yang menghubungkan antara kaki A2 dan B2. Pada kondisi kritis, deformasi total yang terjadi sebesar **10,751 mm** yang didominasi dengan deformasi searah dengan gaya gravitasi (sumbu-y

negatif). Sedangkan tegangan maksimum terjadi pada ujung sambungan *tension pipe* yang tersambung pada *skidshoe*, tegangan yang terjadi sebesar **418,19 MPa**, sedangkan tegangan luluh pada komponen ini sebesar 360 MPa. Diketahui hasil rasio antara tegangan yang terjadi dengan tegangan ijin Von Mises sebesar **1,29** yang menunjukkan struktur *tension pipe* mengalami kegagalan akibat beban pada kondisi kritis. Dimana *tension pipe* mengalami tekanan dan puntiran pada bagian ujung pipa dan kerusakan yang terjadi pada *tension pipe* tidak merusak struktur utama yaitu bagian *skid shoe*.

Dari hasil analisa yang dilakukan, *tension pipe* mengalami kerusakan akibat tekanan dan puntiran pada bagian sambungan pipa dengan *gusset plate*. Kerusakan yang terjadi pada *tension pipe* tidak merusak struktur utama yaitu bagian *skid shoe*. Beberapa rekomendasi yang dapat dilakukan untuk mencegah terjadinya kerusakan pada *tension pipe*, yaitu meningkatkan kualitas dari material dan atau meningkatkan dimensi dari *tension pipe* dan *gusset plate*, penambahan konfigurasi *brace* antar *skid frame*, dan menyusun *emergency plan* ketika terjadi kerusakan pada struktur *skid frame* saat proses *loadout*.

5.2. Saran

Berdasarkan kesimpulan diatas, beberapa saran yang diharapkan dapat menjadi masukan dan bahan pertimbangan dalam pengembangan untuk penelitian selanjutnya antara lain:

1. Melakukan analisa kekuatan dan pengujian kapasitas dari *barge* saat operasi pada fase *loadout*
2. Melakukan analisa kekuatan pada bagian *trunion skidshoe* pada fase *loadout* dengan mempertimbangkan *amplification factor* akibat penggunaan ulang *skidshoe*
3. Melakukan analisa kekuatan pada struktur *skid frame* dengan mempertimbangkan fase transportasi

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LAMPIRAN A
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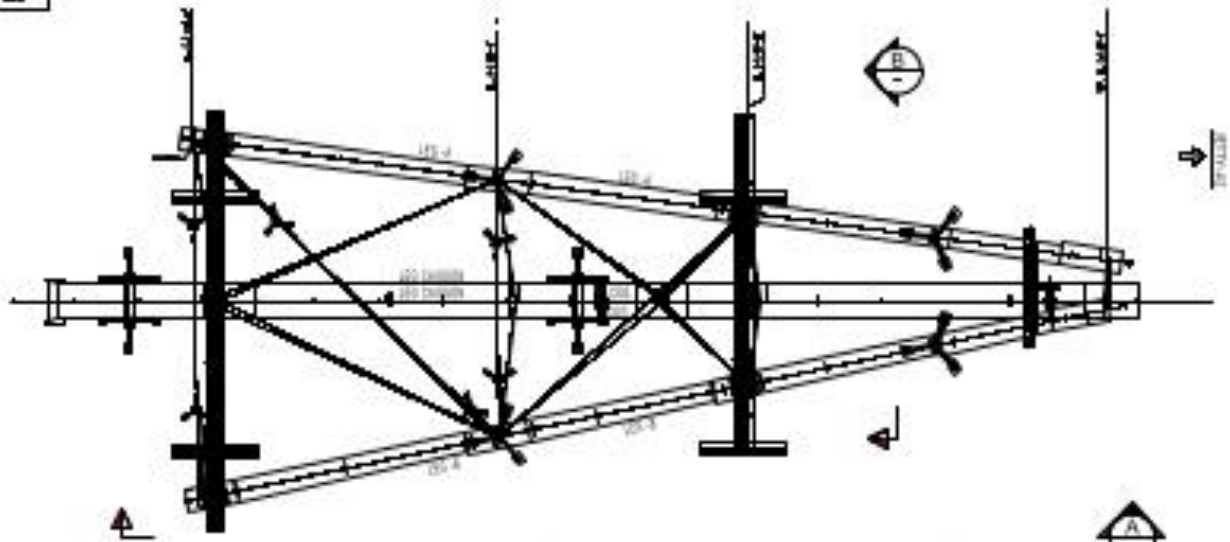
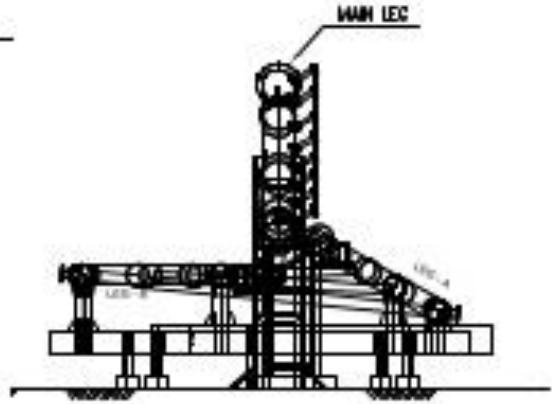
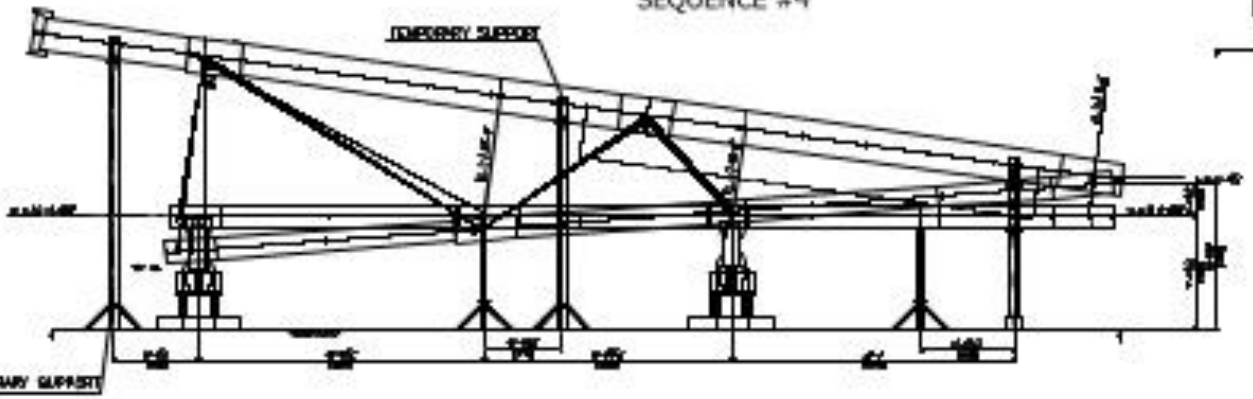


PHE-24 JACKET MAIN LEG INSTALLATION
SEQUENCE #4

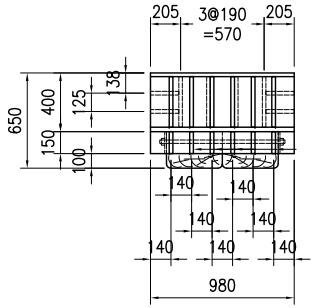


SECTION B

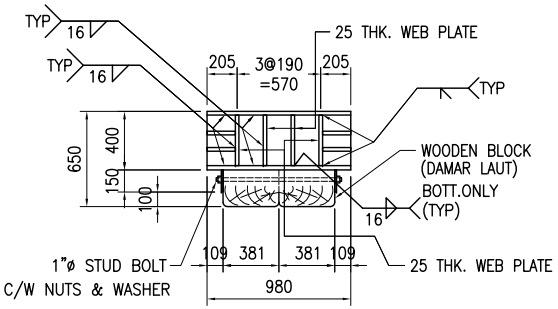


PERTAMINA
PHE WMO

PHE-24 JACKET
GENERAL FABRICATION & ERECTION
PROCEDURE



VIEW A



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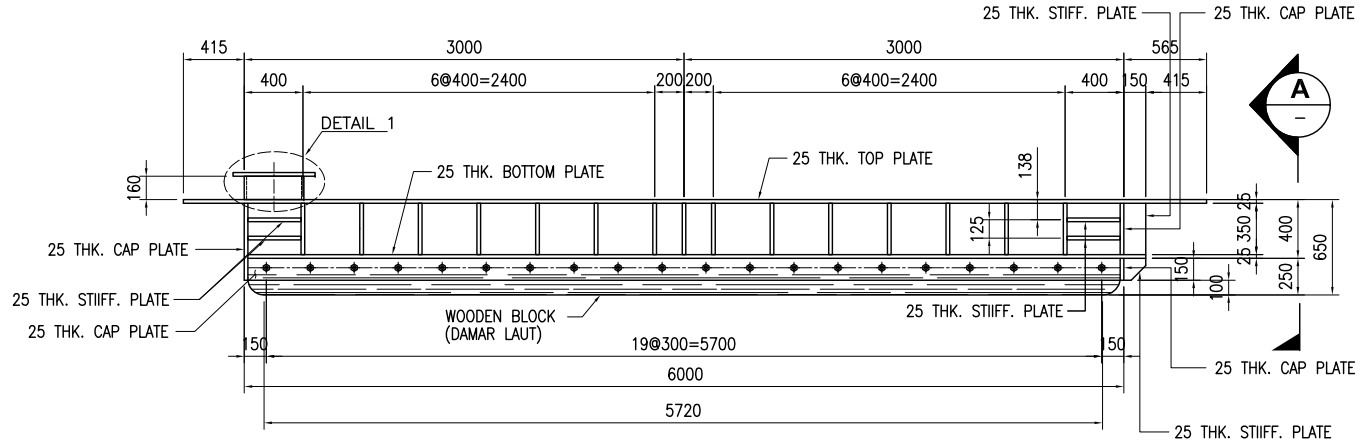
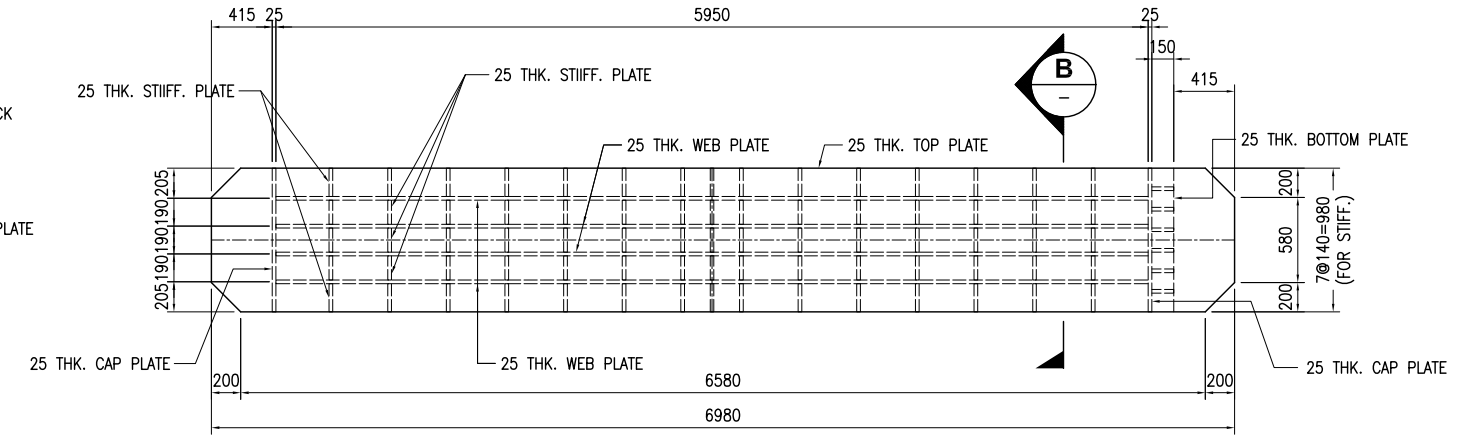
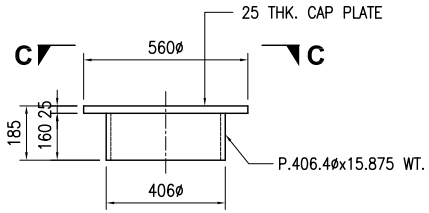
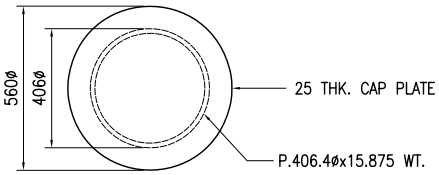




SKID SHOE TYPE - 1 (10 REQ'D)



DETAIL - 1



SECT. - C

PT. GUNANUSA UTAMA FABRICATORS
CONSTRUCTION ENGINEERING

DCS NO.:

APPROVED FOR CONSTRUCTION

DATE : SIGN :

REV	DESCRIPTION	DRAWN	CHK'D	APPV'D	DATE
0	ISSUED FOR CONSTRUCTION	SOF			

REF.DWG.: REV. 0

OIL AND NATURAL GAS CORPORATION LIMITED INDIA

DAMAN DEVELOPMENT PROJECT

Consortium of Swiber Offshore (India) Pvt. Ltd. (SOIPL) and Swiber Offshore Construction Pte. Ltd. (SOCPL)
Singapore 609920

PT. GUNANUSA UTAMA FABRICATORS
JAKARTA – INDONESIA

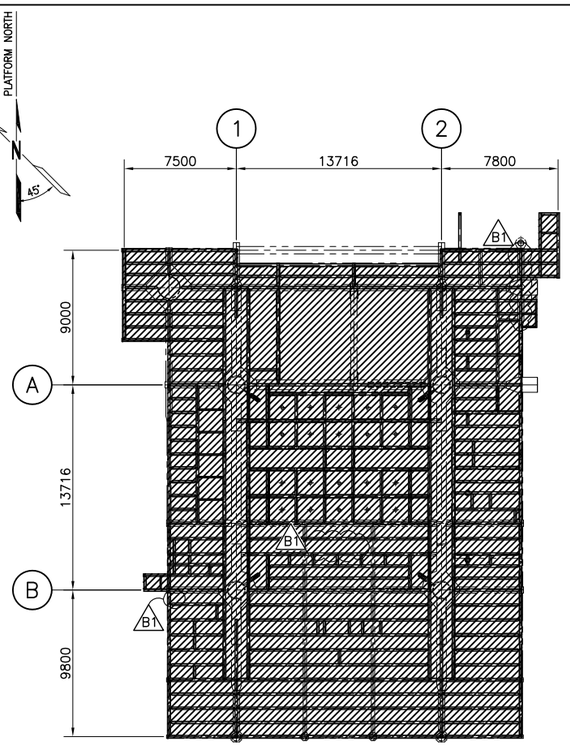
TITLE :

DAMAN DEVELOPMENT PROJECT
SKIDSHOE FRAMING PLAN ON BARGE

DRAWN : SOF	DESIGNER: LS	APPV'D :	0 REV
DATE : 22/10/15	DATE : 22/10/15	DATE :	
JOB No : 15004	DWG No : PRO-15004-PTG-SKS-001		

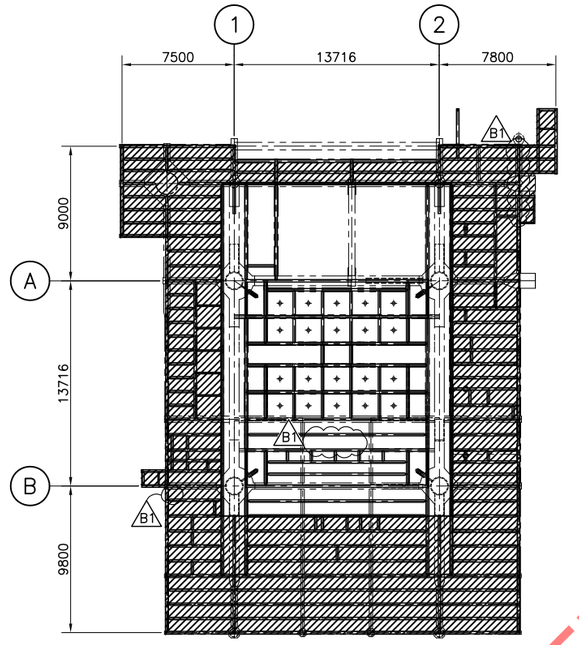
SHT: 4

FILE :D:\PTG\01 KERJAAN\10 ONGC - DAMAN\02 PROCEDURE\02 LOAD OUT PROCEDURE\SKID BEAM AND SKID SHOE\SKIDSHOE LAYOUT.dwg



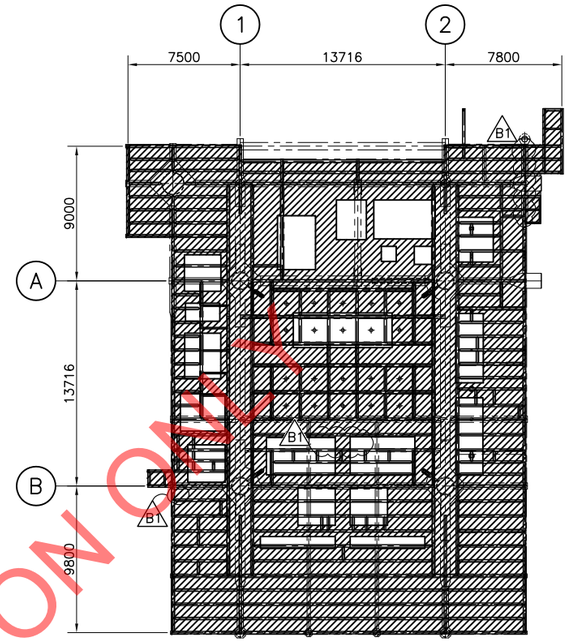
CASE I

UPPER DECK PLAN AT TOS EL(+) 24300



CASE II

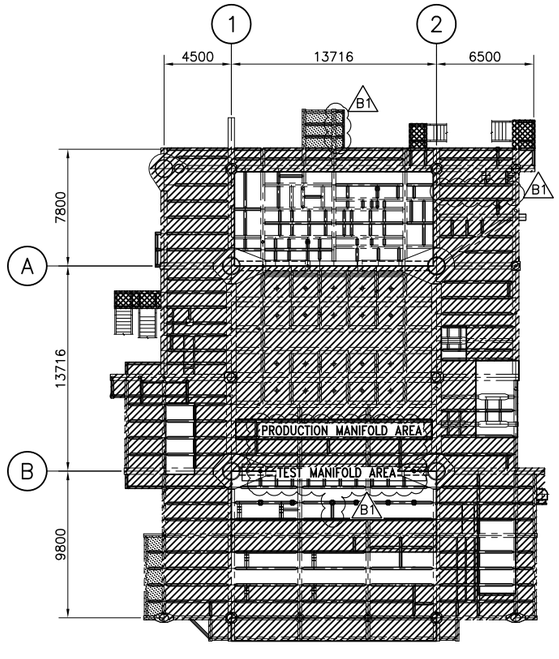
UPPER DECK PLAN AT TOS EL(+) 24300



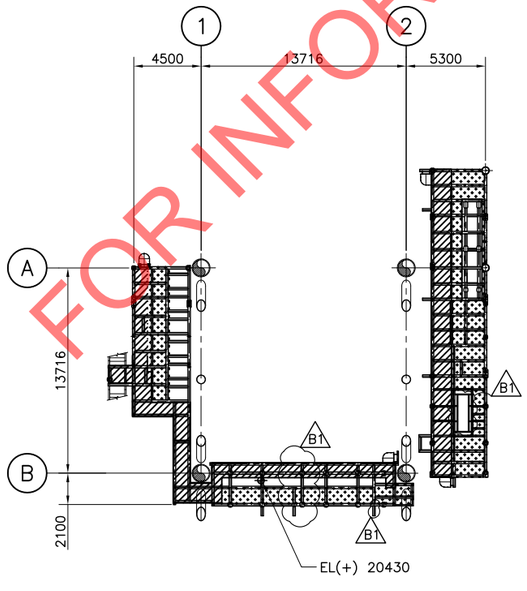
CASE III

UPPER DECK PLAN AT TOS EL(+) 24300

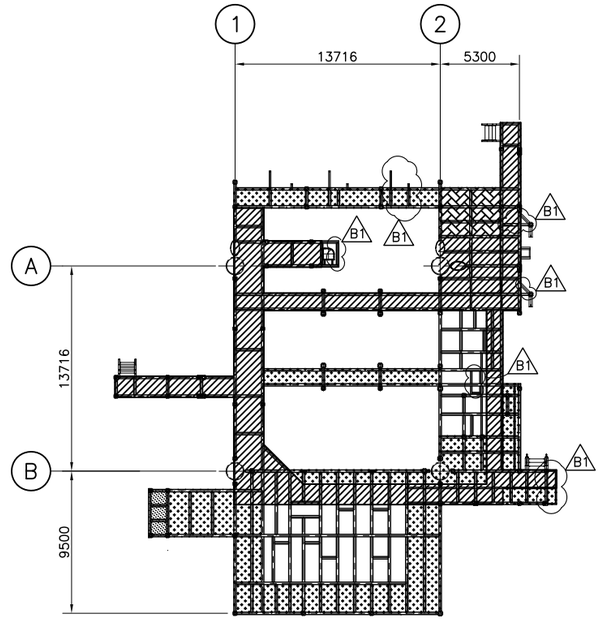
REFER NOTE 2



LOWER DECK PLAN AT TOS EL(+) 18000



MEZZANINE DECK PLAN AT TOS EL(+) 20740, UNO



SUMP DECK PLAN AT TOS EL(+) 14700

NOTES:

1. FOR GENERAL NOTES REFER DWG No MM-ZTK-1C-WPX-STR-DWG-0001 & 0002.
2. THE SPREADER BEAMS TO SUPPORT HEAVY LOADS OF WELL SERVICE EQUIPMENT WHERE POSSIBLE ON MAIN SKID BEAMS SHALL BE PROVIDED.

DESIGN CRITERIA FOR LOADING DIAGRAMS

DEAD & LIVE LOADS

1. ALL STRUCTURAL COMPONENTS HAVE BEEN DESIGNED TO SUPPORT THE APPLIED LOADS. HOWEVER, THE STRUCTURE HAS BEEN GLOBALLY DESIGNED FOR THE FOLLOWING LIVE LOADS (ACTING IN CONJUNCTION WITH PLATE AND BEAMS DEAD LOADS ONLY).

AREA "UNITS" LOADS

UPPER DECK	CASE I CASE II CASE III	15.00 kN/m² 10.00 kN/m² 15.00 kN/m²
LOWER DECK		5.00 kN/m²
MEZZANINE DECK		5.00 kN/m² (MAIN ESCAPE WAY) 2.50 kN/m²
SUMP DECK		5.00 kN/m² (MAIN ESCAPE WAY) 2.50 kN/m²
MUSTER AREA		10.00 kN/m²
LAYDOWN AREA		20.00 kN/m²
STAIR/LANDING ACCESS PLATFORM		2.50 kN/m²

NOTE:

CASE I – PRODUCTION ONLY

CASE II – SIMULTANEOUS OPERATIONS OF DRILLING AND PRODUCTION

CASE III – SIMULTANEOUS OPERATIONS OF WELL SERVICING AND PRODUCTION

2. ACCORDING TO THE TYPE OF ANALYSIS EITHER GLOBAL OR LOCAL ANALYSIS FOR THE STRUCTURAL COMPONENTS, A COEFFICIENT "Ks" GIVEN BELOW SHALL BE APPLIED TO THE OPEN AREA LIVE LOAD.

CONDITION	Ks
JACKET GLOBAL ANALYSIS	0.25
TOPSIDE, PLATING, FLOOR BEAMS AND SECONDARY TRUSSES	1.00
TOPSIDE PRIMARY TRUSSES, INCLUDING FRAME BEAMS ON VARIOUS LEVELS	0.50
MODULE SUPPORTS OR DECK SUPPORTS	0.25

DOCUMENT CLASS: 1

REV	DESCRIPTION	DATE	BY	CHECK	APPR.	CHECK	APPR.
				ENG.	APPR.	COMPANY	APPR.
B1	ISSUED FOR APPROVAL	07/10/16	RSD	SS/SMR	TV	NW	WT
A1	ISSUED FOR REVIEW	26/08/16	RSD	SS/SMR	TV	NW	WT

PTTEP International Limited

EPCI OF WELLHEAD PLATFORMS, ASSOCIATED PIPELINES AND TIE-INS FOR ZAWTIKA DEVELOPMENT PROJECT PHASE 1C

WP9 TOPSIDE
DECK DESIGN LOADING DIAGRAMS

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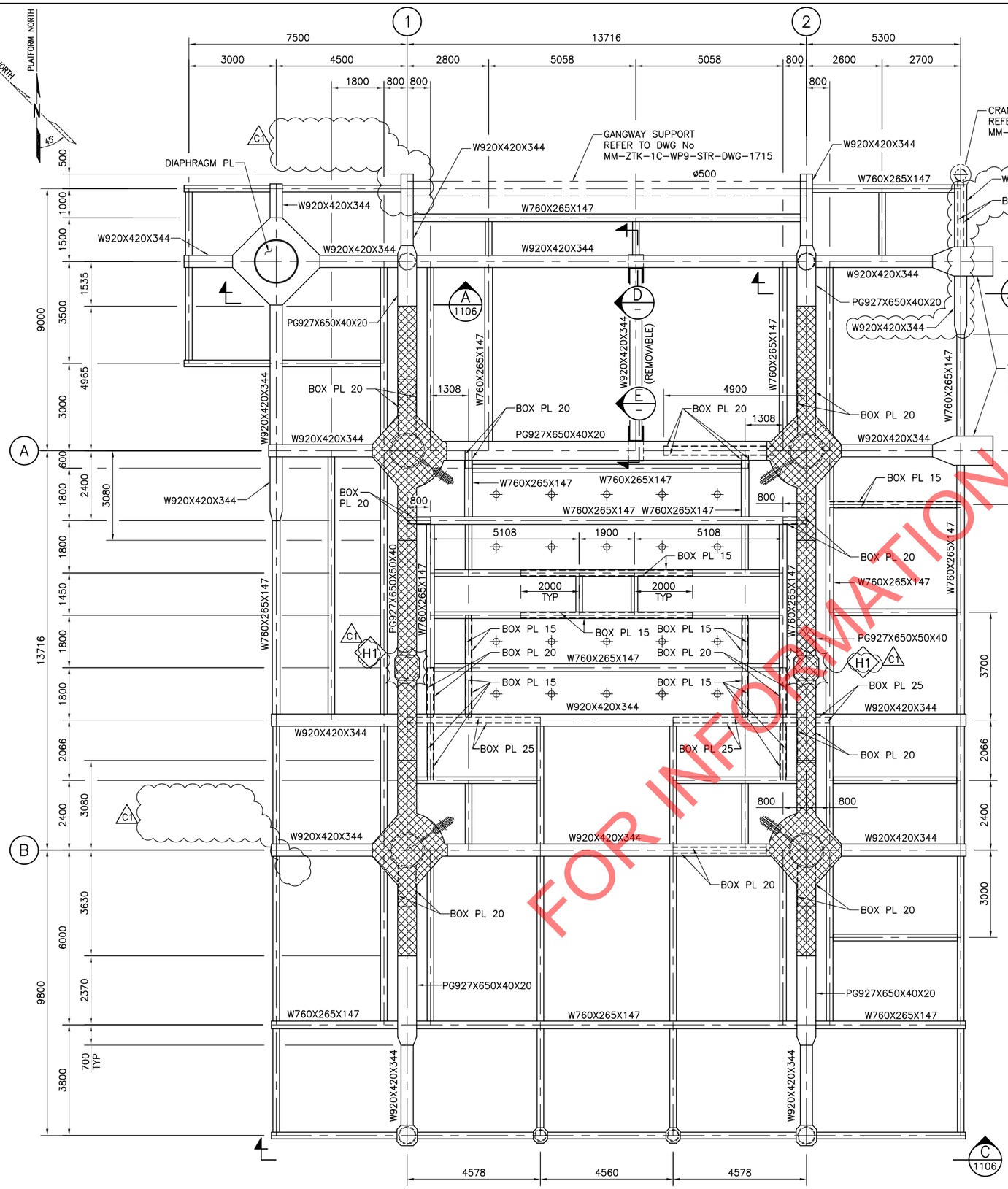
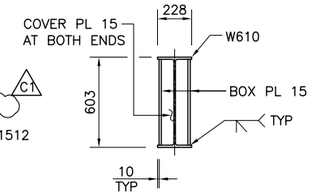
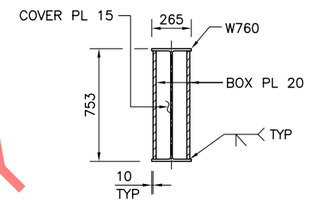


UPPER DECK PRIMARY STEEL FRAMING PLAN AT TOS EL(+) 23990

ALL MEMBERS ARE W610X230X101, UNO
SKID BEAM OMITTED FOR CLARITY
SCALE 1:75



W610 BOX SECTION
SCALE 1:20



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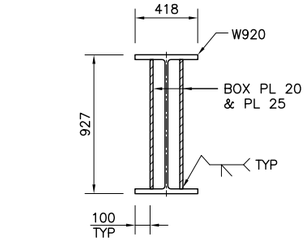

W920 BOX SECTION
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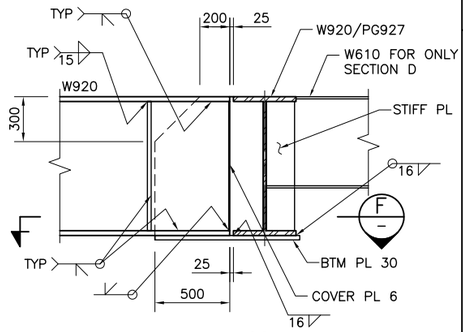
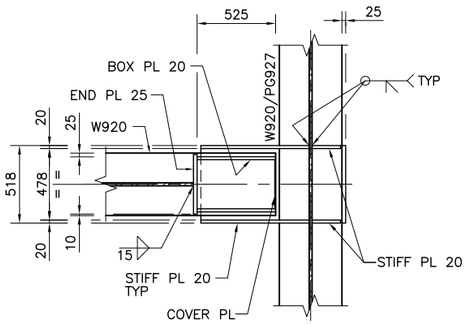


SECTION D – AS SHOWN
SCALE 1:20

SECTION E – SIMILAR BUT OPP HAND
SCALE 1:20



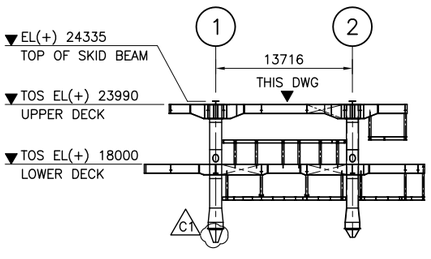
SECTION F
SCALE 1:20

SPECIFICATION

REP	QTY.	DESCRIPTION	MATERIAL	L.A UNIT ml/m2	L.A TOT. ml/m2	W. UNIT kg/ml/m2	W. TOTAL kg	A	B
–	–	PL 6	S235 KL+20	–	0.57	47.10	26.85	1	1
–	–	PL 15	S355 KL 0	C1	31.53	117.75	3712.66	1	1
–	–	PL 20	S355 KL 0	–	8.45	157.00	1326.65	1	1
–	–	PL 20	S355 KT-20	–	54.46	157.00	8550.22	1	S
–	–	PL 25	S355 KT-20	–	19.86	196.25	3897.53	1	S
–	–	PL 30	S355 KT-20	–	1.12	235.50	263.76	1	S
–	–	PL 40	S355 KT-20	–	37.40	314.00	11743.60	1	S
–	–	PL 50	S355 KT-40	–	5.79	392.50	2272.58	1	S
–	–	PL 50	S355 KT-40 Z35	–	9.82	392.50	3854.35	1	S
–	–	W610X230X101	S355 KL 0	–	249.23	101.00	25172.23	1	1
–	–	W760X265X147	S355 KL 0	–	137.49	147.00	20211.03	1	1
–	–	W920X420X344	S355 KT-20	–	107.76	344.00	37069.49	1	S
							C1		
W.TOTAL							C1 118101.00		

(A) STANDARD :
1 * PEGS-12059-OSS-002

(B) STEEL CATEGORY : S * SPECIAL
1 * FIRST
2 * SECOND
NS * NON – STRUCTURAL



KEY PLAN
NTS

NOTES:

1. FOR GENERAL NOTES REFER TO DRAWING No MM-ZTK-1C-WPX-STR-DWG-0001 & 0002.
2. UNLESS NOTED OTHERWISE, ALL STRUCTURAL STEEL MATERIAL SHOWN ON THIS DRAWING SHALL BE AS PER TABLE SHOWN ABOVE.
3. ALL STRUCTURAL STEEL MEMBER MARKED THUS ⊠ SHALL BE OF STEEL MATERIAL WITH SPECIFIED REDUCTION OF AREA IN THE THROUGH THICKNESS DIRECTION FOR TOP FLANGE ONLY, UNO.
4. UPPER DECK JOINT DETAIL MARKING PLAN REFER TO DRAWING No MM-ZTK-1C-WP9-STR-DWG-1118.
5. UPON THE COMPANY'S REPRESENTATIVE APPROVAL AT YARD, W920X420X344 SHALL BE SUBSTITUTED BY PG920X418X32X19.3. FOR PG-920 DETAIL REFER TO DRAWING No MM-ZTK-1C-WPX-STR-DWG-0014.

HOLDS LIST:

C1

H1 C1 COLUMN MAY UPSIZE TO ø750X30 PENDING FINALIZING TRANSPORTATION ANALYSIS

DOCUMENT CLASS : 1

PT. Gunanusa Utama Fabricators — Technip

REV	DESCRIPTION	DATE	BY	CHECK	APPR.	CHECK	APPR.
C1	APPROVED FOR CONSTRUCTION	06/10/16	SCB	SS/SMR	TV	NW	WT
B1	ISSUED FOR APPROVAL	14/09/16	RSD	SS/SMR	TV	NW	WT
A1	ISSUED FOR REVIEW	11/08/16	RSD	SS/SMR	TV	NW	WT
				ENG. APPR.		COMPANY APPR.	

PTTEP International Limited

EPCI OF WELLHEAD PLATFORMS, ASSOCIATED PIPELINES AND TIE-INS FOR ZAWTIKA DEVELOPMENT PROJECT PHASE 1C

WP9 TOPSIDE
UPPER DECK PRIMARY STEEL
FRAMING PLAN AT TOS EL(+) 23990

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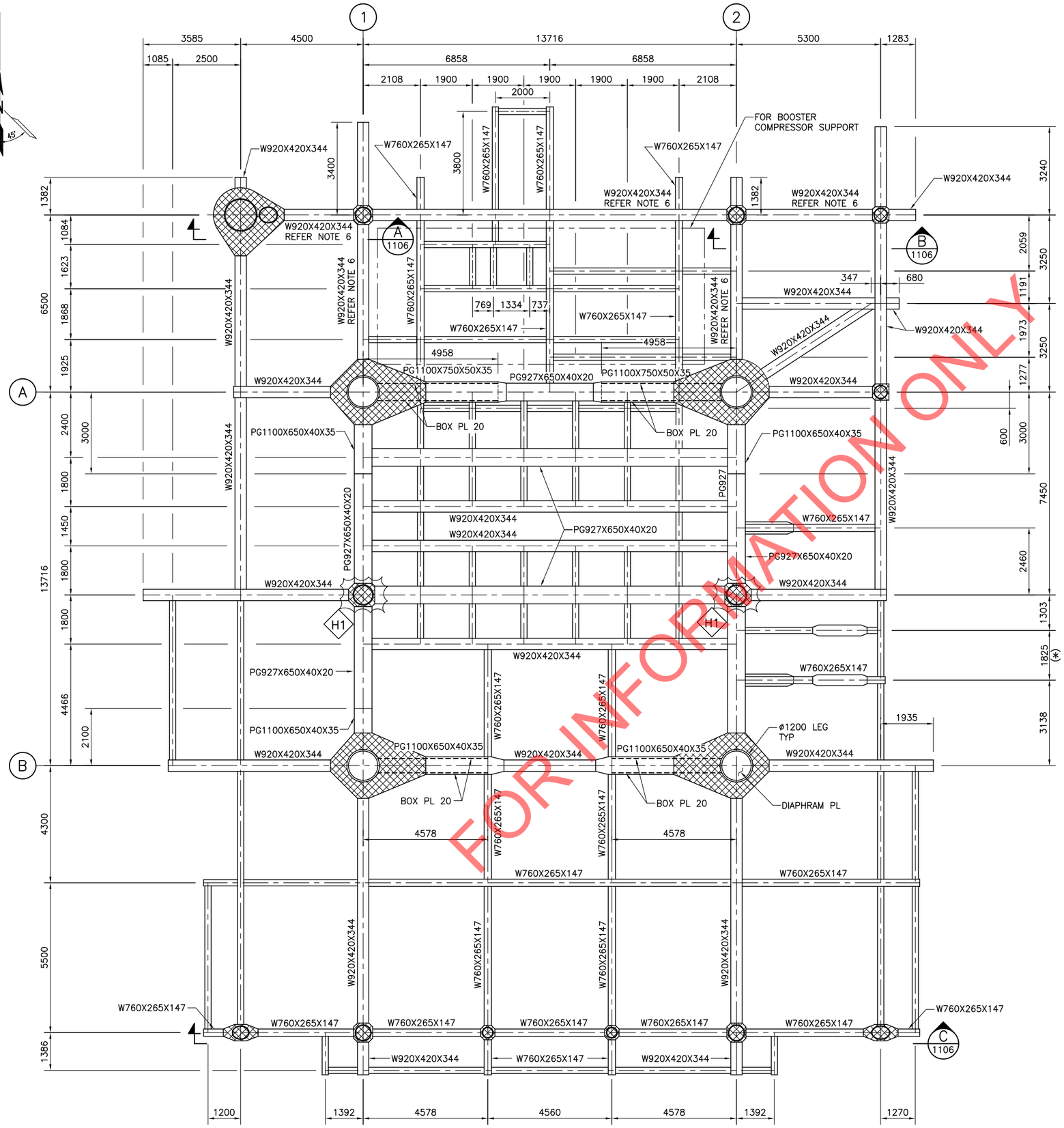
AS NOTED	MM-ZTK-1C-WP9-STR-DWG-1100	1/1	C1



LOWER DECK PRIMARY STEEL FRAMING PLAN AT TOS EL(+) 18000

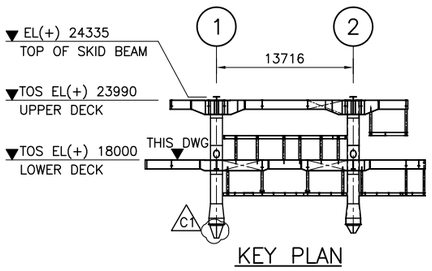
ALL MEMBERS ARE W610X230X101, UNO

SPECIFICATION

REP	QTY.	DESCRIPTION	MATERIAL	L.A. UNIT ml/m2	L.A. TOT. ml/m2	W. UNIT kg/ml/m2	W. TOTAL kg	A	B
–	–	PL 20	S355 KT-20	–	74.42	157.00	11683.94	1	S
–	–	PL 35	S355 KT-20	–	26.88	274.75	7385.28	1	S
–	–	PL 40	S355 KT-20	–	70.21	314.00	22045.94	1	S
–	–	PL 50	S355 KT-40		8.83	392.50	3465.78	1	S
–	–	W610X230X101	S355 KL 0	C1	189.51	101.00	19140.51	1	1
–	–	W760X265X147	S355 KL 0	–	117.64	147.00	17293.08	1	1
–	–	W920X420X344	S355 KT-20	–	177.52	344.00	61066.88	1	S
W.TOTAL						C1	142081.40		

(A) STANDARD :
1 * PEGS-12059-OSS-002

(B) STEEL CATEGORY : S * SPECIAL
1 * FIRST
2 * SECOND
NS * NON – STRUCTURAL



KEY PLAN
NTS

NOTES:

1. FOR GENERAL NOTES REFER TO DRAWING No MM-ZTK-1C-WPX-STR-DWG-0001 & 0002.
2. UNLESS NOTED OTHERWISE, ALL STRUCTURAL STEEL MATERIAL SHOWN ON THIS DRAWING SHALL BE AS PER TABLE SHOWN ABOVE.
3. ALL STRUCTURAL STEEL MEMBER MARKED THUS ⊠ SHALL BE OF STEEL MATERIAL WITH SPECIFIED REDUCTION OF AREA IN THE THROUGH THICKNESS DIRECTION FOR TOP FLANGE ONLY, UNO.
4. LOWER DECK JOINT DETAIL MARKING PLAN REFER TO DRAWING No MM-ZTK-1C-WP9-STR-DWG-1119.
5. UPON THE COMPANY'S REPRESENTATIVE APPROVAL AT YARD, W920X420X344 SHALL BE SUBSTITUTED BY PG920X418X32X19.3. FOR PG-920 DETAIL REFER TO DRAWING No MM-ZTK-1C-WPX-STR-DWG-0014.
6. THIS BEAM IF REQUIRED TO BE SUBSTITUTED BY PG920 AS PER NOTE 5. THE WELDING BETWEEN WEB AND FLANGE PLATES SHALL BE FULL PENETRATION WELD, REFER DRAWING No MM-ZTK-1C-WPX-STR-DWG-0014.
7. (*) THE DIMENSION SHALL BE VERIFIED WITH FINAL VENDOR DATA PRIOR TO FABRICATION.

HOLDS LIST:

H1 — COLUMN MAY UPSIZE TO ø750X30 PENDING FINALIZING TRANSPORTATION ANALYSIS

DOCUMENT CLASS : 1

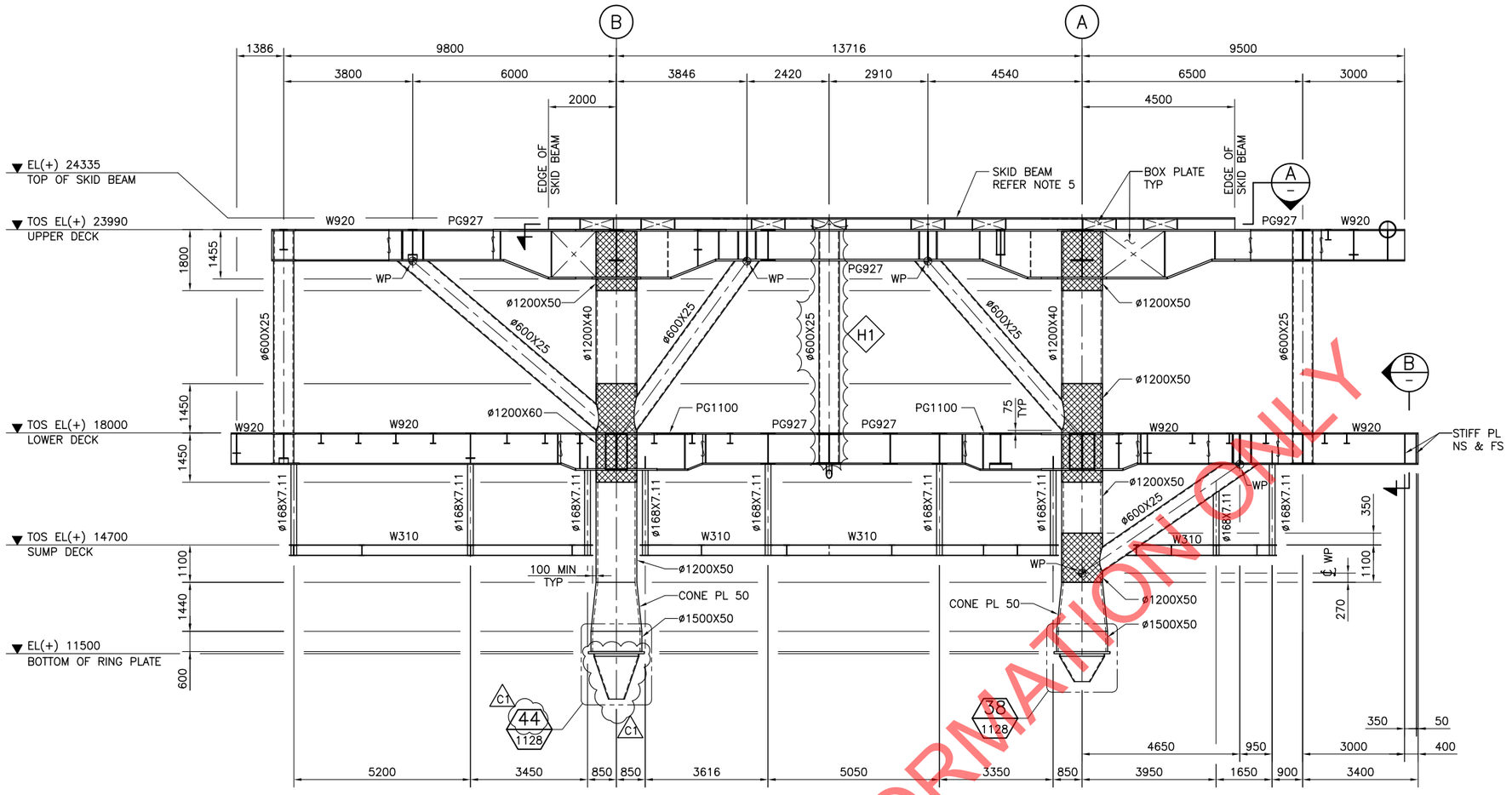
REV	DESCRIPTION	DATE	BY	CHECK	APPR.	CHECK	APPR.
				ENG. APPR.		COMPANY APPR.	
C1	APPROVED FOR CONSTRUCTION	06/10/16	SCB	SS/SMR	TV	NW	WT
B1	ISSUED FOR APPROVAL	08/09/16	RSD	SS/SMR	TV	NW	WT
A1	ISSUED FOR REVIEW	11/08/16	RSD	SS/SMR	TV	NW	WT

PTTEP International Limited

EPCI OF WELLHEAD PLATFORMS, ASSOCIATED PIPELINES AND TIE-INS FOR ZAWTIKA DEVELOPMENT PROJECT PHASE 1C

WP9 TOPSIDE
LOWER DECK PRIMARY STEEL
FRAMING PLAN AT TOS EL(+) 18000

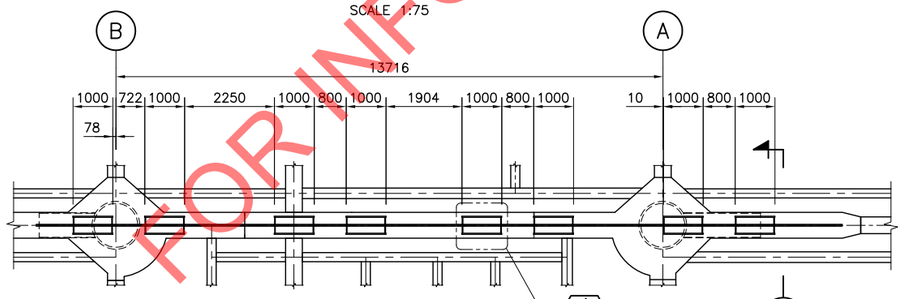
SCALE :	DRAWING NO.	SHEET	REV.
1:75	MM-ZTK-1C-WP9-STR-DWG-1101	1/1	C1



ELEVATION TRUSS ROW '1'

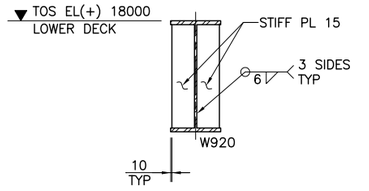
UPPER DECK SECONDARY BEAMS NOT SHOWN FOR CLARITY

SCALE 1:75

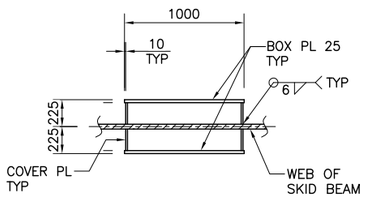


SECTION A / SCALE 1:75

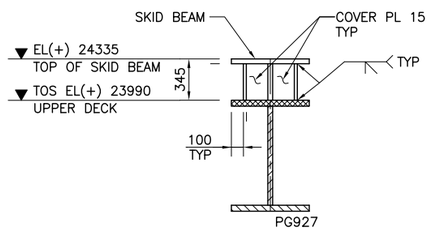
SHADOW NOT SHOWN FOR CLARITY



SECTION B / SCALE 1:20 TYP 2 PLACES



DETAIL 1 / SCALE 1:25



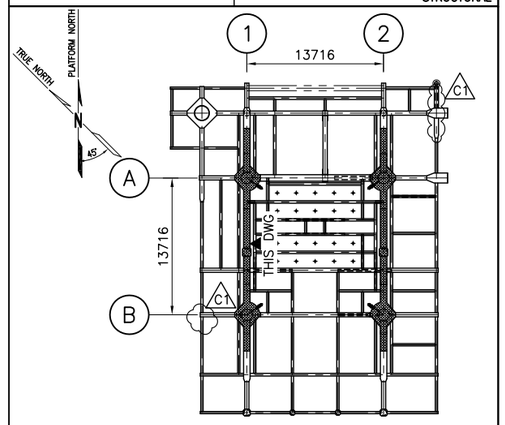
SECTION C / SCALE 1:20

SPECIFICATION

REP	QTY.	DESCRIPTION	MATERIAL	L.A UNIT ml/m2	L.A TOT. ml/m2	W. UNIT kg/ml/m2	W. TOTAL kg	A	B
–	–	PL 50	S355 KT–40	–	12.21	392.50	4792.43	1	S
–	–	ø168X7.11	S355 KL+20	–	20.05	28.20	565.41	1	2
–	–	ø600X25	S355 KL 0	–	41.22	354.50	14612.49	1	1
–	–	ø1200X40	S355 KT–20	–	5.48	1144.30	6270.76	1	S
–	–	ø1200X50	S355 KT–40 Z35	–	7.85	1418.00	11131.30	1	S
–	–	ø1200X50	S355 KT–40	–	4.45	1418.00	6310.10	1	S
–	–	ø1500X50	S355 KT–40	–	1.20	1788.00	2145.60	1	S
–	–	PL 40	S355 KT–20	–	19.31	314.00	6063.34	1	S
–	–	PL 25	S355 KT–20	–	4.88	196.25	957.70	1	S
–	–	PL 15	S355 KT 0	–	2.39	117.75	281.42	1	S
–	–	ø1200X60	S355 KT–40 Z35	–	2.90	1686.85	4891.87	1	S
W.TOTAL							58022.42		

(A) STANDARD :
1 * PEGS–12059–OSS–002

(B) STEEL CATEGORY : S * SPECIAL
1 * FIRST
2 * SECOND
NS * NON – STRUCTURAL



KEY PLAN
NTS

NOTES:

1. FOR GENERAL NOTES REFER TO DRAWING No MM–ZTK–1C–WPX–STR–DWG–0001 & 0002.
2. UNLESS NOTED OTHERWISE, ALL STRUCTURAL STEEL MATERIAL SHOWN ON THIS DRAWING SHALL BE AS PER TABLE SHOWN ABOVE.
3. ALL STRUCTURAL STEEL MEMBERS MARKED THUS ▨ SHALL BE Z35 STEEL UNO.
4. JOINT DETAILS REFER TO DRAWING No MM–ZTK–1C–WP9–STR–DWG–1118 & 1119.
5. FOR SKID BEAM DETAILS REFER TO DRAWING No MM–ZTK–1C–WPX–STR–DWG–0014.
6. FOR PAR–PIN ELEVATION VIEW REFER TO DRAWING No MM–ZTK–1C–WP9–STR–DWG–1715.
7. UPON THE COMPANY'S REPRESENTATIVE APPROVAL AT YARD, W920X420X344 SHALL BE SUBSTITUTED BY PG920X418X32X19.3. FOR PG920 DETAIL REFER TO DRAWING No MM–ZTK–1C–WPX–STR–DWG–0014.

C1

HOLDS LIST:

H1 COLUMN MAY UPSIZE TO ø750X30 PENDING FINALIZING TRANSPORTATION ANALYSIS

DOCUMENT CLASS : 1

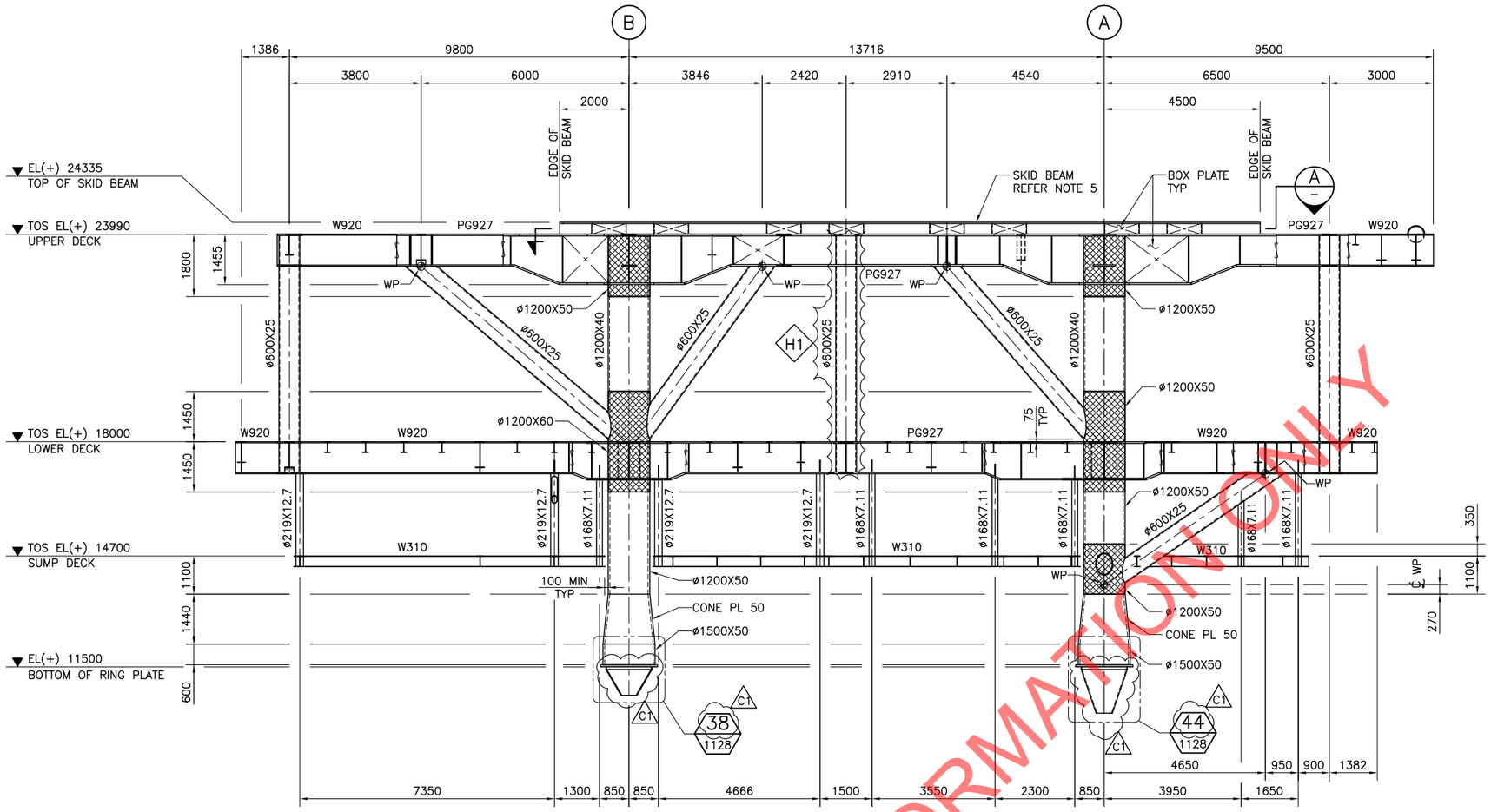
REV	DESCRIPTION	DATE	BY	CHECK	APPR.	CHECK	APPR.
				ENG. APPR.		COMPANY APPR.	
C1	APPROVED FOR CONSTRUCTION	06/10/16	SCB	SS/SMR	TV	NW	WT
B1	ISSUED FOR APPROVAL	15/09/16	RSD	SS/SMR	TV	NW	WT
A1	ISSUED FOR REVIEW	11/08/16	RSD	SS/SMR	TV	NW	WT

PTTEP International Limited

EPCI OF WELLHEAD PLATFORMS, ASSOCIATED PIPELINES AND TIE-INS FOR ZAWTIKA DEVELOPMENT PROJECT PHASE 1C

WP9 TOPSIDE
ELEVATION TRUSS ROW '1'

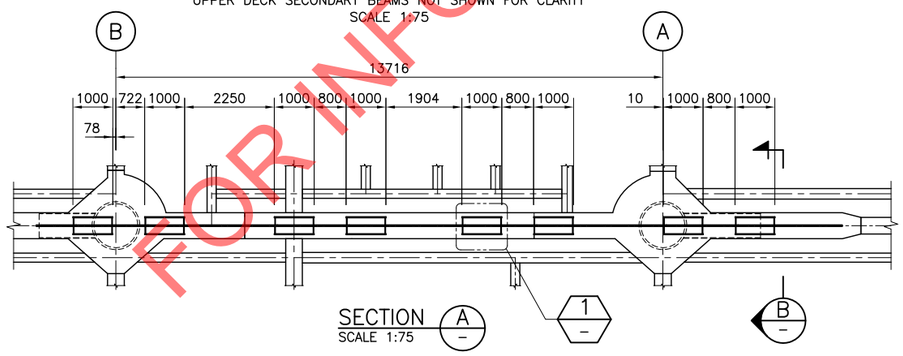
SCALE :	DRAWING NO.	SHEET	REV.
AS NOTED	MM-ZTK-1C-WP9-STR-DWG-1102	1/1	C1



ELEVATION TRUSS ROW '2'

UPPER DECK SECONDARY BEAMS NOT SHOWN FOR CLARITY

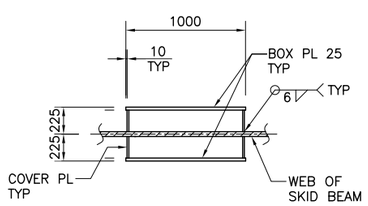
SCALE 1:75



SECTION A

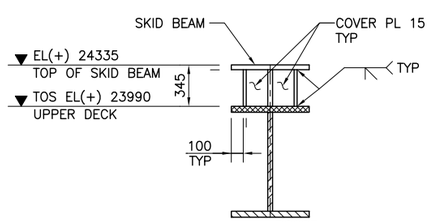
SCALE 1:75

SHADOW NOT SHOWN FOR CLARITY



DETAIL 1

SCALE 1:25



SECTION B

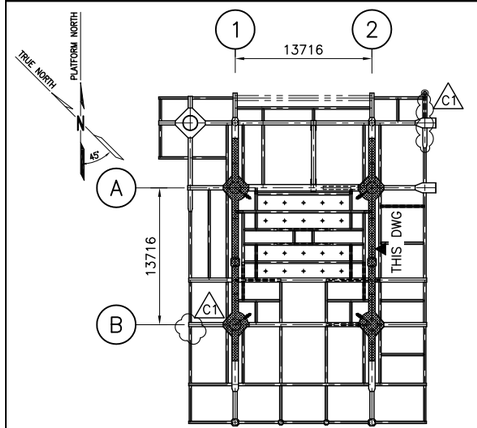
SCALE 1:20

SPECIFICATION

REP	QTY.	DESCRIPTION	MATERIAL	LA UNIT ml/m2	LA TOT. ml/m2	W. UNIT kg/ml/m2	W. TOTAL kg	A	B
–	–	PL 50	S355 KT–40	–	12.21	392.50	4792.43	1	S
–	–	ø168X7.11	S355 KL+20	–	13.02	28.20	367.16	1	2
–	–	ø219X12.7	S355 KL+20	–	9.32	64.60	602.07	1	2
H1 –	–	ø600X25	S355 KL 0	–	41.22	354.50	14612.49	1	1
–	–	ø1200X40	S355 KT–20	–	5.48	1144.30	6270.76	1	S
–	–	ø1200X50	S355 KT–40 Z35	–	7.85	1418.00	11131.30	1	S
–	–	ø1200X50	S355 KT–40	–	4.45	1418.00	6310.10	1	S
–	–	ø1500X50	S355 KT–40	–	1.20	1788.00	2145.60	1	S
–	–	PL 40	S355 KT–20	–	19.31	314.00	6063.34	1	S
–	–	PL 25	S355 KT–20	–	4.88	196.25	957.70	1	S
–	–	PL 15	S355 KT 0	–	1.75	117.75	206.06	1	S
–	–	ø1200X60	S355 KT–40 Z35	–	2.90	1686.85	4891.87	1	S
W.TOTAL							58350.88		

(A) STANDARD :
1 * PEGS–12059–OSS–002

(B) STEEL CATEGORY : S * SPECIAL
1 * FIRST
2 * SECOND
NS * NON – STRUCTURAL



KEY PLAN

NTS

NOTES:

1. FOR GENERAL NOTES REFER TO DRAWING No MM–ZTK–1C–WPX–STR–DWG–0001 & 0002.
2. UNLESS NOTED OTHERWISE, ALL STRUCTURAL STEEL MATERIAL SHOWN ON THIS DRAWING SHALL BE AS PER TABLE SHOWN ABOVE.
3. ALL STRUCTURAL STEEL MEMBERS MARKED THUS ▨ SHALL BE Z35 STEEL UNO.
4. JOINT DETAILS REFER TO DRAWING No MM–ZTK–1C–WP9–STR–DWG–1118 & 1119.
5. FOR SKID BEAM DETAILS REFER TO DRAWING No MM–ZTK–1C–WPX–STR–DWG–0014.
6. UPON THE COMPANY'S REPRESENTATIVE APPROVAL AT YARD, W920X420X344 SHALL BE SUBSTITUTED BY PG920X418X32X19.3. FOR PG920 DETAIL REFER TO DRAWING No MM–ZTK–1C–WPX–STR–DWG–0014. C1

HOLDS LIST:

H1 COLUMN MAY UPSIZE TO ø750X30 PENDING FINALIZING TRANSPORTATION ANALYSIS

DOCUMENT CLASS : 1

PT. Gunanusa Utama Fabricators

Technip

REV	DESCRIPTION	DATE	BY	CHECK	APPR.	CHECK	APPR.
				ENG.	APPR.	COMPANY	APPR.
C1	APPROVED FOR CONSTRUCTION	06/10/16	SCB	SS/SMR	TV	NW	WT
B1	ISSUED FOR APPROVAL	15/09/16	RSD	SS/SMR	TV	NW	WT
A1	ISSUED FOR REVIEW	11/08/16	RSD	SS/SMR	TV	NW	WT

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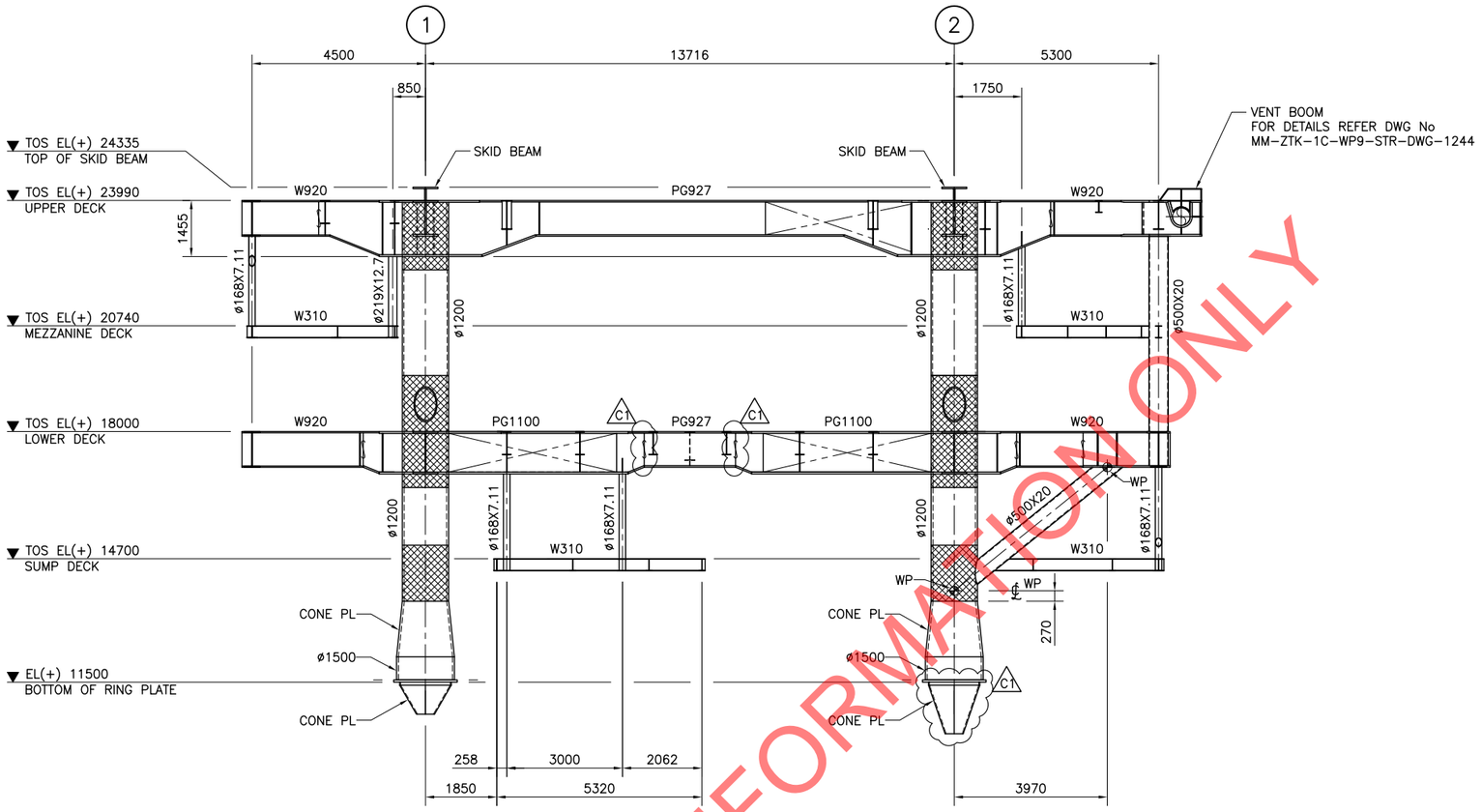
EPCI OF WELLHEAD PLATFORMS, ASSOCIATED PIPELINES AND TIE-INS FOR ZAWTIKA DEVELOPMENT PROJECT PHASE 1C

WP9 TOPSIDE
ELEVATION TRUSS ROW '2'

SCALE :	DRAWING NO.	SHEET	REV.
AS NOTED	MM-ZTK-1C-WP9-STR-DWG-1103	1/1	C1



ELEVATION TRUSS ROW 'A'

UPPER DECK SECONDARY BEAMS NOT SHOWN FOR CLARITY

SCALE 1:75

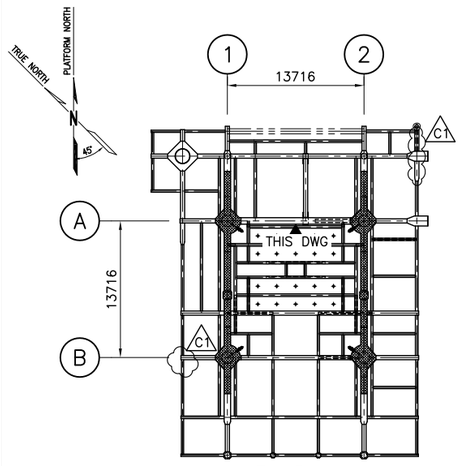
SPECIFICATION

REP	QTY.	DESCRIPTION	MATERIAL	L.A. UNIT ml/m2	L.A. TOT. ml/m2	W. UNIT kg/ml/m2	W. TOTAL kg	A	B
–	–	ø168X7.11	S355 KL+20	–	11.16	28.20	314.71	1	2
–	–	ø219X12.7	S355 KL+20	–	1.80	64.60	116.28	1	2
–	–	ø500X20	S355 KL 0	–	9.91	236.75	2346.19	1	1

W.TOTAL 2777.18

(A) STANDARD :
1 * PEGS-12059-OSS-002

(B) STEEL CATEGORY : S * SPECIAL
1 * FIRST
2 * SECOND
NS * NON – STRUCTURAL



KEY PLAN

NTS

NOTES:

1. FOR GENERAL NOTES REFER TO DRAWING No MM-ZTK-1C-WPX-STR-DWG-0001 & 0002.
2. UNLESS NOTED OTHERWISE, ALL STRUCTURAL STEEL MATERIAL SHOWN ON THIS DRAWING SHALL BE AS PER TABLE SHOWN ABOVE.
3. ALL STRUCTURAL STEEL MEMBERS MARKED THUS ▨ SHALL BE Z35 STEEL UNO.
4. JOINT DETAIL REFER TO DRAWING No MM-ZTK-1C-WP9-STR-DWG-1118 & 1119.
5. UPON THE COMPANY'S REPRESENTATIVE APPROVAL AT YARD, W920X420X344 SHALL BE SUBSTITUTED BY PG920X418X32X19.3. FOR PG920 DETAIL REFER TO DRAWING No MM-ZTK-1C-WPX-STR-DWG-0014.

C1

DOCUMENT CLASS : 1

PT. Gunanusa Utama Fabricators

Technip

REV	DESCRIPTION	DATE	BY	CHECK	APPR.	CHECK	APPR.
				ENG. APPR.		COMPANY APPR.	
C1	APPROVED FOR CONSTRUCTION	06/10/16	SCB	SS/SMR	TV	NW	WT
B1	ISSUED FOR APPROVAL	15/09/16	RSD	SS/SMR	TV	NW	WT
A1	ISSUED FOR REVIEW	11/08/16	RSD	SS/SMR	TV	NW	WT

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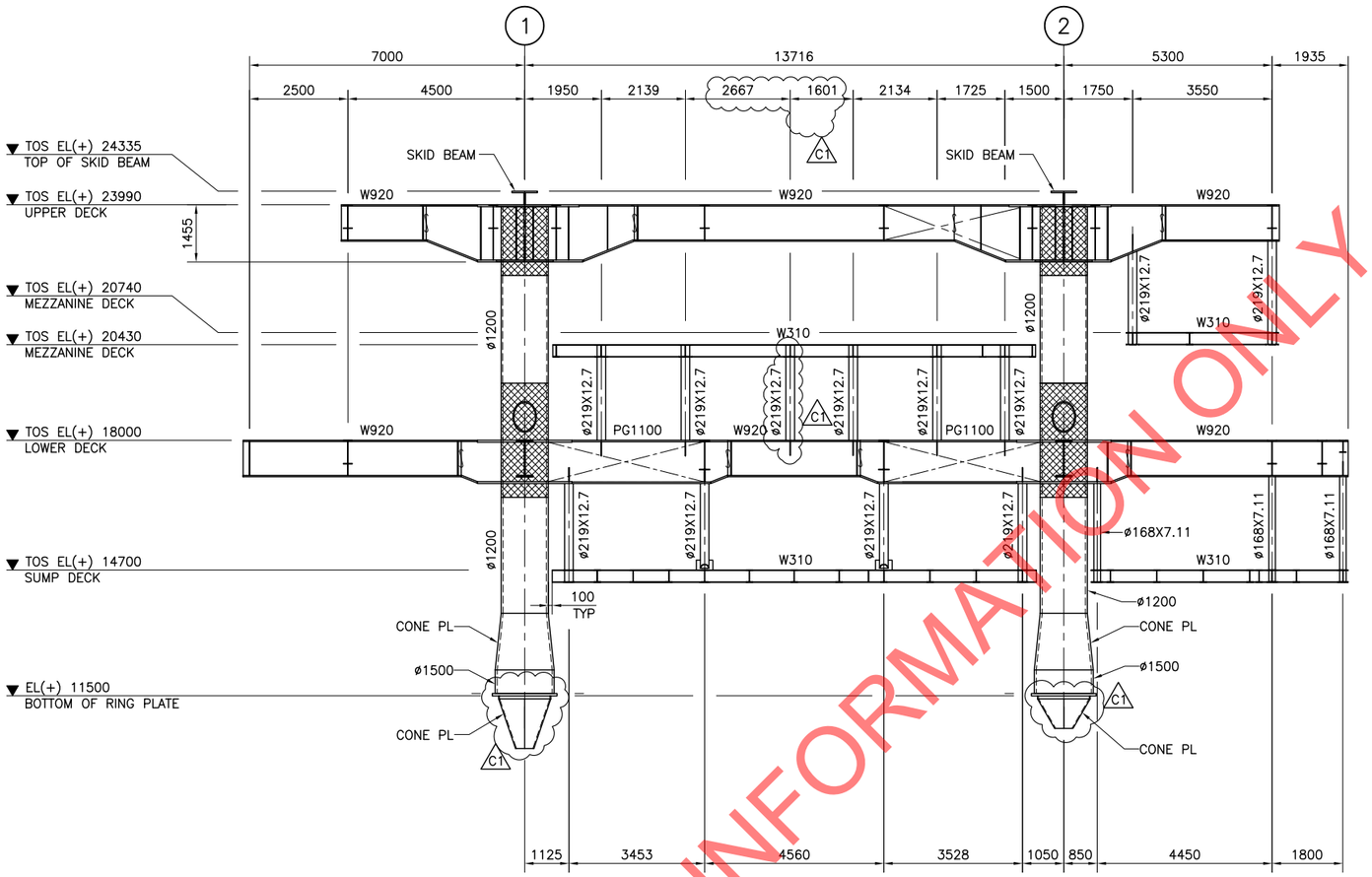
EPCI OF WELLHEAD PLATFORMS, ASSOCIATED PIPELINES AND TIE-INS FOR ZAWTIKA DEVELOPMENT PROJECT PHASE 1C

WP9 TOPSIDE
ELEVATION TRUSS ROW 'A'

SCALE :	DRAWING NO.	SHEET	REV.
AS NOTED	MM-ZTK-1C-WP9-STR-DWG-1104	1/1	C1



ELEVATION TRUSS ROW 'B'

UPPER DECK SECONDARY BEAMS NOT SHOWN FOR CLARITY

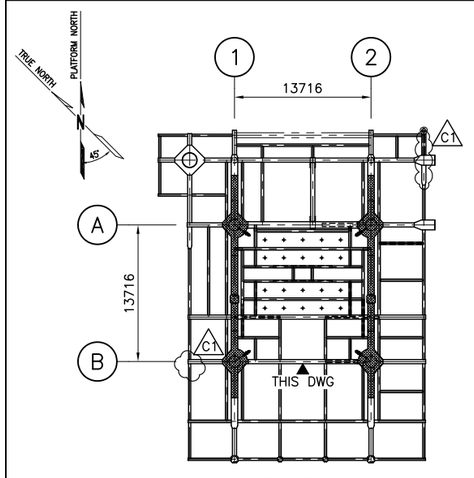
SCALE 1:75

SPECIFICATION

REP	QTY.	DESCRIPTION	SPECIIFICATION	L.A. UNIT ml/m2	L.A. TOT. ml/m2	W. UNIT kg/ml/m2	W. TOTAL kg	A	B
–	–	ø168X7.11	S355 KL+20	–	6.95	28.20	195.99	1	2
–	–	ø219X12.7	S355 KL+20	–	25.81	64.60	1667.33	1	2
W.TOTAL							1863.32		

(A) STANDARD :
1 * PEGS-12059-OSS-002

(B) STEEL CATEGORY : S * SPECIAL
1 * FIRST
2 * SECOND
NS * NON – STRUCTURAL



KEY PLAN

NTS

NOTES:

1. FOR GENERAL NOTES REFER TO DRAWING No MM-ZTK-1C-WPX-STR-DWG-0001 & 0002.
2. UNLESS NOTED OTHERWISE, ALL STRUCTURAL STEEL MATERIAL SHOWN ON THIS DRAWING SHALL BE AS PER TABLE SHOWN ABOVE.
3. ALL STRUCTURAL STEEL MEMBERS MARKED THUS ▨ SHALL BE Z35 STEEL UNO.
4. JOINT DETAIL REFER TO DRAWING No MM-ZTK-1C-WP9-STR-DWG-1118 & 1119.
5. UPON THE COMPANY'S REPRESENTATIVE APPROVAL AT YARD, W920X420X344 SHALL BE SUBSTITUTED BY PG920X418X32X19.3. FOR PG920 DETAIL REFER TO DRAWING No MM-ZTK-1C-WPX-STR-DWG-0014.

C1

DOCUMENT CLASS : 1

PT. Gunanusa Utama Fabricators

Technip

REV	DESCRIPTION	DATE	BY	CHECK	APPR.	CHECK	APPR.
				ENG. APPR.		COMPANY APPR.	
C1	APPROVED FOR CONSTRUCTION	06/10/16	SCB	SS/SMR	TV	NW	WT
B1	ISSUED FOR APPROVAL	20/09/16	RSD	SS/SMR	TV	NW	WT
A1	ISSUED FOR REVIEW	11/08/16	RSD	SS/SMR	TV	NW	WT

PTTEP

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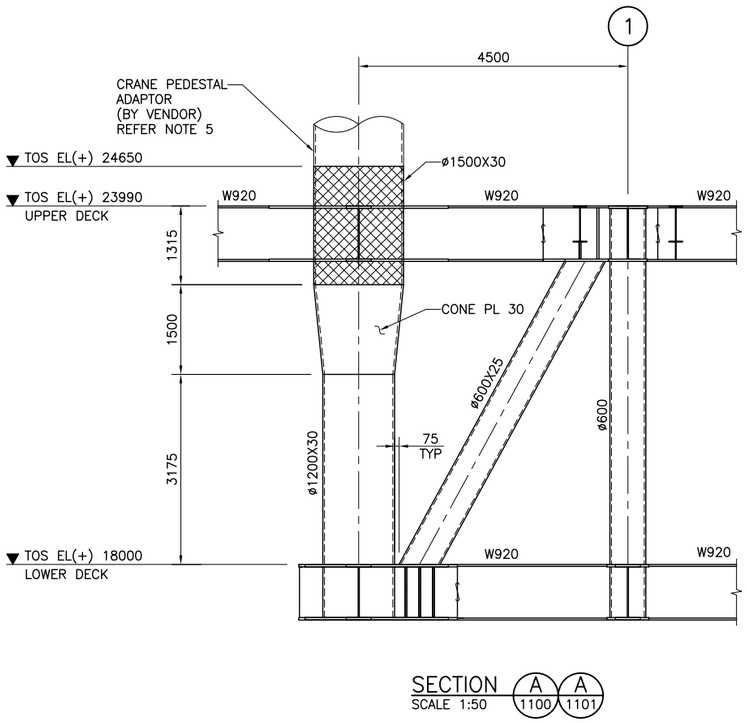
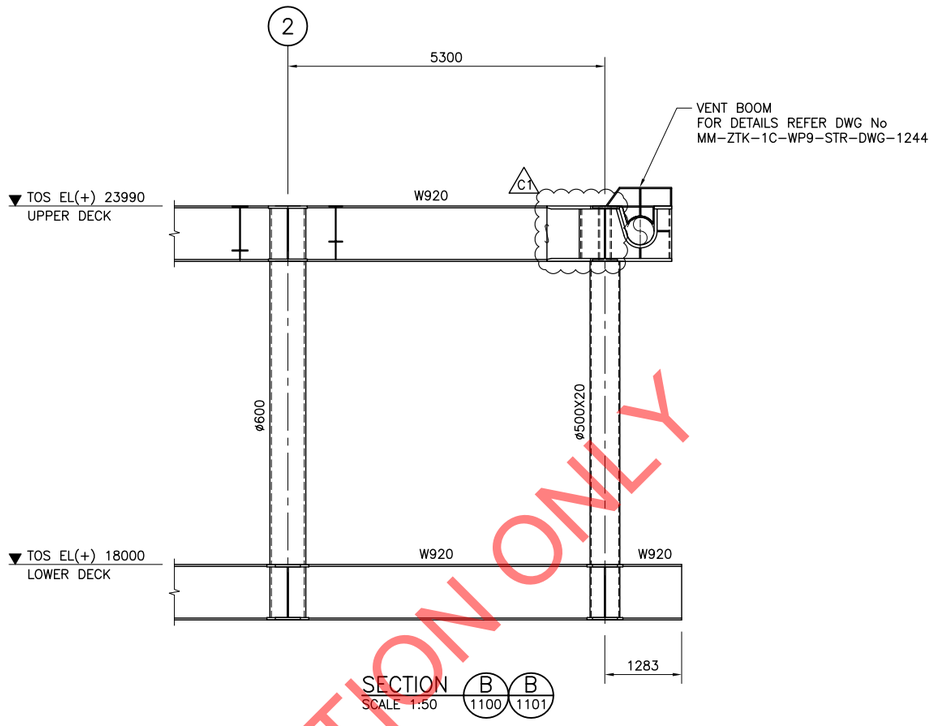
EPCI OF WELLHEAD PLATFORMS, ASSOCIATED PIPELINES AND TIE-INS FOR ZAWTIKA DEVELOPMENT PROJECT PHASE 1C

WP9 TOPSIDE
ELEVATION TRUSS ROW 'B'

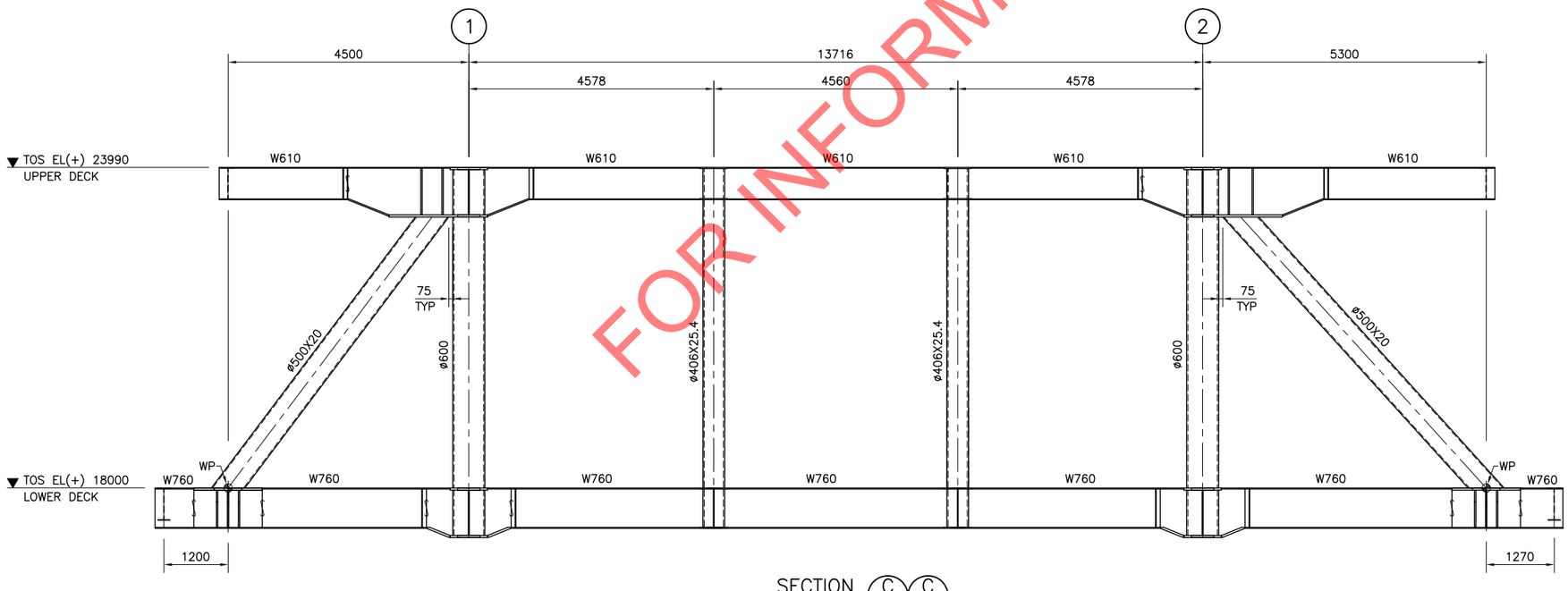
SCALE :	DRAWING NO.	SHEET	REV.
AS NOTED	MM-ZTK-1C-WP9-STR-DWG-1105	1/1	C1



SECTION A 1100 A 1101
SCALE 1:50



SECTION B 1100 B 1101
SCALE 1:50



SECTION C 1100 C 1101
SCALE 1:50

SPECIFICATION

REP	QTY.	DESCRIPTION	MATERIAL	L.A. UNIT ml/m2	L.A. TOT. ml/m2	W. UNIT kg/ml/m2	W. TOTAL kg	A	B
–	–	PL 30	S355 KT-20	–	6.46	235.5	1521.33	1	S
–	–	ø406X25.4	S355 KL 0	–	10.78	238.41	2570.06	1	1
–	–	ø500X20	S355 KL 0	–	19.06	236.75	4512.46	1	1
–	–	ø600X25	S355 KL 0	–	6.10	354.51	2162.51	1	1
–	–	ø1200X30	S355 KT-20	–	3.18	865.62	2752.67	1	S
–	–	ø1500X30	S355 KT-20 Z35	–	1.98	1087.57	2153.39	1	S

W.TOTAL 15672.42

(A) STANDARD :
1 * PEGS-12059-OSS-002

(B) STEEL CATEGORY : S * SPECIAL
1 * FIRST
2 * SECOND
NS * NON – STRUCTURAL

NOTES:

1. FOR GENERAL NOTES REFER TO DRAWING No MM-ZTK-1C-WPX-STR-DWG-0001 & 0002.
2. UNLESS NOTED OTHERWISE, ALL STRUCTURAL STEEL MATERIAL SHOWN ON THIS DRAWING SHALL BE AS PER TABLE SHOWN ABOVE.
3. ALL STRUCTURAL STEEL MEMBERS MARKED THUS ⊠ SHALL BE Z35 STEEL UNO.
4. JOINT DETAIL REFER TO DRAWING No MM-ZTK-1C-WP9-STR-DWG-1118 & 1119.
5. LONGITUDINAL SEAMS OF CRANE PEDESTAL ADAPTOR AND CRANE PEDESTAL SUPPORT STRUCTURE SHALL BE RADIALLY OFFSET BY AT LEAST 90 DEGREES.
6. UPON THE COMPANY'S REPRESENTATIVE APPROVAL AT YARD, W920X420X344 SHALL BE SUBSTITUTED BY PG920X418X32X19.3. FOR PG920 DETAIL REFER TO DRAWING No MM-ZTK-1C-WPX-STR-DWG-0014.

C1

DOCUMENT CLASS : 1

PT. Dumamsa Utama Fabricators

Technip

REV	DESCRIPTION	DATE	BY	CHECK	APPR.	CHECK	APPR.
				ENG. APPR.		COMPANY APPR.	
C1	APPROVED FOR CONSTRUCTION	06/10/16	SCB	SS/SMR	TV	NW	WT
B1	ISSUED FOR APPROVAL	20/09/16	RSD	SS/SMR	TV	NW	WT
A1	ISSUED FOR REVIEW	11/08/16	RSD	SS/SMR	TV	NW	WT

PTTEP International Limited

EPCI OF WELLHEAD PLATFORMS, ASSOCIATED PIPELINES AND TIE-INS FOR ZAWTIKA DEVELOPMENT PROJECT PHASE 1C

WP9 TOPSIDE SECTIONS

SCALE :	DRAWING NO.	SHEET	REV.
AS NOTED	MM-ZTK-1C-WP9-STR-DWG-1106	1/1	C1

LAMPIRAN B
PERHITUNGAN REAKSI FASE FABRIKASI DAN WEIGHING

1. Preface

This section purpose is to show the temporary support design properties during fabrication, load out which is planed to be used for WP9 Topside module.

2. Framing Member and Section Properties

Row - 1 Support:

i) Crossbeam

Length	:	1835	cm
Top Flange Thickness	:	3	cm
Bottom Flange Thickness	:	3	cm
Web Thickness	:	3.0	cm
Depth	:	105	cm
Width	:	78	cm
Density	:	0.00785	kg/cm^3
S355 Material			
Yield Stress	:	3515	kg/cm^2

ii) Dummy Leg & Weighing Pipe

Dummy Leg Height	:	97.5	cm
Dummy Leg OD	:	150	cm
Dummy Leg Thickness	:	4	cm
Dummy Leg Yield Stress	:	3515	kg/cm^2
Weighing Pipe Height	:	58.75	cm
Weighing Pipe OD	:	40.64	cm
Weighing Pipe Thickness	:	2.54	cm
Weighing Pipe Yield Stress	:	3515	kg/cm^2
Weighing Pipe Qty.	:	2	ea
Density	:	0.00785	kg/cm^3

Row - 2 Support:

i) Crossbeam

Length	:	1750	cm
Top Flange Thickness	:	3	cm
Bottom Flange Thickness	:	3	cm
Web Thickness	:	3.0	cm
Depth	:	132	cm
Width	:	80	cm
Density	:	0.00785	kg/cm^3
S355 Material			
Yield Stress	:	3515	kg/cm^2

ii) Dummy Leg & Weighing Pipe

Dummy Leg Height	:	97.5	cm
Dummy Leg OD	:	150	cm
Dummy Leg Thickness	:	4	cm
Dummy Leg Yield Stress	:	3515	kg/cm^2
Weighing Pipe Height	:	29.5	cm
Weighing Pipe OD	:	40.64	cm
Weighing Pipe Thickness	:	2.54	cm
Weighing Pipe Yield Stress	:	3515	kg/cm^2
Weighing Pipe Qty.	:	2	ea
Density	:	0.00785	kg/cm^3

iii) *Compression Pipe*

Comp. Pipe Length	:	1535.50	cm
Comp. Pipe OD	:	35.56	cm
Comp. Pipe Thickness	:	1.91	cm
Comp. Pipe Yield Stress	:	4691	kg/cm^2
Comp. Pipe Qty.	:	2	ea
Density	:	0.00785	kg/cm^3

iv) *X-Bracing Pipe*

X-Bracing Pipe Length	:	881.58	cm
X-Bracing Pipe OD	:	35.56	cm
X-Bracing Pipe Thickness	:	1.91	cm
X-Bracing Pipe Yield Stress	:	4691	kg/cm^2
X-Bracing Pipe Qty.	:	1	ea
Density	:	0.00785	kg/cm^3

v) *Tension Pipe (Bottom)*

Tension Pipe Length	:	405.80	cm
Tension Pipe OD	:	45.70	cm
Tension Pipe Thickness	:	1.59	cm
Tension Pipe Yield Stress	:	4691	kg/cm^2
Tension Pipe Qty.	:	1	ea
Density	:	0.00785	kg/cm^3

vi) *Tension Pipe (Top)*

Tension Pipe Length	:	610.20	cm
Tension Pipe OD	:	45.70	cm
Tension Pipe Thickness	:	1.59	cm
Tension Pipe Yield Stress	:	4691	kg/cm^2
Tension Pipe Qty.	:	1	ea
Density	:	0.00785	kg/cm^3

iii) *Compression Pipe*

Comp. Pipe Length	:	1535.50	cm
Comp. Pipe OD	:	35.56	cm
Comp. Pipe Thickness	:	1.91	cm
Comp. Pipe Yield Stress	:	4691	kg/cm^2
Comp. Pipe Qty.	:	2	ea
Density	:	0.00785	kg/cm^3

iv) *X-Bracing Pipe*

X-Bracing Pipe Length	:	881.58	cm
X-Bracing Pipe OD	:	35.56	cm
X-Bracing Pipe Thickness	:	1.91	cm
X-Bracing Pipe Yield Stress	:	4691	kg/cm^2
X-Bracing Pipe Qty.	:	1	ea
Density	:	0.00785	kg/cm^3

v) *Tension Pipe (Bottom)*

Tension Pipe Length	:	405.80	cm
Tension Pipe OD	:	45.70	cm
Tension Pipe Thickness	:	1.59	cm
Tension Pipe Yield Stress	:	4691	kg/cm^2
Tension Pipe Qty.	:	1	ea
Density	:	0.00785	kg/cm^3

vi) *Tension Pipe (Top)*

Tension Pipe Length	:	610.20	cm
Tension Pipe OD	:	45.70	cm
Tension Pipe Thickness	:	1.59	cm
Tension Pipe Yield Stress	:	4691	kg/cm^2
Tension Pipe Qty.	:	1	ea
Density	:	0.00785	kg/cm^3

vii) *Trunion Pipe*

Trunion Pipe Height	:	30.00	cm
Trunion Pipe OD	:	50.80	cm
Trunion Pipe Thickness	:	3.81	cm
ASTM36 Material			
Trunion Pipe Yield Stress	:	2531	kg/cm^2
Trunion Pipe Qty.	:	2	ea
Density	:	0.00785	kg/cm^3

Framing Members Weight Summary

Row - 1		
No.	**Item**	**Weight (Ton)**
1	Crossbeam	15.30
2	Dummy Leg & Weighing Pipe	1.54
3	Compression Pipe	4.86
4	X-Bracing Pipe	1.40
5	Tension Pipe (Bottom)	0.70
6	Tension Pipe (Top)	1.06
	Net Weight	24.85
	***Contingency**	10%
	Total Weight	27.34
	Estimated Weight on each support	13.67

Row - 2		
No.	**Item**	**Weight (Ton)**
1	Crossbeam	14.59
2	Dummy Leg & Weighing Pipe	1.47
3	Compression Pipe	4.86
4	X-Bracing Pipe	1.40
5	Tension Pipe (Bottom)	0.70
6	Tension Pipe (Top)	1.06
7	Trunion Pipe	0.26
	Net Weight	24.34
	***Contingency**	10%
	Total Weight	26.77
	Estimated Weight on each support	13.39

Note: 10% Contingency represent the additional stiffener, base plate, etc. contingency factor based on ISO19901-5

3. Design Load - Fabrication Phase

The WP9 Topside support frame structure during fabrication are designed to accommodate the skidding load out method purpose.
For fabrication purpose, the module's weight will be spreaded out onto the temporary supports.

The module's weight are taken from MM-ZTK-1C-WP9-STR-WCR-1001_Rev_C1 *WP9 Topside Weight Control Report* are as follow:

CATEGORY	Factored Weight	CoG (m)		
	Wt.(MT)	X	Y	Z
Dry	**1552.00**	**-1.76**	**-0.31**	**20.35**
Operation	2471.00	-1.35	-0.05	20.90
Load Out	1565.00	-1.58	-0.15	19.81
Transportation	1634.00	-1.51	-0.14	19.59
Lifting	1456.00	-1.69	-0.16	20.50

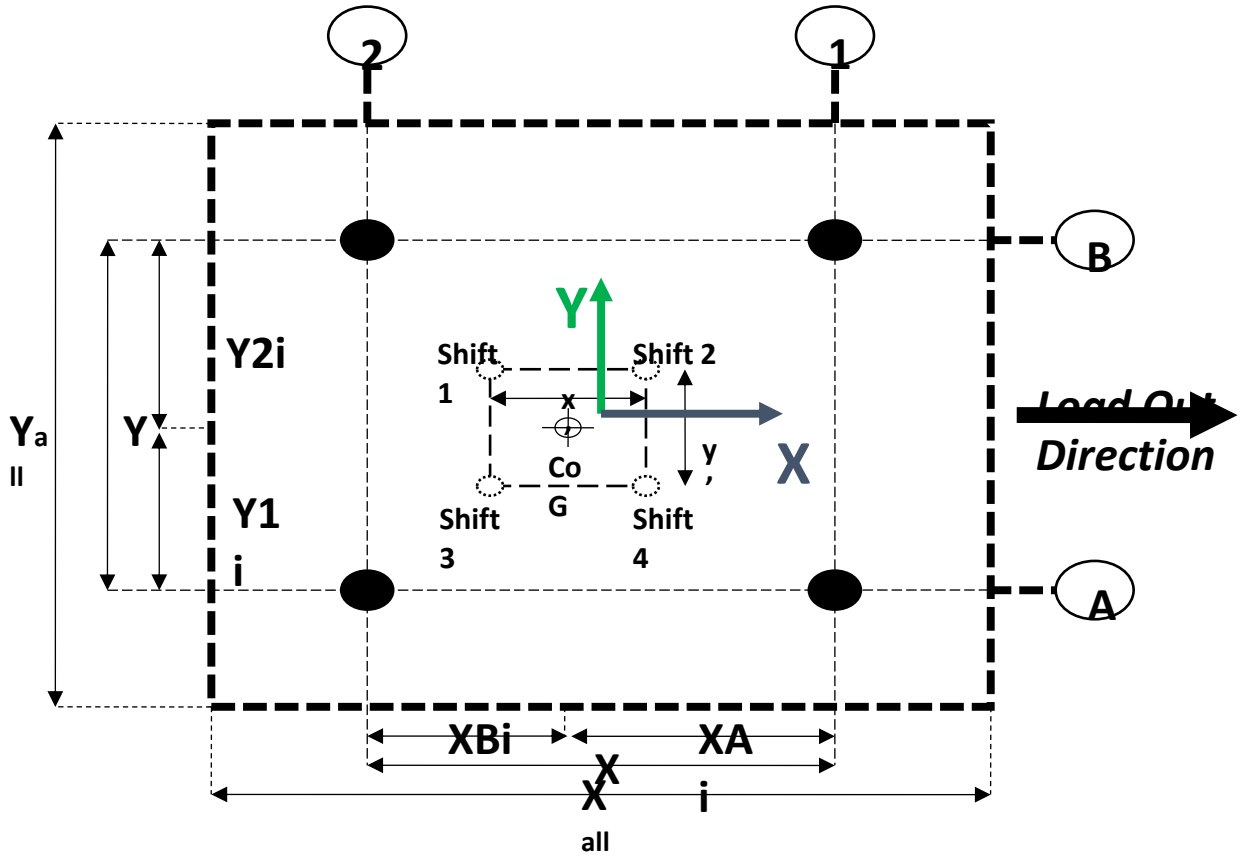
For Fabrication purposes, the weight on **Dry Category** will be use for temporary support design check. The coordinate in above values is adjusted to new global axis as per picture below.

Maximum weight during fabrication: 1552.00 MT

CoG Location: X_{cog} : -1760 mm

Y_{cog} : -310 mm

Z_{cog} : 20350 mm



Xall	=	29036.00	mm	Yall	=	34642.00	mm
x'	=	1451.80	mm	y'	=	1732.10	mm

i) Initial Centre of Gravity

X = 13716.00 mm XAi = $X/2 - X_{cog}$ = 8618.00 mm XBi = X - XA = 5098.00 mm

Y = 13716.00 mm Y1i = $Y/2 + Y_{cog}$ = 6548.00 mm Y2i = Y - Y1 = 7168.00 mm

$$\text{Weight at Row - A} = \frac{\text{Y2 x WP9 Total Weight}}{\text{Y1} + \text{Y2}} = \frac{7168.00 \times 1552.00}{6548.00 + 7168.00} = 811.08 \text{ Ton}$$

$$\text{Weight at Row - B} = \frac{\text{Y1 x WP9 Total Weight}}{\text{Y1} + \text{Y2}} = \frac{6548.00 \times 1552.00}{6548.00 + 7168.00} = 740.92 \text{ Ton}$$

$$\text{Weight at Row - A1} = \frac{\text{XB x Weight at Row - A}}{\text{XA} + \text{XB}} = \frac{5098.00 \times 811.08}{8618.00 + 5098.00} = 301.46 \text{ Ton}$$

$$\text{Weight at Row - B1} = \frac{\text{XB x Weight at Row - } \mathbf{B}}{\text{XA} + \text{XB}} = \frac{5098.00 \times 740.92}{8618.00 + 5098.00} = 275.39 \text{ Ton}$$

$$\text{Weight at Row - A2} = \frac{\text{XA x Weight at Row - A}}{\text{XA} + \text{XB}} = \frac{8618.00 \times 811.08}{8618.00 + 5098.00} = 509.61 \text{ Ton}$$

$$\text{Weight at Row - B2} = \frac{\text{XA x Weight at Row - B}}{\text{XA} + \text{XB}} = \frac{8618.00 \times 740.92}{8618.00 + 5098.00} = 465.53 \text{ Ton}$$

ii) CoG Shift-1

X	=	13716.00	mm	XA	=	XAi + x'/2		XB	=	X - XA	
					=	9343.90	mm		=	4372.10	mm
Y	=	13716.00	mm	Y1	=	Y1i + y'/2	mm	Y2	=	Y - Y1	mm
					=	7414.05	mm		=	6301.95	mm

$$\text{Weight at Row - A} = \frac{\text{Y2 x WP9 Total Weight}}{\text{Y1} + \text{Y2}} = \frac{6301.95 \times 1552.00}{7414.05 + 6301.95} = 713.08 \text{ Ton}$$

$$\text{Weight at Row - B} = \frac{\text{Y1 x WP9 Total Weight}}{\text{Y1} + \text{Y2}} = \frac{7414.05 \times 1552.00}{7414.05 + 6301.95} = 838.92 \text{ Ton}$$

$$\text{Weight at Row - A1} = \frac{\text{XB x Weight at Row - A}}{\text{XA} + \text{XB}} = \frac{4372.10 \times 713.08}{9343.90 + 4372.10} = 227.30 \text{ Ton}$$

$$\text{Weight at Row - B1} = \frac{\text{XB x Weight at Row - B}}{\text{XA} + \text{XB}} = \frac{4372.10 \times 838.92}{9343.90 + 4372.10} = 267.41 \text{ Ton}$$

$$\text{Weight at Row - A2} = \frac{\text{XA x Weight at Row - A}}{\text{XA} + \text{XB}} = \frac{9343.90 \times 713.08}{9343.90 + 4372.10} = 485.78 \text{ Ton}$$

$$\text{Weight at Row - B2} = \frac{\text{XA x Weight at Row - B}}{\text{XA} + \text{XB}} = \frac{9343.90 \times 838.92}{9343.90 + 4372.10} = 571.51 \text{ Ton}$$

iii) CoG Shift-2

X	=	13716.00	mm	XA	=	XAi - x'/2		XB	=	X - XA		
					=	7892.10	mm		=	5823.90	mm	
Y	=	13716.00	mm	Y1	=	Y1i + y'/2	mm	Y2	=	Y - Y1	mm	
					=	7414.05	mm		=	6301.95	mm	

$$\text{Weight at Row - A} = \frac{\text{Y2 x WP9 Total Weight}}{\text{Y1} + \text{Y2}} = \frac{6301.95 \times 1552.00}{7414.05 + 6301.95} = 713.08 \text{ Ton}$$

$$\text{Weight at Row - B} = \frac{\text{Y1 x WP9 Total Weight}}{\text{Y1} + \text{Y2}} = \frac{7414.05 \times 1552.00}{7414.05 + 6301.95} = 838.92 \text{ Ton}$$

$$\text{Weight at Row - A1} = \frac{\text{XB x Weight at Row - A}}{\text{XA} + \text{XB}} = \frac{5823.90 \times 713.08}{7892.10 + 5823.90} = 302.78 \text{ Ton}$$

$$\text{Weight at Row - B1} = \frac{\text{XB x Weight at Row - B}}{\text{XA} + \text{XB}} = \frac{5823.90 \times 838.92}{7892.10 + 5823.90} = 356.21 \text{ Ton}$$

$$\text{Weight at Row - A2} = \frac{\text{XA x Weight at Row - A}}{\text{XA} + \text{XB}} = \frac{7892.10 \times 713.08}{7892.10 + 5823.90} = 410.30 \text{ Ton}$$

$$\text{Weight at Row - B2} = \frac{\text{XA x Weight at Row - A}}{\text{XA} + \text{XB}} = \frac{7892.10 \times 838.92}{7892.10 + 5823.90} = 482.71 \text{ Ton}$$

iv) CoG Shift-3

X	=	13716.00	mm	XA	=	XAi + x'/2		XB	=	X - XA		
					=	9343.90	mm		=	4372.10	mm	
Y	=	13716.00	mm	Y1	=	Y1i - y'/2	mm	Y2	=	Y - Y1	mm	
					=	5681.95	mm		=	8034.05	mm	

$$\text{Weight at Row - A} = \frac{\text{Y2 x WP9 Total Weight}}{\text{Y1} + \text{Y2}} = \frac{8034.05 \times 1552.00}{5681.95 + 8034.05} = 909.07 \text{ Ton}$$

$$\text{Weight at Row - B} = \frac{\text{Y1 x WP9 Total Weight}}{\text{Y1} + \text{Y2}} = \frac{5681.95 \times 1552.00}{5681.95 + 8034.05} = 642.93 \text{ Ton}$$

$$\text{Weight at Row - A1} = \frac{\text{XB x Weight at Row - A}}{\text{XA} + \text{XB}} = \frac{4372.10 \times 909.07}{9343.90 + 4372.10} = 289.78 \text{ Ton}$$

$$\text{Weight at Row - B1} = \frac{\text{XB x Weight at Row - B}}{\text{XA} + \text{XB}} = \frac{4372.10 \times 642.93}{9343.90 + 4372.10} = 204.94 \text{ Ton}$$

$$\text{Weight at Row - A2} = \frac{\text{XA x Weight at Row - A}}{\text{XA} + \text{XB}} = \frac{9343.90 \times 909.07}{9343.90 + 4372.10} = 619.30 \text{ Ton}$$

$$\text{Weight at Row - B2} = \frac{\text{XA x Weight at Row - B}}{\text{XA} + \text{XB}} = \frac{9343.90 \times 642.93}{9343.90 + 4372.10} = 437.99 \text{ Ton}$$

v) CoG Shift-4

X	=	13716.00	mm	XA	=	XAi - x'/2		XB	=	X - XA		
					=	7892.10	mm		=	5823.90	mm	
Y	=	13716.00	mm	Y1	=	Y1i - y'/2	mm	Y2	=	Y - Y1	mm	
					=	5681.95	mm		=	8034.05	mm	

$$\text{Weight at Row - A} = \frac{\text{Y2 x WP9 Total Weight}}{\text{Y1} + \text{Y2}} = \frac{8034.05 \times 1552.00}{5681.95 + 8034.05} = 909.07 \text{ Ton}$$

$$\text{Weight at Row - B} = \frac{\text{Y1 x WP9 Total Weight}}{\text{Y1} + \text{Y2}} = \frac{5681.95 \times 1552.00}{5681.95 + 8034.05} = 642.93 \text{ Ton}$$

$$\text{Weight at Row - A1} = \frac{\text{XB x Weight at Row - A}}{\text{XA} + \text{XB}} = \frac{5823.90 \times 909.07}{7892.10 + 5823.90} = 386.00 \text{ Ton}$$

$$\text{Weight at Row - B1} = \frac{\text{XB x Weight at Row - B}}{\text{XA} + \text{XB}} = \frac{5823.90 \times 642.93}{7892.10 + 5823.90} = 272.99 \text{ Ton}$$

$$\text{Weight at Row - A2} = \frac{\text{XA x Weight at Row - A}}{\text{XA} + \text{XB}} = \frac{7892.10 \times 909.07}{7892.10 + 5823.90} = 523.07 \text{ Ton}$$

$$\text{Weight at Row - B2} = \frac{\text{XA x Weight at Row - A}}{\text{XA} + \text{XB}} = \frac{7892.10 \times 642.93}{7892.10 + 5823.90} = 369.94 \text{ Ton}$$

Design Load Summary for Fabrication Phase

SUPPORT	Centre of Gravity Location					MAX REACTION
	Initial CoG	Shift-1	Shift-2	Shift-3	Shift-4	
	MT	MT	MT	MT	MT	MT
A1	301.46	227.30	302.78	289.78	**386.00**	386.00
A2	509.61	485.78	410.30	**619.30**	523.07	619.30
B1	275.39	267.41	**356.21**	204.94	272.99	356.21
B2	465.53	**571.51**	482.71	437.99	369.94	571.51
TOTAL	1552.00	1552.00	1552.00	1552.00	1552.00	

Design Load - Load Out Phase

Structure shall be analyzed using three case of Loadout load; Max Fx, Max Fy, and Max Fz

The maximum load derived from structure to the load out supports are:

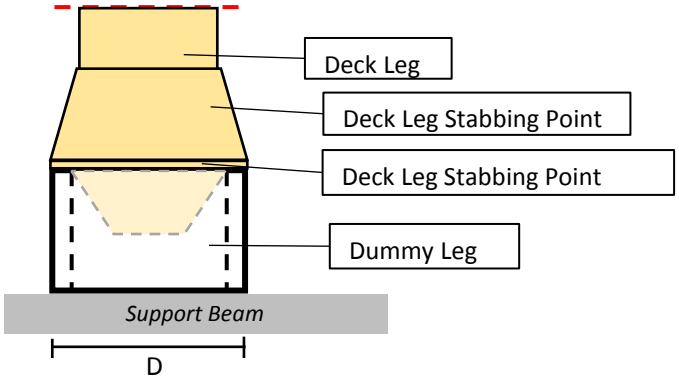
LOAD CONDITION 3415 Maximum Fx							
MEMBER	**END**	**Fx (T)**	**Fy (T)**	**Fz (T)**	**Mx (T-mm)**	**My (T-mm)**	**Mz (T-mm)**
1172- GB01	1172	-587.25	59.22	-86.83	-73.47	-378.54	-145.53
	GB01	-588.84	59.22	-86.83	-73.47	-463.20	-87.78
1272- GB02	1272	-27.29	65.71	40.50	-86.71	104.91	-71.48
	GB02	-28.43	65.71	40.50	-86.71	133.47	-25.15
1372- GA01	1372	114.72	-76.17	-58.91	-73.81	-63.56	-135.85
	GA01	113.14	-76.17	-58.91	-73.81	-121.00	-210.12
1472- GA02	1472	**-928.54**	-48.76	105.24	-51.47	627.79	-174.85
	GA02	**-929.69**	-48.76	105.24	-51.47	701.98	-209.23

LOAD CONDITION 3435 Maximum Fy							
MEMBER	**END**	**Fx (T)**	**Fy (T)**	**Fz (T)**	**Mx (T-mm)**	**My (T-mm)**	**Mz (T-mm)**
1172- GB01	1172	294.64	-94.89	83.32	87.20	239.68	-150.34
	GB01	293.05	-94.89	83.32	87.20	320.91	-242.86
1272- GB02	1272	-892.00	-103.93	-137.32	76.66	-608.27	-156.29
	GB02	-893.15	-103.93	-137.32	76.66	-705.07	-229.56
1372- GA01	1372	-780.27	52.83	138.28	45.82	543.10	-200.17
	GA01	-781.85	52.83	138.28	45.82	677.93	-148.67
1472- GA02	1472	-50.73	**146.00**	-84.28	102.64	-119.47	-200.59
	GA02	-51.87	**146.00**	-84.28	102.64	-178.89	-97.67

LOAD CONDITION 3435 Maximum Fz							
MEMBER	**END**	**Fx (T)**	**Fy (T)**	**Fz (T)**	**Mx (T-mm)**	**My (T-mm)**	**Mz (T-mm)**
1172- GB01	1172	294.64	-94.89	83.32	87.20	239.68	-150.34
	GB01	293.05	-94.89	83.32	87.20	320.91	-242.86
1272- GB02	1272	-892.00	-103.93	-137.32	76.66	-608.27	-156.29
	GB02	-893.15	-103.93	-137.32	76.66	-705.07	-229.56
1372- GA01	1372	-780.27	52.83	**138.28**	45.82	543.10	-200.17
	GA01	-781.85	52.83	**138.28**	45.82	677.93	-148.67
1472- GA02	1472	-50.73	146.00	-84.28	102.64	-119.47	-200.59
	GA02	-51.87	146.00	-84.28	102.64	-178.89	-97.67

LAMPIRAN C
PERHITUNGAN MODIFIKASI *SKID FRAME*

1. Dummy Leg (Support Can) Initial Design



Max. React Z caused by Topside(kN)			
B1	**B2**	**A1**	**A2**
3562.10	5715.06	3859.98133	**6192.97713**

Pipe Properties

Outside Diameter	O_D =	150	cm	*Effective Length Factor*	K =	1.00	
Wall Thickness	t =	50.8	cm	*Unbraced Length*	l =	1535.5	cm
Area	A =	15831.62	cm2	*Radius of Gyration*	r =	542.88	cm
Yield Strength	Fy =	34.7	kN/cm2		π =	3.14	
Young Modulus	E =	20000	kN/cm2				

Allowable Axial Tension (API RP 2A LRFD)

$$f_t \le \varphi_t F_y$$

F_T = 0.85 x F_y = 0.85 x 34.7 = **29.495** **kN/cm2**

Allowable Axial Compression -Buckling (API RP 2A LRFD)

$\sqrt{2}$ = 1.4142

Slenderness Ratio $\frac{K.l}{r}\frac{\sqrt{Fy}}{\sqrt{E}}$ = 0.1178

$\lambda < \sqrt{2}$

The allowable axial compressive stress, Fa, should be determined from the following AISC formulas for members with a D/t ratio equal to or less than 60:

$$F_{cn} = \left(1.0 - 0.25\lambda^2\right)F_y \text{ untuk } \lambda < \sqrt{2}$$

$$F_{cn} = \frac{1}{\lambda^2}F_y \text{ untuk } \lambda \ge \sqrt{2}$$

$$\lambda = \frac{KL}{\pi r}\left[\frac{F_y}{E}\right]^{0.5}$$

Fa = 20.367 kN/cm2 ***for λ < √2***

Fa = 7E+06 kN/cm2 *for for λ > √2*

Actual Axial Load

$$P = \frac{\text{Load}}{\text{Area}} = \frac{6192.977}{15831.61635} = \mathbf{0.391}\ \mathbf{kN/cm2}$$

	Allowable	Actual (kN/cm2)	UC	Note
Tension	29.495	0.39	0.0133	**SECURE!**
Compression (Buckling)	20.367	0.39	0.0192	**SECURE!**

Skidshoe Max. Reaction
Friction Load (modified)

Friction Load Summary

LEG	MAX LOAD (T)	CONDITION	Friction Coefficient	Friction Load (T)
B1	6762.115	Static	0.25	1690.52875
		Moving	0.08	540.9692
A1	6368.836	Static	0.25	1592.209
		Moving	0.08	509.50688
B2	8031.827	Static	0.25	2007.95675
		Moving	0.08	642.54616
A2	8493.429	Static	0.25	2123.35725
		Moving	0.08	679.47432

ROW	MAX LOAD (T)	CONDITION	Friction Coefficient	Min. Pulling Load (T)	Condition Use to Analysis
A	8658.199	Static	0.25	2164.54975	*Braking Load Even Skidding*
		Moving	0.08	692.65592	
B	8359.602	Static	0.25	2089.9005	*Braking Load Even Skidding*
		Moving	0.08	668.76816	
A+B	15157.787	Static	0.25	3789.44675	*Racking Load Uneven Skidding*
		Moving	0.08	1212.62296	

Note: Break out force will be calculated by friction coefficient multipled by topside factored weight with friction at each skid shoes to balance.The friction applied at the bottom of each skidshoe is calculated by friction coefficient multiply by maximum reaction force from condition 3101-3348

Skidshoe Max. Reaction
Friction Load (modified)

Skidshoe Max. Reaction
Friction Load (modified)

Skidshoe Max. Reaction

Friction Load (modified)

Force-Z on Fixed Joint Reaction (SACS)

LOAD	LEG B1				
COND	LB07	0008	0013	LB13	TOTAL
3101	15.071	1309.133	1715.2	59.641	3099.045
3102	17.668	1841.397	2207.842	61.415	4128.322
3103	14.574	1227.53	1659.818	59.644	2961.566
3104	15.568	1390.735	1770.581	59.637	3236.521
3105	12.473	776.868	1222.557	57.867	2069.765
3201	1.603	351.637	1563.045	58.859	1975.144
3202	28.539	2266.628	1867.354	60.423	4222.944
3203	28.539	2266.628	1867.354	60.423	4222.944
3204	1.603	351.637	1563.045	58.859	1975.144
3205	7.378	822.828	1118.039	-166.099	1782.146
3206	22.763	1795.437	2312.36	285.38	4415.94
3207	7.378	822.828	1118.039	-166.099	1782.146
3208	22.763	1795.437	2312.36	285.38	4415.94
3211	4.201	883.901	2055.688	60.633	3004.423
3212	31.136	2798.893	2359.996	62.196	5252.221
3213	31.136	2798.893	2359.996	62.196	5252.221
3214	4.201	883.901	2055.688	60.633	3004.423
3215	9.976	1355.093	1610.682	-164.325	2811.426
3216	25.361	2327.702	2805.002	287.154	5445.219
3217	9.976	1355.093	1610.682	-164.325	2811.426
3218	25.361	2327.702	2805.002	287.154	5445.219
3221	1.106	270.034	1507.664	58.862	1837.666
3222	28.042	2185.026	1811.973	60.426	4085.467
3223	28.042	2185.026	1811.973	60.426	4085.467
3224	1.106	270.034	1507.664	58.862	1837.666
3225	6.881	741.225	1062.658	-166.095	1644.669
3226	22.267	1713.834	2256.979	285.383	4278.463
3227	6.881	741.225	1062.658	-166.095	1644.669
3228	22.267	1713.834	2256.979	285.383	4278.463
3231	2.1	433.24	1618.427	58.856	2112.623
3232	29.035	2348.231	1922.735	60.419	4360.42
3233	29.035	2348.231	1922.735	60.419	4360.42
3234	2.1	433.24	1618.427	58.856	2112.623
3235	7.875	904.431	1173.421	-166.102	1919.625
3236	23.26	1877.04	2367.741	285.377	4553.418
3237	7.875	904.431	1173.421	-166.102	1919.625
3238	23.26	1877.04	2367.741	285.377	4553.418
3241	-0.994	-180.628	1070.403	57.085	945.866
3242	25.941	1734.364	1374.711	58.649	3193.665
3243	25.941	1734.364	1374.711	58.649	3193.665
3244	-0.994	-180.628	1070.403	57.085	945.866
3245	4.781	290.564	625.397	-167.873	752.869
3246	20.166	1263.172	1819.717	283.606	3386.661
3247	4.781	290.564	625.397	-167.873	752.869
3248	20.166	1263.172	1819.717	283.606	3386.661
3301	-11.865	-605.859	1410.891	58.077	851.244
3302	42.006	3224.124	2019.508	61.204	5346.842
3303	42.006	3224.124	2019.508	61.204	5346.842

Skidshoe Max. Reaction
Friction Load (modified)

3304	-11.865	-605.859	1410.891	58.077	851.244
3305	-0.314	336.524	520.879	-391.838	465.251
3306	30.456	2281.741	2909.52	511.119	5732.836
3307	-0.314	336.524	520.879	-391.838	465.251
3308	30.456	2281.741	2909.52	511.119	5732.836
3311	-9.267	-73.595	1903.534	59.851	1880.523
3312	44.604	3756.389	2512.151	62.978	6376.122
3313	44.604	3756.389	2512.151	62.978	6376.122
3314	-9.267	-73.595	1903.534	59.851	1880.523
3315	2.283	868.788	1013.522	-390.064	1494.529
3316	33.054	2814.006	3402.162	512.893	6762.115
3317	2.283	868.788	1013.522	-390.064	1494.529
3318	33.054	2814.006	3402.162	512.893	6762.115
3321	-12.362	-687.462	1355.51	58.08	713.766
3322	41.509	3142.521	1964.127	61.208	5209.365
3323	41.509	3142.521	1964.127	61.208	5209.365
3324	-12.362	-687.462	1355.51	58.08	713.766
3325	-0.811	254.921	465.498	-391.835	327.773
3326	29.959	2200.138	2854.139	511.123	5595.359
3327	-0.811	254.921	465.498	-391.835	327.773
3328	29.959	2200.138	2854.139	511.123	5595.359
3331	-11.368	-524.256	1466.272	58.074	988.722
3332	42.503	3305.727	2074.889	61.201	5484.32
3333	42.503	3305.727	2074.889	61.201	5484.32
3334	-11.368	-524.256	1466.272	58.074	988.722
3335	0.182	418.127	576.26	-391.841	602.728
3336	30.953	2363.344	2964.901	511.116	5870.314
3337	0.182	418.127	576.26	-391.841	602.728
3338	30.953	2363.344	2964.901	511.116	5870.314
3341	-14.462	-1138.12	918.248	56.303	-178.035
3342	39.409	2691.86	1526.865	59.43	4317.564
3343	39.409	2691.86	1526.865	59.43	4317.564
3344	-14.462	-1138.12	918.248	56.303	-178.035
3345	-2.912	-195.741	28.237	-393.612	-564.028
3346	27.859	1749.477	2416.877	509.346	4703.559
3347	-2.912	-195.741	28.237	-393.612	-564.028
3348	27.859	1749.477	2416.877	509.346	4703.559
3401	0	0	0	0	0
3402	0	0	0	0	0
3403	0	0	0	0	0
3404	0	0	0	0	0
3405	0	0	0	0	0
3411	157.001	2992.033	3761.835	518.724	7429.593
3412	157.272	3493.928	4196.824	511.577	8359.601
3413	195.183	3345.522	4189.373	629.523	8359.601
3414	118.82	2638.544	3334.299	407.925	6499.588
3415	156.731	2490.138	3326.847	525.871	6499.587
3421	91.565	3526.459	1896.375	40.91	5555.309
3422	95.228	4065.421	2385.686	42.213	6588.548
3423	64.747	2722.074	1789.368	47.843	4624.032
3424	118.383	4330.844	2003.381	33.978	6486.586
3425	87.901	2987.498	1407.063	39.608	4522.07

Skidshoe Max. Reaction
Friction Load (modified)

3431	-134.765	-2653.04	1455.966	92.357	-1239.48
3432	-104.338	-1369.7	1999.544	88.087	613.592
3433	-134.044	-2709.84	1402.781	91.961	-1349.15
3434	-135.487	-2596.23	1509.151	92.753	-1129.82
3435	-165.193	-3936.38	912.388	96.626	-3092.55

Skidshoe Max. Reaction

Friction Load (modified)

Force-Z on Fixed Joint Reaction (SACS)

LOAD COND	LEG A1				
	LB33	0016	0007	LB39	TOTAL
3101	11.455	984.693	1767.025	56.197	2819.37
3102	11.88	1006.264	1748.109	56.177	2822.43
3103	9.366	527.849	1329.525	54.709	1921.449
3104	13.545	1441.537	2204.525	57.686	3717.293
3105	11.031	963.122	1785.941	56.218	2816.312
3201	18.132	1437.5	2408.185	281.326	4145.143
3202	4.779	531.886	1125.865	-168.932	1493.598
3203	4.779	531.886	1125.865	-168.932	1493.598
3204	18.132	1437.5	2408.185	281.326	4145.143
3205	24.528	1929.3	1932.521	56.922	3943.271
3206	-1.617	40.086	1601.529	55.473	1695.471
3207	24.528	1929.3	1932.521	56.922	3943.271
3208	-1.617	40.086	1601.529	55.473	1695.471
3211	18.556	1459.071	2389.269	281.306	4148.202
3212	5.204	553.458	1106.948	-168.952	1496.658
3213	5.204	553.458	1106.948	-168.952	1496.658
3214	18.556	1459.071	2389.269	281.306	4148.202
3215	24.952	1950.871	1913.605	56.901	3946.329
3216	-1.193	61.657	1582.612	55.452	1698.528
3217	24.952	1950.871	1913.605	56.901	3946.329
3218	-1.193	61.657	1582.612	55.452	1698.528
3221	16.043	980.656	1970.685	279.838	3247.222
3222	2.69	75.042	688.365	-170.421	595.676
3223	2.69	75.042	688.365	-170.421	595.676
3224	16.043	980.656	1970.685	279.838	3247.222
3225	22.439	1472.456	1495.021	55.433	3045.349
3226	-3.706	-416.758	1164.028	53.984	797.548
3227	22.439	1472.456	1495.021	55.433	3045.349
3228	-3.706	-416.758	1164.028	53.984	797.548
3231	20.221	1894.343	2845.685	282.815	5043.064
3232	6.868	988.73	1563.365	-167.443	2391.52
3233	6.868	988.73	1563.365	-167.443	2391.52
3234	20.221	1894.343	2845.685	282.815	5043.064
3235	26.617	2386.143	2370.021	58.41	4841.191
3236	0.472	496.93	2039.029	56.961	2593.392
3237	26.617	2386.143	2370.021	58.41	4841.191
3238	0.472	496.93	2039.029	56.961	2593.392
3241	17.707	1415.928	2427.101	281.347	4142.083
3242	4.355	510.315	1144.781	-168.912	1490.539
3243	4.355	510.315	1144.781	-168.912	1490.539
3244	17.707	1415.928	2427.101	281.347	4142.083
3245	24.104	1907.728	1951.438	56.942	3940.212
3246	-2.041	18.515	1620.445	55.493	1692.412
3247	24.104	1907.728	1951.438	56.942	3940.212
3248	-2.041	18.515	1620.445	55.493	1692.412
3301	24.808	1890.306	3049.344	506.455	5470.913
3302	-1.897	79.079	484.705	-394.061	167.826
3303	-1.897	79.079	484.705	-394.061	167.826

Skidshoe Max. Reaction
Friction Load (modified)

3304	24.808	1890.306	3049.344	506.455	5470.913
3305	37.6	2873.906	2098.018	57.646	5067.17
3306	-14.689	-904.521	1436.032	54.748	571.57
3307	37.6	2873.906	2098.018	57.646	5067.17
3308	-14.689	-904.521	1436.032	54.748	571.57
3311	25.232	1911.878	3030.428	506.435	5473.973
3312	-1.473	100.651	465.789	-394.081	170.886
3313	-1.473	100.651	465.789	-394.081	170.886
3314	25.232	1911.878	3030.428	506.435	5473.973
3315	38.024	2895.478	2079.101	57.626	5070.229
3316	-14.265	-882.949	1417.116	54.728	574.63
3317	38.024	2895.478	2079.101	57.626	5070.229
3318	-14.265	-882.949	1417.116	54.728	574.63
3321	22.719	1433.463	2611.844	504.967	4572.993
3322	-3.986	-377.764	47.205	-395.55	-730.095
3323	-3.986	-377.764	47.205	-395.55	-730.095
3324	22.719	1433.463	2611.844	504.967	4572.993
3325	35.511	2417.063	1660.517	56.158	4169.249
3326	-16.778	-1361.36	998.532	53.26	-326.35
3327	35.511	2417.063	1660.517	56.158	4169.249
3328	-16.778	-1361.36	998.532	53.26	-326.35
3331	26.897	2347.15	3486.845	507.944	6368.836
3332	0.192	535.923	922.205	-392.572	1065.748
3333	0.192	535.923	922.205	-392.572	1065.748
3334	26.897	2347.15	3486.845	507.944	6368.836
3335	39.689	3330.75	2535.518	59.135	5965.092
3336	-12.6	-447.677	1873.532	56.237	1469.492
3337	39.689	3330.75	2535.518	59.135	5965.092
3338	-12.6	-447.677	1873.532	56.237	1469.492
3341	24.384	1868.735	3068.261	506.476	5467.856
3342	-2.321	57.508	503.621	-394.041	164.767
3343	-2.321	57.508	503.621	-394.041	164.767
3344	24.384	1868.735	3068.261	506.476	5467.856
3345	37.176	2852.335	2116.934	57.666	5064.111
3346	-15.113	-926.092	1454.948	54.769	568.512
3347	37.176	2852.335	2116.934	57.666	5064.111
3348	-15.113	-926.092	1454.948	54.769	568.512
3401	83.593	3407.119	2023.358	45.678	5559.748
3402	112.526	4239.086	2090.091	38.063	6479.766
3403	77.456	2840.734	1574.818	45.252	4538.26
3404	89.731	3973.504	2471.899	46.103	6581.237
3405	54.661	2575.152	1956.626	53.292	4639.731
3411	-119.615	-2427.11	1421.653	90.425	-1034.65
3412	-116.225	-2326.77	1411.486	89.613	-941.892
3413	-150.649	-3723.28	896.156	94.756	-2883.01
3414	-88.581	-1130.95	1947.15	86.094	813.716
3415	-123.005	-2527.46	1431.82	91.237	-1127.4
3421	0	0	0	0	0
3422	0	0	0	0	0
3423	0	0	0	0	0
3424	0	0	0	0	0
3425	0	0	0	0	0

				Skidshoe Max. Reaction	
				Friction Load (modified)	
3431	198.08	2836.381	4152.035	541.696	7728.192
3432	164.956	2512.188	3673.082	447.959	6798.185
3433	194.375	2361.632	3705.878	536.299	6798.184
3434	201.784	3311.129	4598.191	547.093	8658.197
3435	231.204	3160.574	4630.988	635.432	8658.198

Skidshoe Max. Reaction
Friction Load (modified)

Force-Z on Fixed Joint Reaction (SACS)

LOAD COND	LEG B2				
	LB20	0014	0005	LB26	TOTAL
3101	60.66	1946.462	2297.579	25.849	4330.55
3102	60.751	1916.681	2228.658	25.187	4231.277
3103	62.577	2464.326	2842.834	28.297	5398.034
3104	58.743	1428.599	1752.324	23.4	3263.066
3105	60.569	1976.244	2366.5	26.51	4429.823
3201	61.363	2086.411	3267.185	39.491	5454.45
3202	59.957	1806.514	1327.973	12.206	3206.65
3203	59.957	1806.514	1327.973	12.206	3206.65
3204	61.363	2086.411	3267.185	39.491	5454.45
3205	286.188	2539.997	2787.764	33.497	5647.446
3206	-164.868	1352.928	1807.393	18.2	3013.653
3207	286.188	2539.997	2787.764	33.497	5647.446
3208	-164.868	1352.928	1807.393	18.2	3013.653
3211	61.454	2056.63	3198.264	38.83	5355.178
3212	60.048	1776.733	1259.052	11.545	3107.378
3213	60.048	1776.733	1259.052	11.545	3107.378
3214	61.454	2056.63	3198.264	38.83	5355.178
3215	286.279	2510.216	2718.844	32.836	5548.175
3216	-164.777	1323.147	1738.473	17.539	2914.382
3217	286.279	2510.216	2718.844	32.836	5548.175
3218	-164.777	1323.147	1738.473	17.539	2914.382
3221	63.28	2604.275	3812.44	41.939	6521.934
3222	61.874	2324.378	1873.227	14.654	4274.133
3223	61.874	2324.378	1873.227	14.654	4274.133
3224	63.28	2604.275	3812.44	41.939	6521.934
3225	288.105	3057.861	3333.019	35.945	6714.93
3226	-162.951	1870.792	2352.648	20.649	4081.138
3227	288.105	3057.861	3333.019	35.945	6714.93
3228	-162.951	1870.792	2352.648	20.649	4081.138
3231	59.446	1568.547	2721.93	37.043	4386.966
3232	58.04	1288.65	782.718	9.758	2139.166
3233	58.04	1288.65	782.718	9.758	2139.166
3234	59.446	1568.547	2721.93	37.043	4386.966
3235	284.271	2022.133	2242.509	31.049	4579.962
3236	-166.785	835.064	1262.138	15.752	1946.169
3237	284.271	2022.133	2242.509	31.049	4579.962
3238	-166.785	835.064	1262.138	15.752	1946.169
3241	61.272	2116.192	3336.106	40.152	5553.722
3242	59.866	1836.295	1396.893	12.868	3305.922
3243	59.866	1836.295	1396.893	12.868	3305.922
3244	61.272	2116.192	3336.106	40.152	5553.722
3245	286.097	2569.778	2856.685	34.158	5746.718
3246	-164.959	1382.709	1876.314	18.862	3112.926
3247	286.097	2569.778	2856.685	34.158	5746.718
3248	-164.959	1382.709	1876.314	18.862	3112.926
3301	62.065	2226.359	4236.792	53.133	6578.349
3302	59.254	1666.566	358.366	-1.436	2082.75
3303	59.254	1666.566	358.366	-1.436	2082.75

Skidshoe Max. Reaction
Friction Load (modified)

3304	62.065	2226.359	4236.792	53.133	6578.349
3305	511.716	3133.531	3277.95	41.145	6964.342
3306	-390.396	759.393	1317.208	10.552	1696.757
3307	511.716	3133.531	3277.95	41.145	6964.342
3308	-390.396	759.393	1317.208	10.552	1696.757
3311	62.156	2196.578	4167.871	52.472	6479.077
3312	59.345	1636.785	289.446	-2.097	1983.479
3313	59.345	1636.785	289.446	-2.097	1983.479
3314	62.156	2196.578	4167.871	52.472	6479.077
3315	511.807	3103.751	3209.029	40.484	6865.071
3316	-390.306	729.612	1248.287	9.891	1597.484
3317	511.807	3103.751	3209.029	40.484	6865.071
3318	-390.306	729.612	1248.287	9.891	1597.484
3321	63.982	2744.223	4782.046	55.582	7645.833
3322	61.172	2184.429	903.621	1.012	3150.234
3323	61.172	2184.429	903.621	1.012	3150.234
3324	63.982	2744.223	4782.046	55.582	7645.833
3325	513.633	3651.396	3823.205	43.593	8031.827
3326	-388.479	1277.257	1862.463	13	2764.241
3327	513.633	3651.396	3823.205	43.593	8031.827
3328	-388.479	1277.257	1862.463	13	2764.241
3331	60.148	1708.495	3691.536	50.685	5510.864
3332	57.337	1148.702	-186.889	-3.884	1015.266
3333	57.337	1148.702	-186.889	-3.884	1015.266
3334	60.148	1708.495	3691.536	50.685	5510.864
3335	509.799	2615.668	2732.695	38.697	5896.859
3336	-392.314	241.529	771.953	8.104	629.272
3337	509.799	2615.668	2732.695	38.697	5896.859
3338	-392.314	241.529	771.953	8.104	629.272
3341	61.974	2256.14	4305.712	53.795	6677.621
3342	59.164	1696.347	427.287	-0.775	2182.023
3343	59.164	1696.347	427.287	-0.775	2182.023
3344	61.974	2256.14	4305.712	53.795	6677.621
3345	511.625	3163.313	3346.87	41.806	7063.614
3346	-390.487	789.174	1386.129	11.213	1796.029
3347	511.625	3163.313	3346.87	41.806	7063.614
3348	-390.487	789.174	1386.129	11.213	1796.029
3401	401.537	3126.8	3742.657	158.6	7429.594
3402	507.769	3570.862	4087.727	193.242	8359.6
3403	391.023	3580.421	4232.545	155.611	8359.6
3404	412.051	2673.179	3252.769	161.589	6499.588
3405	295.305	2682.738	3397.587	123.957	6499.587
3411	0	0	0	0	0
3412	0	0	0	0	0
3413	0	0	0	0	0
3414	0	0	0	0	0
3415	0	0	0	0	0
3421	75.582	1791.273	55.445	-48.016	1874.284
3422	75.863	1765.075	-20.473	-49.413	1771.052
3423	71.714	2349.165	1333.937	-19.249	3735.567
3424	79.45	1233.382	-1223.05	-76.783	13.002
3425	75.301	1817.472	131.362	-46.618	1977.517

			Skidshoe Max. Reaction		
			Friction Load (modified)		
3431	17.01	2138.432	6332.366	181.267	8669.075
3432	24.794	2069.206	5499.561	152.449	7746.01
3433	19.033	2654.028	6852.728	182.956	9708.745
3434	14.987	1622.835	5812.003	179.578	7629.403
3435	9.227	2207.658	7165.171	210.085	9592.141

Skidshoe Max. Reaction
Friction Load (modified)

Force-Z on Fixed Joint Reaction (SACS)

LOAD COND	LEG A2				
	LB46	0015	0006	LB52	TOTAL
3101	51.461	2246.85	2591.585	18.924	4908.82
3102	50.246	1796.725	2111.762	17.023	3975.756
3103	51.268	2219.616	2586.636	19.215	4876.735
3104	51.655	2274.085	2596.534	18.632	4940.906
3105	52.677	2696.976	3071.408	20.824	5841.885
3201	-175.85	1633.884	2114.458	10.557	3583.049
3202	278.773	2859.817	3068.712	27.29	6234.592
3203	278.773	2859.817	3068.712	27.29	6234.592
3204	-175.85	1633.884	2114.458	10.557	3583.049
3205	50.321	2098.453	1630.822	5.326	3784.922
3206	52.602	2395.248	3552.349	32.522	6032.721
3207	50.321	2098.453	1630.822	5.326	3784.922
3208	52.602	2395.248	3552.349	32.522	6032.721
3211	-177.066	1183.758	1634.635	8.656	2649.983
3212	277.557	2409.691	2588.889	25.39	5301.527
3213	277.557	2409.691	2588.889	25.39	5301.527
3214	-177.066	1183.758	1634.635	8.656	2649.983
3215	49.105	1648.327	1150.998	3.425	2851.855
3216	51.386	1945.122	3072.526	30.621	5099.655
3217	49.105	1648.327	1150.998	3.425	2851.855
3218	51.386	1945.122	3072.526	30.621	5099.655
3221	-176.044	1606.649	2109.51	10.849	3550.964
3222	278.579	2832.583	3063.763	27.582	6202.507
3223	278.579	2832.583	3063.763	27.582	6202.507
3224	-176.044	1606.649	2109.51	10.849	3550.964
3225	50.127	2071.218	1625.873	5.617	3752.835
3226	52.408	2368.014	3547.4	32.813	6000.635
3227	50.127	2071.218	1625.873	5.617	3752.835
3228	52.408	2368.014	3547.4	32.813	6000.635
3231	-175.657	1661.118	2119.407	10.265	3615.133
3232	278.966	2887.052	3073.661	26.999	6266.678
3233	278.966	2887.052	3073.661	26.999	6266.678
3234	-175.657	1661.118	2119.407	10.265	3615.133
3235	50.514	2125.687	1635.771	5.034	3817.006
3236	52.795	2422.482	3557.298	32.23	6064.805
3237	50.514	2125.687	1635.771	5.034	3817.006
3238	52.795	2422.482	3557.298	32.23	6064.805
3241	-174.635	2084.009	2594.282	12.458	4516.114
3242	279.988	3309.943	3548.535	29.191	7167.657
3243	279.988	3309.943	3548.535	29.191	7167.657
3244	-174.635	2084.009	2594.282	12.458	4516.114
3245	51.536	2548.578	2110.645	7.226	4717.985
3246	53.817	2845.374	4032.172	34.422	6965.785
3247	51.536	2548.578	2110.645	7.226	4717.985
3248	53.817	2845.374	4032.172	34.422	6965.785
3301	-403.162	1020.917	1637.332	2.19	2257.277
3302	506.084	3472.784	3545.839	35.657	7560.364
3303	506.084	3472.784	3545.839	35.657	7560.364

Skidshoe Max. Reaction
Friction Load (modified)

3304	-403.162	1020.917	1637.332	2.19	2257.277
3305	49.18	1950.055	670.058	-8.272	2661.021
3306	53.742	2543.646	4513.113	46.119	7156.62
3307	49.18	1950.055	670.058	-8.272	2661.021
3308	53.742	2543.646	4513.113	46.119	7156.62
3311	-404.378	570.791	1157.508	0.289	1324.21
3312	504.869	3022.658	3066.015	33.756	6627.298
3313	504.869	3022.658	3066.015	33.756	6627.298
3314	-404.378	570.791	1157.508	0.289	1324.21
3315	47.965	1499.929	190.235	-10.173	1727.956
3316	52.526	2093.52	4033.289	44.219	6223.554
3317	47.965	1499.929	190.235	-10.173	1727.956
3318	52.526	2093.52	4033.289	44.219	6223.554
3321	-403.356	993.682	1632.383	2.482	2225.191
3322	505.891	3445.55	3540.89	35.949	7528.28
3323	505.891	3445.55	3540.89	35.949	7528.28
3324	-403.356	993.682	1632.383	2.482	2225.191
3325	48.987	1922.821	665.109	-7.981	2628.936
3326	53.548	2516.411	4508.164	46.411	7124.534
3327	48.987	1922.821	665.109	-7.981	2628.936
3328	53.548	2516.411	4508.164	46.411	7124.534
3331	-402.969	1048.151	1642.281	1.898	2289.361
3332	506.278	3500.018	3550.787	35.365	7592.448
3333	506.278	3500.018	3550.787	35.365	7592.448
3334	-402.969	1048.151	1642.281	1.898	2289.361
3335	49.374	1977.289	675.007	-8.564	2693.106
3336	53.936	2570.88	4518.062	45.828	7188.706
3337	49.374	1977.289	675.007	-8.564	2693.106
3338	53.936	2570.88	4518.062	45.828	7188.706
3341	-401.947	1471.042	2117.155	4.091	3190.341
3342	507.3	3922.909	4025.662	37.558	8493.429
3343	507.3	3922.909	4025.662	37.558	8493.429
3344	-401.947	1471.042	2117.155	4.091	3190.341
3345	50.396	2400.181	1149.881	-6.372	3594.086
3346	54.958	2993.771	4992.936	48.02	8089.685
3347	50.396	2400.181	1149.881	-6.372	3594.086
3348	54.958	2993.771	4992.936	48.02	8089.685
3401	87.751	2117.351	65.705	-102.365	2168.442
3402	92.483	1606.464	-1246.1	-134.429	318.418
3403	86.43	2096.624	174.166	-97.296	2259.924
3404	89.072	2138.077	-42.756	-107.433	2076.96
3405	83.018	2628.237	1377.511	-70.3	4018.466
3411	31.406	2530.81	6072.18	128.442	8762.838
3412	30.477	2072.496	5512.66	124.443	7740.076
3413	22.391	2563.094	6933.536	162.174	9681.195
3414	40.422	2498.525	5210.824	94.71	7844.481
3415	32.336	2989.124	6631.701	132.44	9785.601
3421	390.59	3422.483	3797.593	117.525	7728.191
3422	387.291	2978.195	3315.979	116.719	6798.184
3423	299.237	2962.979	3449.958	86.011	6798.185
3424	481.943	3881.987	4145.228	149.04	8658.198
3425	393.889	3866.771	4279.206	118.331	8658.197

Skidshoe Max. Reaction
Friction Load (modified)

3431	0	0	0	0	0
3432	0	0	0	0	0
3433	0	0	0	0	0
3434	0	0	0	0	0
3435	0	0	0	0	0

Skidshoe Max. Reaction

Friction Load (modified)

Force-Z on Fixed Joint Reaction (SACS)

LOAD	ROW A			ROW B			A+B		
COND	A1	A2	TOTAL	B1	B2	TOTAL	ROW A	ROW B	TOTAL
3101	2819.37	4908.82	7728.19	3099.045	4330.55	7429.595	7728.19	7429.595	15157.79
3102	2822.43	3975.756	6798.186	4128.322	4231.277	8359.599	6798.186	8359.599	15157.79
3103	1921.449	4876.735	6798.184	2961.566	5398.034	8359.6	6798.184	8359.6	15157.78
3104	3717.293	4940.906	8658.199	3236.521	3263.066	6499.587	8658.199	6499.587	15157.79
3105	2816.312	5841.885	8658.197	2069.765	4429.823	6499.588	8658.197	6499.588	15157.79
3201	4145.143	3583.049	7728.192	1975.144	5454.45	7429.594	7728.192	7429.594	15157.79
3202	1493.598	6234.592	7728.19	4222.944	3206.65	7429.594	7728.19	7429.594	15157.78
3203	1493.598	6234.592	7728.19	4222.944	3206.65	7429.594	7728.19	7429.594	15157.78
3204	4145.143	3583.049	7728.192	1975.144	5454.45	7429.594	7728.192	7429.594	15157.79
3205	3943.271	3784.922	7728.193	1782.146	5647.446	7429.592	7728.193	7429.592	15157.79
3206	1695.471	6032.721	7728.192	4415.94	3013.653	7429.593	7728.192	7429.593	15157.79
3207	3943.271	3784.922	7728.193	1782.146	5647.446	7429.592	7728.193	7429.592	15157.79
3208	1695.471	6032.721	7728.192	4415.94	3013.653	7429.593	7728.192	7429.593	15157.79
3211	4148.202	2649.983	6798.185	3004.423	5355.178	8359.601	6798.185	8359.601	15157.79
3212	1496.658	5301.527	6798.185	5252.221	3107.378	8359.599	6798.185	8359.599	15157.78
3213	1496.658	5301.527	6798.185	5252.221	3107.378	8359.599	6798.185	8359.599	15157.78
3214	4148.202	2649.983	6798.185	3004.423	5355.178	8359.601	6798.185	8359.601	15157.79
3215	3946.329	2851.855	6798.184	2811.426	5548.175	8359.601	6798.184	8359.601	15157.79
3216	1698.528	5099.655	6798.183	5445.219	2914.382	8359.601	6798.183	8359.601	15157.78
3217	3946.329	2851.855	6798.184	2811.426	5548.175	8359.601	6798.184	8359.601	15157.79
3218	1698.528	5099.655	6798.183	5445.219	2914.382	8359.601	6798.183	8359.601	15157.78
3221	3247.222	3550.964	6798.186	1837.666	6521.934	8359.6	6798.186	8359.6	15157.79
3222	595.676	6202.507	6798.183	4085.467	4274.133	8359.6	6798.183	8359.6	15157.78
3223	595.676	6202.507	6798.183	4085.467	4274.133	8359.6	6798.183	8359.6	15157.78
3224	3247.222	3550.964	6798.186	1837.666	6521.934	8359.6	6798.186	8359.6	15157.79
3225	3045.349	3752.835	6798.184	1644.669	6714.93	8359.599	6798.184	8359.599	15157.78
3226	797.548	6000.635	6798.183	4278.463	4081.138	8359.601	6798.183	8359.601	15157.78
3227	3045.349	3752.835	6798.184	1644.669	6714.93	8359.599	6798.184	8359.599	15157.78
3228	797.548	6000.635	6798.183	4278.463	4081.138	8359.601	6798.183	8359.601	15157.78
3231	5043.064	3615.133	8658.197	2112.623	4386.966	6499.589	8658.197	6499.589	15157.79
3232	2391.52	6266.678	8658.198	4360.42	2139.166	6499.586	8658.198	6499.586	15157.78
3233	2391.52	6266.678	8658.198	4360.42	2139.166	6499.586	8658.198	6499.586	15157.78
3234	5043.064	3615.133	8658.197	2112.623	4386.966	6499.589	8658.197	6499.589	15157.79
3235	4841.191	3817.006	8658.197	1919.625	4579.962	6499.587	8658.197	6499.587	15157.78
3236	2593.392	6064.805	8658.197	4553.418	1946.169	6499.587	8658.197	6499.587	15157.78
3237	4841.191	3817.006	8658.197	1919.625	4579.962	6499.587	8658.197	6499.587	15157.78
3238	2593.392	6064.805	8658.197	4553.418	1946.169	6499.587	8658.197	6499.587	15157.78
3241	4142.083	4516.114	8658.197	945.866	5553.722	6499.588	8658.197	6499.588	15157.79
3242	1490.539	7167.657	8658.196	3193.665	3305.922	6499.587	8658.196	6499.587	15157.78
3243	1490.539	7167.657	8658.196	3193.665	3305.922	6499.587	8658.196	6499.587	15157.78
3244	4142.083	4516.114	8658.197	945.866	5553.722	6499.588	8658.197	6499.588	15157.79
3245	3940.212	4717.985	8658.197	752.869	5746.718	6499.587	8658.197	6499.587	15157.78
3246	1692.412	6965.785	8658.197	3386.661	3112.926	6499.587	8658.197	6499.587	15157.78
3247	3940.212	4717.985	8658.197	752.869	5746.718	6499.587	8658.197	6499.587	15157.78
3248	1692.412	6965.785	8658.197	3386.661	3112.926	6499.587	8658.197	6499.587	15157.78
3301	5470.913	2257.277	7728.19	851.244	6578.349	7429.593	7728.19	7429.593	15157.78
3302	167.826	7560.364	7728.19	5346.842	2082.75	7429.592	7728.19	7429.592	15157.78
3303	167.826	7560.364	7728.19	5346.842	2082.75	7429.592	7728.19	7429.592	15157.78

Skidshoe Max. Reaction
Friction Load (modified)

3304	5470.913	2257.277	7728.19	851.244	6578.349	7429.593	7728.19	7429.593	15157.78
3305	5067.17	2661.021	7728.191	465.251	6964.342	7429.593	7728.191	7429.593	15157.78
3306	571.57	7156.62	7728.19	5732.836	1696.757	7429.593	7728.19	7429.593	15157.78
3307	5067.17	2661.021	7728.191	465.251	6964.342	7429.593	7728.191	7429.593	15157.78
3308	571.57	7156.62	7728.19	5732.836	1696.757	7429.593	7728.19	7429.593	15157.78
3311	5473.973	1324.21	6798.183	1880.523	6479.077	8359.6	6798.183	8359.6	15157.78
3312	170.886	6627.298	6798.184	6376.122	1983.479	8359.601	6798.184	8359.601	15157.79
3313	170.886	6627.298	6798.184	6376.122	1983.479	8359.601	6798.184	8359.601	15157.79
3314	5473.973	1324.21	6798.183	1880.523	6479.077	8359.6	6798.183	8359.6	15157.78
3315	5070.229	1727.956	6798.185	1494.529	6865.071	8359.6	6798.185	8359.6	15157.79
3316	574.63	6223.554	6798.184	6762.115	1597.484	8359.599	6798.184	8359.599	15157.78
3317	5070.229	1727.956	6798.185	1494.529	6865.071	8359.6	6798.185	8359.6	15157.79
3318	574.63	6223.554	6798.184	6762.115	1597.484	8359.599	6798.184	8359.599	15157.78
3321	4572.993	2225.191	6798.184	713.766	7645.833	8359.599	6798.184	8359.599	15157.78
3322	-730.095	7528.28	6798.185	5209.365	3150.234	8359.599	6798.185	8359.599	15157.78
3323	-730.095	7528.28	6798.185	5209.365	3150.234	8359.599	6798.185	8359.599	15157.78
3324	4572.993	2225.191	6798.184	713.766	7645.833	8359.599	6798.184	8359.599	15157.78
3325	4169.249	2628.936	6798.185	327.773	8031.827	8359.6	6798.185	8359.6	15157.79
3326	-326.35	7124.534	6798.184	5595.359	2764.241	8359.6	6798.184	8359.6	15157.78
3327	4169.249	2628.936	6798.185	327.773	8031.827	8359.6	6798.185	8359.6	15157.79
3328	-326.35	7124.534	6798.184	5595.359	2764.241	8359.6	6798.184	8359.6	15157.78
3331	6368.836	2289.361	8658.197	988.722	5510.864	6499.586	8658.197	6499.586	15157.78
3332	1065.748	7592.448	8658.196	5484.32	1015.266	6499.586	8658.196	6499.586	15157.78
3333	1065.748	7592.448	8658.196	5484.32	1015.266	6499.586	8658.196	6499.586	15157.78
3334	6368.836	2289.361	8658.197	988.722	5510.864	6499.586	8658.197	6499.586	15157.78
3335	5965.092	2693.106	8658.198	602.728	5896.859	6499.587	8658.198	6499.587	15157.79
3336	1469.492	7188.706	8658.198	5870.314	629.272	6499.586	8658.198	6499.586	15157.78
3337	5965.092	2693.106	8658.198	602.728	5896.859	6499.587	8658.198	6499.587	15157.79
3338	1469.492	7188.706	8658.198	5870.314	629.272	6499.586	8658.198	6499.586	15157.78
3341	5467.856	3190.341	8658.197	-178.035	6677.621	6499.586	8658.197	6499.586	15157.78
3342	164.767	8493.429	8658.196	4317.564	2182.023	6499.587	8658.196	6499.587	15157.78
3343	164.767	8493.429	8658.196	4317.564	2182.023	6499.587	8658.196	6499.587	15157.78
3344	5467.856	3190.341	8658.197	-178.035	6677.621	6499.586	8658.197	6499.586	15157.78
3345	5064.111	3594.086	8658.197	-564.028	7063.614	6499.586	8658.197	6499.586	15157.78
3346	568.512	8089.685	8658.197	4703.559	1796.029	6499.588	8658.197	6499.588	15157.79
3347	5064.111	3594.086	8658.197	-564.028	7063.614	6499.586	8658.197	6499.586	15157.78
3348	568.512	8089.685	8658.197	4703.559	1796.029	6499.588	8658.197	6499.588	15157.79
3401	5559.748	2168.442	7728.19	0	7429.594	7429.594	7728.19	7429.594	15157.78
3402	6479.766	318.418	6798.184	0	8359.6	8359.6	6798.184	8359.6	15157.78
3403	4538.26	2259.924	6798.184	0	8359.6	8359.6	6798.184	8359.6	15157.78
3404	6581.237	2076.96	8658.197	0	6499.588	6499.588	8658.197	6499.588	15157.79
3405	4639.731	4018.466	8658.197	0	6499.587	6499.587	8658.197	6499.587	15157.78
3411	-1034.65	8762.838	7728.19	7429.593	0	7429.593	7728.19	7429.593	15157.78
3412	-941.892	7740.076	6798.184	8359.601	0	8359.601	6798.184	8359.601	15157.79
3413	-2883.01	9681.195	6798.183	8359.601	0	8359.601	6798.183	8359.601	15157.78
3414	813.716	7844.481	8658.197	6499.588	0	6499.588	8658.197	6499.588	15157.79
3415	-1127.4	9785.601	8658.197	6499.587	0	6499.587	8658.197	6499.587	15157.78
3421	0	7728.191	7728.191	5555.309	1874.284	7429.593	7728.191	7429.593	15157.78
3422	0	6798.184	6798.184	6588.548	1771.052	8359.6	6798.184	8359.6	15157.78
3423	0	6798.185	6798.185	4624.032	3735.567	8359.599	6798.185	8359.599	15157.78
3424	0	8658.198	8658.198	6486.586	13.002	6499.588	8658.198	6499.588	15157.79
3425	0	8658.197	8658.197	4522.07	1977.517	6499.587	8658.197	6499.587	15157.78

Skidshoe Max. Reaction
Friction Load (modified)

3431	7728.192	0	7728.192	-1239.48	8669.075	7429.595	7728.192	7429.595	15157.79
3432	6798.185	0	6798.185	613.592	7746.01	8359.602	6798.185	8359.602	15157.79
3433	6798.184	0	6798.184	-1349.15	9708.745	8359.6	6798.184	8359.6	15157.78
3434	8658.197	0	8658.197	-1129.82	7629.403	6499.587	8658.197	6499.587	15157.78
3435	8658.198	0	8658.198	-3092.55	9592.141	6499.587	8658.198	6499.587	15157.79

Skidshoe Max. Reaction

Friction Load (modified)

Force-Z on Fixed Joint Reaction (SACS)

LOAD COND	LEG B1				
	LB07	0008	0013	LB13	TOTAL
3501	23.833	1333.737	1700.368	22.659	3080.597
3502	27.172	1865.169	2191.708	24.429	4108.478
3503	23.294	1254.062	1645.742	22.582	2945.68
3504	24.371	1413.413	1754.995	22.736	3215.515
3505	20.493	802.306	1209.029	20.889	2052.717
3511	3.266	325.853	1549.386	24.129	1902.634
3512	44.399	2341.621	1851.35	21.189	4258.559
3513	42.996	2340.739	1849.21	21.052	4253.997
3514	4.67	326.736	1551.527	24.266	1907.199
3515	10.519	796.235	1103.589	-200.895	1709.448
3516	37.146	1871.24	2297.147	246.214	4451.747
3517	11.923	797.117	1105.73	-200.758	1714.012
3518	35.743	1870.357	2295.007	246.077	4447.184
3521	6.606	857.285	2040.725	25.899	2930.515
3522	47.739	2873.053	2342.689	22.959	5286.44
3523	46.336	2872.17	2340.549	22.822	5281.877
3524	8.009	858.168	2042.866	26.036	2935.079
3525	13.859	1327.667	1594.928	-199.125	2737.329
3526	40.486	2402.671	2788.487	247.984	5479.628
3527	15.262	1328.549	1597.069	-198.988	2741.892
3528	39.083	2401.789	2786.346	247.847	5475.065
3531	2.728	246.178	1494.76	24.052	1767.718
3532	43.86	2261.945	1796.724	21.112	4123.641
3533	42.457	2261.063	1794.583	20.975	4119.078
3534	4.131	247.06	1496.9	24.189	1772.28
3535	9.981	716.559	1048.962	-200.972	1574.53
3536	36.607	1791.564	2242.521	246.137	4316.829
3537	11.384	717.442	1051.103	-200.835	1579.094
3538	35.204	1790.681	2240.38	246	4312.265
3541	3.805	405.529	1604.013	24.206	2037.553
3542	44.938	2421.297	1905.977	21.267	4393.479
3543	43.535	2420.414	1903.836	21.13	4388.915
3544	5.208	406.412	1606.154	24.343	2042.117
3545	11.058	875.911	1158.216	-200.818	1844.367
3546	37.685	1950.915	2351.774	246.291	4586.665
3547	12.461	876.793	1160.357	-200.681	1848.93
3548	36.282	1950.033	2349.633	246.154	4582.102
3551	-0.073	-205.578	1058.047	22.359	874.755
3552	41.059	1810.19	1360.011	19.42	3230.68
3553	39.656	1809.307	1357.87	19.283	3226.116
3554	1.33	-204.696	1060.188	22.496	879.318
3555	7.18	264.803	612.25	-202.665	681.568
3556	33.806	1339.808	1805.808	244.444	3423.866
3557	8.583	265.686	614.391	-202.528	686.132
3558	32.403	1338.925	1803.668	244.307	3419.303
3601	36.957	1457.536	1594.315	-6.1	3082.708
3602	40.297	1988.968	2085.654	-4.33	4110.589
3603	36.418	1377.86	1539.688	-6.177	2947.789

Skidshoe Max. Reaction
Friction Load (modified)

3604	37.496	1537.212	1648.942	-6.023	3217.627
3605	33.617	926.105	1102.976	-7.87	2054.828
3611	16.391	449.652	1443.333	-4.63	1904.746
3612	57.523	2465.42	1745.297	-7.57	4260.67
3613	56.12	2464.537	1743.156	-7.707	4256.106
3614	17.794	450.535	1445.474	-4.493	1909.31
3615	23.644	920.034	997.536	-229.655	1711.559
3616	50.27	1995.039	2191.094	217.454	4453.857
3617	25.047	920.916	999.677	-229.518	1716.122
3618	48.867	1994.156	2188.953	217.317	4449.293
3621	19.731	981.084	1934.672	-2.861	2932.626
3622	60.863	2996.852	2236.636	-5.8	5288.551
3623	59.46	2995.969	2234.495	-5.937	5283.987
3624	21.134	981.967	1936.813	-2.724	2937.19
3625	26.984	1451.465	1488.875	-227.885	2739.439
3626	53.61	2526.47	2682.433	219.224	5481.737
3627	28.387	1452.348	1491.016	-227.748	2744.003
3628	52.207	2525.588	2680.292	219.087	5477.174
3631	15.852	369.977	1388.706	-4.708	1769.827
3632	56.985	2385.744	1690.67	-7.647	4125.752
3633	55.582	2384.862	1688.529	-7.784	4121.189
3634	17.255	370.859	1390.847	-4.571	1774.39
3635	23.105	840.358	942.909	-229.732	1576.64
3636	49.732	1915.363	2136.467	217.377	4318.939
3637	24.508	841.241	945.05	-229.595	1581.204
3638	48.329	1914.48	2134.326	217.24	4314.375
3641	16.93	529.328	1497.96	-4.553	2039.665
3642	58.062	2545.096	1799.924	-7.493	4395.589
3643	56.659	2544.213	1797.783	-7.63	4391.025
3644	18.333	530.211	1500.1	-4.416	2044.228
3645	24.183	999.71	1052.162	-229.578	1846.477
3646	50.809	2074.714	2245.721	217.531	4588.775
3647	25.586	1000.592	1054.303	-229.441	1851.04
3648	49.406	2073.832	2243.58	217.394	4584.212
3651	13.051	-81.779	951.994	-6.4	876.866
3652	54.184	1933.988	1253.958	-9.34	3232.79
3653	52.781	1933.106	1251.817	-9.477	3228.227
3654	14.454	-80.897	954.134	-6.263	881.428
3655	20.304	388.602	506.197	-231.425	683.678
3656	46.931	1463.607	1699.755	215.684	3425.977
3657	21.707	389.485	508.337	-231.288	688.241
3658	45.528	1462.724	1697.614	215.547	3421.413
3701	-43.022	704.513	2156.64	267.169	3085.3
3702	-39.682	1235.945	2647.979	268.939	4113.181
3703	-43.561	624.837	2102.013	267.092	2950.381
3704	-42.483	784.189	2211.266	267.246	3220.218
3705	-46.362	173.082	1665.3	265.399	2057.419
3711	-63.588	-303.371	2005.657	268.639	1907.337
3712	-22.456	1712.397	2307.622	265.699	4263.262
3713	-23.859	1711.515	2305.481	265.562	4258.699
3714	-62.185	-302.488	2007.798	268.776	1911.901
3715	-56.335	167.011	1559.86	43.614	1714.15

Skidshoe Max. Reaction
Friction Load (modified)

3716	-29.709	1242.015	2753.419	490.723	4456.448
3717	-54.932	167.893	1562.001	43.751	1718.713
3718	-31.112	1241.133	2751.278	490.586	4451.885
3721	-60.249	228.061	2496.997	270.409	2935.218
3722	-19.116	2243.829	2798.961	267.469	5291.143
3723	-20.519	2242.946	2796.82	267.332	5286.579
3724	-58.846	228.943	2499.137	270.546	2939.78
3725	-52.996	698.442	2051.2	45.384	2742.03
3726	-26.369	1773.447	3244.758	492.493	5484.329
3727	-51.592	699.325	2053.341	45.521	2746.595
3728	-27.772	1772.565	3242.617	492.356	5479.766
3731	-64.127	-383.046	1951.031	268.562	1772.42
3732	-22.994	1632.721	2252.995	265.622	4128.344
3733	-24.398	1631.839	2250.854	265.485	4123.78
3734	-62.724	-382.164	1953.172	268.699	1776.983
3735	-56.874	87.335	1505.234	43.537	1579.232
3736	-30.248	1162.34	2698.792	490.646	4321.53
3737	-55.471	88.218	1507.374	43.674	1583.795
3738	-31.651	1161.457	2696.651	490.509	4316.966
3741	-63.05	-223.695	2060.284	268.716	2042.255
3742	-21.917	1792.073	2362.248	265.776	4398.18
3743	-23.32	1791.19	2360.108	265.639	4393.617
3744	-61.647	-222.812	2062.425	268.853	2046.819
3745	-55.797	246.687	1614.487	43.691	1849.068
3746	-29.17	1321.691	2808.046	490.801	4591.368
3747	-54.394	247.569	1616.628	43.828	1853.631
3748	-30.573	1320.809	2805.905	490.664	4586.805
3751	-66.928	-834.802	1514.318	266.869	879.457
3752	-25.796	1180.965	1816.282	263.929	3235.38
3753	-27.199	1180.083	1814.142	263.792	3230.818
3754	-65.525	-833.92	1516.459	267.006	884.02
3755	-59.675	-364.421	1068.521	41.844	686.269
3756	-33.049	710.584	2262.08	488.954	3428.569
3757	-58.272	-363.538	1070.662	41.982	690.834
3758	-34.452	709.701	2259.939	488.817	3424.005

Skidshoe Max. Reaction

Friction Load (modified)

Force-Z on Fixed Joint Reaction (SACS)

LOAD COND	LEG A1				
	LB33	0016	0007	LB39	TOTAL
3501	22.999	1065.206	1728.025	10.404	2826.634
3502	23.432	1086.905	1710.279	10.482	2831.098
3503	20.311	607.108	1289.81	8.899	1926.128
3504	25.688	1523.304	2166.24	11.908	3727.14
3505	22.566	1043.508	1745.771	10.326	2822.171
3511	35.08	1569.985	2368.104	233.276	4206.445
3512	10.919	560.427	1087.946	-212.469	1446.823
3513	12.326	561.414	1089.959	-212.33	1451.369
3514	33.673	1568.998	2366.091	233.138	4201.9
3515	43.02	2059.789	1892.873	8.915	4004.597
3516	2.979	70.623	1563.177	11.893	1648.672
3517	41.613	2058.802	1890.86	8.776	4000.051
3518	4.385	71.61	1565.19	12.032	1653.217
3521	35.513	1591.684	2350.358	233.354	4210.909
3522	11.352	582.126	1070.2	-212.391	1451.287
3523	12.759	583.113	1072.213	-212.252	1455.833
3524	34.106	1590.697	2348.346	233.215	4206.364
3525	43.453	2081.488	1875.127	8.993	4009.061
3526	3.412	92.322	1545.431	11.971	1653.136
3527	42.046	2080.501	1873.114	8.854	4004.515
3528	4.818	93.309	1547.444	12.11	1657.681
3531	32.391	1111.887	1929.889	231.772	3305.939
3532	8.23	102.329	649.731	-213.973	546.317
3533	9.637	103.316	651.744	-213.834	550.863
3534	30.985	1110.9	1927.876	231.633	3301.394
3535	40.331	1601.691	1454.658	7.41	3104.09
3536	0.29	-387.475	1124.962	10.388	748.165
3537	38.925	1600.704	1452.645	7.272	3099.546
3538	1.697	-386.488	1126.975	10.527	752.711
3541	37.768	2028.083	2806.319	234.781	5106.951
3542	13.607	1018.525	1526.161	-210.964	2347.329
3543	15.014	1019.512	1528.173	-210.825	2351.874
3544	36.362	2027.096	2804.306	234.642	5102.406
3545	45.708	2517.887	2331.087	10.419	4905.101
3546	5.667	528.721	2001.392	13.397	2549.177
3547	44.302	2516.9	2329.075	10.28	4900.557
3548	7.074	529.708	2003.405	13.536	2553.723
3551	34.647	1548.286	2385.85	233.199	4201.982
3552	10.486	538.729	1105.692	-212.547	1442.36
3553	11.893	539.716	1107.704	-212.408	1446.905
3554	33.24	1547.3	2383.837	233.06	4197.437
3555	42.587	2038.091	1910.618	8.837	4000.133
3556	2.546	48.925	1580.923	11.815	1644.209
3557	41.18	2037.104	1908.606	8.698	3995.588
3558	3.952	49.912	1582.936	11.954	1648.754
3601	-47.563	395.022	2220.691	265.625	2833.775
3602	-47.13	416.72	2202.945	265.703	2838.238
3603	-50.252	-63.076	1782.476	264.121	1933.269

Skidshoe Max. Reaction
Friction Load (modified)

3604	-44.875	853.12	2658.906	267.13	3734.281
3605	-47.996	373.323	2238.437	265.547	2829.311
3611	-35.483	899.801	2860.77	488.498	4213.586
3612	-59.644	-109.757	1580.612	42.753	1453.964
3613	-58.237	-108.77	1582.625	42.891	1458.509
3614	-36.89	898.814	2858.757	488.359	4209.04
3615	-27.543	1389.605	2385.539	264.136	4011.737
3616	-67.584	-599.561	2055.843	267.114	1655.812
3617	-28.949	1388.618	2383.526	263.997	4007.192
3618	-66.177	-598.574	2057.856	267.253	1660.358
3621	-35.05	921.499	2843.024	488.576	4218.049
3622	-59.211	-88.059	1562.866	42.83	1458.426
3623	-57.804	-87.072	1564.879	42.969	1462.972
3624	-36.457	920.513	2841.012	488.437	4213.505
3625	-27.11	1411.303	2367.793	264.214	4016.2
3626	-67.151	-577.862	2038.097	267.192	1660.276
3627	-28.516	1410.317	2365.78	264.075	4011.656
3628	-65.744	-576.876	2040.11	267.331	1664.821
3631	-38.171	441.703	2422.555	486.993	3313.08
3632	-62.332	-567.855	1142.397	41.248	553.458
3633	-60.926	-566.868	1144.41	41.387	558.003
3634	-39.578	440.716	2420.542	486.855	3308.535
3635	-30.231	931.507	1947.324	262.632	3111.232
3636	-70.272	-1057.66	1617.628	265.61	755.307
3637	-31.638	930.52	1945.311	262.493	3106.686
3638	-68.866	-1056.67	1619.641	265.749	759.852
3641	-32.794	1357.899	3298.985	490.002	5114.092
3642	-56.955	348.341	2018.827	44.257	2354.47
3643	-55.549	349.328	2020.84	44.396	2359.015
3644	-34.201	1356.912	3296.972	489.863	5109.546
3645	-24.854	1847.703	2823.754	265.641	4912.244
3646	-64.895	-141.463	2494.058	268.619	2556.319
3647	-26.261	1846.716	2821.741	265.502	4907.698
3648	-63.489	-140.476	2496.071	268.757	2560.863
3651	-35.916	878.102	2878.516	488.42	4209.122
3652	-60.077	-131.456	1598.358	42.675	1449.5
3653	-58.67	-130.469	1600.37	42.814	1454.045
3654	-37.323	877.115	2876.503	488.281	4204.576
3655	-27.976	1367.906	2403.284	264.058	4007.272
3656	-68.017	-621.26	2073.589	267.036	1651.348
3657	-29.382	1366.919	2401.272	263.919	4002.728
3658	-66.61	-620.273	2075.602	267.175	1655.894
3701	32.878	1160.969	1642.426	-7.416	2828.857
3702	33.311	1182.667	1624.68	-7.339	2833.319
3703	30.189	702.871	1204.211	-8.921	1928.35
3704	35.566	1619.067	2080.641	-5.912	3729.362
3705	32.445	1139.27	1660.172	-7.494	2824.393
3711	44.958	1665.748	2282.505	215.456	4208.667
3712	20.797	656.19	1002.347	-230.289	1449.045
3713	22.204	657.177	1004.359	-230.15	1453.59
3714	43.552	1664.761	2280.492	215.317	4204.122
3715	52.898	2155.552	1807.273	-8.905	4006.818

Skidshoe Max. Reaction
Friction Load (modified)

3716	12.857	166.386	1477.578	-5.927	1650.894
3717	51.492	2154.565	1805.261	-9.044	4002.274
3718	14.264	167.373	1479.591	-5.789	1655.439
3721	45.391	1687.447	2264.759	215.534	4213.131
3722	21.23	677.889	984.601	-230.211	1453.509
3723	22.637	678.875	986.614	-230.072	1458.054
3724	43.984	1686.46	2262.746	215.395	4208.585
3725	53.331	2177.25	1789.528	-8.827	4011.282
3726	13.29	188.085	1459.832	-5.85	1655.357
3727	51.925	2176.264	1787.515	-8.966	4006.738
3728	14.697	189.071	1461.845	-5.711	1659.902
3731	42.27	1207.65	1844.29	213.952	3308.162
3732	18.109	198.092	564.132	-231.793	548.54
3733	19.516	199.079	566.144	-231.655	553.084
3734	40.863	1206.663	1842.277	213.813	3303.616
3735	50.21	1697.454	1369.058	-10.41	3106.312
3736	10.169	-291.712	1039.363	-7.432	750.388
3737	48.803	1696.467	1367.046	-10.549	3101.767
3738	11.575	-290.725	1041.376	-7.293	754.933
3741	47.647	2123.846	2720.719	216.961	5109.173
3742	23.486	1114.288	1440.562	-228.785	2349.551
3743	24.893	1115.275	1442.574	-228.646	2354.096
3744	46.24	2122.859	2718.707	216.822	5104.628
3745	55.587	2613.65	2245.488	-7.401	4907.324
3746	15.546	624.484	1915.793	-4.423	2551.4
3747	54.18	2612.663	2243.476	-7.54	4902.779
3748	16.952	625.471	1917.806	-4.284	2555.945
3751	44.525	1644.049	2300.25	215.378	4204.202
3752	20.364	634.491	1020.093	-230.367	1444.581
3753	21.771	635.478	1022.105	-230.228	1449.126
3754	43.119	1643.062	2298.238	215.239	4199.658
3755	52.465	2133.853	1825.019	-8.983	4002.354
3756	12.424	144.687	1495.324	-6.005	1646.43
3757	51.059	2132.866	1823.006	-9.122	3997.809
3758	13.831	145.674	1497.336	-5.866	1650.975

Skidshoe Max. Reaction
Friction Load (modified)

Force-Z on Fixed Joint Reaction (SACS)

LOAD COND	LEG B2				
	LB20	0014	0005	LB26	TOTAL
3501	-214.702	2204.875	2306.825	52.548	4349.546
3502	-214.647	2176.187	2238.472	51.881	4251.893
3503	-212.755	2721.844	2850.549	54.983	5414.621
3504	-216.648	1687.906	1763.101	50.113	3284.472
3505	-214.756	2233.563	2375.179	53.215	4447.201
3511	-213.657	2354.392	3315.45	66.778	5522.963
3512	-215.746	2055.358	1298.2	38.318	3176.13
3513	-215.755	2055.99	1296.991	38.284	3175.51
3514	-213.648	2353.76	3316.659	66.811	5523.582
3515	11.191	2808.67	2835.499	60.772	5716.132
3516	-440.595	1601.079	1778.152	44.324	2982.96
3517	11.2	2808.038	2836.708	60.805	5716.751
3518	-440.604	1601.712	1776.943	44.291	2982.342
3521	-213.602	2325.704	3247.097	66.111	5425.31
3522	-215.691	2026.671	1229.847	37.651	3078.478
3523	-215.7	2027.303	1228.638	37.618	3077.859
3524	-213.593	2325.072	3248.306	66.145	5425.93
3525	11.246	2779.983	2767.145	60.105	5618.479
3526	-440.54	1572.392	1709.798	43.657	2885.307
3527	11.255	2779.35	2768.354	60.138	5619.097
3528	-440.549	1573.024	1708.59	43.624	2884.689
3531	-211.71	2871.361	3859.175	69.213	6588.039
3532	-213.8	2572.327	1841.924	40.753	4241.204
3533	-213.809	2572.959	1840.715	40.719	4240.584
3534	-211.701	2870.728	3860.383	69.246	6588.656
3535	13.138	3325.639	3379.223	63.207	6781.207
3536	-438.648	2118.049	2321.876	46.759	4048.036
3537	13.147	3325.007	3380.431	63.24	6781.825
3538	-438.657	2118.681	2320.667	46.726	4047.417
3541	-215.603	1837.423	2771.726	64.343	4457.889
3542	-217.693	1538.389	754.476	35.883	2111.055
3543	-217.702	1539.022	753.267	35.849	2110.436
3544	-215.594	1836.79	2772.936	64.376	4458.508
3545	9.245	2291.701	2291.775	58.337	4651.058
3546	-442.541	1084.111	1234.428	41.889	1917.887
3547	9.254	2291.069	2292.983	58.37	4651.676
3548	-442.55	1084.743	1233.219	41.856	1917.268
3551	-213.712	2383.079	3383.804	67.445	5620.616
3552	-215.801	2084.046	1366.553	38.984	3273.782
3553	-215.81	2084.678	1365.345	38.951	3273.164
3554	-213.703	2382.447	3385.013	67.478	5621.235
3555	11.137	2837.358	2903.852	61.439	5813.786
3556	-440.649	1629.767	1846.505	44.991	3080.614
3557	11.146	2836.725	2905.061	61.472	5814.404
3558	-440.658	1630.399	1845.296	44.957	3079.994
3601	-82.599	1904.503	2487.711	37.849	4347.464
3602	-82.544	1875.815	2419.358	37.182	4249.811
3603	-80.653	2421.472	3031.435	40.284	5412.538

Skidshoe Max. Reaction
Friction Load (modified)

3604	-84.546	1387.534	1943.987	35.414	3282.389
3605	-82.654	1933.19	2556.064	38.515	4445.115
3611	-81.555	2054.02	3496.336	52.079	5520.88
3612	-83.644	1754.986	1479.086	23.618	3174.046
3613	-83.653	1755.618	1477.877	23.585	3173.427
3614	-81.546	2053.387	3497.545	52.112	5521.498
3615	143.294	2508.298	3016.385	46.073	5714.05
3616	-308.492	1300.707	1959.038	29.624	2980.877
3617	143.303	2507.666	3017.594	46.106	5714.669
3618	-308.501	1301.34	1957.829	29.591	2980.259
3621	-81.5	2025.332	3427.983	51.412	5423.227
3622	-83.589	1726.298	1410.733	22.951	3076.393
3623	-83.598	1726.931	1409.524	22.918	3075.775
3624	-81.491	2024.7	3429.192	51.445	5423.846
3625	143.349	2479.61	2948.031	45.406	5616.396
3626	-308.437	1272.02	1890.684	28.958	2883.225
3627	143.358	2478.978	2949.24	45.439	5617.015
3628	-308.446	1272.652	1889.476	28.924	2882.606
3631	-79.608	2570.989	4040.061	54.514	6585.956
3632	-81.698	2271.955	2022.81	26.053	4239.12
3633	-81.707	2272.587	2021.601	26.02	4238.501
3634	-79.599	2570.356	4041.269	54.547	6586.573
3635	145.24	3025.267	3560.109	48.508	6779.124
3636	-306.546	1817.676	2502.762	32.059	4045.951
3637	145.249	3024.635	3561.318	48.541	6779.743
3638	-306.555	1818.309	2501.553	32.026	4045.333
3641	-83.501	1537.051	2952.613	49.644	4455.807
3642	-85.59	1238.017	935.362	21.183	2108.972
3643	-85.6	1238.649	934.153	21.15	2108.352
3644	-83.492	1536.418	2953.821	49.677	4456.424
3645	141.347	1991.329	2472.661	43.638	4648.975
3646	-310.439	783.738	1415.314	27.189	1915.802
3647	141.356	1990.697	2473.869	43.671	4649.593
3648	-310.448	784.371	1414.105	27.156	1915.184
3651	-81.61	2082.707	3564.69	52.746	5618.533
3652	-83.699	1783.673	1547.439	24.285	3271.698
3653	-83.708	1784.306	1546.23	24.252	3271.08
3654	-81.601	2082.075	3565.899	52.779	5619.152
3655	143.239	2536.986	3084.738	46.739	5811.702
3656	-308.547	1329.395	2027.391	30.291	3078.53
3657	143.248	2536.353	3085.947	46.773	5812.321
3658	-308.556	1330.027	2026.182	30.258	3077.911
3701	191.614	2489.348	1640.048	23.815	4344.825
3702	191.669	2460.66	1571.695	23.149	4247.173
3703	193.56	3006.316	2183.772	26.25	5409.898
3704	189.667	1972.379	1096.324	21.38	3279.75
3705	191.559	2518.035	1708.401	24.482	4442.477
3711	192.658	2638.865	2648.673	38.046	5518.242
3712	190.569	2339.831	631.423	9.585	3171.408
3713	190.56	2340.463	630.214	9.552	3170.789
3714	192.667	2638.232	2649.882	38.079	5518.86
3715	417.507	3093.143	2168.721	32.04	5711.411

Skidshoe Max. Reaction
Friction Load (modified)

3716	-34.279	1885.552	1111.374	15.591	2978.238
3717	417.516	3092.511	2169.93	32.073	5712.03
3718	-34.288	1886.185	1110.166	15.558	2977.621
3721	192.713	2610.177	2580.32	37.379	5420.589
3722	190.624	2311.143	563.069	8.918	3073.754
3723	190.615	2311.775	561.86	8.885	3073.135
3724	192.722	2609.544	2581.529	37.412	5421.207
3725	417.562	3064.455	2100.368	31.373	5613.758
3726	-34.224	1856.865	1043.021	14.925	2880.587
3727	417.571	3063.823	2101.577	31.406	5614.377
3728	-34.233	1857.497	1041.812	14.891	2879.967
3731	194.605	3155.833	3192.397	40.481	6583.316
3732	192.515	2856.8	1175.147	12.02	4236.482
3733	192.506	2857.432	1173.938	11.987	4235.863
3734	194.614	3155.201	3193.606	40.514	6583.935
3735	419.453	3610.112	2712.445	34.475	6776.485
3736	-32.333	2402.521	1655.098	18.026	4043.312
3737	419.462	3609.479	2713.654	34.508	6777.103
3738	-32.342	2403.153	1653.89	17.993	4042.694
3741	190.712	2121.896	2104.949	35.611	4453.168
3742	188.623	1822.862	87.699	7.15	2106.334
3743	188.614	1823.494	86.49	7.117	2105.715
3744	190.721	2121.263	2106.158	35.644	4453.786
3745	415.56	2576.174	1624.997	29.605	4646.336
3746	-36.226	1368.583	567.65	13.156	1913.163
3747	415.569	2575.542	1626.206	29.638	4646.955
3748	-36.235	1369.216	566.442	13.123	1912.546
3751	192.603	2667.552	2717.026	38.713	5615.894
3752	190.514	2368.518	699.776	10.252	3269.06
3753	190.505	2369.151	698.567	10.219	3268.442
3754	192.612	2666.92	2718.235	38.746	5616.513
3755	417.452	3121.831	2237.075	32.706	5809.064
3756	-34.334	1914.24	1179.728	16.258	3075.892
3757	417.461	3121.198	2238.283	32.74	5809.682
3758	-34.343	1914.872	1178.519	16.225	3075.273

Skidshoe Max. Reaction

Friction Load (modified)

Force-Z on Fixed Joint Reaction (SACS)

LOAD COND	LEG A2				
	LB46	0015	0006	LB52	TOTAL
3501	-219.126	2469.18	2606.529	44.423	4901.006
3502	-220.372	2018.007	2126.15	42.53	3966.315
3503	-219.277	2442.851	2603.056	44.726	4871.356
3504	-218.975	2495.509	2610.002	44.12	4930.656
3505	-217.879	2920.352	3086.908	46.316	5835.697
3511	-446.81	1847.326	2089.773	35.451	3525.74
3512	8.558	3091.034	3123.286	53.394	6276.272
3513	8.57	3090.452	3124.458	53.429	6276.909
3514	-446.822	1847.907	2088.601	35.417	3525.103
3515	-220.6	2311.784	1606.189	30.234	3727.607
3516	-217.652	2626.575	3606.87	58.612	6074.405
3517	-220.613	2312.366	1605.017	30.199	3726.969
3518	-217.639	2625.993	3608.041	58.647	6075.042
3521	-448.056	1396.153	1609.394	33.559	2591.05
3522	7.311	2639.861	2642.907	51.502	5341.581
3523	7.324	2639.279	2644.078	51.536	5342.217
3524	-448.069	1396.735	1608.222	33.524	2590.412
3525	-221.847	1860.612	1125.81	28.341	2792.916
3526	-218.898	2175.402	3126.491	56.719	5139.714
3527	-221.859	1861.194	1124.638	28.306	2792.279
3528	-218.886	2174.82	3127.662	56.754	5140.35
3531	-446.961	1820.997	2086.3	35.754	3496.09
3532	8.407	3064.705	3119.813	53.697	6246.622
3533	8.42	3064.123	3120.984	53.732	6247.259
3534	-446.973	1821.578	2085.128	35.72	3495.453
3535	-220.751	2285.456	1602.716	30.537	3697.958
3536	-217.803	2600.246	3603.396	58.915	6044.754
3537	-220.764	2286.037	1601.544	30.502	3697.319
3538	-217.79	2599.664	3604.568	58.95	6045.392
3541	-446.659	1873.655	2093.246	35.149	3555.391
3542	8.709	3117.363	3126.759	53.092	6305.923
3543	8.721	3116.781	3127.931	53.126	6306.559
3544	-446.671	1874.237	2092.074	35.114	3554.754
3545	-220.449	2338.113	1609.662	29.931	3757.257
3546	-217.501	2652.904	3610.343	58.309	6104.055
3547	-220.462	2338.696	1608.49	29.896	3756.62
3548	-217.488	2652.322	3611.515	58.344	6104.693
3551	-445.563	2298.499	2570.152	37.344	4460.432
3552	9.804	3542.206	3603.665	55.287	7210.962
3553	9.817	3541.625	3604.837	55.322	7211.601
3554	-445.576	2299.08	2568.98	37.31	4459.794
3555	-219.354	2762.957	2086.568	32.127	4662.298
3556	-216.405	3077.748	4087.249	60.505	7009.097
3557	-219.366	2763.539	2085.396	32.092	4661.661
3558	-216.393	3077.166	4088.42	60.539	7009.732
3601	189.343	2784.452	1904.249	15.794	4893.838
3602	188.097	2333.28	1423.87	13.902	3959.149
3603	189.193	2758.123	1900.776	16.097	4864.189

Skidshoe Max. Reaction
Friction Load (modified)

3604	189.494	2810.781	1907.722	15.492	4923.489
3605	190.59	3235.625	2384.628	17.687	5828.53
3611	-38.34	2162.598	1387.492	6.823	3518.573
3612	417.027	3406.306	2421.005	24.766	6269.104
3613	417.04	3405.724	2422.177	24.8	6269.741
3614	-38.353	2163.18	1386.321	6.788	3517.936
3615	187.869	2627.057	903.908	1.605	3720.439
3616	190.818	2941.847	2904.589	29.983	6067.237
3617	187.857	2627.639	902.737	1.571	3719.804
3618	190.83	2941.265	2905.761	30.018	6067.874
3621	-39.587	1711.426	907.113	4.93	2583.882
3622	415.781	2955.134	1940.626	22.873	5334.414
3623	415.793	2954.552	1941.798	22.908	5335.051
3624	-39.599	1712.007	905.941	4.895	2583.244
3625	186.623	2175.884	423.529	-0.288	2785.748
3626	189.571	2490.675	2424.21	28.091	5132.547
3627	186.61	2176.466	422.357	-0.322	2785.111
3628	189.584	2490.093	2425.382	28.125	5133.184
3631	-38.491	2136.269	1384.019	7.126	3488.923
3632	416.876	3379.977	2417.532	25.069	6239.454
3633	416.889	3379.395	2418.704	25.103	6240.091
3634	-38.504	2136.851	1382.847	7.091	3488.285
3635	187.718	2600.728	900.435	1.908	3690.789
3636	190.667	2915.519	2901.116	30.286	6037.588
3637	187.706	2601.31	899.263	1.874	3690.153
3638	190.679	2914.936	2902.288	30.321	6038.224
3641	-38.189	2188.927	1390.965	6.52	3548.223
3642	417.178	3432.635	2424.479	24.463	6298.755
3643	417.191	3432.053	2425.65	24.498	6299.392
3644	-38.202	2189.509	1389.794	6.485	3547.586
3645	188.02	2653.386	907.382	1.302	3750.09
3646	190.969	2968.177	2908.063	29.681	6096.89
3647	188.007	2653.968	906.21	1.268	3749.453
3648	190.981	2967.594	2909.234	29.715	6097.524
3651	-37.094	2613.771	1867.872	8.716	4453.265
3652	418.274	3857.479	2901.385	26.659	7203.797
3653	418.286	3856.897	2902.556	26.693	7204.432
3654	-37.106	2614.353	1866.7	8.681	4452.628
3655	189.116	3078.23	1384.288	3.498	4655.132
3656	192.064	3393.02	3384.968	31.876	7001.928
3657	189.103	3078.812	1383.116	3.464	4654.495
3658	192.077	3392.438	3386.14	31.911	7002.566
3701	-84.388	2206.354	2746.836	30.002	4898.804
3702	-85.635	1755.181	2266.457	28.109	3964.112
3703	-84.539	2180.025	2743.363	30.305	4869.154
3704	-84.237	2232.683	2750.31	29.699	4928.455
3705	-83.142	2657.526	3227.216	31.895	5833.495
3711	-312.072	1584.5	2230.08	21.031	3523.539
3712	143.296	2828.208	3263.593	38.973	6274.07
3713	143.308	2827.626	3264.765	39.008	6274.707
3714	-312.085	1585.082	2228.908	20.996	3522.901
3715	-85.862	2048.959	1746.496	15.813	3725.406

Skidshoe Max. Reaction
Friction Load (modified)

3716	-82.914	2363.749	3747.177	44.191	6072.203
3717	-85.875	2049.541	1745.324	15.778	3724.768
3718	-82.901	2363.167	3748.348	44.226	6072.84
3721	-313.319	1133.327	1749.701	19.138	2588.847
3722	142.049	2377.035	2783.214	37.081	5339.379
3723	142.062	2376.453	2784.385	37.115	5340.015
3724	-313.331	1133.909	1748.529	19.103	2588.21
3725	-87.109	1597.786	1266.117	13.92	2790.714
3726	-84.16	1912.576	3266.798	42.298	5137.512
3727	-87.122	1598.368	1264.945	13.885	2790.076
3728	-84.148	1911.994	3267.969	42.333	5138.148
3731	-312.223	1558.171	2226.607	21.333	3493.888
3732	143.145	2801.879	3260.12	39.276	6244.42
3733	143.157	2801.297	3261.292	39.311	6245.057
3734	-312.235	1558.753	2225.435	21.299	3493.252
3735	-86.013	2022.63	1743.023	16.116	3695.756
3736	-83.065	2337.42	3743.703	44.494	6042.552
3737	-86.026	2023.212	1741.851	16.081	3695.118
3738	-83.052	2336.838	3744.875	44.529	6043.19
3741	-311.921	1610.829	2233.553	20.728	3553.189
3742	143.446	2854.537	3267.066	38.671	6303.72
3743	143.459	2853.955	3268.238	38.705	6304.357
3744	-311.934	1611.411	2232.381	20.693	3552.551
3745	-85.712	2075.288	1749.969	15.51	3755.055
3746	-82.763	2390.078	3750.65	43.888	6101.853
3747	-85.724	2075.869	1748.797	15.475	3754.417
3748	-82.75	2389.496	3751.822	43.923	6102.491
3751	-310.825	2035.672	2710.459	22.923	4458.229
3752	144.542	3279.38	3743.972	40.866	7208.76
3753	144.555	3278.799	3745.144	40.901	7209.399
3754	-310.838	2036.254	2709.287	22.889	4457.592
3755	-84.616	2500.131	2226.875	17.706	4660.096
3756	-81.667	2814.922	4227.556	46.084	7006.895
3757	-84.629	2500.713	2225.703	17.671	4659.458
3758	-81.655	2814.34	4228.728	46.118	7007.531

Skidshoe Max. Reaction

Friction Load (modified)

Force-Z on Fixed Joint Reaction (SACS)

LOAD	ROW A			ROW B			A+B		
COND	A1	A2	TOTAL	B1	B2	TOTAL	ROW A	ROW B	TOTAL
3501	2826.634	4901.006	7727.64	3080.597	4349.546	7430.143	7727.64	7430.143	15157.78
3502	2831.098	3966.315	6797.413	4108.478	4251.893	8360.371	6797.413	8360.371	15157.78
3503	1926.128	4871.356	6797.484	2945.68	5414.621	8360.301	6797.484	8360.301	15157.79
3504	3727.14	4930.656	8657.796	3215.515	3284.472	6499.987	8657.796	6499.987	15157.78
3505	2822.171	5835.697	8657.868	2052.717	4447.201	6499.918	8657.868	6499.918	15157.79
3511	4206.445	3525.74	7732.185	1902.634	5522.963	7425.597	7732.185	7425.597	15157.78
3512	1446.823	6276.272	7723.095	4258.559	3176.13	7434.689	7723.095	7434.689	15157.78
3513	1451.369	6276.909	7728.278	4253.997	3175.51	7429.507	7728.278	7429.507	15157.79
3514	4201.9	3525.103	7727.003	1907.199	5523.582	7430.781	7727.003	7430.781	15157.78
3515	4004.597	3727.607	7732.204	1709.448	5716.132	7425.58	7732.204	7425.58	15157.78
3516	1648.672	6074.405	7723.077	4451.747	2982.96	7434.707	7723.077	7434.707	15157.78
3517	4000.051	3726.969	7727.02	1714.012	5716.751	7430.763	7727.02	7430.763	15157.78
3518	1653.217	6075.042	7728.259	4447.184	2982.342	7429.526	7728.259	7429.526	15157.79
3521	4210.909	2591.05	6801.959	2930.515	5425.31	8355.825	6801.959	8355.825	15157.78
3522	1451.287	5341.581	6792.868	5286.44	3078.478	8364.918	6792.868	8364.918	15157.79
3523	1455.833	5342.217	6798.05	5281.877	3077.859	8359.736	6798.05	8359.736	15157.79
3524	4206.364	2590.412	6796.776	2935.079	5425.93	8361.009	6796.776	8361.009	15157.79
3525	4009.061	2792.916	6801.977	2737.329	5618.479	8355.808	6801.977	8355.808	15157.79
3526	1653.136	5139.714	6792.85	5479.628	2885.307	8364.935	6792.85	8364.935	15157.79
3527	4004.515	2792.279	6796.794	2741.892	5619.097	8360.989	6796.794	8360.989	15157.78
3528	1657.681	5140.35	6798.031	5475.065	2884.689	8359.754	6798.031	8359.754	15157.79
3531	3305.939	3496.09	6802.029	1767.718	6588.039	8355.757	6802.029	8355.757	15157.79
3532	546.317	6246.622	6792.939	4123.641	4241.204	8364.845	6792.939	8364.845	15157.78
3533	550.863	6247.259	6798.122	4119.078	4240.584	8359.662	6798.122	8359.662	15157.78
3534	3301.394	3495.453	6796.847	1772.28	6588.656	8360.936	6796.847	8360.936	15157.78
3535	3104.09	3697.958	6802.048	1574.53	6781.207	8355.737	6802.048	8355.737	15157.79
3536	748.165	6044.754	6792.919	4316.829	4048.036	8364.865	6792.919	8364.865	15157.78
3537	3099.546	3697.319	6796.865	1579.094	6781.825	8360.919	6796.865	8360.919	15157.78
3538	752.711	6045.392	6798.103	4312.265	4047.417	8359.682	6798.103	8359.682	15157.79
3541	5106.951	3555.391	8662.342	2037.553	4457.889	6495.442	8662.342	6495.442	15157.78
3542	2347.329	6305.923	8653.252	4393.479	2111.055	6504.534	8653.252	6504.534	15157.79
3543	2351.874	6306.559	8658.433	4388.915	2110.436	6499.351	8658.433	6499.351	15157.78
3544	5102.406	3554.754	8657.16	2042.117	4458.508	6500.625	8657.16	6500.625	15157.79
3545	4905.101	3757.257	8662.358	1844.367	4651.058	6495.425	8662.358	6495.425	15157.78
3546	2549.177	6104.055	8653.232	4586.665	1917.887	6504.552	8653.232	6504.552	15157.78
3547	4900.557	3756.62	8657.177	1848.93	4651.676	6500.606	8657.177	6500.606	15157.78
3548	2553.723	6104.693	8658.416	4582.102	1917.268	6499.37	8658.416	6499.37	15157.79
3551	4201.982	4460.432	8662.414	874.755	5620.616	6495.371	8662.414	6495.371	15157.79
3552	1442.36	7210.962	8653.322	3230.68	3273.782	6504.462	8653.322	6504.462	15157.78
3553	1446.905	7211.601	8658.506	3226.116	3273.164	6499.28	8658.506	6499.28	15157.79
3554	4197.437	4459.794	8657.231	879.318	5621.235	6500.553	8657.231	6500.553	15157.78
3555	4000.133	4662.298	8662.431	681.568	5813.786	6495.354	8662.431	6495.354	15157.79
3556	1644.209	7009.097	8653.306	3423.866	3080.614	6504.48	8653.306	6504.48	15157.79
3557	3995.588	4661.661	8657.249	686.132	5814.404	6500.536	8657.249	6500.536	15157.79
3558	1648.754	7009.732	8658.486	3419.303	3079.994	6499.297	8658.486	6499.297	15157.78
3601	2833.775	4893.838	7727.613	3082.708	4347.464	7430.172	7727.613	7430.172	15157.79
3602	2838.238	3959.149	6797.387	4110.589	4249.811	8360.4	6797.387	8360.4	15157.79
3603	1933.269	4864.189	6797.458	2947.789	5412.538	8360.327	6797.458	8360.327	15157.79

Skidshoe Max. Reaction
Friction Load (modified)

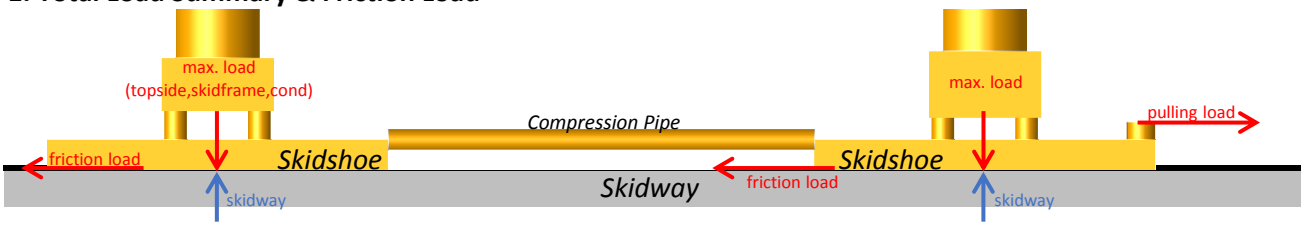
3604	3734.281	4923.489	8657.77	3217.627	3282.389	6500.016	8657.77	6500.016	15157.79
3605	2829.311	5828.53	8657.841	2054.828	4445.115	6499.943	8657.841	6499.943	15157.78
3611	4213.586	3518.573	7732.159	1904.746	5520.88	7425.626	7732.159	7425.626	15157.79
3612	1453.964	6269.104	7723.068	4260.67	3174.046	7434.716	7723.068	7434.716	15157.78
3613	1458.509	6269.741	7728.25	4256.106	3173.427	7429.533	7728.25	7429.533	15157.78
3614	4209.04	3517.936	7726.976	1909.31	5521.498	7430.808	7726.976	7430.808	15157.78
3615	4011.737	3720.439	7732.176	1711.559	5714.05	7425.609	7732.176	7425.609	15157.79
3616	1655.812	6067.237	7723.049	4453.857	2980.877	7434.734	7723.049	7434.734	15157.78
3617	4007.192	3719.804	7726.996	1716.122	5714.669	7430.791	7726.996	7430.791	15157.79
3618	1660.358	6067.874	7728.232	4449.293	2980.259	7429.552	7728.232	7429.552	15157.78
3621	4218.049	2583.882	6801.931	2932.626	5423.227	8355.853	6801.931	8355.853	15157.78
3622	1458.426	5334.414	6792.84	5288.551	3076.393	8364.944	6792.84	8364.944	15157.78
3623	1462.972	5335.051	6798.023	5283.987	3075.775	8359.762	6798.023	8359.762	15157.79
3624	4213.505	2583.244	6796.749	2937.19	5423.846	8361.036	6796.749	8361.036	15157.79
3625	4016.2	2785.748	6801.948	2739.439	5616.396	8355.835	6801.948	8355.835	15157.78
3626	1660.276	5132.547	6792.823	5481.737	2883.225	8364.962	6792.823	8364.962	15157.79
3627	4011.656	2785.111	6796.767	2744.003	5617.015	8361.018	6796.767	8361.018	15157.79
3628	1664.821	5133.184	6798.005	5477.174	2882.606	8359.78	6798.005	8359.78	15157.79
3631	3313.08	3488.923	6802.003	1769.827	6585.956	8355.783	6802.003	8355.783	15157.79
3632	553.458	6239.454	6792.912	4125.752	4239.12	8364.872	6792.912	8364.872	15157.78
3633	558.003	6240.091	6798.094	4121.189	4238.501	8359.69	6798.094	8359.69	15157.78
3634	3308.535	3488.285	6796.82	1774.39	6586.573	8360.963	6796.82	8360.963	15157.78
3635	3111.232	3690.789	6802.021	1576.64	6779.124	8355.764	6802.021	8355.764	15157.79
3636	755.307	6037.588	6792.895	4318.939	4045.951	8364.89	6792.895	8364.89	15157.79
3637	3106.686	3690.153	6796.839	1581.204	6779.743	8360.947	6796.839	8360.947	15157.79
3638	759.852	6038.224	6798.076	4314.375	4045.333	8359.708	6798.076	8359.708	15157.78
3641	5114.092	3548.223	8662.315	2039.665	4455.807	6495.472	8662.315	6495.472	15157.79
3642	2354.47	6298.755	8653.225	4395.589	2108.972	6504.561	8653.225	6504.561	15157.79
3643	2359.015	6299.392	8658.407	4391.025	2108.352	6499.377	8658.407	6499.377	15157.78
3644	5109.546	3547.586	8657.132	2044.228	4456.424	6500.652	8657.132	6500.652	15157.78
3645	4912.244	3750.09	8662.334	1846.477	4648.975	6495.452	8662.334	6495.452	15157.79
3646	2556.319	6096.89	8653.209	4588.775	1915.802	6504.577	8653.209	6504.577	15157.79
3647	4907.698	3749.453	8657.151	1851.04	4649.593	6500.633	8657.151	6500.633	15157.78
3648	2560.863	6097.524	8658.387	4584.212	1915.184	6499.396	8658.387	6499.396	15157.78
3651	4209.122	4453.265	8662.387	876.866	5618.533	6495.399	8662.387	6495.399	15157.79
3652	1449.5	7203.797	8653.297	3232.79	3271.698	6504.488	8653.297	6504.488	15157.79
3653	1454.045	7204.432	8658.477	3228.227	3271.08	6499.307	8658.477	6499.307	15157.78
3654	4204.576	4452.628	8657.204	881.428	5619.152	6500.58	8657.204	6500.58	15157.78
3655	4007.272	4655.132	8662.404	683.678	5811.702	6495.38	8662.404	6495.38	15157.78
3656	1651.348	7001.928	8653.276	3425.977	3078.53	6504.507	8653.276	6504.507	15157.78
3657	4002.728	4654.495	8657.223	688.241	5812.321	6500.562	8657.223	6500.562	15157.79
3658	1655.894	7002.566	8658.46	3421.413	3077.911	6499.324	8658.46	6499.324	15157.78
3701	2828.857	4898.804	7727.661	3085.3	4344.825	7430.125	7727.661	7430.125	15157.79
3702	2833.319	3964.112	6797.431	4113.181	4247.173	8360.354	6797.431	8360.354	15157.79
3703	1928.35	4869.154	6797.504	2950.381	5409.898	8360.279	6797.504	8360.279	15157.78
3704	3729.362	4928.455	8657.817	3220.218	3279.75	6499.968	8657.817	6499.968	15157.79
3705	2824.393	5833.495	8657.888	2057.419	4442.477	6499.896	8657.888	6499.896	15157.78
3711	4208.667	3523.539	7732.206	1907.337	5518.242	7425.579	7732.206	7425.579	15157.79
3712	1449.045	6274.07	7723.115	4263.262	3171.408	7434.67	7723.115	7434.67	15157.79
3713	1453.59	6274.707	7728.297	4258.699	3170.789	7429.488	7728.297	7429.488	15157.79
3714	4204.122	3522.901	7727.023	1911.901	5518.86	7430.761	7727.023	7430.761	15157.78
3715	4006.818	3725.406	7732.224	1714.15	5711.411	7425.561	7732.224	7425.561	15157.79

Skidshoe Max. Reaction
Friction Load (modified)

3716	1650.894	6072.203	7723.097	4456.448	2978.238	7434.686	7723.097	7434.686	15157.78
3717	4002.274	3724.768	7727.042	1718.713	5712.03	7430.743	7727.042	7430.743	15157.79
3718	1655.439	6072.84	7728.279	4451.885	2977.621	7429.506	7728.279	7429.506	15157.79
3721	4213.131	2588.847	6801.978	2935.218	5420.589	8355.807	6801.978	8355.807	15157.79
3722	1453.509	5339.379	6792.888	5291.143	3073.754	8364.897	6792.888	8364.897	15157.79
3723	1458.054	5340.015	6798.069	5286.579	3073.135	8359.714	6798.069	8359.714	15157.78
3724	4208.585	2588.21	6796.795	2939.78	5421.207	8360.987	6796.795	8360.987	15157.78
3725	4011.282	2790.714	6801.996	2742.03	5613.758	8355.788	6801.996	8355.788	15157.78
3726	1655.357	5137.512	6792.869	5484.329	2880.587	8364.916	6792.869	8364.916	15157.79
3727	4006.738	2790.076	6796.814	2746.595	5614.377	8360.972	6796.814	8360.972	15157.79
3728	1659.902	5138.148	6798.05	5479.766	2879.967	8359.733	6798.05	8359.733	15157.78
3731	3308.162	3493.888	6802.05	1772.42	6583.316	8355.736	6802.05	8355.736	15157.79
3732	548.54	6244.42	6792.96	4128.344	4236.482	8364.826	6792.96	8364.826	15157.79
3733	553.084	6245.057	6798.141	4123.78	4235.863	8359.643	6798.141	8359.643	15157.78
3734	3303.616	3493.252	6796.868	1776.983	6583.935	8360.918	6796.868	8360.918	15157.79
3735	3106.312	3695.756	6802.068	1579.232	6776.485	8355.717	6802.068	8355.717	15157.79
3736	750.388	6042.552	6792.94	4321.53	4043.312	8364.842	6792.94	8364.842	15157.78
3737	3101.767	3695.118	6796.885	1583.795	6777.103	8360.898	6796.885	8360.898	15157.78
3738	754.933	6043.19	6798.123	4316.966	4042.694	8359.66	6798.123	8359.66	15157.78
3741	5109.173	3553.189	8662.362	2042.255	4453.168	6495.423	8662.362	6495.423	15157.79
3742	2349.551	6303.72	8653.271	4398.18	2106.334	6504.514	8653.271	6504.514	15157.79
3743	2354.096	6304.357	8658.453	4393.617	2105.715	6499.332	8658.453	6499.332	15157.79
3744	5104.628	3552.551	8657.179	2046.819	4453.786	6500.605	8657.179	6500.605	15157.78
3745	4907.324	3755.055	8662.379	1849.068	4646.336	6495.404	8662.379	6495.404	15157.78
3746	2551.4	6101.853	8653.253	4591.368	1913.163	6504.531	8653.253	6504.531	15157.78
3747	4902.779	3754.417	8657.196	1853.631	4646.955	6500.586	8657.196	6500.586	15157.78
3748	2555.945	6102.491	8658.436	4586.805	1912.546	6499.351	8658.436	6499.351	15157.79
3751	4204.202	4458.229	8662.431	879.457	5615.894	6495.351	8662.431	6495.351	15157.78
3752	1444.581	7208.76	8653.341	3235.38	3269.06	6504.44	8653.341	6504.44	15157.78
3753	1449.126	7209.399	8658.525	3230.818	3268.442	6499.26	8658.525	6499.26	15157.79
3754	4199.658	4457.592	8657.25	884.02	5616.513	6500.533	8657.25	6500.533	15157.78
3755	4002.354	4660.096	8662.45	686.269	5809.064	6495.333	8662.45	6495.333	15157.78
3756	1646.43	7006.895	8653.325	3428.569	3075.892	6504.461	8653.325	6504.461	15157.79
3757	3997.809	4659.458	8657.267	690.834	5809.682	6500.516	8657.267	6500.516	15157.78
3758	1650.975	7007.531	8658.506	3424.005	3075.273	6499.278	8658.506	6499.278	15157.78

Compression Pipe, Tension Pipe
Trunion Design

1. Total Load Summary & Friction Load

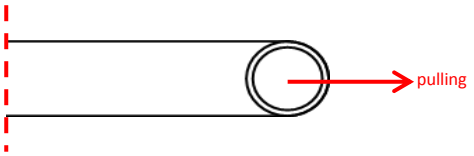


Leg	Max. Load (T)	Condition	Frictional Coefficient	Friction Load (T)
A1	6368.84	Static	0.25	1592.209
		Moving	0.08	509.507
A2	8493.43	Static	0.25	2123.357
		Moving	0.08	679.474
B1	6762.12	Static	0.25	1690.529
		Moving	0.08	540.969
B2	8031.83	Static	0.25	2007.957
		Moving	0.08	642.546

Note: Sliding Surface (Teflon - Waxed Wood) by DNV

Leg	Max. Load (T)	Condition	Frictional Coefficient	Minimum Pulling Load to Move (T)	Condition Use to Analysis
ROW-A	8658.20	Static	0.25	2164.550	*Braking Load*
		Moving	0.08	692.656	*Even Skidding*
ROW-B	8359.60	Static	0.25	2089.901	*Braking Load*
		Moving	0.08	668.768	*Even Skidding*
ROW-A & ROW-B	15157.79	**Static**	**0.25**	**3789.447**	*Racking Load*
		Moving	0.08	1212.623	*Uneven Skidding*

2. Compression & Tension Pipe Initial Design



Pipe Properties

Outside Diameter	O_D =	18	in	=	45.72	cm
Wall Thickness	t =	0.625	in	=	1.5875	cm
Area	A =	220.101	cm2			
Yield Strength	Fy =	36	kN/cm2			
Young Modulus	E =	20000	kN/cm2			
Radius	r =	22.86	cm			
	=	3.14				

1

Allowable Axial Tension (API RP 2A LRFD)

F_T = 0.85 x F_Y = 0.85 x 36 = **30.600 kN/cm2**

Actual Axial Tension

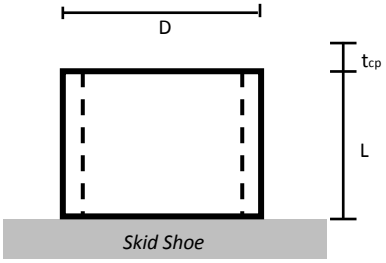
$$F = \frac{\text{Pulling Load}}{\text{Area}} = \frac{3978.919}{220.1010612} = \mathbf{19.885\ kN/cm2} < 30.600\ \text{kN/cm2}$$

SECURE!

3. Trunion Initial Design

A) Design Data

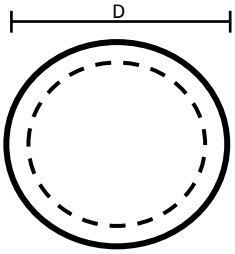
Max. Load T = 378.94 T



Trunion Body

Outer Diamater	D	=	20.00	in	=	50.80	cm
Wall Thickness	t	=	1.50	in	=	3.81	cm
Length	L	=	300.00	mm	=	30.00	cm

Pipe Properties



Type		=	ASTM A36			
Yield Stress	F_y	=	36.00	ksi	=	2531.1 kg/cm²
Allowable Shear	F_{sp}	=	1012.4	kg/cm²		
Allowable Bending	F_{bp}	=	1670.5	kg/cm²		

B) Trunion Section Area

Section Area	A_p	=	0.25π.(D-(D-2t)^2	=	562.45 cm²
Shear Area	A_{sp}	=	0.5 x A_p	=	281.22 cm²
Section Modulus	S_p	=	0.0982 x $(D^4-(D-2t)^4)/D$	=	6153.5 cm²

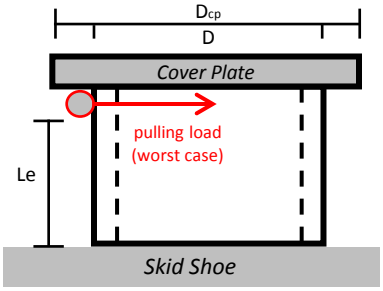
C) Stress Check

Shear Stress

$P_{sp} = F_{sp} \times A_{sp} = 284.72$ T

$$SF = \frac{P_s}{T} = \frac{284.72}{378.94} = \mathbf{0.75} > 1$$

NOT SECURE!



Bending Stress

$M_{bp} = F_{bp} \times S_p = 10279$ T.cm

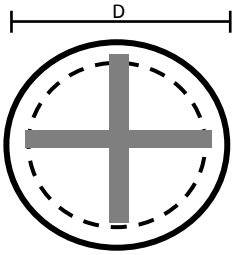
$M = T \times L = 11368.340$ T.cm

$$SF = \frac{M_b}{M} = \mathbf{0.90} > 1$$

NOT SECURE!

D) Cross Plate Stiffner Added

Plate Properties



Thickness	t_{pl}	=	35.00	mm	=	3.50 cm
Type		=	ASTM A36			
Yield Stress	F_y	=	36.00	ksi	=	2531.1 kg/cm²
Allowable Shear	F_{sp}	=	1012.4	kg/cm²		
Allowable Bending	F_{bp}	=	1670.5	kg/cm²		

Section Area	A_p	=	0.25π.(D-(D-2t)^2	=	562.45 cm²
	A_{pl}	=	2.tpl(D-2t)	=	302.26 cm²
Shear Area	A_{sp}	=	0.5 x Ap	=	281.22 cm²
	A_{spl}	=	$\frac{1}{2} \times \frac{2A_{pl}}{3}$	=	100.75 cm²
Section Modulus	Sp	=	0.0982 x $(D^4-(D-2t)^4)/D$	=	6153.5 cm²
	Spl	=	$\frac{tpl \times Lpl^2}{6}$	=	1087.6 cm²

Compression Pipe, Tension Pipe
Trunion Design

Shear Stress

P_{sp}	=	F_{sp}	x	A_{sp}	=	284.72	T	*Pipe*
P_{spl}	=	F_{spl}	x	A_{spl}	=	102	T +	*Cross Plate*
				P_s	=	386.72	T	*Trunion*

$$SF = \frac{P_s}{T} = \mathbf{1.0205} > \mathbf{1}\ \textbf{SECURE!}$$

Bending Stress

M_{bp}	=	F_{bp}	x	S_p	=	10279	T.cm	*Pipe*
M_{bpl}	=	F_{bpl}	x	S_{pl}	=	1816.9	T.cm +	*Cross Plate*
				M_b	=	12096	T.cm	*Trunion*

$$M = T \times L = 11368 \text{ T.cm}$$

$$SF = \frac{M_b}{M} = \mathbf{1.064} > \mathbf{1}\ \textbf{SECURE!}$$

LAMPIRAN D
OUTPUT ANALISA SACS

MEMBER FORCES AND MOMENTS REPORT

MEMBER NUMBER	MEMBER END	GROUP ID	LOAD COND	FORCE(X) kN	FORCE(Y) kN	FORCE(Z) kN	MOMENT(X) kN-m	MOMENT(Y) kN-m	MOMENT(Z) kN-m
1172-GB01	1172	DM5	3101	-2956.4133	-18.5912	-181.1119	-27.7721	-1462.6163	-183.0361
			3102	-4019.3274	-10.0844	-237.3762	-31.2796	-1904.5757	-162.9308
			3103	-2841.1946	-10.6878	-146.3579	-30.7875	-1333.9498	-214.4450
			3104	-3071.6323	-26.4945	-215.8659	-24.7567	-1591.2827	-151.6272
			3105	-1893.4994	-27.0979	-124.8476	-24.2646	-1020.6569	-203.1414
			3201	-1881.5751	-171.1196	-1.6883	251.5154	-724.4600	-452.3145
			3202	-4031.2517	133.9373	-360.5356	-307.0596	-2200.7727	86.2424
			3203	-4031.2517	133.9373	-360.5356	-307.0596	-2200.7727	86.2424
			3204	-1881.5751	-171.1196	-1.6883	251.5154	-724.4600	-452.3145
			3205	-1777.1285	-171.7135	7.7089	256.5913	-664.0328	260.9321
			3206	-4135.6982	134.5312	-369.9328	-312.1355	-2261.1997	-627.0043
			3207	-1777.1285	-171.7135	7.7089	256.5913	-664.0328	260.9321
			3208	-4135.6982	134.5312	-369.9328	-312.1355	-2261.1997	-627.0043
			3211	-2944.4893	-162.6129	-57.9526	248.0079	-1166.4193	-432.2093
			3212	-5094.1660	142.4440	-416.7999	-310.5671	-2642.7322	106.3477
			3213	-5094.1660	142.4440	-416.7999	-310.5671	-2642.7322	106.3477
			3214	-2944.4893	-162.6129	-57.9526	248.0079	-1166.4193	-432.2093
			3215	-2840.0425	-163.2067	-48.5554	253.0838	-1105.9923	281.0374
			3216	-5198.6128	143.0379	-426.1971	-315.6430	-2703.1592	-606.8990
			3217	-2840.0425	-163.2067	-48.5554	253.0838	-1105.9923	281.0374
			3218	-5198.6128	143.0379	-426.1971	-315.6430	-2703.1592	-606.8990
			3221	-1766.3562	-163.2162	33.0657	248.5000	-595.7935	-483.7234
			3222	-3916.0327	141.8407	-325.7816	-310.0750	-2072.1062	54.8335
			3223	-3916.0327	141.8407	-325.7816	-310.0750	-2072.1062	54.8335
			3224	-1766.3562	-163.2162	33.0657	248.5000	-595.7935	-483.7234
			3225	-1661.9095	-163.8101	42.4629	253.5759	-535.3664	229.5232
			3226	-4020.4792	142.4345	-335.1788	-315.1509	-2132.5332	-658.4131
			3227	-1661.9095	-163.8101	42.4629	253.5759	-535.3664	229.5232
			3228	-4020.4792	142.4345	-335.1788	-315.1509	-2132.5332	-658.4131
			3231	-1996.7941	-179.0230	-36.4422	254.5308	-853.1264	-420.9056
			3232	-4146.4707	126.0339	-395.2895	-304.0442	-2329.4392	117.6513
			3233	-4146.4707	126.0339	-395.2895	-304.0442	-2329.4392	117.6513
			3234	-1996.7941	-179.0230	-36.4422	254.5308	-853.1264	-420.9056
			3235	-1892.3474	-179.6168	-27.0451	259.6067	-792.6993	292.3410
			3236	-4250.9170	126.6278	-404.6867	-309.1202	-2389.8662	-595.5953
			3237	-1892.3474	-179.6168	-27.0451	259.6067	-792.6993	292.3410
			3238	-4250.9170	126.6278	-404.6867	-309.1202	-2389.8662	-595.5953
			3241	-818.6611	-179.6263	54.5760	255.0229	-282.5006	-472.4198
			3242	-2968.3376	125.4305	-304.2712	-303.5521	-1758.8132	66.1371
			3243	-2968.3376	125.4305	-304.2712	-303.5521	-1758.8132	66.1371
			3244	-818.6611	-179.6263	54.5760	255.0229	-282.5006	-472.4198
			3245	-714.2145	-180.2202	63.9732	260.0988	-222.0735	240.8268
			3246	-3072.7844	126.0244	-313.6684	-308.6281	-1819.2404	-647.1096
			3247	-714.2145	-180.2202	63.9732	260.0988	-222.0735	240.8268
			3248	-3072.7844	126.0244	-313.6684	-308.6281	-1819.2404	-647.1096
			3301	-806.7368	-323.6480	177.7354	530.8029	13.6964	-721.5930
			3302	-5106.0903	286.4657	-539.9592	-586.3471	-2938.9292	355.5208
			3303	-5106.0903	286.4657	-539.9592	-586.3471	-2938.9292	355.5208
			3304	-806.7368	-323.6480	177.7354	530.8029	13.6964	-721.5930
			3305	-597.8436	-324.8358	196.5298	540.9548	134.5506	704.9002
			3306	-5314.9834	287.6535	-558.7536	-596.4990	-3059.7832	-1070.9724
			3307	-597.8436	-324.8358	196.5298	540.9548	134.5506	704.9002
			3308	-5314.9834	287.6535	-558.7536	-596.4990	-3059.7832	-1070.9724
			3311	-1869.6508	-315.1413	121.4710	527.2955	-428.2630	-701.4877
			3312	-6169.0044	294.9724	-596.2236	-589.8546	-3380.8882	375.6261
			3313	-6169.0044	294.9724	-596.2236	-589.8546	-3380.8882	375.6261
			3314	-1869.6508	-315.1413	121.4710	527.2955	-428.2630	-701.4877
			3315	-1660.7576	-316.3290	140.2654	537.4473	-307.4088	725.0055
			3316	-6377.8975	296.1602	-615.0179	-600.0064	-3501.7427	-1050.8672
			3317	-1660.7576	-316.3290	140.2654	537.4473	-307.4088	725.0055
			3318	-6377.8975	296.1602	-615.0179	-600.0064	-3501.7427	-1050.8672
			3321	-691.5178	-315.7446	212.4893	527.7875	142.3628	-753.0019
			3322	-4990.8711	294.3691	-505.2052	-589.3625	-2810.2625	324.1119
			3323	-4990.8711	294.3691	-505.2052	-589.3625	-2810.2625	324.1119
			3324	-691.5178	-315.7446	212.4893	527.7875	142.3628	-753.0019
			3325	-482.6246	-316.9324	231.2837	537.9393	263.2170	673.4913
			3326	-5199.7646	295.5568	-523.9996	-599.5144	-2931.1169	-1102.3813
			3327	-482.6246	-316.9324	231.2837	537.9393	263.2170	673.4913
			3328	-5199.7646	295.5568	-523.9996	-599.5144	-2931.1169	-1102.3813
			3331	-921.9557	-331.5514	142.9814	533.8183	-114.9701	-690.1841
			3332	-5221.3091	278.5623	-574.7132	-583.3317	-3067.5952	386.9297
			3333	-5221.3091	278.5623	-574.7132	-583.3317	-3067.5952	386.9297
			3334	-921.9557	-331.5514	142.9814	533.8183	-114.9701	-690.1841
			3335	-713.0625	-332.7392	161.7758	543.9702	5.8841	736.3091
			3336	-5430.2026	279.7501	-593.5076	-593.4836	-3188.4497	-1039.5636
			3337	-713.0625	-332.7392	161.7758	543.9702	5.8841	736.3091
			3338	-5430.2026	279.7501	-593.5076	-593.4836	-3188.4497	-1039.5636
			3341	256.1773	-332.1547	233.9997	534.3104	455.6558	-741.6983
			3342	-4043.1760	277.9590	-483.6949	-582.8397	-2496.9695	335.4156
			3343	-4043.1760	277.9590	-483.6949	-582.8397	-2496.9695	335.4156
			3344	256.1773	-332.1547	233.9997	534.3104	455.6558	-741.6983
			3345	465.0705	-333.3425	252.7941	544.4622	576.5100	684.7949
			3346	-4252.0693	279.1467	-502.4893	-592.9915	-2617.8240	-1091.0776
			3347	465.0705	-333.3425	252.7941	544.4622	576.5100	684.7949
			3348	-4252.0693	279.1467	-502.4893	-592.9915	-2617.8240	-1091.0776

	GB01		3101	-2972.2478	-18.5912	-181.1119	-27.7721	-1639.1998	-201.1624
			3102	-4035.1619	-10.0844	-237.3762	-31.2796	-2136.0168	-172.7631
			3103	-2857.0288	-10.6878	-146.3579	-30.7875	-1476.6483	-224.8655
			3104	-3087.4668	-26.4945	-215.8659	-24.7567	-1801.7513	-177.4593
			3105	-1909.3337	-27.0979	-124.8476	-24.2646	-1142.3829	-229.5617
			3201	-1897.4094	-171.1196	-1.6883	251.5154	-726.1061	-619.1556
			3202	-4047.0862	133.9373	-360.5356	-307.0596	-2552.2937	216.8307
			3203	-4047.0862	133.9373	-360.5356	-307.0596	-2552.2937	216.8307
			3204	-1897.4094	-171.1196	-1.6883	251.5154	-726.1061	-619.1556
			3205	-1792.9628	-171.7135	7.7089	256.5913	-656.5167	93.5120
			3206	-4151.5327	134.5312	-369.9328	-312.1355	-2621.8831	-495.8369
			3207	-1792.9628	-171.7135	7.7089	256.5913	-656.5167	93.5120
			3208	-4151.5327	134.5312	-369.9328	-312.1355	-2621.8831	-495.8369
			3211	-2960.3235	-162.6129	-57.9526	248.0079	-1222.9231	-590.7563
			3212	-5110.0000	142.4440	-416.7999	-310.5671	-3049.1106	245.2301
			3213	-5110.0000	142.4440	-416.7999	-310.5671	-3049.1106	245.2301
			3214	-2960.3235	-162.6129	-57.9526	248.0079	-1222.9231	-590.7563
			3215	-2855.8770	-163.2067	-48.5554	253.0838	-1153.3336	121.9113
			3216	-5214.4468	143.0379	-426.1971	-315.6430	-3118.7000	-467.4375
			3217	-2855.8770	-163.2067	-48.5554	253.0838	-1153.3336	121.9113
			3218	-5214.4468	143.0379	-426.1971	-315.6430	-3118.7000	-467.4375
			3221	-1782.1904	-163.2162	33.0657	248.5000	-563.5546	-642.8586
			3222	-3931.8672	141.8407	-325.7816	-310.0750	-2389.7422	193.1276
			3223	-3931.8672	141.8407	-325.7816	-310.0750	-2389.7422	193.1276
			3224	-1782.1904	-163.2162	33.0657	248.5000	-563.5546	-642.8586
			3225	-1677.7438	-163.8101	42.4629	253.5759	-493.9652	69.8089
			3226	-4036.3140	142.4345	-335.1788	-315.1509	-2459.3315	-519.5400
			3227	-1677.7438	-163.8101	42.4629	253.5759	-493.9652	69.8089
			3228	-4036.3140	142.4345	-335.1788	-315.1509	-2459.3315	-519.5400
			3231	-2012.6283	-179.0230	-36.4422	254.5308	-888.6576	-595.4524
			3232	-4162.3052	126.0339	-395.2895	-304.0442	-2714.8452	240.5339
			3233	-4162.3052	126.0339	-395.2895	-304.0442	-2714.8452	240.5339
			3234	-2012.6283	-179.0230	-36.4422	254.5308	-888.6576	-595.4524
			3235	-1908.1818	-179.6168	-27.0451	259.6067	-819.0682	117.2152
			3236	-4266.7520	126.6278	-404.6867	-309.1202	-2784.4346	-472.1337
			3237	-1908.1818	-179.6168	-27.0451	259.6067	-819.0682	117.2152
			3238	-4266.7520	126.6278	-404.6867	-309.1202	-2784.4346	-472.1337
			3241	-834.4954	-179.6263	54.5760	255.0229	-229.2892	-647.5549
			3242	-2984.1721	125.4305	-304.2712	-303.5521	-2055.4766	188.4314
			3243	-2984.1721	125.4305	-304.2712	-303.5521	-2055.4766	188.4314
			3244	-834.4954	-179.6263	54.5760	255.0229	-229.2892	-647.5549
			3245	-730.0487	-180.2202	63.9732	260.0988	-159.6998	65.1127
			3246	-3088.6184	126.0244	-313.6684	-308.6281	-2125.0662	-524.2361
			3247	-730.0487	-180.2202	63.9732	260.0988	-159.6998	65.1127
			3248	-3088.6184	126.0244	-313.6684	-308.6281	-2125.0662	-524.2361
			3301	-822.5710	-323.6480	177.7354	530.8029	186.9877	-1037.1487
			3302	-5121.9243	286.4657	-539.9592	-586.3471	-3465.3875	634.8239
			3303	-5121.9243	286.4657	-539.9592	-586.3471	-3465.3875	634.8239
			3304	-822.5710	-323.6480	177.7354	530.8029	186.9877	-1037.1487
			3305	-613.6778	-324.8358	196.5298	540.9548	326.1664	388.1865
			3306	-5330.8179	287.6535	-558.7536	-596.4990	-3604.5662	-790.5112
			3307	-613.6778	-324.8358	196.5298	540.9548	326.1664	388.1865
			3308	-5330.8179	287.6535	-558.7536	-596.4990	-3604.5662	-790.5112
			3311	-1885.4851	-315.1413	121.4710	527.2955	-309.8293	-1008.7495
			3312	-6184.8384	294.9724	-596.2236	-589.8546	-3962.2043	663.2232
			3313	-6184.8384	294.9724	-596.2236	-589.8546	-3962.2043	663.2232
			3314	-1885.4851	-315.1413	121.4710	527.2955	-309.8293	-1008.7495
			3315	-1676.5919	-316.3290	140.2654	537.4473	-170.6505	416.5858
			3316	-6393.7319	296.1602	-615.0179	-600.0064	-4101.3833	-762.1119
			3317	-1676.5919	-316.3290	140.2654	537.4473	-170.6505	416.5858
			3318	-6393.7319	296.1602	-615.0179	-600.0064	-4101.3833	-762.1119
			3321	-707.3521	-315.7446	212.4893	527.7875	349.5392	-1060.8518
			3322	-5006.7051	294.3691	-505.2052	-589.3625	-3302.8359	611.1207
			3323	-5006.7051	294.3691	-505.2052	-589.3625	-3302.8359	611.1207
			3324	-707.3521	-315.7446	212.4893	527.7875	349.5392	-1060.8518
			3325	-498.4589	-316.9324	231.2837	537.9393	488.7180	364.4833
			3326	-5215.5986	295.5568	-523.9996	-599.5144	-3442.0146	-814.2144
			3327	-498.4589	-316.9324	231.2837	537.9393	488.7180	364.4833
			3328	-5215.5986	295.5568	-523.9996	-599.5144	-3442.0146	-814.2144
			3331	-937.7900	-331.5514	142.9814	533.8183	24.4361	-1013.4456
			3332	-5237.1431	278.5623	-574.7132	-583.3317	-3627.9390	658.5270
			3333	-5237.1431	278.5623	-574.7132	-583.3317	-3627.9390	658.5270
			3334	-937.7900	-331.5514	142.9814	533.8183	24.4361	-1013.4456
			3335	-728.8968	-332.7392	161.7758	543.9702	163.6149	411.8896
			3336	-5446.0366	279.7501	-593.5076	-593.4836	-3767.1177	-766.8081
			3337	-728.8968	-332.7392	161.7758	543.9702	163.6149	411.8896
			3338	-5446.0366	279.7501	-593.5076	-593.4836	-3767.1177	-766.8081
			3341	240.3430	-332.1547	233.9997	534.3104	683.8046	-1065.5481
			3342	-4059.0103	277.9590	-483.6949	-582.8397	-2968.5703	606.4246
			3343	-4059.0103	277.9590	-483.6949	-582.8397	-2968.5703	606.4246
			3344	240.3430	-332.1547	233.9997	534.3104	683.8046	-1065.5481
			3345	449.2362	-333.3425	252.7941	544.4622	822.9834	359.7871
			3346	-4267.9038	279.1467	-502.4893	-592.9915	-3107.7493	-818.9106
			3347	449.2362	-333.3425	252.7941	544.4622	822.9834	359.7871
			3348	-4267.9038	279.1467	-502.4893	-592.9915	-3107.7493	-818.9106
1172-GB01	1172	DM5	3401	-186.2800	-525.9494	361.0624	496.1039	550.4280	418.4047
			3402	-324.1405	-690.7223	483.5596	680.9886	780.3951	579.8448
			3403	-194.6958	-493.4637	371.8108	470.1058	589.9685	374.6547
			3404	-177.8641	-558.4351	350.3140	522.1019	510.8874	462.1547
			3405	-48.4194	-361.1766	238.5652	311.2191	320.4608	256.9646
	GB01		3401	-202.1142	-525.9494	361.0624	496.1039	902.4626	-94.3941

			3402	-339.9747	-690.7223	483.5596	680.9886	1251.8641	-93.6070
			3403	-210.5300	-493.4637	371.8108	470.1058	952.4827	-106.4707
			3404	-193.6983	-558.4351	350.3140	522.1019	852.4424	-82.3176
			3405	-64.2536	-361.1766	238.5652	311.2191	553.0610	-95.1813
1172-GB01	1172	DM5	3411	-6845.3281	588.5273	-908.7299	-722.5699	-4165.1045	-1406.7878
			3412	-7818.1250	584.8208	-949.1312	-710.4293	-4544.8057	-1358.3019
			3413	-7688.3716	750.1428	-1053.7043	-891.7634	-4702.5815	-1732.8177
			3414	-6002.2852	426.9119	-763.7553	-553.3765	-3627.6277	-1080.7578
			3415	-5872.5317	592.2338	-868.3285	-734.7106	-3785.4038	-1455.2737
	GB01		3411	-6861.1621	588.5273	-908.7299	-722.5699	-5051.1133	-832.9756
			3412	-7833.9590	584.8208	-949.1312	-710.4293	-5470.2051	-788.1035
			3413	-7704.2056	750.1428	-1053.7043	-891.7634	-5729.9399	-1001.4311
			3414	-6018.1191	426.9119	-763.7553	-553.3765	-4372.2866	-664.5201
			3415	-5888.3657	592.2338	-868.3285	-734.7106	-4632.0215	-877.8476
1172-GB01	1172	DM5	3421	-5268.3223	401.8234	-614.2786	-454.2211	-3029.9033	428.5846
			3422	-6334.0181	412.8811	-673.2791	-457.2025	-3476.0181	450.5616
			3423	-4407.8423	269.4373	-438.8196	-330.9756	-2403.3042	198.6235
			3424	-6128.8027	534.2094	-789.7376	-577.4666	-3656.5027	658.5457
			3425	-4202.6265	390.7657	-555.2781	-451.2397	-2583.7886	406.6075
	GB01		3421	-5284.1567	401.8234	-614.2786	-454.2211	-3628.8228	820.3611
			3422	-6349.8525	412.8811	-673.2791	-457.2025	-4132.4629	853.1194
			3423	-4423.6768	269.4373	-438.8196	-330.9756	-2831.1516	461.3241
			3424	-6144.6372	534.2094	-789.7376	-577.4666	-4426.4937	1179.3981
			3425	-4218.4609	390.7657	-555.2781	-451.2397	-3125.1829	787.6028
1172-GB01	1172	DM5	3431	1110.7611	-794.4116	623.8498	722.1480	1409.1317	-1275.9506
			3432	-724.8316	-639.9055	414.5231	572.2977	421.4975	-1048.5404
			3433	1199.7405	-781.8504	653.9675	714.8967	1519.3771	-1300.7025
			3434	1021.7817	-806.9727	593.7321	729.3994	1298.8865	-1251.1986
			3435	2946.3538	-948.9177	833.1765	871.9983	2396.7659	-1503.3607
	GB01		3431	1094.9270	-794.4116	623.8498	722.1480	2017.3829	-2050.4988
			3432	-740.6657	-639.9055	414.5231	572.2977	825.6558	-1672.4457
			3433	1183.9064	-781.8504	653.9675	714.8967	2156.9929	-2063.0037
			3434	1005.9476	-806.9727	593.7321	729.3994	1877.7729	-2037.9939
			3435	2930.5198	-948.9177	833.1765	871.9983	3209.1101	-2428.5520
1172-GB01	1172	DM5	3501	-2942.6687	-18.9005	-172.2802	-37.4150	-1408.3096	-190.5794
			3502	-4003.8174	-10.0722	-227.9620	-39.3248	-1843.7578	-170.3683
			3503	-2829.9263	-10.8378	-138.6114	-40.1462	-1286.6351	-221.6603
			3504	-3055.4111	-26.9632	-205.9490	-34.6837	-1529.9841	-159.4985
			3505	-1881.5201	-27.7288	-116.5985	-35.5051	-972.8614	-210.7905
			3511	-1818.2996	-182.9981	13.1508	192.3357	-645.5395	-471.0623
			3512	-4067.0378	145.1971	-357.7112	-267.1656	-2171.0796	89.9035
			3513	-4066.3320	145.7874	-358.4196	-266.1314	-2178.9211	90.3956
			3514	-1819.0051	-183.5883	13.8591	191.3015	-637.6978	-471.5544
			3515	-1713.6122	-183.2941	21.8383	198.3751	-587.9835	242.8365
			3516	-4171.7251	145.4931	-366.3988	-273.2050	-2228.6357	-623.9953
			3517	-1714.3177	-183.8843	22.5467	197.3409	-580.1419	242.3443
			3518	-4171.0195	146.0833	-367.1071	-272.1708	-2236.4773	-623.5031
			3521	-2879.4480	-174.1698	-42.5310	190.4259	-1080.9877	-450.8512
			3522	-5128.1865	154.0254	-413.3929	-269.0755	-2606.5278	110.1145
			3523	-5127.4810	154.6156	-414.1013	-268.0412	-2614.3696	110.6067
			3524	-2880.1536	-174.7600	-41.8226	189.3916	-1073.1460	-451.3434
			3525	-2774.7607	-174.4658	-33.8434	196.4653	-1023.4317	263.0476
			3526	-5232.8740	154.3214	-422.0805	-275.1149	-2664.0840	-603.7842
			3527	-2775.4666	-175.0560	-33.1350	195.4310	-1015.5901	262.5554
			3528	-5232.1685	154.9116	-422.7889	-274.0807	-2671.9255	-603.2921
			3531	-1705.5571	-174.9353	46.8196	189.6045	-523.8650	-502.1432
			3532	-3954.2954	153.2598	-324.0424	-269.8969	-2049.4050	58.8225
			3533	-3953.5898	153.8501	-324.7508	-268.8626	-2057.2468	59.3147
			3534	-1706.2628	-175.5256	47.5280	188.5702	-516.0233	-502.6354
			3535	-1600.8698	-175.2313	55.5072	195.6439	-466.3090	211.7556
			3536	-4058.9829	153.5558	-332.7299	-275.9363	-2106.9612	-655.0763
			3537	-1601.5754	-175.8216	56.2155	194.6096	-458.4674	211.2634
			3538	-4058.2773	154.1461	-333.4383	-274.9020	-2114.8027	-654.5840
			3541	-1931.0420	-191.0608	-20.5180	195.0670	-767.2140	-439.9813
			3542	-4179.7803	137.1343	-391.3800	-264.4344	-2292.7542	120.9844
			3543	-4179.0747	137.7246	-392.0884	-263.4002	-2300.5959	121.4766
			3544	-1931.7476	-191.6511	-19.8097	194.0327	-759.3723	-440.4735
			3545	-1826.3546	-191.3568	-11.8305	201.1064	-709.6580	273.9174
			3546	-4284.4678	137.4303	-400.0676	-270.4738	-2350.3101	-592.9144
			3547	-1827.0602	-191.9471	-11.1221	200.0721	-701.8164	273.4252
			3548	-4283.7622	138.0206	-400.7759	-269.4396	-2358.1519	-592.4222
			3551	-757.1511	-191.8264	68.8325	194.2456	-210.0913	-491.2733
			3552	-3005.8894	136.3688	-302.0295	-265.2558	-1735.6315	69.6924
			3553	-3005.1838	136.9590	-302.7378	-264.2215	-1743.4731	70.1846
			3554	-757.8566	-192.4166	69.5409	193.2113	-202.2496	-491.7656
			3555	-652.4637	-192.1224	77.5201	200.2850	-152.5353	222.6254
			3556	-3110.5767	136.6648	-310.7170	-271.2952	-1793.1875	-644.2064
			3557	-653.1693	-192.7126	78.2284	199.2507	-144.6937	222.1332
			3558	-3109.8711	137.2550	-311.4254	-270.2610	-1801.0291	-643.7142
			3601	-2941.5251	-16.3594	-170.3662	-74.6689	-1402.3346	-195.8445
			3602	-4002.6736	-7.5311	-226.0480	-76.5788	-1837.7828	-175.6334
			3603	-2828.7830	-8.2966	-136.6974	-77.4002	-1280.6602	-226.9254
			3604	-3054.2676	-24.4221	-204.0351	-71.9377	-1524.0092	-164.7636
			3605	-1880.3767	-25.1876	-114.6845	-72.7591	-966.8864	-216.0556
			3611	-1817.1561	-180.4569	15.0648	155.0817	-639.5645	-476.3274
			3612	-4065.8945	147.7382	-355.7972	-304.4196	-2165.1047	84.6384
			3613	-4065.1890	148.3285	-356.5056	-303.3854	-2172.9463	85.1306
			3614	-1817.8617	-181.0472	15.7731	154.0475	-631.7228	-476.8195
			3615	-1712.4688	-180.7529	23.7523	161.1212	-582.0085	237.5714
			3616	-4170.5815	148.0342	-364.4848	-310.4590	-2222.6609	-629.2604
			3617	-1713.1743	-181.3432	24.4607	160.0869	-574.1669	237.0792

	3618	-4169.8760	148.6245	-365.1931	-309.4248	-2230.5024	-628.7682
	3621	-2878.3044	-171.6286	-40.6170	153.1719	-1075.0128	-456.1163
	3622	-5127.0430	156.5665	-411.4790	-306.3295	-2600.5527	104.8494
	3623	-5126.3374	157.1568	-412.1873	-305.2952	-2608.3945	105.3416
	3624	-2879.0100	-172.2189	-39.9086	152.1377	-1067.1710	-456.6085
	3625	-2773.6172	-171.9246	-31.9294	159.2113	-1017.4567	257.7825
	3626	-5231.7300	156.8625	-420.1665	-312.3689	-2658.1089	-609.0493
	3627	-2774.3228	-172.5149	-31.2211	158.1771	-1009.6151	257.2903
	3628	-5231.0244	157.4528	-420.8749	-311.3346	-2665.9504	-608.5571
	3631	-1704.4137	-172.3942	48.7336	152.3505	-517.8900	-507.4082
	3632	-3953.1521	155.8009	-322.1284	-307.1509	-2043.4302	53.5574
	3633	-3952.4465	156.3912	-322.8368	-306.1166	-2051.2717	54.0496
	3634	-1705.1193	-172.9845	49.4419	151.3163	-510.0484	-507.9005
	3635	-1599.7263	-172.6902	57.4211	158.3899	-460.3340	206.4905
	3636	-4057.8394	156.0969	-330.8160	-313.1903	-2100.9861	-660.3414
	3637	-1600.4319	-173.2805	58.1295	157.3557	-452.4924	205.9983
	3638	-4057.1338	156.6872	-331.5243	-312.1560	-2108.8276	-659.8491
	3641	-1929.8986	-188.5196	-18.6041	157.8130	-761.2390	-445.2464
	3642	-4178.6367	139.6755	-389.4661	-301.6884	-2286.7793	115.7193
	3643	-4177.9312	140.2658	-390.1744	-300.6541	-2294.6208	116.2115
	3644	-1930.6041	-189.1099	-17.8957	156.7787	-753.3973	-445.7386
	3645	-1825.2112	-188.8157	-9.9165	163.8524	-703.6830	268.6523
	3646	-4283.3242	139.9715	-398.1536	-307.7278	-2344.3350	-598.1794
	3647	-1825.9167	-189.4059	-9.2081	162.8181	-695.8414	268.1601
	3648	-4282.6187	140.5617	-398.8620	-306.6936	-2352.1768	-597.6873
	3651	-756.0076	-189.2852	70.7465	156.9916	-204.1163	-496.5384
	3652	-3004.7458	138.9099	-300.1155	-302.5098	-1729.6564	64.4273
	3653	-3004.0403	139.5002	-300.8239	-301.4755	-1737.4982	64.9195
	3654	-756.7132	-189.8755	71.4549	155.9573	-196.2747	-497.0306
	3655	-651.3202	-189.5812	79.4341	163.0310	-146.5603	217.3604
	3656	-3109.4333	139.2059	-308.8030	-308.5492	-1787.2125	-649.4715
	3657	-652.0258	-190.1715	80.1424	161.9967	-138.7187	216.8681
	3658	-3108.7278	139.7962	-309.5114	-307.5150	-1795.0541	-648.9792
	3701	-2943.3503	-46.0660	-171.7935	-2.7014	-1404.8483	-150.3951
	3702	-4004.4990	-37.2377	-227.4753	-4.6112	-1840.2965	-130.1841
	3703	-2830.6079	-38.0032	-138.1247	-5.4326	-1283.1738	-181.4761
	3704	-3056.0928	-54.1287	-205.4623	0.0299	-1526.5228	-119.3142
	3705	-1882.2019	-54.8942	-116.1118	-0.7915	-969.4001	-170.6062
	3711	-1818.9812	-210.1635	13.6375	227.0493	-642.0782	-430.8780
	3712	-4067.7195	118.0316	-357.2245	-232.4521	-2167.6184	130.0877
	3713	-4067.0139	118.6219	-357.9329	-231.4178	-2175.4600	130.5799
	3714	-1819.6869	-210.7538	14.3458	226.0151	-634.2366	-431.3702
	3715	-1714.2938	-210.4595	22.3250	233.0887	-584.5222	283.0208
	3716	-4172.4067	118.3276	-365.9120	-238.4915	-2225.1746	-583.8111
	3717	-1714.9995	-211.0498	23.0334	232.0545	-576.6806	282.5286
	3718	-4171.7012	118.9179	-366.6205	-237.4572	-2233.0161	-583.3188
	3721	-2880.1299	-201.3352	-42.0443	225.1395	-1077.5265	-410.6669
	3722	-5128.8682	126.8599	-412.9063	-234.3619	-2603.0664	150.2988
	3723	-5128.1626	127.4502	-413.6146	-233.3277	-2610.9084	150.7910
	3724	-2880.8354	-201.9255	-41.3359	224.1052	-1069.6847	-411.1591
	3725	-2775.4426	-201.6312	-33.3567	231.1789	-1019.9704	303.2319
	3726	-5233.5557	127.1559	-421.5938	-240.4013	-2660.6226	-563.6000
	3727	-2776.1482	-202.2215	-32.6483	230.1446	-1012.1288	302.7397
	3728	-5232.8501	127.7462	-422.3022	-239.3671	-2668.4641	-563.1077
	3731	-1706.2389	-202.1008	47.3063	224.3181	-520.4037	-461.9589
	3732	-3954.9771	126.0943	-323.5557	-235.1833	-2045.9440	99.0068
	3733	-3954.2715	126.6846	-324.2641	-234.1490	-2053.7856	99.4990
	3734	-1706.9445	-202.6911	48.0147	223.2838	-512.5621	-462.4511
	3735	-1601.5515	-202.3968	55.9939	230.3575	-462.8477	251.9399
	3736	-4059.6646	126.3903	-332.2433	-241.2227	-2103.4998	-614.8920
	3737	-1602.2571	-202.9870	56.7022	229.3232	-455.0061	251.4476
	3738	-4058.9590	126.9806	-332.9516	-240.1884	-2111.3413	-614.3997
	3741	-1931.7236	-218.2262	-20.0313	229.7806	-763.7527	-399.7971
	3742	-4180.4619	109.9689	-390.8933	-229.7208	-2289.2930	161.1687
	3743	-4179.7563	110.5592	-391.6017	-228.6866	-2297.1345	161.6608
	3744	-1932.4293	-218.8165	-19.3230	228.7463	-755.9111	-400.2892
	3745	-1827.0363	-218.5222	-11.3438	235.8200	-706.1967	314.1017
	3746	-4285.1494	110.2649	-399.5809	-235.7602	-2346.8489	-552.7302
	3747	-1827.7419	-219.1125	-10.6354	234.7857	-698.3551	313.6095
	3748	-4284.4438	110.8551	-400.2892	-234.7260	-2354.6904	-552.2379
	3751	-757.8328	-218.9918	69.3192	228.9592	-206.6300	-451.0891
	3752	-3006.5710	109.2033	-301.5428	-230.5422	-1732.1702	109.8766
	3753	-3005.8655	109.7936	-302.2511	-229.5080	-1740.0118	110.3688
	3754	-758.5383	-219.5821	70.0276	227.9249	-198.7883	-451.5812
	3755	-653.1454	-219.2878	78.0068	234.9986	-149.0740	262.8097
	3756	-3111.2583	109.4993	-310.2303	-236.5816	-1789.7262	-604.0222
	3757	-653.8510	-219.8781	78.7151	233.9643	-141.2324	262.3175
	3758	-3110.5527	110.0896	-310.9387	-235.5474	-1797.5677	-603.5299
GB01	3501	-2958.5029	-18.9005	-172.2802	-37.4150	-1576.2821	-209.0073
	3502	-4019.6514	-10.0722	-227.9620	-39.3248	-2066.0198	-180.1887
	3503	-2845.7605	-10.8378	-138.6114	-40.1462	-1421.7806	-232.2271
	3504	-3071.2454	-26.9632	-205.9490	-34.6837	-1730.7836	-185.7875
	3505	-1897.3545	-27.7288	-116.5985	-35.5051	-1086.5444	-237.8259
	3511	-1834.1338	-182.9981	13.1508	192.3357	-632.7174	-649.4847
	3512	-4082.8723	145.1971	-357.7112	-267.1656	-2519.8469	231.4701
	3513	-4082.1667	145.7874	-358.4196	-266.1314	-2528.3789	232.5378
	3514	-1834.8395	-183.5883	13.8591	191.3015	-624.1852	-650.5525
	3515	-1729.4465	-183.2941	21.8383	198.3751	-566.6912	64.1255
	3516	-4187.5596	145.4931	-366.3988	-273.2050	-2585.8730	-482.1401
	3517	-1730.1521	-183.8843	22.5467	197.3409	-558.1589	63.0577
	3518	-4186.8540	146.0833	-367.1071	-272.1708	-2594.4053	-481.0723

3521	-2895.2820	-174.1698	-42.5310	190.4259	-1122.4551	-620.6661
3522	-5144.0205	154.0254	-413.3929	-269.0755	-3009.5845	260.2887
3523	-5143.3149	154.6156	-414.1013	-268.0412	-3018.1165	261.3565
3524	-2895.9878	-174.7600	-41.8226	189.3916	-1113.9229	-621.7338
3525	-2790.5950	-174.4658	-33.8434	196.4653	-1056.4288	92.9441
3526	-5248.7080	154.3214	-422.0805	-275.1149	-3075.6106	-453.3214
3527	-2791.3005	-175.0560	-33.1350	195.4310	-1047.8965	91.8764
3528	-5248.0024	154.9116	-422.7889	-274.0807	-3084.1431	-452.2537
3531	-1721.3915	-174.9353	46.8196	189.6045	-478.2159	-672.7045
3532	-3970.1299	153.2598	-324.0424	-269.8969	-2365.3452	208.2503
3533	-3969.4243	153.8501	-324.7508	-268.8626	-2373.8774	209.3180
3534	-1722.0970	-175.5256	47.5280	188.5702	-469.6837	-673.7723
3535	-1616.7041	-175.2313	55.5072	195.6439	-412.1897	40.9057
3536	-4074.8171	153.5558	-332.7299	-275.9363	-2431.3716	-505.3599
3537	-1617.4097	-175.8216	56.2155	194.6096	-403.6574	39.8379
3538	-4074.1116	154.1461	-333.4383	-274.9020	-2439.9041	-504.2921
3541	-1946.8762	-191.0608	-20.5180	195.0670	-787.2189	-626.2649
3542	-4195.6147	137.1343	-391.3800	-264.4344	-2674.3481	254.6899
3543	-4194.9092	137.7246	-392.0884	-263.4002	-2682.8806	255.7576
3544	-1947.5819	-191.6511	-19.8097	194.0327	-778.6866	-627.3326
3545	-1842.1888	-191.3568	-11.8305	201.1064	-721.1926	87.3453
3546	-4300.3018	137.4303	-400.0676	-270.4738	-2740.3745	-458.9203
3547	-1842.8945	-191.9471	-11.1221	200.0721	-712.6603	86.2775
3548	-4299.5962	138.0206	-400.7759	-269.4396	-2748.9067	-457.8525
3551	-772.9854	-191.8264	68.8325	194.2456	-142.9798	-678.3033
3552	-3021.7236	136.3688	-302.0295	-265.2558	-2030.1091	202.6515
3553	-3021.0181	136.9590	-302.7378	-264.2215	-2038.6415	203.7192
3554	-773.6909	-192.4166	69.5409	193.2113	-134.4476	-679.3710
3555	-668.2980	-192.1224	77.5201	200.2850	-76.9535	35.3068
3556	-3126.4111	136.6648	-310.7170	-271.2952	-2096.1355	-510.9587
3557	-669.0035	-192.7126	78.2284	199.2507	-68.4212	34.2391
3558	-3125.7056	137.2550	-311.4254	-270.2610	-2104.6675	-509.8910
3601	-2957.3596	-16.3594	-170.3662	-74.6689	-1568.4412	-211.7948
3602	-4018.5083	-7.5311	-226.0480	-76.5788	-2058.1787	-182.9762
3603	-2844.6172	-8.2966	-136.6974	-77.4002	-1413.9397	-235.0146
3604	-3070.1021	-24.4221	-204.0351	-71.9377	-1722.9426	-188.5750
3605	-1896.2111	-25.1876	-114.6845	-72.7591	-1078.7035	-240.6134
3611	-1832.9904	-180.4569	15.0648	155.0817	-624.8765	-652.2722
3612	-4081.7285	147.7382	-355.7972	-304.4196	-2512.0059	228.6826
3613	-4081.0229	148.3285	-356.5056	-303.3854	-2520.5381	229.7504
3614	-1833.6959	-181.0472	15.7731	154.0475	-616.3443	-653.3399
3615	-1728.3030	-180.7529	23.7523	161.1212	-558.8502	61.3380
3616	-4186.4160	148.0342	-364.4848	-310.4590	-2578.0320	-484.9276
3617	-1729.0085	-181.3432	24.4607	160.0869	-550.3180	60.2703
3618	-4185.7104	148.6245	-365.1931	-309.4248	-2586.5645	-483.8598
3621	-2894.1389	-171.6286	-40.6170	153.1719	-1114.6141	-623.4536
3622	-5142.8774	156.5665	-411.4790	-306.3295	-3001.7434	257.5013
3623	-5142.1719	157.1568	-412.1873	-305.2952	-3010.2759	258.5690
3624	-2894.8445	-172.2189	-39.9086	152.1377	-1106.0819	-624.5213
3625	-2789.4517	-171.9246	-31.9294	159.2113	-1048.5879	90.1566
3626	-5247.5649	156.8625	-420.1665	-312.3689	-3067.7698	-456.1089
3627	-2790.1572	-172.5149	-31.2211	158.1771	-1040.0557	89.0889
3628	-5246.8589	157.4528	-420.8749	-311.3346	-3076.3020	-455.0412
3631	-1720.2479	-172.3942	48.7336	152.3505	-470.3750	-675.4920
3632	-3968.9861	155.8009	-322.1284	-307.1509	-2357.5044	205.4628
3633	-3968.2805	156.3912	-322.8368	-306.1166	-2366.0369	206.5306
3634	-1720.9536	-172.9845	49.4419	151.3163	-461.8428	-676.5597
3635	-1615.5605	-172.6902	57.4211	158.3899	-404.3488	38.1182
3636	-4073.6736	156.0969	-330.8160	-313.1903	-2423.5308	-508.1473
3637	-1616.2662	-173.2805	58.1295	157.3557	-395.8165	37.0505
3638	-4072.9680	156.6872	-331.5243	-312.1560	-2432.0627	-507.0796
3641	-1945.7328	-188.5196	-18.6041	157.8130	-779.3779	-629.0524
3642	-4194.4712	139.6755	-389.4661	-301.6884	-2666.5073	251.9024
3643	-4193.7651	140.2658	-390.1744	-300.6541	-2675.0396	252.9702
3644	-1946.4384	-189.1099	-17.8957	156.7787	-770.8457	-630.1201
3645	-1841.0454	-188.8157	-9.9165	163.8524	-713.3517	84.5578
3646	-4299.1587	139.9715	-398.1536	-307.7278	-2732.5337	-461.7077
3647	-1841.7510	-189.4059	-9.2081	162.8181	-704.8194	83.4901
3648	-4298.4526	140.5617	-398.8620	-306.6936	-2741.0659	-460.6400
3651	-771.8419	-189.2852	70.7465	156.9916	-135.1389	-681.0908
3652	-3020.5801	138.9099	-300.1155	-302.5098	-2022.2682	199.8640
3653	-3019.8745	139.5002	-300.8239	-301.4755	-2030.8003	200.9317
3654	-772.5475	-189.8755	71.4549	155.9573	-126.6066	-682.1586
3655	-667.1545	-189.5812	79.4341	163.0310	-69.1126	32.5194
3656	-3125.2673	139.2059	-308.8030	-308.5492	-2088.2944	-513.7462
3657	-667.8601	-190.1715	80.1424	161.9967	-60.5803	31.4516
3658	-3124.5618	139.7962	-309.5114	-307.5150	-2096.8269	-512.6784
3701	-2959.1846	-46.0660	-171.7935	-2.7014	-1572.3464	-195.3092
3702	-4020.3330	-37.2377	-227.4753	-4.6112	-2062.0840	-166.4906
3703	-2846.4424	-38.0032	-138.1247	-5.4326	-1417.8450	-218.5291
3704	-3071.9270	-54.1287	-205.4623	0.0299	-1726.8479	-172.0894
3705	-1898.0361	-54.8942	-116.1118	-0.7915	-1082.6088	-224.1279
3711	-1834.8156	-210.1635	13.6375	227.0493	-628.7817	-635.7866
3712	-4083.5540	118.0316	-357.2245	-232.4521	-2515.9111	245.1682
3713	-4082.8484	118.6219	-357.9329	-231.4178	-2524.4434	246.2359
3714	-1835.5211	-210.7538	14.3458	226.0151	-620.2495	-636.8544
3715	-1730.1282	-210.4595	22.3250	233.0887	-562.7554	77.8235
3716	-4188.2412	118.3276	-365.9120	-238.4915	-2581.9373	-468.4420
3717	-1730.8337	-211.0498	23.0334	232.0545	-554.2231	76.7558
3718	-4187.5356	118.9179	-366.6205	-237.4572	-2590.4697	-467.3743
3721	-2895.9639	-201.3352	-42.0443	225.1395	-1118.5194	-606.9680

			3722	-5144.7021	126.8599	-412.9063	-234.3619	-3005.6487	273.9868
			3723	-5143.9966	127.4502	-413.6146	-233.3277	-3014.1812	275.0545
			3724	-2896.6694	-201.9255	-41.3359	224.1052	-1109.9872	-608.0358
			3725	-2791.2766	-201.6312	-33.3567	231.1789	-1052.4930	106.6422
			3726	-5249.3896	127.1559	-421.5938	-240.4013	-3071.6750	-439.6234
			3727	-2791.9822	-202.2215	-32.6483	230.1446	-1043.9608	105.5744
			3728	-5248.6841	127.7462	-422.3022	-239.3671	-3080.2070	-438.5557
			3731	-1722.0731	-202.1008	47.3063	224.3181	-474.2802	-659.0065
			3732	-3970.8115	126.0943	-323.5557	-235.1833	-2361.4097	221.9484
			3733	-3970.1060	126.6846	-324.2641	-234.1490	-2369.9419	223.0161
			3734	-1722.7787	-202.6911	48.0147	223.2838	-465.7480	-660.0742
			3735	-1617.3857	-202.3968	55.9939	230.3575	-408.2540	54.6037
			3736	-4075.4988	126.3903	-332.2433	-241.2227	-2427.4358	-491.6618
			3737	-1618.0913	-202.9870	56.7022	229.3232	-399.7217	53.5360
			3738	-4074.7932	126.9806	-332.9516	-240.1884	-2435.9680	-490.5941
			3741	-1947.5580	-218.2262	-20.0313	229.7806	-783.2831	-612.5668
			3742	-4196.2964	109.9689	-390.8933	-229.7208	-2670.4126	268.3880
			3743	-4195.5908	110.5592	-391.6017	-228.6866	-2678.9446	269.4557
			3744	-1948.2635	-218.8165	-19.3230	228.7463	-774.7509	-613.6346
			3745	-1842.8706	-218.5222	-11.3438	235.8200	-717.2569	101.0433
			3746	-4300.9834	110.2649	-399.5809	-235.7602	-2736.4387	-445.2222
			3747	-1843.5762	-219.1125	-10.6354	234.7857	-708.7246	99.9756
			3748	-4300.2778	110.8551	-400.2892	-234.7260	-2744.9712	-444.1545
			3751	-773.6670	-218.9918	69.3192	228.9592	-139.0441	-664.6053
			3752	-3022.4053	109.2033	-301.5428	-230.5422	-2026.1733	216.3495
			3753	-3021.6997	109.7936	-302.2511	-229.5080	-2034.7056	217.4173
			3754	-774.3726	-219.5821	70.0276	227.9249	-130.5118	-665.6730
			3755	-668.9796	-219.2878	78.0068	234.9986	-73.0178	49.0049
			3756	-3127.0928	109.4993	-310.2303	-236.5816	-2092.1997	-497.2606
			3757	-669.6852	-219.8781	78.7151	233.9643	-64.4855	47.9371
			3758	-3126.3872	110.0896	-310.9387	-235.5474	-2100.7322	-496.1929
1272-GB02	1272	DM5	3101	-4116.5547	-84.9538	-361.7686	-24.3104	-2120.2356	-150.3844
			3102	-4050.2695	-86.8143	-326.2707	-24.2417	-1975.1160	-123.0403
			3103	-5230.5410	-88.6456	-408.8775	-21.3155	-2513.1431	-173.8462
			3104	-3002.5681	-81.2620	-314.6596	-27.3054	-1727.3280	-126.9226
			3105	-4182.8394	-83.0933	-397.2665	-24.3792	-2265.3550	-177.7285
			3201	-5173.0303	-244.7338	-555.5303	264.5141	-2966.2800	-432.1490
			3202	-3060.0786	74.8262	-168.0069	-313.1350	-1274.1910	131.3803
			3203	-3060.0786	74.8262	-168.0069	-313.1350	-1274.1910	131.3803
			3204	-5173.0303	-244.7338	-555.5303	264.5141	-2966.2800	-432.1490
			3205	-5279.3691	-235.8633	-561.2653	267.2298	-3013.9346	280.4953
			3206	-2953.7400	65.9557	-162.2719	-315.8506	-1226.5365	-581.2640
			3207	-5279.3691	-235.8633	-561.2653	267.2298	-3013.9346	280.4953
			3208	-2953.7400	65.9557	-162.2719	-315.8506	-1226.5365	-581.2640
			3211	-5106.7451	-246.5943	-520.0324	264.5829	-2821.1604	-404.8050
			3212	-2993.7937	72.9657	-132.5089	-313.0663	-1129.0715	158.7243
			3213	-2993.7937	72.9657	-132.5089	-313.0663	-1129.0715	158.7243
			3214	-5106.7451	-246.5943	-520.0324	264.5829	-2821.1604	-404.8050
			3215	-5213.0845	-237.7238	-525.7673	267.2986	-2868.8149	307.8393
			3216	-2887.4548	64.0952	-126.7740	-315.7819	-1081.4170	-553.9200
			3217	-5213.0845	-237.7238	-525.7673	267.2986	-2868.8149	307.8393
			3218	-2887.4548	64.0952	-126.7740	-315.7819	-1081.4170	-553.9200
			3221	-6287.0161	-248.4256	-602.6392	267.5091	-3359.1875	-455.6108
			3222	-4174.0649	71.1344	-215.1158	-310.1400	-1667.0985	107.9185
			3223	-4174.0649	71.1344	-215.1158	-310.1400	-1667.0985	107.9185
			3224	-6287.0161	-248.4256	-602.6392	267.5091	-3359.1875	-455.6108
			3225	-6393.3555	-239.5551	-608.3741	270.2247	-3406.8420	257.0335
			3226	-4067.7261	62.2640	-209.3808	-312.8557	-1619.4440	-604.7258
			3227	-6393.3555	-239.5551	-608.3741	270.2247	-3406.8420	257.0335
			3228	-4067.7261	62.2640	-209.3808	-312.8557	-1619.4440	-604.7258
			3231	-4059.0439	-241.0420	-508.4214	261.5192	-2573.3726	-408.6873
			3232	-1946.0924	78.5180	-120.8979	-316.1300	-881.2836	154.8421
			3233	-1946.0924	78.5180	-120.8979	-316.1300	-881.2836	154.8421
			3234	-4059.0439	-241.0420	-508.4214	261.5192	-2573.3726	-408.6873
			3235	-4165.3828	-232.1715	-514.1563	264.2348	-2621.0271	303.9571
			3236	-1839.7537	69.6476	-115.1630	-318.8456	-833.6291	-557.8022
			3237	-4165.3828	-232.1715	-514.1563	264.2348	-2621.0271	303.9571
			3238	-1839.7537	69.6476	-115.1630	-318.8456	-833.6291	-557.8022
			3241	-5239.3149	-242.8733	-591.0283	264.4454	-3111.3997	-459.4931
			3242	-3126.3635	76.6867	-203.5048	-313.2038	-1419.3105	104.0362
			3243	-3126.3635	76.6867	-203.5048	-313.2038	-1419.3105	104.0362
			3244	-5239.3149	-242.8733	-591.0283	264.4454	-3111.3997	-459.4931
			3245	-5345.6543	-234.0028	-596.7632	267.1610	-3159.0540	253.1512
			3246	-3020.0247	67.8163	-197.7699	-315.9194	-1371.6560	-608.6081
			3247	-5345.6543	-234.0028	-596.7632	267.1610	-3159.0540	253.1512
			3248	-3020.0247	67.8163	-197.7699	-315.9194	-1371.6560	-608.6081
			3301	-6229.5059	-404.5138	-749.2920	553.3387	-3812.3245	-713.9138
			3302	-2003.6030	234.6062	25.7549	-601.9596	-428.1467	413.1449
			3303	-2003.6030	234.6062	25.7549	-601.9596	-428.1467	413.1449
			3304	-6229.5059	-404.5138	-749.2920	553.3387	-3812.3245	-713.9138
			3305	-6442.1836	-386.7728	-760.7619	558.7700	-3907.6335	711.3749
			3306	-1790.9253	216.8653	37.2247	-607.3909	-332.8376	-1012.1437
			3307	-6442.1836	-386.7728	-760.7619	558.7700	-3907.6335	711.3749
			3308	-1790.9253	216.8653	37.2247	-607.3909	-332.8376	-1012.1437
			3311	-6163.2212	-406.3743	-713.7941	553.4075	-3667.2048	-686.5696
			3312	-1937.3181	232.7457	61.2528	-601.8908	-283.0271	440.4890
			3313	-1937.3181	232.7457	61.2528	-601.8908	-283.0271	440.4890
			3314	-6163.2212	-406.3743	-713.7941	553.4075	-3667.2048	-686.5696
			3315	-6375.8989	-388.6333	-725.2640	558.8387	-3762.5139	738.7190
			3316	-1724.6405	215.0048	72.7227	-607.3221	-187.7181	-984.7996

	3317	-6375.8989	-388.6333	-725.2640	558.8387	-3762.5139	738.7190
	3318	-1724.6405	215.0048	72.7227	-607.3221	-187.7181	-984.7996
	3321	-7343.4922	-408.2055	-796.4009	556.3337	-4205.2319	-737.3755
	3322	-3117.5891	230.9144	-21.3541	-598.9647	-821.0541	389.6832
	3323	-3117.5891	230.9144	-21.3541	-598.9647	-821.0541	389.6832
	3324	-7343.4922	-408.2055	-796.4009	556.3337	-4205.2319	-737.3755
	3325	-7556.1704	-390.4647	-807.8708	561.7649	-4300.5410	687.9131
	3326	-2904.9116	213.1735	-9.8842	-604.3959	-725.7451	-1035.6055
	3327	-7556.1704	-390.4647	-807.8708	561.7649	-4300.5410	687.9131
	3328	-2904.9116	213.1735	-9.8842	-604.3959	-725.7451	-1035.6055
	3331	-5115.5200	-400.8220	-702.1831	550.3438	-3419.4170	-690.4519
	3332	-889.6168	238.2980	72.8638	-604.9545	-35.2392	436.6068
	3333	-889.6168	238.2980	72.8638	-604.9545	-35.2392	436.6068
	3334	-5115.5200	-400.8220	-702.1831	550.3438	-3419.4170	-690.4519
	3335	-5328.1973	-383.0810	-713.6530	555.7750	-3514.7261	734.8367
	3336	-676.9390	220.5571	84.3337	-610.3858	60.0699	-988.6819
	3337	-5328.1973	-383.0810	-713.6530	555.7750	-3514.7261	734.8367
	3338	-676.9390	220.5571	84.3337	-610.3858	60.0699	-988.6819
	3341	-6295.7910	-402.6533	-784.7899	553.2699	-3957.4441	-741.2578
	3342	-2069.8879	236.4667	-9.7431	-602.0284	-573.2662	385.8009
	3343	-2069.8879	236.4667	-9.7431	-602.0284	-573.2662	385.8009
	3344	-6295.7910	-402.6533	-784.7899	553.2699	-3957.4441	-741.2578
	3345	-6508.4683	-384.9123	-796.2598	558.7012	-4052.7532	684.0309
	3346	-1857.2102	218.7258	1.7268	-607.4596	-477.9572	-1039.4878
	3347	-6508.4683	-384.9123	-796.2598	558.7012	-4052.7532	684.0309
	3348	-1857.2102	218.7258	1.7268	-607.4596	-477.9572	-1039.4878
GB02	3101	-4128.0039	-84.9538	-361.7686	-24.3104	-2375.2810	-210.2765
	3102	-4061.7188	-86.8143	-326.2707	-24.2417	-2205.1355	-184.2441
	3103	-5241.9897	-88.6456	-408.8775	-21.3155	-2801.4001	-236.3410
	3104	-3014.0173	-81.2620	-314.6596	-27.3054	-1949.1617	-184.2120
	3105	-4194.2886	-83.0933	-397.2665	-24.3792	-2545.4265	-236.3089
	3201	-5184.4795	-244.7338	-555.5303	264.5141	-3357.9265	-604.6855
	3202	-3071.5278	74.8262	-168.0069	-313.1350	-1392.6351	184.1325
	3203	-3071.5278	74.8262	-168.0069	-313.1350	-1392.6351	184.1325
	3204	-5184.4795	-244.7338	-555.5303	264.5141	-3357.9265	-604.6855
	3205	-5290.8179	-235.8633	-561.2653	267.2298	-3409.6243	114.2125
	3206	-2965.1892	65.9557	-162.2719	-315.8506	-1340.9375	-534.7655
	3207	-5290.8179	-235.8633	-561.2653	267.2298	-3409.6243	114.2125
	3208	-2965.1892	65.9557	-162.2719	-315.8506	-1340.9375	-534.7655
	3211	-5118.1943	-246.5943	-520.0324	264.5829	-3187.7813	-578.6531
	3212	-3005.2429	72.9657	-132.5089	-313.0663	-1222.4897	210.1649
	3213	-3005.2429	72.9657	-132.5089	-313.0663	-1222.4897	210.1649
	3214	-5118.1943	-246.5943	-520.0324	264.5829	-3187.7813	-578.6531
	3215	-5224.5337	-237.7238	-525.7673	267.2986	-3239.4790	140.2449
	3216	-2898.9041	64.0952	-126.7740	-315.7819	-1170.7921	-508.7331
	3217	-5224.5337	-237.7238	-525.7673	267.2986	-3239.4790	140.2449
	3218	-2898.9041	64.0952	-126.7740	-315.7819	-1170.7921	-508.7331
	3221	-6298.4653	-248.4256	-602.6392	267.5091	-3784.0457	-630.7499
	3222	-4185.5142	71.1344	-215.1158	-310.1400	-1818.7544	158.0680
	3223	-4185.5142	71.1344	-215.1158	-310.1400	-1818.7544	158.0680
	3224	-6298.4653	-248.4256	-602.6392	267.5091	-3784.0457	-630.7499
	3225	-6404.8047	-239.5551	-608.3741	270.2247	-3835.7437	88.1480
	3226	-4079.1753	62.2640	-209.3808	-312.8557	-1767.0566	-560.8300
	3227	-6404.8047	-239.5551	-608.3741	270.2247	-3835.7437	88.1480
	3228	-4079.1753	62.2640	-209.3808	-312.8557	-1767.0566	-560.8300
	3231	-4070.4932	-241.0420	-508.4214	261.5192	-2931.8074	-578.6210
	3232	-1957.5416	78.5180	-120.8979	-316.1300	-966.5161	210.1970
	3233	-1957.5416	78.5180	-120.8979	-316.1300	-966.5161	210.1970
	3234	-4070.4932	-241.0420	-508.4214	261.5192	-2931.8074	-578.6210
	3235	-4176.8320	-232.1715	-514.1563	264.2348	-2983.5051	140.2770
	3236	-1851.2028	69.6476	-115.1630	-318.8456	-914.8184	-508.7010
	3237	-4176.8320	-232.1715	-514.1563	264.2348	-2983.5051	140.2770
	3238	-1851.2028	69.6476	-115.1630	-318.8456	-914.8184	-508.7010
	3241	-5250.7642	-242.8733	-591.0283	264.4454	-3528.0723	-630.7179
	3242	-3137.8127	76.6867	-203.5048	-313.2038	-1562.7806	158.1001
	3243	-3137.8127	76.6867	-203.5048	-313.2038	-1562.7806	158.1001
	3244	-5250.7642	-242.8733	-591.0283	264.4454	-3528.0723	-630.7179
	3245	-5357.1035	-234.0028	-596.7632	267.1610	-3579.7698	88.1801
	3246	-3031.4739	67.8163	-197.7699	-315.9194	-1511.0830	-560.7979
	3247	-5357.1035	-234.0028	-596.7632	267.1610	-3579.7698	88.1801
	3248	-3031.4739	67.8163	-197.7699	-315.9194	-1511.0830	-560.7979
	3301	-6240.9551	-404.5138	-749.2920	553.3387	-4340.5723	-999.0945
	3302	-2015.0522	234.6062	25.7549	-601.9596	-409.9894	578.5415
	3303	-2015.0522	234.6062	25.7549	-601.9596	-409.9894	578.5415
	3304	-6240.9551	-404.5138	-749.2920	553.3387	-4340.5723	-999.0945
	3305	-6453.6328	-386.7728	-760.7619	558.7700	-4443.9678	438.7015
	3306	-1802.3745	216.8653	37.2247	-607.3909	-306.5941	-859.2545
	3307	-6453.6328	-386.7728	-760.7619	558.7700	-4443.9678	438.7015
	3308	-1802.3745	216.8653	37.2247	-607.3909	-306.5941	-859.2545
	3311	-6174.6704	-406.3743	-713.7941	553.4075	-4170.4268	-973.0620
	3312	-1948.7673	232.7457	61.2528	-601.8908	-239.8440	604.5740
	3313	-1948.7673	232.7457	61.2528	-601.8908	-239.8440	604.5740
	3314	-6174.6704	-406.3743	-713.7941	553.4075	-4170.4268	-973.0620
	3315	-6387.3477	-388.6333	-725.2640	558.8387	-4273.8223	464.7339
	3316	-1736.0896	215.0048	72.7227	-607.3221	-136.4486	-833.2220
	3317	-6387.3477	-388.6333	-725.2640	558.8387	-4273.8223	464.7339
	3318	-1736.0896	215.0048	72.7227	-607.3221	-136.4486	-833.2220
	3321	-7354.9414	-408.2055	-796.4009	556.3337	-4766.6914	-1025.1591
	3322	-3129.0383	230.9144	-21.3541	-598.9647	-836.1086	552.4770
	3323	-3129.0383	230.9144	-21.3541	-598.9647	-836.1086	552.4770
	3324	-7354.9414	-408.2055	-796.4009	556.3337	-4766.6914	-1025.1591

			3325	-7567.6187	-390.4647	-807.8708	561.7649	-4870.0869	412.6370
			3326	-2916.3608	213.1735	-9.8842	-604.3959	-732.7133	-885.3189
			3327	-7567.6187	-390.4647	-807.8708	561.7649	-4870.0869	412.6370
			3328	-2916.3608	213.1735	-9.8842	-604.3959	-732.7133	-885.3189
			3331	-5126.9688	-400.8220	-702.1831	550.3438	-3914.4534	-973.0300
			3332	-901.0659	238.2980	72.8638	-604.9545	16.1297	604.6060
			3333	-901.0659	238.2980	72.8638	-604.9545	16.1297	604.6060
			3334	-5126.9688	-400.8220	-702.1831	550.3438	-3914.4534	-973.0300
			3335	-5339.6470	-383.0810	-713.6530	555.7750	-4017.8484	464.7660
			3336	-688.3882	220.5571	84.3337	-610.3858	119.5251	-833.1900
			3337	-5339.6470	-383.0810	-713.6530	555.7750	-4017.8484	464.7660
			3338	-688.3882	220.5571	84.3337	-610.3858	119.5251	-833.1900
			3341	-6307.2402	-402.6533	-784.7899	553.2699	-4510.7183	-1025.1270
			3342	-2081.3372	236.4667	-9.7431	-602.0284	-580.1349	552.5091
			3343	-2081.3372	236.4667	-9.7431	-602.0284	-580.1349	552.5091
			3344	-6307.2402	-402.6533	-784.7899	553.2699	-4510.7183	-1025.1270
			3345	-6519.9180	-384.9123	-796.2598	558.7012	-4614.1133	412.6690
			3346	-1868.6594	218.7258	1.7268	-607.4596	-476.7395	-885.2869
			3347	-6519.9180	-384.9123	-796.2598	558.7012	-4614.1133	412.6690
			3348	-1868.6594	218.7258	1.7268	-607.4596	-476.7395	-885.2869
1272-GB02	1272	DM5	3401	-6834.9048	-556.1644	-907.2953	437.5762	-4316.7969	629.6125
			3402	-7677.0884	-702.5976	-1052.8203	603.3152	-4914.1050	929.7613
			3403	-7827.4341	-540.1434	-929.7802	419.5553	-4608.2476	571.9330
			3404	-5842.3760	-572.1853	-884.8104	455.5971	-4025.3462	687.2921
			3405	-5992.7212	-409.7312	-761.7703	271.8372	-3719.4885	329.4638
	GB02		3401	-6846.3535	-556.1644	-907.2953	437.5762	-4956.4370	237.5187
			3402	-7688.5371	-702.5976	-1052.8203	603.3152	-5656.3403	434.4326
			3403	-7838.8823	-540.1434	-929.7802	419.5553	-5263.7393	191.1338
			3404	-5853.8247	-572.1853	-884.8104	455.5971	-4649.1343	283.9036
			3405	-6004.1699	-409.7312	-761.7703	271.8372	-4256.5337	40.6048
1272-GB02	1272	DM5	3411	-295.0618	637.7830	423.0798	-847.4241	1119.9465	-685.1016
			3412	-317.2474	618.5059	441.1245	-827.7487	1190.7634	-655.4299
			3413	-467.8585	812.7741	571.5035	-1042.4454	1530.6222	-846.2027
			3414	-122.2652	462.7918	274.6561	-652.4027	709.2708	-524.0004
			3415	-272.8762	657.0600	405.0351	-867.0994	1049.1295	-714.7731
	GB02		3411	-306.5112	637.7830	423.0798	-847.4241	1418.2163	-235.4669
			3412	-328.6968	618.5059	441.1245	-827.7487	1501.7548	-219.3855
			3413	-479.3078	812.7741	571.5035	-1042.4454	1933.5302	-273.2000
			3414	-133.7145	462.7918	274.6561	-652.4027	902.9025	-197.7338
			3415	-284.3256	657.0600	405.0351	-867.0994	1334.6780	-251.5482
1272-GB02	1272	DM5	3421	-1850.3289	345.3631	113.5033	-513.3489	-187.9490	500.9527
			3422	-1781.3881	346.0904	150.8203	-511.2143	-40.6629	530.6946
			3423	-3693.9063	197.8654	-88.9947	-364.9166	-1197.8541	265.2314
			3424	-6.7516	492.8608	316.0013	-661.7813	821.9560	736.6740
			3425	-1919.2697	344.6357	76.1864	-515.4836	-335.2351	471.2109
	GB02		3421	-1861.7782	345.3631	113.5033	-513.3489	-107.9296	744.4324
			3422	-1792.8375	346.0904	150.8203	-511.2143	65.6648	774.6871
			3423	-3705.3555	197.8654	-88.9947	-364.9166	-1260.5951	404.7258
			3424	-18.2009	492.8608	316.0013	-661.7813	1044.7358	1084.1390
			3425	-1930.7188	344.6357	76.1864	-515.4836	-281.5241	714.1778
1272-GB02	1272	DM5	3431	-8097.0356	-889.8615	-1182.4526	636.2203	-5328.1626	-1314.6761
			3432	-7274.0439	-740.3943	-991.7540	505.8154	-4573.6738	-1066.4983
			3433	-9185.1807	-888.7672	-1225.1880	635.6566	-5701.5098	-1330.9296
			3434	-7008.8911	-890.9558	-1139.7173	636.7841	-4954.8154	-1298.4227
			3435	-8920.0273	-1039.3286	-1373.1512	766.6252	-6082.6514	-1562.8540
	GB02		3431	-8108.4844	-889.8615	-1182.4526	636.2203	-6161.7876	-1942.0250
			3432	-7285.4927	-740.3943	-991.7540	505.8154	-5272.8574	-1588.4733
			3433	-9196.6289	-888.7672	-1225.1880	635.6566	-6565.2627	-1957.5068
			3434	-7020.3398	-890.9558	-1139.7173	636.7841	-5758.3125	-1926.5431
			3435	-8931.4756	-1039.3286	-1373.1512	766.6252	-7050.7183	-2295.5767
1272-GB02	1272	DM5	3501	-4128.8906	-88.7485	-366.4747	-18.8086	-2133.1667	-151.3085
			3502	-4064.3342	-90.5068	-330.6602	-19.2771	-1988.9968	-123.8686
			3503	-5240.3242	-92.3533	-413.9505	-16.1761	-2525.1196	-174.4240
			3504	-3017.4578	-85.1438	-318.9989	-21.4412	-1741.2141	-128.1930
			3505	-4193.4473	-86.9903	-402.2893	-18.3402	-2277.3369	-178.7484
			3511	-5233.3032	-254.7138	-566.3849	291.5130	-3012.8135	-441.5883
			3512	-3024.4783	77.2167	-166.5646	-329.1303	-1253.5203	138.9713
			3513	-3024.1309	77.6349	-166.1185	-330.2747	-1252.5917	139.4214
			3514	-5233.6509	-255.1319	-566.8309	292.6574	-3013.7419	-442.0383
			3515	-5339.9180	-245.7057	-571.9912	293.8337	-3060.2969	271.7331
			3516	-2917.8635	68.2086	-160.9582	-331.4510	-1206.0367	-574.3500
			3517	-5340.2651	-246.1238	-572.4373	294.9781	-3061.2253	271.2830
			3518	-2917.5166	68.6267	-160.5121	-332.5954	-1205.1083	-573.9000
			3521	-5168.7466	-256.4720	-530.5703	291.0446	-2868.6436	-414.1484
			3522	-2959.9216	75.4585	-130.7500	-329.5988	-1109.3502	166.4112
			3523	-2959.5745	75.8766	-130.3039	-330.7431	-1108.4218	166.8612
			3524	-5169.0942	-256.8902	-531.0164	292.1890	-2869.5720	-414.5985
			3525	-5275.3618	-247.4639	-536.1766	293.3652	-2916.1270	299.1729
			3526	-2853.3069	66.4504	-125.1436	-331.9194	-1061.8668	-546.9102
			3527	-5275.7085	-247.8820	-536.6227	294.5096	-2917.0554	298.7229
			3528	-2852.9600	66.8685	-124.6975	-333.0638	-1060.9382	-546.4601
			3531	-6344.7363	-258.3186	-613.8607	294.1456	-3404.7664	-464.7038
			3532	-4135.9116	73.6119	-214.0404	-326.4977	-1645.4730	115.8558
			3533	-4135.5645	74.0301	-213.5943	-327.6421	-1644.5444	116.3059
			3534	-6345.0840	-258.7367	-614.3068	295.2900	-3405.6948	-465.1538
			3535	-6451.3516	-249.3104	-619.4670	296.4662	-3452.2498	248.6176
			3536	-4029.2969	64.6038	-208.4340	-328.8184	-1597.9895	-597.4655
			3537	-6451.6982	-249.7286	-619.9131	297.6107	-3453.1782	248.1675
			3538	-4028.9500	65.0219	-207.9879	-329.9628	-1597.0610	-597.0154
			3541	-4121.8706	-251.1090	-518.9091	288.8805	-2620.8608	-418.4728
			3542	-1913.0452	80.8215	-119.0888	-331.7629	-861.5675	162.0868

3543	-1912.6979	81.2396	-118.6427	-332.9073	-860.6390	162.5368
3544	-4122.2178	-251.5271	-519.3552	290.0248	-2621.7893	-418.9229
3545	-4228.4849	-242.1009	-524.5154	291.2011	-2668.3442	294.8485
3546	-1806.4305	71.8134	-113.4824	-334.0836	-814.0840	-551.2346
3547	-4228.8325	-242.5190	-524.9615	292.3455	-2669.2727	294.3985
3548	-1806.0834	72.2315	-113.0363	-335.2279	-813.1555	-550.7845
3551	-5297.8599	-252.9556	-602.1995	291.9815	-3156.9834	-469.0281
3552	-3089.0347	78.9750	-202.3792	-328.6619	-1397.6903	111.5314
3553	-3088.6875	79.3931	-201.9331	-329.8063	-1396.7617	111.9815
3554	-5298.2070	-253.3737	-602.6455	293.1259	-3157.9121	-469.4782
3555	-5404.4746	-243.9474	-607.8058	294.3021	-3204.4670	244.2932
3556	-2982.4199	69.9668	-196.7728	-330.9825	-1350.2068	-601.7899
3557	-5404.8218	-244.3656	-608.2519	295.4465	-3205.3955	243.8431
3558	-2982.0730	70.3849	-196.3267	-332.1269	-1349.2783	-601.3398
3601	-4129.2773	-95.6873	-368.0345	14.6259	-2134.3655	-147.4500
3602	-4064.7207	-97.4456	-332.2199	14.1574	-1990.1954	-120.0101
3603	-5240.7104	-99.2921	-415.5103	17.2584	-2526.3181	-170.5655
3604	-3017.8442	-92.0826	-320.5587	11.9933	-1742.4126	-124.3345
3605	-4193.8340	-93.9291	-403.8491	15.0943	-2278.5354	-174.8899
3611	-5233.6895	-261.6526	-567.9447	324.9475	-3014.0120	-437.7298
3612	-3024.8647	70.2779	-168.1244	-295.6958	-1254.7188	142.8298
3613	-3024.5173	70.6961	-167.6783	-296.8402	-1253.7903	143.2798
3614	-5234.0371	-262.0707	-568.3907	326.0919	-3014.9404	-438.1798
3615	-5340.3047	-252.6445	-573.5510	327.2682	-3061.4956	275.5916
3616	-2918.2500	61.2698	-162.5180	-298.0165	-1207.2354	-570.4915
3617	-5340.6514	-253.0626	-573.9971	328.4126	-3062.4241	275.1415
3618	-2917.9031	61.6879	-162.0719	-299.1609	-1206.3068	-570.0415
3621	-5169.1333	-263.4108	-532.1301	324.4791	-2869.8420	-410.2899
3622	-2960.3081	68.5197	-132.3098	-296.1642	-1110.5488	170.2697
3623	-2959.9609	68.9378	-131.8637	-297.3087	-1109.6202	170.7197
3624	-5169.4805	-263.8289	-532.5762	325.6235	-2870.7705	-410.7400
3625	-5275.7480	-254.4027	-537.7365	326.7997	-2917.3254	303.0314
3626	-2853.6934	59.5116	-126.7034	-298.4849	-1063.0653	-543.0517
3627	-5276.0952	-254.8208	-538.1826	327.9442	-2918.2539	302.5814
3628	-2853.3464	59.9297	-126.2573	-299.6293	-1062.1368	-542.6016
3631	-6345.1230	-265.2574	-615.4205	327.5801	-3405.9648	-460.8453
3632	-4136.2979	66.6731	-215.6002	-293.0632	-1646.6715	119.7143
3633	-4135.9507	67.0913	-215.1541	-294.2076	-1645.7430	120.1644
3634	-6345.4702	-265.6755	-615.8666	328.7245	-3406.8933	-461.2953
3635	-6451.7378	-256.2492	-621.0269	329.9008	-3453.4482	252.4761
3636	-4029.6833	57.6650	-209.9938	-295.3839	-1599.1881	-593.6070
3637	-6452.0850	-256.6674	-621.4729	331.0452	-3454.3767	252.0260
3638	-4029.3362	58.0831	-209.5477	-296.5283	-1598.2595	-593.1570
3641	-4122.2568	-258.0478	-520.4689	322.3150	-2622.0593	-414.6143
3642	-1913.4316	73.8827	-120.6486	-298.3284	-862.7661	165.9453
3643	-1913.0844	74.3008	-120.2025	-299.4727	-861.8375	166.3953
3644	-4122.6040	-258.4659	-520.9149	323.4594	-2622.9878	-415.0644
3645	-4228.8711	-249.0397	-526.0753	324.6357	-2669.5427	298.7070
3646	-1806.8170	64.8746	-115.0422	-300.6490	-815.2825	-547.3760
3647	-4229.2188	-249.4578	-526.5213	325.7800	-2670.4712	298.2570
3648	-1806.4698	65.2927	-114.5961	-301.7934	-814.3540	-546.9260
3651	-5298.2461	-259.8944	-603.7593	325.4160	-3158.1821	-465.1696
3652	-3089.4211	72.0361	-203.9389	-295.2274	-1398.8888	115.3899
3653	-3089.0740	72.4543	-203.4929	-296.3718	-1397.9603	115.8400
3654	-5298.5938	-260.3125	-604.2053	326.5604	-3159.1106	-465.6197
3655	-5404.8608	-250.8863	-609.3656	327.7366	-3205.6655	248.1517
3656	-2982.8064	63.0280	-198.3326	-297.5480	-1351.4053	-597.9314
3657	-5405.2080	-251.3044	-609.8117	328.8810	-3206.5940	247.7016
3658	-2982.4595	63.4461	-197.8865	-298.6924	-1350.4768	-597.4813
3701	-4128.3594	-60.0671	-364.7755	-51.2327	-2127.0410	-186.5737
3702	-4063.8027	-61.8253	-328.9609	-51.7011	-1982.8711	-159.1338
3703	-5239.7925	-63.6719	-412.2513	-48.6001	-2518.9939	-209.6891
3704	-3016.9263	-56.4623	-317.2997	-53.8653	-1735.0883	-163.4582
3705	-4192.9155	-58.3089	-400.5901	-50.7643	-2271.2112	-214.0135
3711	-5232.7715	-226.0324	-564.6857	259.0890	-3006.6877	-476.8535
3712	-3023.9465	105.8981	-164.8654	-361.5544	-1247.3944	103.7061
3713	-3023.5994	106.3163	-164.4193	-362.6988	-1246.4659	104.1562
3714	-5233.1191	-226.4505	-565.1317	260.2334	-3007.6162	-477.3036
3715	-5339.3867	-217.0242	-570.2920	261.4096	-3054.1711	236.4679
3716	-2917.3320	96.8900	-159.2590	-363.8750	-1199.9110	-609.6152
3717	-5339.7334	-217.4424	-570.7381	262.5540	-3055.0996	236.0178
3718	-2916.9849	97.3081	-158.8129	-365.0194	-1198.9824	-609.1652
3721	-5168.2153	-227.7906	-528.8711	258.6205	-2862.5176	-449.4136
3722	-2959.3901	104.1399	-129.0508	-362.0228	-1103.2244	131.1460
3723	-2959.0430	104.5580	-128.6047	-363.1672	-1102.2959	131.5960
3724	-5168.5625	-228.2088	-529.3171	259.7650	-2863.4463	-449.8636
3725	-5274.8301	-218.7825	-534.4774	260.9412	-2910.0012	263.9077
3726	-2852.7754	95.1318	-123.4444	-364.3434	-1055.7410	-582.1754
3727	-5275.1772	-219.2006	-534.9235	262.0856	-2910.9297	263.4577
3728	-2852.4285	95.5499	-122.9983	-365.4879	-1054.8125	-581.7253
3731	-6344.2051	-229.6372	-612.1614	261.7216	-3398.6404	-499.9689
3732	-4135.3799	102.2934	-212.3412	-358.9218	-1639.3472	80.5907
3733	-4135.0327	102.7115	-211.8951	-360.0662	-1638.4187	81.0407
3734	-6344.5522	-230.0553	-612.6075	262.8659	-3399.5688	-500.4190
3735	-6450.8198	-220.6290	-617.7678	264.0422	-3446.1240	213.3524
3736	-4028.7651	93.2852	-206.7348	-361.2424	-1591.8638	-632.7307
3737	-6451.1670	-221.0472	-618.2139	265.1866	-3447.0525	212.9023
3738	-4028.4182	93.7034	-206.2887	-362.3868	-1590.9352	-632.2806
3741	-4121.3389	-222.4276	-517.2098	256.4564	-2614.7349	-453.7380
3742	-1912.5135	109.5029	-117.3895	-364.1870	-855.4417	126.8216
3743	-1912.1664	109.9211	-116.9435	-365.3313	-854.5131	127.2716

	3744	-4121.6860	-222.8457	-517.6559	257.6008	-2615.6633	-454.1880
	3745	-4227.9531	-213.4195	-522.8162	258.7771	-2662.2183	259.5833
	3746	-1805.8990	100.4948	-111.7832	-366.5076	-807.9582	-586.4997
	3747	-4228.3008	-213.8376	-523.2623	259.9214	-2663.1470	259.1333
	3748	-1805.5518	100.9129	-111.3371	-367.6520	-807.0296	-586.0497
	3751	-5297.3281	-224.2742	-600.5002	259.5574	-3150.8577	-504.2934
	3752	-3088.5032	107.6564	-200.6799	-361.0859	-1391.5645	76.2663
	3753	-3088.1558	108.0745	-200.2339	-362.2303	-1390.6360	76.7163
	3754	-5297.6758	-224.6923	-600.9463	260.7018	-3151.7861	-504.7434
	3755	-5403.9429	-215.2660	-606.1066	261.8781	-3198.3411	209.0280
	3756	-2981.8884	98.6482	-195.0736	-363.4066	-1344.0809	-637.0551
	3757	-5404.2900	-215.6842	-606.5527	263.0225	-3199.2698	208.5780
	3758	-2981.5415	99.0664	-194.6275	-364.5510	-1343.1525	-636.6050
GB02	3501	-4140.3398	-88.7485	-366.4747	-18.8086	-2391.5300	-213.8759
	3502	-4075.7834	-90.5068	-330.6602	-19.2771	-2222.1108	-187.6756
	3503	-5251.7734	-92.3533	-413.9505	-16.1761	-2816.9531	-239.5327
	3504	-3028.9070	-85.1438	-318.9989	-21.4412	-1966.1068	-188.2191
	3505	-4204.8965	-86.9903	-402.2893	-18.3402	-2560.9492	-240.0762
	3511	-5244.7524	-254.7138	-566.3849	291.5130	-3412.1125	-621.1606
	3512	-3035.9272	77.2167	-166.5646	-329.1303	-1370.9474	193.4088
	3513	-3035.5801	77.6349	-166.1185	-330.2747	-1369.7043	194.1537
	3514	-5245.0996	-255.1319	-566.8309	292.6574	-3413.3555	-621.9055
	3515	-5351.3672	-245.7057	-571.9912	293.8337	-3463.5483	98.5114
	3516	-2929.3127	68.2086	-160.9582	-331.4510	-1319.5115	-526.2632
	3517	-5351.7144	-246.1238	-572.4373	294.9781	-3464.7915	97.7666
	3518	-2928.9656	68.6267	-160.5121	-332.5954	-1318.2684	-525.5184
	3521	-5180.1958	-256.4720	-530.5703	291.0446	-3242.6934	-594.9603
	3522	-2971.3708	75.4585	-130.7500	-329.5988	-1201.5282	219.6091
	3523	-2971.0237	75.8766	-130.3039	-330.7431	-1200.2852	220.3540
	3524	-5180.5435	-256.8902	-531.0164	292.1890	-3243.9365	-595.7051
	3525	-5286.8110	-247.4639	-536.1766	293.3652	-3294.1292	124.7117
	3526	-2864.7561	66.4504	-125.1436	-331.9194	-1150.0923	-500.0629
	3527	-5287.1577	-247.8820	-536.6227	294.5096	-3295.3723	123.9669
	3528	-2864.4092	66.8685	-124.6975	-333.0638	-1148.8492	-499.3180
	3531	-6356.1855	-258.3186	-613.8607	294.1456	-3837.5354	-646.8174
	3532	-4147.3608	73.6119	-214.0404	-326.4977	-1796.3706	167.7520
	3533	-4147.0132	74.0301	-213.5943	-327.6421	-1795.1276	168.4968
	3534	-6356.5332	-258.7367	-614.3068	295.2900	-3838.7788	-647.5623
	3535	-6462.8008	-249.3104	-619.4670	296.4662	-3888.9717	72.8546
	3536	-4040.7458	64.6038	-208.4340	-328.8184	-1744.9347	-551.9200
	3537	-6463.1475	-249.7286	-619.9131	297.6107	-3890.2144	72.1097
	3538	-4040.3989	65.0219	-207.9879	-329.9628	-1743.6917	-551.1752
	3541	-4133.3193	-251.1090	-518.9091	288.8805	-2986.6895	-595.5038
	3542	-1924.4944	80.8215	-119.0888	-331.7629	-945.5242	219.0657
	3543	-1924.1471	81.2396	-118.6427	-332.9073	-944.2812	219.8105
	3544	-4133.6670	-251.5271	-519.3552	290.0248	-2987.9324	-596.2486
	3545	-4239.9341	-242.1009	-524.5154	291.2011	-3038.1252	124.1683
	3546	-1817.8798	71.8134	-113.4824	-334.0836	-894.0883	-500.6064
	3547	-4240.2817	-242.5190	-524.9615	292.3455	-3039.3684	123.4234
	3548	-1817.5325	72.2315	-113.0363	-335.2279	-892.8453	-499.8615
	3551	-5309.3086	-252.9556	-602.1995	291.9815	-3581.5317	-647.3610
	3552	-3100.4839	78.9750	-202.3792	-328.6619	-1540.3666	167.2085
	3553	-3100.1367	79.3931	-201.9331	-329.8063	-1539.1235	167.9533
	3554	-5309.6563	-253.3737	-602.6455	293.1259	-3582.7747	-648.1058
	3555	-5415.9238	-243.9474	-607.8058	294.3021	-3632.9675	72.3111
	3556	-2993.8691	69.9668	-196.7728	-330.9825	-1488.9307	-552.4636
	3557	-5416.2710	-244.3656	-608.2519	295.4465	-3634.2107	71.5662
	3558	-2993.5222	70.3849	-196.3267	-332.1269	-1487.6876	-551.7187
	3601	-4140.7266	-95.6873	-368.0345	14.6259	-2393.8284	-214.9092
	3602	-4076.1699	-97.4456	-332.2199	14.1574	-2224.4092	-188.7089
	3603	-5252.1597	-99.2921	-415.5103	17.2584	-2819.2515	-240.5661
	3604	-3029.2935	-92.0826	-320.5587	11.9933	-1968.4052	-189.2524
	3605	-4205.2827	-93.9291	-403.8491	15.0943	-2563.2476	-241.1096
	3611	-5245.1387	-261.6526	-567.9447	324.9475	-3414.4109	-622.1940
	3612	-3036.3137	70.2779	-168.1244	-295.6958	-1373.2457	192.3755
	3613	-3035.9666	70.6961	-167.6783	-296.8402	-1372.0027	193.1203
	3614	-5245.4863	-262.0707	-568.3907	326.0919	-3415.6538	-622.9388
	3615	-5351.7539	-252.6445	-573.5510	327.2682	-3465.8467	97.4781
	3616	-2929.6990	61.2698	-162.5180	-298.0165	-1321.8098	-527.2966
	3617	-5352.1006	-253.0626	-573.9971	328.4126	-3467.0898	96.7332
	3618	-2929.3521	61.6879	-162.0719	-299.1609	-1320.5668	-526.5517
	3621	-5180.5820	-263.4108	-532.1301	324.4791	-3244.9917	-595.9937
	3622	-2971.7573	68.5197	-132.3098	-296.1642	-1203.8265	218.5758
	3623	-2971.4102	68.9378	-131.8637	-297.3087	-1202.5835	219.3206
	3624	-5180.9297	-263.8289	-532.5762	325.6235	-3246.2349	-596.7385
	3625	-5287.1973	-254.4027	-537.7365	326.7997	-3296.4275	123.6784
	3626	-2865.1426	59.5116	-126.7034	-298.4849	-1152.3906	-501.0962
	3627	-5287.5444	-254.8208	-538.1826	327.9442	-3297.6707	122.9335
	3628	-2864.7957	59.9297	-126.2573	-299.6293	-1151.1476	-500.3514
	3631	-6356.5723	-265.2574	-615.4205	327.5801	-3839.8340	-647.8508
	3632	-4147.7471	66.6731	-215.6002	-293.0632	-1798.6689	166.7186
	3633	-4147.3999	67.0913	-215.1541	-294.2076	-1797.4259	167.4635
	3634	-6356.9194	-265.6755	-615.8666	328.7245	-3841.0769	-648.5956
	3635	-6463.1870	-256.2492	-621.0269	329.9008	-3891.2703	71.8212
	3636	-4041.1323	57.6650	-209.9938	-295.3839	-1747.2330	-552.9534
	3637	-6463.5342	-256.6674	-621.4729	331.0452	-3892.5129	71.0764
	3638	-4040.7854	58.0831	-209.5477	-296.5283	-1745.9900	-552.2086
	3641	-4133.7061	-258.0478	-520.4689	322.3150	-2988.9878	-596.5371
	3642	-1924.8807	73.8827	-120.6486	-298.3284	-947.8226	218.0323
	3643	-1924.5336	74.3008	-120.2025	-299.4727	-946.5795	218.7771
	3644	-4134.0532	-258.4659	-520.9149	323.4594	-2990.2307	-597.2820

			3645	-4240.3203	-249.0397	-526.0753	324.6357	-3040.4236	123.1349
			3646	-1818.2662	64.8746	-115.0422	-300.6490	-896.3867	-501.6397
			3647	-4240.6680	-249.4578	-526.5213	325.7800	-3041.6667	122.3901
			3648	-1817.9189	65.2927	-114.5961	-301.7934	-895.1436	-500.8949
			3651	-5309.6953	-259.8944	-603.7593	325.4160	-3583.8301	-648.3943
			3652	-3100.8704	72.0361	-203.9389	-295.2274	-1542.6649	166.1752
			3653	-3100.5229	72.4543	-203.4929	-296.3718	-1541.4219	166.9200
			3654	-5310.0430	-260.3125	-604.2053	326.5604	-3585.0730	-649.1392
			3655	-5416.3101	-250.8863	-609.3656	327.7366	-3635.2659	71.2778
			3656	-2994.2556	63.0280	-198.3326	-297.5480	-1491.2290	-553.4969
			3657	-5416.6572	-251.3044	-609.8117	328.8810	-3636.5090	70.5329
			3658	-2993.9087	63.4461	-197.8865	-298.6924	-1489.9860	-552.7520
			3701	-4139.8086	-60.0671	-364.7755	-51.2327	-2384.2063	-228.9208
			3702	-4075.2520	-61.8253	-328.9609	-51.7011	-2214.7871	-202.7205
			3703	-5251.2417	-63.6719	-412.2513	-48.6001	-2809.6294	-254.5776
			3704	-3028.3755	-56.4623	-317.2997	-53.8653	-1958.7831	-203.2640
			3705	-4204.3647	-58.3089	-400.5901	-50.7643	-2553.6255	-255.1211
			3711	-5244.2207	-226.0324	-564.6857	259.0890	-3404.7888	-636.2056
			3712	-3035.3958	105.8981	-164.8654	-361.5544	-1363.6238	178.3639
			3713	-3035.0486	106.3163	-164.4193	-362.6988	-1362.3807	179.1088
			3714	-5244.5684	-226.4505	-565.1317	260.2334	-3406.0320	-636.9503
			3715	-5350.8359	-217.0242	-570.2920	261.4096	-3456.2249	83.4665
			3716	-2928.7810	96.8900	-159.2590	-363.8750	-1312.1879	-541.3081
			3717	-5351.1826	-217.4424	-570.7381	262.5540	-3457.4678	82.7217
			3718	-2928.4341	97.3081	-158.8129	-365.0194	-1310.9448	-540.5632
			3721	-5179.6641	-227.7906	-528.8711	258.6205	-3235.3696	-610.0052
			3722	-2970.8394	104.1399	-129.0508	-362.0228	-1194.2046	204.5643
			3723	-2970.4922	104.5580	-128.6047	-363.1672	-1192.9615	205.3091
			3724	-5180.0117	-228.2088	-529.3171	259.7650	-3236.6128	-610.7500
			3725	-5286.2793	-218.7825	-534.4774	260.9412	-3286.8057	109.6669
			3726	-2864.2246	95.1318	-123.4444	-364.3434	-1142.7687	-515.1078
			3727	-5286.6260	-219.2006	-534.9235	262.0856	-3288.0486	108.9220
			3728	-2863.8777	95.5499	-122.9983	-365.4879	-1141.5256	-514.3629
			3731	-6355.6543	-229.6372	-612.1614	261.7216	-3830.2122	-661.8624
			3732	-4146.8291	102.2934	-212.3412	-358.9218	-1789.0469	152.7071
			3733	-4146.4819	102.7115	-211.8951	-360.0662	-1787.8038	153.4519
			3734	-6356.0015	-230.0553	-612.6075	262.8659	-3831.4551	-662.6072
			3735	-6462.2690	-220.6290	-617.7678	264.0422	-3881.6479	57.8097
			3736	-4040.2144	93.2852	-206.7348	-361.2424	-1737.6110	-566.9649
			3737	-6462.6162	-221.0472	-618.2139	265.1866	-3882.8911	57.0649
			3738	-4039.8674	93.7034	-206.2887	-362.3868	-1736.3679	-566.2201
			3741	-4132.7881	-222.4276	-517.2098	256.4564	-2979.3657	-610.5487
			3742	-1923.9628	109.5029	-117.3895	-364.1870	-938.2006	204.0208
			3743	-1923.6155	109.9211	-116.9435	-365.3313	-936.9575	204.7656
			3744	-4133.1353	-222.8457	-517.6559	257.6008	-2980.6086	-611.2935
			3745	-4239.4023	-213.4195	-522.8162	258.7771	-3030.8015	109.1234
			3746	-1817.3481	100.4948	-111.7832	-366.5076	-886.7646	-515.6513
			3747	-4239.7500	-213.8376	-523.2623	259.9214	-3032.0447	108.3785
			3748	-1817.0010	100.9129	-111.3371	-367.6520	-885.5216	-514.9064
			3751	-5308.7773	-224.2742	-600.5002	259.5574	-3574.2080	-662.4058
			3752	-3099.9524	107.6564	-200.6799	-361.0859	-1533.0430	152.1636
			3753	-3099.6050	108.0745	-200.2339	-362.2303	-1531.7998	152.9084
			3754	-5309.1250	-224.6923	-600.9463	260.7018	-3575.4512	-663.1507
			3755	-5415.3921	-215.2660	-606.1066	261.8781	-3625.6440	57.2662
			3756	-2993.3376	98.6482	-195.0736	-363.4066	-1481.6071	-567.5084
			3757	-5415.7393	-215.6842	-606.5527	263.0225	-3626.8870	56.5213
			3758	-2992.9907	99.0664	-194.6275	-364.5510	-1480.3640	-566.7636
1372-GA01	1372	DM5	3101	-2534.3013	-152.6621	275.1502	-141.8151	1973.7765	-352.0597
			3102	-2503.6912	-152.4808	323.6229	-146.7989	2058.0149	-322.6519
			3103	-1614.1199	-157.0415	236.5976	-139.6562	1536.5637	-364.1990
			3104	-3454.4829	-148.2827	313.7027	-143.9740	2410.9890	-339.9203
			3105	-2564.9116	-152.8434	226.6775	-136.8313	1889.5381	-381.4674
			3201	-3721.0388	-30.4443	485.0686	84.0717	2775.7339	-807.6776
			3202	-1347.5640	-274.8799	65.2318	-367.7019	1171.8192	103.5582
			3203	-1347.5640	-274.8799	65.2318	-367.7019	1171.8192	103.5582
			3204	-3721.0388	-30.4443	485.0686	84.0717	2775.7339	-807.6776
			3205	-3610.5645	-10.4097	470.3678	110.0436	2701.9883	-81.2399
			3206	-1458.0382	-294.9145	79.9326	-393.6739	1245.5646	-622.8795
			3207	-3610.5645	-10.4097	470.3678	110.0437	2701.9883	-81.2399
			3208	-1458.0382	-294.9145	79.9326	-393.6739	1245.5646	-622.8795
			3211	-3690.4285	-30.2630	533.5413	79.0879	2859.9722	-778.2697
			3212	-1316.9539	-274.6986	113.7045	-372.6857	1256.0575	132.9660
			3213	-1316.9539	-274.6986	113.7045	-372.6857	1256.0575	132.9660
			3214	-3690.4285	-30.2630	533.5413	79.0879	2859.9722	-778.2697
			3215	-3579.9543	-10.2284	518.8405	105.0598	2786.2268	-51.8321
			3216	-1427.4281	-294.7332	128.4053	-398.6577	1329.8029	-593.4717
			3217	-3579.9543	-10.2284	518.8405	105.0599	2786.2268	-51.8321
			3218	-1427.4281	-294.7332	128.4053	-398.6577	1329.8029	-593.4717
			3221	-2800.8574	-34.8237	446.5161	86.2306	2338.5210	-819.8168
			3222	-427.3825	-279.2593	26.6792	-365.5430	734.6065	91.4188
			3223	-427.3825	-279.2593	26.6792	-365.5430	734.6065	91.4188
			3224	-2800.8574	-34.8237	446.5161	86.2306	2338.5210	-819.8168
			3225	-2690.3831	-14.7891	431.8152	112.2025	2264.7756	-93.3793
			3226	-537.8568	-299.2939	41.3800	-391.5150	808.3519	-635.0188
			3227	-2690.3831	-14.7891	431.8152	112.2026	2264.7756	-93.3793
			3228	-537.8568	-299.2939	41.3800	-391.5150	808.3519	-635.0188
			3231	-4641.2202	-26.0649	523.6212	81.9128	3212.9463	-795.5381
			3232	-2267.7454	-270.5005	103.7843	-369.8608	1609.0319	115.6976
			3233	-2267.7454	-270.5005	103.7843	-369.8608	1609.0319	115.6976
			3234	-4641.2202	-26.0649	523.6212	81.9128	3212.9463	-795.5381

	3235	-4530.7461	-6.0303	508.9203	107.8847	3139.2009	-69.1005
	3236	-2378.2197	-290.5351	118.4851	-395.8328	1682.7772	-610.7401
	3237	-4530.7461	-6.0303	508.9203	107.8848	3139.2009	-69.1005
	3238	-2378.2197	-290.5351	118.4851	-395.8328	1682.7772	-610.7401
	3241	-3751.6487	-30.6256	436.5959	89.0555	2691.4954	-837.0853
	3242	-1378.1742	-275.0612	16.7591	-362.7181	1087.5809	74.1505
	3243	-1378.1742	-275.0611	16.7591	-362.7181	1087.5809	74.1505
	3244	-3751.6487	-30.6256	436.5959	89.0555	2691.4954	-837.0853
	3245	-3641.1748	-10.5910	421.8951	115.0274	2617.7500	-110.6476
	3246	-1488.6483	-295.0957	31.4599	-388.6900	1161.3262	-652.2872
	3247	-3641.1748	-10.5910	421.8951	115.0275	2617.7500	-110.6476
	3248	-1488.6483	-295.0957	31.4599	-388.6901	1161.3262	-652.2872
	3301	-4907.7764	91.7735	694.9870	309.9585	3577.6909	-1263.2953
	3302	-160.8266	-397.0977	-144.6866	-593.5887	369.8620	559.1761
	3303	-160.8266	-397.0977	-144.6866	-593.5887	369.8620	559.1761
	3304	-4907.7764	91.7734	694.9870	309.9585	3577.6909	-1263.2953
	3305	-4686.8276	131.8427	665.5854	361.9023	3430.2002	189.5799
	3306	-381.7752	-437.1668	-115.2851	-645.5326	517.3527	-893.6992
	3307	-4686.8276	131.8427	665.5854	361.9024	3430.2002	189.5799
	3308	-381.7752	-437.1668	-115.2851	-645.5327	517.3527	-893.6992
	3311	-4877.1665	91.9547	743.4597	304.9747	3661.9292	-1233.8877
	3312	-130.2164	-396.9164	-96.2139	-598.5725	454.1003	588.5838
	3313	-130.2164	-396.9164	-96.2139	-598.5725	454.1003	588.5838
	3314	-4877.1665	91.9547	743.4597	304.9747	3661.9292	-1233.8877
	3315	-4656.2173	132.0239	714.0581	356.9186	3514.4387	218.9876
	3316	-351.1650	-436.9855	-66.8124	-650.5164	601.5911	-864.2914
	3317	-4656.2173	132.0239	714.0581	356.9186	3514.4387	218.9876
	3318	-351.1650	-436.9855	-66.8124	-650.5164	601.5911	-864.2914
	3321	-3987.5947	87.3940	656.4344	312.1174	3140.4783	-1275.4348
	3322	759.3549	-401.4771	-183.2392	-591.4297	-67.3507	547.0367
	3323	759.3549	-401.4771	-183.2392	-591.4297	-67.3507	547.0367
	3324	-3987.5947	87.3940	656.4344	312.1174	3140.4783	-1275.4348
	3325	-3766.6460	127.4632	627.0329	364.0613	2992.9873	177.4405
	3326	538.4063	-441.5463	-153.8376	-643.3737	80.1400	-905.8386
	3327	-3766.6460	127.4632	627.0329	364.0613	2992.9873	177.4405
	3328	538.4063	-441.5463	-153.8376	-643.3737	80.1400	-905.8386
	3331	-5827.9575	96.1529	733.5396	307.7996	4014.9036	-1251.1560
	3332	-1081.0081	-392.7182	-106.1341	-595.7476	807.0746	571.3154
	3333	-1081.0081	-392.7182	-106.1341	-595.7476	807.0746	571.3154
	3334	-5827.9575	96.1529	733.5396	307.7996	4014.9036	-1251.1560
	3335	-5607.0088	136.2221	704.1380	359.7435	3867.4128	201.7193
	3336	-1301.9567	-432.7874	-76.7325	-647.6915	954.5654	-881.5598
	3337	-5607.0088	136.2221	704.1380	359.7435	3867.4128	201.7193
	3338	-1301.9567	-432.7874	-76.7325	-647.6916	954.5654	-881.5598
	3341	-4938.3862	91.5922	646.5143	314.9423	3493.4526	-1292.7031
	3342	-191.4367	-397.2789	-193.1593	-588.6049	285.6236	529.7683
	3343	-191.4367	-397.2789	-193.1593	-588.6049	285.6236	529.7683
	3344	-4938.3862	91.5922	646.5143	314.9423	3493.4526	-1292.7031
	3345	-4717.4380	131.6614	617.1127	366.8862	3345.9619	160.1721
	3346	-412.3853	-437.3481	-163.7578	-640.5488	433.1144	-923.1069
	3347	-4717.4380	131.6614	617.1127	366.8862	3345.9619	160.1721
	3348	-412.3853	-437.3481	-163.7578	-640.5488	433.1144	-923.1069
GA01	3101	-2550.1357	-152.6621	275.1502	-141.8151	2242.0469	-500.9047
	3102	-2519.5254	-152.4808	323.6229	-146.7989	2373.5459	-471.3202
	3103	-1629.9542	-157.0415	236.5976	-139.6562	1767.2458	-517.3140
	3104	-3470.3171	-148.2827	313.7027	-143.9740	2716.8481	-484.4954
	3105	-2580.7458	-152.8434	226.6775	-136.8313	2110.5481	-530.4892
	3201	-3736.8728	-30.4443	485.0686	84.0717	3248.6738	-837.3606
	3202	-1363.3982	-274.8799	65.2318	-367.7019	1235.4199	-164.4487
	3203	-1363.3982	-274.8799	65.2318	-367.7019	1235.4199	-164.4487
	3204	-3736.8728	-30.4443	485.0686	84.0717	3248.6738	-837.3606
	3205	-3626.3989	-10.4097	470.3678	110.0436	3160.5955	-91.3893
	3206	-1473.8724	-294.9145	79.9326	-393.6739	1323.4985	-910.4200
	3207	-3626.3989	-10.4097	470.3678	110.0437	3160.5955	-91.3893
	3208	-1473.8724	-294.9145	79.9326	-393.6739	1323.4985	-910.4200
	3211	-3706.2629	-30.2630	533.5413	79.0879	3380.1729	-807.7761
	3212	-1332.7881	-274.6986	113.7045	-372.6857	1366.9189	-134.8642
	3213	-1332.7881	-274.6986	113.7045	-372.6857	1366.9189	-134.8642
	3214	-3706.2629	-30.2630	533.5413	79.0879	3380.1729	-807.7761
	3215	-3595.7886	-10.2284	518.8405	105.0598	3292.0945	-61.8048
	3216	-1443.2623	-294.7332	128.4053	-398.6577	1454.9976	-880.8355
	3217	-3595.7886	-10.2284	518.8405	105.0599	3292.0945	-61.8048
	3218	-1443.2623	-294.7332	128.4053	-398.6577	1454.9976	-880.8355
	3221	-2816.6914	-34.8237	446.5161	86.2306	2773.8728	-853.7700
	3222	-443.2168	-279.2593	26.6792	-365.5430	760.6188	-180.8580
	3223	-443.2168	-279.2593	26.6792	-365.5430	760.6188	-180.8580
	3224	-2816.6914	-34.8237	446.5161	86.2306	2773.8728	-853.7700
	3225	-2706.2173	-14.7891	431.8152	112.2025	2685.7942	-107.7986
	3226	-553.6911	-299.2939	41.3800	-391.5150	848.6974	-926.8293
	3227	-2706.2173	-14.7891	431.8152	112.2026	2685.7942	-107.7986
	3228	-553.6911	-299.2939	41.3800	-391.5150	848.6974	-926.8293
	3231	-4657.0542	-26.0649	523.6212	81.9128	3723.4751	-820.9514
	3232	-2283.5796	-270.5005	103.7843	-369.8608	1710.2211	-148.0394
	3233	-2283.5796	-270.5005	103.7843	-369.8608	1710.2211	-148.0394
	3234	-4657.0542	-26.0649	523.6212	81.9128	3723.4751	-820.9514
	3235	-4546.5801	-6.0303	508.9203	107.8847	3635.3965	-74.9800
	3236	-2394.0540	-290.5351	118.4851	-395.8328	1798.2997	-894.0107
	3237	-4546.5801	-6.0303	508.9203	107.8848	3635.3965	-74.9800
	3238	-2394.0540	-290.5351	118.4851	-395.8328	1798.2997	-894.0107
	3241	-3767.4834	-30.6256	436.5959	89.0555	3117.1748	-866.9451
	3242	-1394.0084	-275.0612	16.7591	-362.7181	1103.9210	-194.0332

			3243	-1394.0084	-275.0611	16.7591	-362.7181	1103.9210	-194.0332
			3244	-3767.4834	-30.6256	436.5959	89.0555	3117.1748	-866.9451
			3245	-3657.0090	-10.5910	421.8951	115.0274	3029.0964	-120.9738
			3246	-1504.4827	-295.0957	31.4599	-388.6900	1191.9995	-940.0045
			3247	-3657.0090	-10.5910	421.8951	115.0275	3029.0964	-120.9738
			3248	-1504.4827	-295.0957	31.4599	-388.6901	1191.9995	-940.0045
			3301	-4923.6104	91.7735	694.9870	309.9585	4255.3008	-1173.8165
			3302	-176.6609	-397.0977	-144.6866	-593.5887	228.7929	172.0072
			3303	-176.6609	-397.0977	-144.6866	-593.5887	228.7929	172.0072
			3304	-4923.6104	91.7734	694.9870	309.9585	4255.3008	-1173.8165
			3305	-4702.6621	131.8427	665.5854	361.9023	4079.1436	318.1260
			3306	-397.6095	-437.1668	-115.2851	-645.5326	404.9502	-1319.9354
			3307	-4702.6621	131.8427	665.5854	361.9024	4079.1436	318.1260
			3308	-397.6095	-437.1668	-115.2851	-645.5327	404.9502	-1319.9354
			3311	-4893.0005	91.9547	743.4597	304.9747	4386.7998	-1144.2321
			3312	-146.0507	-396.9164	-96.2139	-598.5725	360.2919	201.5917
			3313	-146.0507	-396.9164	-96.2139	-598.5725	360.2919	201.5917
			3314	-4893.0005	91.9547	743.4597	304.9747	4386.7998	-1144.2321
			3315	-4672.0518	132.0239	714.0581	356.9186	4210.6426	347.7106
			3316	-366.9993	-436.9855	-66.8124	-650.5164	536.4492	-1290.3508
			3317	-4672.0518	132.0239	714.0581	356.9186	4210.6426	347.7106
			3318	-366.9993	-436.9855	-66.8124	-650.5164	536.4492	-1290.3508
			3321	-4003.4290	87.3940	656.4344	312.1174	3780.4998	-1190.2260
			3322	743.5206	-401.4771	-183.2392	-591.4297	-246.0082	155.5979
			3323	743.5206	-401.4771	-183.2392	-591.4297	-246.0082	155.5979
			3324	-4003.4290	87.3940	656.4344	312.1174	3780.4998	-1190.2260
			3325	-3782.4805	127.4632	627.0329	364.0613	3604.3425	301.7167
			3326	522.5720	-441.5463	-153.8376	-643.3737	-69.8510	-1336.3447
			3327	-3782.4805	127.4632	627.0329	364.0613	3604.3425	301.7167
			3328	522.5720	-441.5463	-153.8376	-643.3737	-69.8510	-1336.3447
			3331	-5843.7915	96.1529	733.5396	307.7996	4730.1021	-1157.4072
			3332	-1096.8423	-392.7182	-106.1341	-595.7476	703.5941	188.4165
			3333	-1096.8423	-392.7182	-106.1341	-595.7476	703.5941	188.4165
			3334	-5843.7915	96.1529	733.5396	307.7996	4730.1021	-1157.4072
			3335	-5622.8433	136.2221	704.1380	359.7435	4553.9448	334.5353
			3336	-1317.7909	-432.7874	-76.7325	-647.6915	879.7513	-1303.5261
			3337	-5622.8433	136.2221	704.1380	359.7435	4553.9448	334.5353
			3338	-1317.7909	-432.7874	-76.7325	-647.6916	879.7513	-1303.5261
			3341	-4954.2207	91.5922	646.5143	314.9423	4123.8018	-1203.4011
			3342	-207.2710	-397.2789	-193.1593	-588.6049	97.2940	142.4227
			3343	-207.2710	-397.2789	-193.1593	-588.6049	97.2940	142.4227
			3344	-4954.2207	91.5922	646.5143	314.9423	4123.8018	-1203.4011
			3345	-4733.2720	131.6614	617.1127	366.8862	3947.6445	288.5415
			3346	-428.2196	-437.3481	-163.7578	-640.5488	273.4512	-1349.5199
			3347	-4733.2720	131.6614	617.1127	366.8862	3947.6445	288.5415
			3348	-428.2196	-437.3481	-163.7578	-640.5488	273.4512	-1349.5199
1372-GA01	1372	DM5	3401	-5107.3911	285.9643	839.7795	177.5775	3620.4375	340.7029
			3402	-5939.7813	429.3106	1072.8004	288.9150	4258.6030	597.5204
			3403	-4071.2424	261.7958	775.3816	165.3687	3107.4819	297.9157
			3404	-6143.5400	310.1328	904.1774	189.7862	4133.3931	383.4902
			3405	-4275.0010	142.6180	606.7586	66.2399	2982.2722	83.8855
	GA01		3401	-5123.2251	285.9643	839.7795	177.5775	4439.2197	619.5172
			3402	-5955.6152	429.3106	1072.8004	288.9150	5304.5801	1016.0969
			3403	-4087.0764	261.7958	775.3816	165.3687	3863.4768	553.1658
			3404	-6159.3740	310.1328	904.1774	189.7862	5014.9629	685.8686
			3405	-4290.8350	142.6180	606.7586	66.2399	3573.8601	222.9376
1372-GA01	1372	DM5	3411	1092.9860	-748.1064	-522.2332	-728.9548	-494.9182	-1307.3424
			3412	1038.7798	-734.5207	-455.3809	-719.8575	-354.1907	-1256.1592
			3413	2906.8967	-900.7262	-759.9000	-865.7256	-1538.2460	-1556.6881
			3414	-720.9248	-595.4865	-284.5663	-592.1840	548.4095	-1057.9966
			3415	1147.1920	-761.6920	-589.0854	-738.0521	-635.6457	-1358.5255
	GA01		3411	1077.1516	-748.1064	-522.2332	-728.9548	-1004.0938	-2036.7432
			3412	1022.9455	-734.5207	-455.3809	-719.8575	-798.1855	-1972.3140
			3413	2891.0625	-900.7262	-759.9000	-865.7256	-2279.1460	-2434.8926
			3414	-736.7591	-595.4865	-284.5663	-592.1840	270.9583	-1638.5936
			3415	1131.3577	-761.6920	-589.0854	-738.0521	-1210.0020	-2101.1724
1372-GA01	1372	DM5	3421	-10.8088	-503.5121	-264.6388	-510.6033	207.2305	288.6299
			3422	22.1191	-506.7726	-218.2096	-514.0897	289.5233	307.1725
			3423	103.0029	-379.5594	-122.0935	-385.1370	342.4986	159.4931
			3424	-124.6205	-627.4648	-407.1840	-636.0697	71.9624	417.7666
			3425	-43.7367	-500.2516	-311.0680	-507.1170	124.9377	270.0873
	GA01		3421	-26.6431	-503.5121	-264.6388	-510.6033	-50.7914	-202.2927
			3422	6.2848	-506.7726	-218.2096	-514.0897	76.7697	-186.9290
			3423	87.1686	-379.5594	-122.0935	-385.1370	223.4578	-210.5760
			3424	-140.4548	-627.4648	-407.1840	-636.0697	-325.0406	-194.0093
			3425	-59.5710	-500.2516	-311.0680	-507.1170	-178.3525	-217.6563
1372-GA01	1372	DM5	3431	-6935.2471	421.0759	1248.3790	355.3069	4947.4014	-1709.0313
			3432	-6067.7988	313.8961	1113.9764	252.3918	4463.7568	-1416.3275
			3433	-5986.3428	412.4222	1203.9053	354.1944	4491.0640	-1713.5326
			3434	-7884.1509	429.7296	1292.8528	356.4194	5403.7388	-1704.5299
			3435	-7802.6948	528.2557	1382.7816	458.2220	5431.0459	-2001.7350
	GA01		3431	-6951.0815	421.0759	1248.3790	355.3069	6164.5664	-1298.4838
			3432	-6083.6338	313.8961	1113.9764	252.3918	5549.8794	-1110.2802
			3433	-6002.1772	412.4222	1203.9053	354.1944	5664.8672	-1311.4225
			3434	-7899.9854	429.7296	1292.8528	356.4194	6664.2651	-1285.5452
			3435	-7818.5293	528.2557	1382.7816	458.2220	6779.2529	-1486.6875
1372-GA01	1372	DM5	3501	-2547.5764	-144.3889	269.4556	-158.2996	1929.4435	-350.7458
			3502	-2518.7126	-144.3926	317.0154	-162.6295	2008.8259	-321.3892
			3503	-1624.9199	-149.0301	231.8041	-154.7134	1496.4812	-363.1670
			3504	-3470.2332	-139.7477	307.1071	-161.8858	2362.4058	-338.3246
			3505	-2576.4404	-144.3852	221.8958	-153.9697	1850.0610	-380.1024

3511	-3783.8140	-11.0582	487.0635	15.0344	2752.0178	-794.9330
3512	-1311.3394	-277.7196	51.8477	-331.6335	1106.8690	93.4414
3513	-1312.0265	-278.2277	51.5319	-330.4700	1098.5420	92.9910
3514	-3783.1267	-10.5500	487.3792	13.8708	2760.3447	-794.4825
3515	-3673.4272	8.8640	472.7261	42.3076	2681.1501	-68.3189
3516	-1421.7257	-297.6417	66.1851	-358.9068	1177.7369	-633.1727
3517	-3672.7400	9.3721	473.0419	41.1441	2689.4771	-67.8684
3518	-1422.4130	-298.1499	65.8693	-357.7433	1169.4098	-633.6232
3521	-3754.9500	-11.0619	534.6234	10.7045	2831.4004	-765.5764
3522	-1282.4753	-277.7233	99.4075	-335.9634	1186.2516	122.7980
3523	-1283.1625	-278.2314	99.0918	-334.7999	1177.9244	122.3476
3524	-3754.2627	-10.5538	534.9391	9.5409	2839.7275	-765.1259
3525	-3644.5635	8.8603	520.2859	37.9778	2760.5325	-38.9623
3526	-1392.8617	-297.6454	113.7449	-363.2367	1257.1194	-603.8161
3527	-3643.8762	9.3684	520.6017	36.8142	2768.8596	-38.5118
3528	-1393.5490	-298.1536	113.4291	-362.0731	1248.7922	-604.2666
3531	-2861.1570	-15.6995	449.4120	18.6206	2319.0557	-807.3542
3532	-388.6827	-282.3608	14.1962	-328.0474	673.9069	81.0202
3533	-389.3698	-282.8690	13.8804	-326.8838	665.5798	80.5698
3534	-2860.4700	-15.1913	449.7278	17.4570	2327.3828	-806.9037
3535	-2750.7708	4.2227	435.0746	45.8938	2248.1877	-80.7400
3536	-499.0692	-302.2830	28.5336	-355.3206	744.7747	-645.5939
3537	-2750.0835	4.7309	435.3904	44.7303	2256.5149	-80.2896
3538	-499.7563	-302.7912	28.2178	-354.1570	736.4476	-646.0444
3541	-4706.4702	-6.4170	524.7150	11.4482	3184.9800	-782.5118
3542	-2233.9958	-273.0783	89.4992	-335.2198	1539.8313	105.8626
3543	-2234.6831	-273.5865	89.1834	-334.0562	1531.5042	105.4121
3544	-4705.7827	-5.9088	525.0308	10.2846	3193.3071	-782.0613
3545	-4596.0840	13.5052	510.3776	38.7214	3114.1121	-55.8977
3546	-2344.3823	-293.0005	103.8366	-362.4930	1610.6991	-620.7515
3547	-4595.3965	14.0134	510.6934	37.5579	3122.4392	-55.4472
3548	-2345.0696	-293.5087	103.5208	-361.3295	1602.3719	-621.2020
3551	-3812.6777	-11.0545	439.5037	19.3643	2672.6353	-824.2896
3552	-1340.2032	-277.7159	4.2878	-327.3037	1027.4868	64.0848
3553	-1340.8904	-278.2240	3.9721	-326.1401	1019.1596	63.6344
3554	-3811.9905	-10.5463	439.8194	18.2007	2680.9626	-823.8391
3555	-3702.2913	8.8677	425.1663	46.6375	2601.7676	-97.6755
3556	-1450.5896	-297.6380	18.6252	-354.5769	1098.3545	-662.5293
3557	-3701.6040	9.3759	425.4820	45.4740	2610.0950	-97.2250
3558	-1451.2769	-298.1462	18.3095	-353.4134	1090.0275	-662.9798
3601	-2550.5374	-180.7719	271.2422	-204.4519	1926.3190	-312.5473
3602	-2521.6733	-180.7756	318.8021	-208.7818	2005.7014	-283.1907
3603	-1627.8807	-185.4131	233.5907	-200.8657	1493.3568	-324.9685
3604	-3473.1941	-176.1306	308.8938	-208.0381	2359.2813	-300.1261
3605	-2579.4014	-180.7681	223.6824	-200.1221	1846.9366	-341.9039
3611	-3786.7747	-47.4412	488.8502	-31.1180	2748.8933	-756.7345
3612	-1314.3002	-314.1025	53.6343	-377.7859	1103.7446	131.6399
3613	-1314.9873	-314.6107	53.3186	-376.6223	1095.4175	131.1895
3614	-3786.0874	-46.9330	489.1659	-32.2815	2757.2205	-756.2840
3615	-3676.3882	-27.5190	474.5128	-3.8447	2678.0254	-30.1203
3616	-1424.6865	-334.0247	67.9717	-405.0591	1174.6124	-594.9742
3617	-3675.7009	-27.0108	474.8286	-5.0083	2686.3525	-29.6699
3618	-1425.3738	-334.5329	67.6560	-403.8956	1166.2853	-595.4247
3621	-3757.9109	-47.4449	536.4100	-35.4478	2828.2759	-727.3779
3622	-1285.4362	-314.1062	101.1942	-382.1158	1183.1271	160.9965
3623	-1286.1233	-314.6144	100.8784	-380.9522	1174.7999	160.5461
3624	-3757.2236	-46.9367	536.7257	-36.6114	2836.6028	-726.9274
3625	-3647.5242	-27.5227	522.0726	-8.1746	2757.4082	-0.7637
3626	-1395.8226	-334.0284	115.5316	-409.3890	1253.9949	-565.6176
3627	-3646.8369	-27.0145	522.3884	-9.3381	2765.7351	-0.3133
3628	-1396.5099	-334.5366	115.2158	-408.2255	1245.6678	-566.0681
3631	-2864.1179	-52.0824	451.1987	-27.5317	2315.9312	-769.1557
3632	-391.6436	-318.7437	15.9828	-374.1997	670.7825	119.2188
3633	-392.3307	-319.2519	15.6671	-373.0361	662.4553	118.7683
3634	-2863.4309	-51.5742	451.5144	-28.6953	2324.2581	-768.7053
3635	-2753.7317	-32.1602	436.8613	-0.2585	2245.0635	-42.5415
3636	-502.0300	-338.6659	30.3202	-401.4729	741.6502	-607.3954
3637	-2753.0444	-31.6521	437.1770	-1.4221	2253.3904	-42.0911
3638	-502.7171	-339.1741	30.0045	-400.3094	733.3231	-607.8459
3641	-4709.4312	-42.7999	526.5017	-34.7042	3181.8555	-744.3133
3642	-2236.9568	-309.4613	91.2859	-381.3721	1536.7068	144.0611
3643	-2237.6438	-309.9695	90.9701	-380.2086	1528.3796	143.6107
3644	-4708.7441	-42.2918	526.8174	-35.8677	3190.1826	-743.8628
3645	-4599.0449	-22.8778	512.1643	-7.4309	3110.9878	-17.6992
3646	-2347.3433	-329.3835	105.6233	-408.6454	1607.5746	-582.5530
3647	-4598.3574	-22.3696	512.4801	-8.5945	3119.3147	-17.2487
3648	-2348.0305	-329.8916	105.3075	-407.4818	1599.2476	-583.0035
3651	-3815.6387	-47.4375	441.2903	-26.7881	2669.5107	-786.0911
3652	-1343.1642	-314.0988	6.0745	-373.4560	1024.3623	102.2833
3653	-1343.8512	-314.6070	5.7588	-372.2924	1016.0352	101.8329
3654	-3814.9514	-46.9293	441.6061	-27.9516	2677.8381	-785.6406
3655	-3705.2522	-27.5153	426.9529	0.4852	2598.6431	-59.4769
3656	-1453.5505	-334.0210	20.4119	-400.7292	1095.2301	-624.3308
3657	-3704.5649	-27.0071	427.2687	-0.6784	2606.9702	-59.0265
3658	-1454.2378	-334.5292	20.0961	-399.5657	1086.9030	-624.7813
3701	-2546.3594	-140.5281	267.6783	-122.1679	1924.5096	-353.4370
3702	-2517.4954	-140.5318	315.2382	-126.4977	2003.8921	-324.0804
3703	-1623.7028	-145.1693	230.0268	-118.5817	1491.5475	-365.8582
3704	-3469.0159	-135.8869	305.3299	-125.7541	2357.4719	-341.0159
3705	-2575.2234	-140.5244	220.1185	-117.8380	1845.1273	-382.7936
3711	-3782.5967	-7.1974	485.2862	51.1661	2747.0840	-797.6243

	3712	-1310.1222	-273.8588	50.0704	-295.5019	1101.9353	90.7502
	3713	-1310.8093	-274.3669	49.7547	-294.3383	1093.6082	90.2997
	3714	-3781.9094	-6.6893	485.6020	50.0025	2755.4109	-797.1738
	3715	-3672.2102	12.7247	470.9488	78.4394	2676.2163	-71.0101
	3716	-1420.5085	-293.7809	64.4078	-322.7751	1172.8031	-635.8640
	3717	-3671.5229	13.2329	471.2646	77.2758	2684.5432	-70.5597
	3718	-1421.1958	-294.2892	64.0920	-321.6115	1164.4760	-636.3145
	3721	-3753.7327	-7.2011	532.8461	46.8362	2826.4666	-768.2676
	3722	-1281.2582	-273.8625	97.6303	-299.8317	1181.3177	120.1068
	3723	-1281.9453	-274.3707	97.3145	-298.6681	1172.9906	119.6563
	3724	-3753.0454	-6.6930	533.1618	45.6727	2834.7937	-767.8172
	3725	-3643.3462	12.7210	518.5087	74.1095	2755.5986	-41.6535
	3726	-1391.6447	-293.7847	111.9676	-327.1049	1252.1855	-606.5074
	3727	-3642.6589	13.2292	518.8245	72.9459	2763.9258	-41.2031
	3728	-1392.3319	-294.2928	111.6519	-325.9414	1243.8584	-606.9578
	3731	-2859.9399	-11.8387	447.6347	54.7523	2314.1218	-810.0455
	3732	-387.4656	-278.5000	12.4189	-291.9156	668.9731	78.3290
	3733	-388.1527	-279.0082	12.1032	-290.7521	660.6460	77.8785
	3734	-2859.2529	-11.3305	447.9505	53.5888	2322.4490	-809.5950
	3735	-2749.5537	8.0835	433.2973	82.0256	2243.2539	-83.4313
	3736	-497.8520	-298.4222	26.7563	-319.1889	739.8409	-648.2852
	3737	-2748.8665	8.5917	433.6131	80.8620	2251.5811	-82.9808
	3738	-498.5391	-298.9304	26.4405	-318.0253	731.5138	-648.7357
	3741	-4705.2529	-2.5562	522.9377	47.5799	3180.0461	-785.2031
	3742	-2232.7788	-269.2175	87.7219	-299.0880	1534.8975	103.1713
	3743	-2233.4658	-269.7257	87.4062	-297.9245	1526.5703	102.7209
	3744	-4704.5664	-2.0480	523.2535	46.4163	3188.3733	-784.7526
	3745	-4594.8667	17.3660	508.6004	74.8531	3109.1782	-58.5889
	3746	-2343.1650	-289.1397	102.0593	-326.3613	1605.7653	-623.4427
	3747	-4594.1797	17.8742	508.9161	73.6896	3117.5054	-58.1385
	3748	-2343.8523	-289.6479	101.7436	-325.1977	1597.4382	-623.8932
	3751	-3811.4607	-7.1937	437.7264	55.4960	2667.7014	-826.9809
	3752	-1338.9861	-273.8551	2.5106	-291.1720	1022.5530	61.3936
	3753	-1339.6732	-274.3633	2.1948	-290.0084	1014.2258	60.9431
	3754	-3810.7734	-6.6856	438.0421	54.3324	2676.0288	-826.5304
	3755	-3701.0742	12.7285	423.3890	82.7692	2596.8337	-100.3667
	3756	-1449.3726	-293.7773	16.8480	-318.4452	1093.4208	-665.2206
	3757	-3700.3870	13.2366	423.7048	81.6057	2605.1611	-99.9163
	3758	-1450.0598	-294.2854	16.5322	-317.2816	1085.0936	-665.6711
GA01	3501	-2563.4109	-144.3889	269.4556	-158.2996	2192.1619	-491.5244
	3502	-2534.5469	-144.3926	317.0154	-162.6295	2317.9150	-462.1714
	3503	-1640.7542	-149.0301	231.8041	-154.7134	1722.4896	-508.4708
	3504	-3486.0674	-139.7477	307.1071	-161.8858	2661.8342	-474.5780
	3505	-2592.2747	-144.3852	221.8958	-153.9697	2066.4089	-520.8773
	3511	-3799.6479	-11.0582	487.0635	15.0344	3226.9031	-805.7147
	3512	-1327.1736	-277.7196	51.8477	-331.6335	1157.4207	-177.3341
	3513	-1327.8607	-278.2277	51.5319	-330.4700	1148.7856	-178.2800
	3514	-3798.9609	-10.5500	487.3792	13.8708	3235.5383	-804.7687
	3515	-3689.2617	8.8640	472.7261	42.3076	3142.0564	-59.6764
	3516	-1437.5599	-297.6417	66.1851	-358.9068	1242.2673	-923.3723
	3517	-3688.5745	9.3721	473.0419	41.1441	3150.6917	-58.7305
	3518	-1438.2472	-298.1499	65.8693	-357.7433	1233.6323	-924.3182
	3521	-3770.7839	-11.0619	534.6234	10.7045	3352.6560	-776.3616
	3522	-1298.3097	-277.7233	99.4075	-335.9634	1283.1737	-147.9812
	3523	-1298.9967	-278.2314	99.0918	-334.7999	1274.5387	-148.9271
	3524	-3770.0969	-10.5538	534.9391	9.5409	3361.2913	-775.4157
	3525	-3660.3977	8.8603	520.2859	37.9778	3267.8093	-30.3235
	3526	-1408.6960	-297.6454	113.7449	-363.2367	1368.0203	-894.0193
	3527	-3659.7104	9.3684	520.6017	36.8142	3276.4446	-29.3775
	3528	-1409.3833	-298.1536	113.4291	-362.0731	1359.3854	-894.9653
	3531	-2876.9915	-15.6995	449.4120	18.6206	2757.2310	-822.6610
	3532	-404.5170	-282.3608	14.1962	-328.0474	687.7483	-194.2805
	3533	-405.2041	-282.8690	13.8804	-326.8838	679.1133	-195.2264
	3534	-2876.3042	-15.1913	449.7278	17.4570	2765.8657	-821.7151
	3535	-2766.6050	4.2227	435.0746	45.8938	2672.3843	-76.6228
	3536	-514.9034	-302.2830	28.5336	-355.3206	772.5950	-940.3187
	3537	-2765.9177	4.7309	435.3904	44.7303	2681.0190	-75.6769
	3538	-515.5906	-302.7912	28.2178	-354.1570	763.9600	-941.2646
	3541	-4722.3047	-6.4170	524.7150	11.4482	3696.5757	-788.7683
	3542	-2249.8303	-273.0783	89.4992	-335.2198	1627.0930	-160.3878
	3543	-2250.5173	-273.5865	89.1834	-334.0562	1618.4580	-161.3337
	3544	-4721.6177	-5.9088	525.0308	10.2846	3705.2104	-787.8224
	3545	-4611.9185	13.5052	510.3776	38.7214	3611.7290	-42.7301
	3546	-2360.2166	-293.0005	103.8366	-362.4930	1711.9396	-906.4260
	3547	-4611.2310	14.0134	510.6934	37.5579	3620.3638	-41.7841
	3548	-2360.9038	-293.5087	103.5208	-361.3295	1703.3047	-907.3719
	3551	-3828.5117	-11.0545	439.5037	19.3643	3101.1499	-835.0676
	3552	-1356.0376	-277.7159	4.2878	-327.3037	1031.6676	-206.6871
	3553	-1356.7246	-278.2240	3.9721	-326.1401	1023.0327	-207.6330
	3554	-3827.8250	-10.5463	439.8194	18.2007	3109.7852	-834.1216
	3555	-3718.1255	8.8677	425.1663	46.6375	3016.3035	-89.0294
	3556	-1466.4240	-297.6380	18.6252	-354.5769	1116.5143	-952.7252
	3557	-3717.4382	9.3759	425.4820	45.4740	3024.9385	-88.0835
	3558	-1467.1112	-298.1462	18.3095	-353.4134	1107.8793	-953.6713
	3601	-2566.3716	-180.7719	271.2422	-204.4519	2190.7793	-488.7991
	3602	-2537.5078	-180.7756	318.8021	-208.7818	2316.5325	-459.4461
	3603	-1643.7151	-185.4131	233.5907	-200.8657	1721.1071	-505.7455
	3604	-3489.0283	-176.1306	308.8938	-208.0381	2660.4517	-471.8527
	3605	-2595.2356	-180.7681	223.6824	-200.1221	2065.0264	-518.1520
	3611	-3802.6086	-47.4412	488.8502	-31.1180	3225.5205	-802.9894
	3612	-1330.1344	-314.1025	53.6343	-377.7859	1156.0382	-174.6088

			3613	-1330.8215	-314.6107	53.3186	-376.6223	1147.4032	-175.5547
			3614	-3801.9219	-46.9330	489.1659	-32.2815	3234.1558	-802.0435
			3615	-3692.2224	-27.5190	474.5128	-3.8447	3140.6738	-56.9511
			3616	-1440.5209	-334.0247	67.9717	-405.0591	1240.8848	-920.6470
			3617	-3691.5352	-27.0108	474.8286	-5.0083	3149.3091	-56.0052
			3618	-1441.2081	-334.5329	67.6560	-403.8956	1232.2499	-921.5929
			3621	-3773.7449	-47.4449	536.4100	-35.4478	3351.2737	-773.6364
			3622	-1301.2705	-314.1062	101.1942	-382.1158	1281.7911	-145.2558
			3623	-1301.9576	-314.6144	100.8784	-380.9522	1273.1563	-146.2018
			3624	-3773.0579	-46.9367	536.7257	-36.6114	3359.9087	-772.6904
			3625	-3663.3586	-27.5227	522.0726	-8.1746	3266.4270	-27.5982
			3626	-1411.6569	-334.0284	115.5316	-409.3890	1366.6378	-891.2940
			3627	-3662.6714	-27.0145	522.3884	-9.3381	3275.0623	-26.6522
			3628	-1412.3441	-334.5366	115.2158	-408.2255	1358.0028	-892.2400
			3631	-2879.9524	-52.0824	451.1987	-27.5317	2755.8484	-819.9357
			3632	-407.4778	-318.7437	15.9828	-374.1997	686.3658	-191.5552
			3633	-408.1649	-319.2519	15.6671	-373.0361	677.7308	-192.5011
			3634	-2879.2651	-51.5742	451.5144	-28.6953	2764.4832	-818.9898
			3635	-2769.5659	-32.1602	436.8613	-0.2585	2671.0017	-73.8975
			3636	-517.8643	-338.6659	30.3202	-401.4729	771.2125	-937.5934
			3637	-2768.8787	-31.6521	437.1770	-1.4221	2679.6365	-72.9516
			3638	-518.5514	-339.1741	30.0045	-400.3094	762.5775	-938.5393
			3641	-4725.2656	-42.7999	526.5017	-34.7042	3695.1931	-786.0429
			3642	-2252.7910	-309.4613	91.2859	-381.3721	1625.7104	-157.6624
			3643	-2253.4783	-309.9695	90.9701	-380.2086	1617.0756	-158.6083
			3644	-4724.5781	-42.2918	526.8174	-35.8677	3703.8279	-785.0970
			3645	-4614.8789	-22.8778	512.1643	-7.4309	3610.3464	-40.0047
			3646	-2363.1775	-329.3835	105.6233	-408.6454	1710.5571	-903.7006
			3647	-4614.1919	-22.3696	512.4801	-8.5945	3618.9812	-39.0588
			3648	-2363.8647	-329.8916	105.3075	-407.4818	1701.9221	-904.6465
			3651	-3831.4727	-47.4375	441.2903	-26.7881	3099.7676	-832.3422
			3652	-1358.9984	-314.0988	6.0745	-373.4560	1030.2852	-203.9618
			3653	-1359.6855	-314.6070	5.7588	-372.2924	1021.6501	-204.9077
			3654	-3830.7856	-46.9293	441.6061	-27.9516	3108.4028	-831.3964
			3655	-3721.0864	-27.5153	426.9529	0.4852	3014.9209	-86.3041
			3656	-1469.3848	-334.0210	20.4119	-400.7292	1115.1317	-950.0000
			3657	-3720.3992	-27.0071	427.2687	-0.6784	3023.5562	-85.3582
			3658	-1470.0720	-334.5292	20.0961	-399.5657	1106.4968	-950.9459
			3701	-2562.1936	-140.5281	267.6783	-122.1679	2185.4951	-490.4514
			3702	-2533.3296	-140.5318	315.2382	-126.4977	2311.2480	-461.0984
			3703	-1639.5371	-145.1693	230.0268	-118.5817	1715.8228	-507.3977
			3704	-3484.8503	-135.8869	305.3299	-125.7541	2655.1675	-473.5050
			3705	-2591.0576	-140.5244	220.1185	-117.8380	2059.7422	-519.8043
			3711	-3798.4307	-7.1974	485.2862	51.1661	3220.2366	-804.6417
			3712	-1325.9564	-273.8588	50.0704	-295.5019	1150.7539	-176.2611
			3713	-1326.6436	-274.3669	49.7547	-294.3383	1142.1189	-177.2070
			3714	-3797.7437	-6.6893	485.6020	50.0025	3228.8713	-803.6957
			3715	-3688.0444	12.7247	470.9488	78.4394	3135.3899	-58.6034
			3716	-1436.3429	-293.7809	64.4078	-322.7751	1235.6005	-922.2993
			3717	-3687.3572	13.2329	471.2646	77.2758	3144.0247	-57.6575
			3718	-1437.0300	-294.2892	64.0920	-321.6115	1226.9656	-923.2452
			3721	-3769.5669	-7.2011	532.8461	46.8362	3345.9895	-775.2886
			3722	-1297.0925	-273.8625	97.6303	-299.8317	1276.5068	-146.9081
			3723	-1297.7797	-274.3707	97.3145	-298.6681	1267.8719	-147.8540
			3724	-3768.8799	-6.6930	533.1618	45.6727	3354.6243	-774.3427
			3725	-3659.1804	12.7210	518.5087	74.1095	3261.1428	-29.2504
			3726	-1407.4789	-293.7847	111.9676	-327.1049	1361.3535	-892.9463
			3727	-3658.4932	13.2292	518.8245	72.9459	3269.7776	-28.3045
			3728	-1408.1661	-294.2928	111.6519	-325.9414	1352.7185	-893.8923
			3731	-2875.7744	-11.8387	447.6347	54.7523	2750.5640	-821.5880
			3732	-403.2999	-278.5000	12.4189	-291.9156	681.0815	-193.2075
			3733	-403.9870	-279.0082	12.1032	-290.7521	672.4465	-194.1534
			3734	-2875.0872	-11.3305	447.9505	53.5888	2759.1992	-820.6421
			3735	-2765.3879	8.0835	433.2973	82.0256	2665.7173	-75.5498
			3736	-513.6863	-298.4222	26.7563	-319.1889	765.9282	-939.2457
			3737	-2764.7007	8.5917	433.6131	80.8620	2674.3525	-74.6039
			3738	-514.3734	-298.9304	26.4405	-318.0253	757.2932	-940.1916
			3741	-4721.0874	-2.5562	522.9377	47.5799	3689.9087	-787.6952
			3742	-2248.6130	-269.2175	87.7219	-299.0880	1620.4261	-159.3147
			3743	-2249.3000	-269.7257	87.4062	-297.9245	1611.7913	-160.2606
			3744	-4720.4004	-2.0480	523.2535	46.4163	3698.5437	-786.7493
			3745	-4610.7012	17.3660	508.6004	74.8531	3605.0620	-41.6570
			3746	-2358.9995	-289.1397	102.0593	-326.3613	1705.2728	-905.3530
			3747	-4610.0137	17.8742	508.9161	73.6896	3613.6970	-40.7111
			3748	-2359.6868	-289.6479	101.7436	-325.1977	1696.6378	-906.2988
			3751	-3827.2947	-7.1937	437.7264	55.4960	3094.4834	-833.9945
			3752	-1354.8204	-273.8551	2.5106	-291.1720	1025.0009	-205.6141
			3753	-1355.5076	-274.3633	2.1948	-290.0084	1016.3658	-206.5600
			3754	-3826.6077	-6.6856	438.0421	54.3324	3103.1182	-833.0486
			3755	-3716.9084	12.7285	423.3890	82.7692	3009.6367	-87.9564
			3756	-1465.2068	-293.7773	16.8480	-318.4452	1109.8474	-951.6523
			3757	-3716.2212	13.2366	423.7048	81.6057	3018.2715	-87.0104
			3758	-1465.8940	-294.2854	16.5322	-317.2816	1101.2125	-952.5982
1472-GA02	1472	DM5	3101	-4676.3628	256.2070	267.7303	63.5042	2957.2246	-809.2776
			3102	-3710.3442	249.3795	240.0240	56.2165	2559.3347	-764.9853
			3103	-4597.7769	256.3748	318.6378	67.0305	3077.5210	-820.9449
			3104	-4754.9492	256.0392	216.8228	59.9780	2836.9285	-797.6103
			3105	-5642.3818	263.0345	295.4366	70.7920	3355.1145	-853.5699
			3201	-3507.9883	446.2977	72.1500	326.0964	2011.2944	-1337.4203
			3202	-5844.7378	66.1164	463.3107	-199.0880	3903.1553	-281.1350

	3203	-5844.7378	66.1164	463.3107	-199.0880	3903.1553	-281.1350
	3204	-3507.9883	446.2977	72.1500	326.0964	2011.2944	-1337.4203
	3205	-3616.5701	417.9865	83.1885	333.1105	2098.2207	-541.9001
	3206	-5736.1558	94.4276	452.2721	-206.1021	3816.2288	-1076.6552
	3207	-3616.5701	417.9865	83.1885	333.1105	2098.2207	-541.9001
	3208	-5736.1558	94.4276	452.2721	-206.1021	3816.2288	-1076.6552
	3211	-2541.9695	439.4702	44.4437	318.8087	1613.4045	-1293.1279
	3212	-4878.7188	59.2889	435.6044	-206.3758	3505.2651	-236.8427
	3213	-4878.7188	59.2889	435.6044	-206.3758	3505.2651	-236.8427
	3214	-2541.9695	439.4702	44.4437	318.8087	1613.4045	-1293.1279
	3215	-2650.5515	411.1590	55.4822	325.8228	1700.3308	-497.6078
	3216	-4770.1372	87.6001	424.5658	-213.3898	3418.3386	-1032.3628
	3217	-2650.5515	411.1590	55.4822	325.8228	1700.3308	-497.6078
	3218	-4770.1372	87.6001	424.5658	-213.3898	3418.3386	-1032.3628
	3221	-3429.4021	446.4655	123.0575	329.6227	2131.5908	-1349.0875
	3222	-5766.1514	66.2842	514.2182	-195.5617	4023.4517	-292.8024
	3223	-5766.1514	66.2842	514.2182	-195.5617	4023.4517	-292.8024
	3224	-3429.4021	446.4655	123.0575	329.6227	2131.5908	-1349.0875
	3225	-3537.9839	418.1543	134.0961	336.6368	2218.5168	-553.5674
	3226	-5657.5693	94.5954	503.1797	-202.5758	3936.5251	-1088.3224
	3227	-3537.9839	418.1543	134.0961	336.6368	2218.5168	-553.5674
	3228	-5657.5693	94.5954	503.1797	-202.5758	3936.5251	-1088.3224
	3231	-3586.5745	446.1299	21.2425	322.5702	1890.9980	-1325.7529
	3232	-5923.3237	65.9485	412.4032	-202.6143	3782.8586	-269.4677
	3233	-5923.3237	65.9485	412.4032	-202.6143	3782.8586	-269.4677
	3234	-3586.5745	446.1299	21.2425	322.5702	1890.9980	-1325.7529
	3235	-3695.1563	417.8186	32.2810	329.5842	1977.9243	-530.2328
	3236	-5814.7417	94.2597	401.3647	-209.6283	3695.9324	-1064.9879
	3237	-3695.1563	417.8186	32.2810	329.5842	1977.9243	-530.2328
	3238	-5814.7417	94.2597	401.3647	-209.6283	3695.9324	-1064.9879
	3241	-4474.0068	453.1252	99.8563	333.3842	2409.1843	-1381.7126
	3242	-6810.7563	72.9439	491.0170	-191.8002	4301.0449	-325.4273
	3243	-6810.7563	72.9439	491.0170	-191.8002	4301.0449	-325.4273
	3244	-4474.0068	453.1252	99.8563	333.3842	2409.1843	-1381.7126
	3245	-4582.5889	424.8140	110.8949	340.3983	2496.1108	-586.1924
	3246	-6702.1743	101.2551	479.9785	-198.8143	4214.1187	-1120.9474
	3247	-4582.5889	424.8140	110.8949	340.3983	2496.1108	-586.1924
	3248	-6702.1743	101.2551	479.9785	-198.8143	4214.1187	-1120.9474
	3301	-2339.6135	636.3883	-123.4303	588.6887	1065.3641	-1865.5629
	3302	-7013.1123	-123.9743	658.8910	-461.6802	4849.0850	247.0076
	3303	-7013.1123	-123.9743	658.8910	-461.6802	4849.0850	247.0076
	3304	-2339.6135	636.3883	-123.4303	588.6887	1065.3641	-1865.5629
	3305	-2556.7773	579.7659	-101.3533	602.7168	1239.2168	-274.5226
	3306	-6795.9487	-67.3519	636.8140	-475.7084	4675.2324	-1344.0326
	3307	-2556.7773	579.7659	-101.3533	602.7168	1239.2168	-274.5226
	3308	-6795.9487	-67.3519	636.8140	-475.7084	4675.2324	-1344.0326
	3311	-1373.5948	629.5608	-151.1366	581.4009	667.4742	-1821.2705
	3312	-6047.0938	-130.8018	631.1847	-468.9680	4451.1953	291.2999
	3313	-6047.0938	-130.8018	631.1847	-468.9680	4451.1953	291.2999
	3314	-1373.5948	629.5608	-151.1366	581.4009	667.4742	-1821.2705
	3315	-1590.7588	572.9384	-129.0596	595.4290	841.3269	-230.2303
	3316	-5829.9297	-74.1794	609.1077	-482.9961	4277.3428	-1299.7404
	3317	-1590.7588	572.9384	-129.0596	595.4290	841.3269	-230.2303
	3318	-5829.9297	-74.1794	609.1077	-482.9961	4277.3428	-1299.7404
	3321	-2261.0273	636.5562	-72.5228	592.2149	1185.6604	-1877.2302
	3322	-6934.5264	-123.8065	709.7985	-458.1539	4969.3813	235.3402
	3323	-6934.5264	-123.8065	709.7985	-458.1539	4969.3813	235.3402
	3324	-2261.0273	636.5562	-72.5228	592.2149	1185.6604	-1877.2302
	3325	-2478.1912	579.9337	-50.4458	606.2430	1359.5131	-286.1900
	3326	-6717.3623	-67.1841	687.7214	-472.1821	4795.5288	-1355.6998
	3327	-2478.1912	579.9337	-50.4458	606.2430	1359.5131	-286.1900
	3328	-6717.3623	-67.1841	687.7214	-472.1821	4795.5288	-1355.6998
	3331	-2418.1997	636.2205	-174.3378	585.1624	945.0678	-1853.8955
	3332	-7091.6987	-124.1421	607.9835	-465.2065	4728.7886	258.6749
	3333	-7091.6987	-124.1421	607.9835	-465.2065	4728.7886	258.6749
	3334	-2418.1997	636.2205	-174.3378	585.1624	945.0678	-1853.8955
	3335	-2635.3635	579.5981	-152.2608	599.1905	1118.9205	-262.8553
	3336	-6874.5347	-67.5197	585.9064	-479.2346	4554.9365	-1332.3654
	3337	-2635.3635	579.5981	-152.2608	599.1905	1118.9205	-262.8553
	3338	-6874.5347	-67.5197	585.9064	-479.2346	4554.9365	-1332.3654
	3341	-3305.6323	643.2158	-95.7240	595.9764	1463.2540	-1909.8550
	3342	-7979.1309	-117.1468	686.5973	-454.3925	5246.9751	202.7153
	3343	-7979.1309	-117.1468	686.5973	-454.3925	5246.9751	202.7153
	3344	-3305.6323	643.2158	-95.7240	595.9764	1463.2540	-1909.8550
	3345	-3522.7961	586.5934	-73.6469	610.0045	1637.1067	-318.8150
	3346	-7761.9673	-60.5244	664.5203	-468.4206	5073.1221	-1388.3250
	3347	-3522.7961	586.5934	-73.6469	610.0045	1637.1067	-318.8150
	3348	-7761.9673	-60.5244	664.5203	-468.4206	5073.1221	-1388.3250
GA02	3101	-4687.8120	256.2070	267.7303	63.5042	3145.9734	-628.6526
	3102	-3721.7935	249.3795	240.0240	56.2165	2728.5505	-589.1737
	3103	-4609.2261	256.3748	318.6378	67.0305	3302.1592	-640.2017
	3104	-4766.3984	256.0392	216.8228	59.9780	2989.7874	-617.1036
	3105	-5653.8311	263.0345	295.4366	70.7920	3563.3960	-668.1315
	3201	-3519.4375	446.2977	72.1500	326.0964	2062.1594	-1022.7820
	3202	-5856.1865	66.1164	463.3107	-199.0880	4229.7871	-234.5232
	3203	-5856.1865	66.1164	463.3107	-199.0880	4229.7871	-234.5232
	3204	-3519.4375	446.2977	72.1500	326.0964	2062.1594	-1022.7820
	3205	-3628.0193	417.9865	83.1885	333.1105	2156.8682	-247.2212
	3206	-5747.6050	94.4276	452.2721	-206.1021	4135.0786	-1010.0840
	3207	-3628.0193	417.9865	83.1885	333.1105	2156.8682	-247.2212
	3208	-5747.6050	94.4276	452.2721	-206.1021	4135.0786	-1010.0840

			3211	-2553.4187	439.4702	44.4437	318.8087	1644.7369	-983.3031
			3212	-4890.1685	59.2889	435.6044	-206.3758	3812.3643	-195.0443
			3213	-4890.1685	59.2889	435.6044	-206.3758	3812.3643	-195.0443
			3214	-2553.4187	439.4702	44.4437	318.8087	1644.7369	-983.3031
			3215	-2662.0007	411.1590	55.4822	325.8228	1739.4454	-207.7423
			3216	-4781.5864	87.6001	424.5658	-213.3898	3717.6558	-970.6050
			3217	-2662.0007	411.1590	55.4822	325.8228	1739.4454	-207.7423
			3218	-4781.5864	87.6001	424.5658	-213.3898	3717.6558	-970.6050
			3221	-3440.8513	446.4655	123.0575	329.6227	2218.3457	-1034.3311
			3222	-5777.6011	66.2842	514.2182	-195.5617	4385.9731	-246.0723
			3223	-5777.6011	66.2842	514.2182	-195.5617	4385.9731	-246.0723
			3224	-3440.8513	446.4655	123.0575	329.6227	2218.3457	-1034.3311
			3225	-3549.4331	418.1543	134.0961	336.6368	2313.0542	-258.7702
			3226	-5669.0186	94.5954	503.1797	-202.5758	4291.2646	-1021.6331
			3227	-3549.4331	418.1543	134.0961	336.6368	2313.0542	-258.7702
			3228	-5669.0186	94.5954	503.1797	-202.5758	4291.2646	-1021.6331
			3231	-3598.0237	446.1299	21.2425	322.5702	1905.9738	-1011.2330
			3232	-5934.7734	65.9485	412.4032	-202.6143	4073.6011	-222.9742
			3233	-5934.7734	65.9485	412.4032	-202.6143	4073.6011	-222.9742
			3234	-3598.0237	446.1299	21.2425	322.5702	1905.9738	-1011.2330
			3235	-3706.6055	417.8186	32.2810	329.5842	2000.6823	-235.6722
			3236	-5826.1909	94.2597	401.3647	-209.6283	3978.8926	-998.5350
			3237	-3706.6055	417.8186	32.2810	329.5842	2000.6823	-235.6722
			3238	-5826.1909	94.2597	401.3647	-209.6283	3978.8926	-998.5350
			3241	-4485.4561	453.1252	99.8563	333.3842	2479.5825	-1062.2610
			3242	-6822.2061	72.9439	491.0170	-191.8002	4647.2095	-274.0022
			3243	-6822.2061	72.9439	491.0170	-191.8002	4647.2095	-274.0022
			3244	-4485.4561	453.1252	99.8563	333.3842	2479.5825	-1062.2610
			3245	-4594.0381	424.8140	110.8949	340.3983	2574.2908	-286.7001
			3246	-6713.6235	101.2551	479.9785	-198.8143	4552.5015	-1049.5630
			3247	-4594.0381	424.8140	110.8949	340.3983	2574.2908	-286.7001
			3248	-6713.6235	101.2551	479.9785	-198.8143	4552.5015	-1049.5630
			3301	-2351.0627	636.3883	-123.4303	588.6887	978.3459	-1416.9115
			3302	-7024.5615	-123.9743	658.8910	-461.6802	5313.6011	159.6062
			3303	-7024.5615	-123.9743	658.8910	-461.6802	5313.6011	159.6062
			3304	-2351.0627	636.3883	-123.4303	588.6887	978.3459	-1416.9115
			3305	-2568.2266	579.7659	-101.3533	602.7168	1167.7629	134.2102
			3306	-6807.3975	-67.3519	636.8140	-475.7084	5124.1836	-1391.5154
			3307	-2568.2266	579.7659	-101.3533	602.7168	1167.7629	134.2102
			3308	-6807.3975	-67.3519	636.8140	-475.7084	5124.1836	-1391.5154
			3311	-1385.0439	629.5608	-151.1366	581.4009	560.9232	-1377.4325
			3312	-6058.5430	-130.8018	631.1847	-468.9680	4896.1782	199.0851
			3313	-6058.5430	-130.8018	631.1847	-468.9680	4896.1782	199.0851
			3314	-1385.0439	629.5608	-151.1366	581.4009	560.9232	-1377.4325
			3315	-1602.2080	572.9384	-129.0596	595.4290	750.3402	173.6892
			3316	-5841.3789	-74.1794	609.1077	-482.9961	4706.7612	-1352.0365
			3317	-1602.2080	572.9384	-129.0596	595.4290	750.3402	173.6892
			3318	-5841.3789	-74.1794	609.1077	-482.9961	4706.7612	-1352.0365
			3321	-2272.4766	636.5562	-72.5228	592.2149	1134.5319	-1428.4604
			3322	-6945.9756	-123.8065	709.7985	-458.1539	5469.7866	148.0571
			3323	-6945.9756	-123.8065	709.7985	-458.1539	5469.7866	148.0571
			3324	-2272.4766	636.5562	-72.5228	592.2149	1134.5319	-1428.4604
			3325	-2489.6404	579.9337	-50.4458	606.2430	1323.9489	122.6612
			3326	-6728.8115	-67.1841	687.7214	-472.1821	5280.3701	-1403.0645
			3327	-2489.6404	579.9337	-50.4458	606.2430	1323.9489	122.6612
			3328	-6728.8115	-67.1841	687.7214	-472.1821	5280.3701	-1403.0645
			3331	-2429.6489	636.2205	-174.3378	585.1624	822.1599	-1405.3624
			3332	-7103.1479	-124.1421	607.9835	-465.2065	5157.4150	171.1552
			3333	-7103.1479	-124.1421	607.9835	-465.2065	5157.4150	171.1552
			3334	-2429.6489	636.2205	-174.3378	585.1624	822.1599	-1405.3624
			3335	-2646.8127	579.5981	-152.2608	599.1905	1011.5770	145.7593
			3336	-6885.9839	-67.5197	585.9064	-479.2346	4967.9976	-1379.9664
			3337	-2646.8127	579.5981	-152.2608	599.1905	1011.5770	145.7593
			3338	-6885.9839	-67.5197	585.9064	-479.2346	4967.9976	-1379.9664
			3341	-3317.0813	643.2158	-95.7240	595.9764	1395.7686	-1456.3904
			3342	-7990.5801	-117.1468	686.5973	-454.3925	5731.0234	120.1272
			3343	-7990.5801	-117.1468	686.5973	-454.3925	5731.0234	120.1272
			3344	-3317.0813	643.2158	-95.7240	595.9764	1395.7686	-1456.3904
			3345	-3534.2454	586.5934	-73.6469	610.0045	1585.1857	94.7313
			3346	-7773.4165	-60.5244	664.5203	-468.4206	5541.6064	-1430.9944
			3347	-3534.2454	586.5934	-73.6469	610.0045	1585.1857	94.7313
			3348	-7773.4165	-60.5244	664.5203	-468.4206	5541.6064	-1430.9944
1472-GA02	1472	DM5	3401	-2155.0562	796.1495	-293.5466	517.2145	783.8252	-180.8368
			3402	-342.6215	964.0092	-503.5397	663.0363	-324.9628	73.0205
			3403	-2190.2603	771.8113	-217.4122	502.9023	997.4008	-220.4592
			3404	-2119.8523	820.4875	-369.6810	531.5267	570.2497	-141.2144
			3405	-3967.4910	628.2897	-83.5535	371.3927	1892.6132	-434.6940
	GA02		3401	-2166.5056	796.1495	-293.5466	517.2145	576.8760	380.4458
			3402	-354.0710	964.0092	-503.5397	663.0363	-679.9565	752.6436
			3403	-2201.7097	771.8113	-217.4122	502.9023	844.1260	323.6651
			3404	-2131.3018	820.4875	-369.6810	531.5267	309.6259	437.2264
			3405	-3978.9404	628.2897	-83.5535	371.3927	1833.7085	8.2480
1472-GA02	1472	DM5	3411	-8236.2275	-478.2039	1007.8832	-508.0637	5812.9897	-1684.0037
			3412	-7187.0391	-468.8060	963.3876	-501.4184	5348.0718	-1619.4896
			3413	-9034.2979	-662.1907	1242.1010	-638.4905	6636.1245	-1911.3356
			3414	-7438.1572	-294.2170	773.6655	-377.6368	4989.8550	-1456.6718
			3415	-9285.4170	-487.6017	1052.3788	-514.7090	6277.9082	-1748.5177
	GA02		3411	-8247.6768	-478.2039	1007.8832	-508.0637	6523.5449	-2021.1359
			3412	-7198.4888	-468.8060	963.3876	-501.4184	6027.2578	-1949.9963
			3413	-9045.7471	-662.1907	1242.1010	-638.4905	7511.8022	-2378.1780
			3414	-7449.6064	-294.2170	773.6655	-377.6368	5535.2871	-1664.0938

			3415	-9296.8652	-487.6017	1052.3788	-514.7090	7019.8320	-2092.2754
1472-GA02	1472	DM5	3421	-7154.1724	-243.6744	765.4141	-328.6445	4985.3672	189.1478
			3422	-6190.3447	-252.1989	740.6684	-335.0956	4593.1416	233.6689
			3423	-6284.8867	-87.7433	649.9078	-202.9292	4437.3101	-132.8690
			3424	-8023.4575	-399.6055	880.9202	-454.3598	5533.4238	511.1646
			3425	-8117.9995	-235.1498	790.1597	-322.1935	5377.5923	144.6267
	GA02		3421	-7165.6216	-243.6744	765.4141	-328.6445	5524.9814	17.3582
			3422	-6201.7944	-252.1989	740.6684	-335.0956	5115.3110	55.8696
			3423	-6296.3359	-87.7433	649.9078	-202.9292	4895.4932	-194.7277
			3424	-8034.9067	-399.6055	880.9202	-454.3598	6154.4702	229.4442
			3425	-8129.4482	-235.1498	790.1597	-322.1935	5934.6523	-21.1531
1472-GA02	1472	DM5	3431	-362.1110	1263.1971	-689.7758	864.3182	-869.3038	-1773.0948
			3432	-216.9571	1066.4037	-536.7451	702.1960	-543.9276	-1540.2405
			3433	-311.8499	1258.1953	-632.6844	863.6369	-725.5670	-1772.2046
			3434	-412.3720	1268.1991	-746.8673	864.9995	-1013.0406	-1773.9850
			3435	-507.2647	1459.9907	-842.8066	1026.4404	-1194.6799	-2005.9491
	GA02		3431	-373.5603	1263.1971	-689.7758	864.3182	-1355.5933	-882.5455
			3432	-228.4065	1066.4037	-536.7451	702.1960	-922.3308	-788.4300
			3433	-323.2993	1258.1953	-632.6844	863.6369	-1171.6072	-885.1816
			3434	-423.8214	1268.1991	-746.8673	864.9995	-1539.5793	-879.9095
			3435	-518.7141	1459.9907	-842.8066	1026.4404	-1788.8556	-976.6611
1472-GA02	1472	DM5	3501	-4664.4956	252.0379	269.2993	70.8664	2940.8716	-795.6914
			3502	-3696.7673	244.9715	241.6067	63.1475	2541.7720	-751.2867
			3503	-4588.4614	252.2212	320.7578	73.8974	3061.9011	-807.7697
			3504	-4740.5298	251.8546	217.8409	67.8354	2819.8420	-783.6130
			3505	-5632.2236	259.1043	296.9920	78.5852	3339.9709	-840.0960
			3511	-3448.2151	448.7701	66.1706	358.3976	1961.4502	-1315.1213
			3512	-5880.7764	55.3057	472.4281	-216.6649	3920.2927	-276.2613
			3513	-5881.1421	54.8055	473.0061	-217.9340	3921.0908	-276.4994
			3514	-3447.8491	449.2703	65.5925	359.6667	1960.6521	-1314.8834
			3515	-3556.6743	420.1357	77.4268	364.7670	2048.6792	-519.0092
			3516	-5772.3169	83.9401	461.1719	-223.0343	3833.0635	-1072.3737
			3517	-3556.3083	420.6360	76.8487	366.0361	2047.8811	-518.7710
			3518	-5772.6831	83.4398	461.7499	-224.3034	3833.8616	-1072.6117
			3521	-2480.4868	441.7037	38.4779	350.6787	1562.3506	-1270.7168
			3522	-4913.0479	48.2394	444.7354	-224.3837	3521.1934	-231.8567
			3523	-4913.4136	47.7391	445.3134	-225.6528	3521.9915	-232.0948
			3524	-2480.1208	442.2039	37.8999	351.9478	1561.5525	-1270.4788
			3525	-2588.9460	413.0694	49.7341	357.0481	1649.5798	-474.6045
			3526	-4804.5889	76.8737	433.4792	-230.7531	3433.9644	-1027.9690
			3527	-2588.5803	413.5696	49.1561	358.3173	1648.7816	-474.3664
			3528	-4804.9551	76.3735	434.0573	-232.0222	3434.7625	-1028.2072
			3531	-3372.1809	448.9533	117.6291	361.4286	2082.4795	-1327.1998
			3532	-5804.7422	55.4890	523.8866	-213.6339	4041.3225	-288.3397
			3533	-5805.1084	54.9888	524.4646	-214.9030	4042.1208	-288.5777
			3534	-3371.8152	449.4536	117.0511	362.6977	2081.6814	-1326.9618
			3535	-3480.6404	420.3190	128.8853	367.7980	2169.7090	-531.0875
			3536	-5696.2832	84.1234	512.6304	-220.0033	3954.0933	-1084.4520
			3537	-3480.2744	420.8192	128.3073	369.0671	2168.9106	-530.8494
			3538	-5696.6489	83.6231	513.2085	-221.2724	3954.8914	-1084.6901
			3541	-3524.2490	448.5868	14.7121	355.3666	1840.4205	-1303.0431
			3542	-5956.8105	55.1225	420.9696	-219.6959	3799.2634	-264.1830
			3543	-5957.1763	54.6222	421.5476	-220.9650	3800.0615	-264.4210
			3544	-3523.8831	449.0870	14.1341	356.6357	1839.6224	-1302.8051
			3545	-3632.7083	419.9525	25.9683	361.7360	1927.6497	-506.9308
			3546	-5848.3511	83.7568	409.7134	-226.0653	3712.0342	-1060.2953
			3547	-3632.3425	420.4527	25.3902	363.0051	1926.8516	-506.6927
			3548	-5848.7168	83.2566	410.2914	-227.3344	3712.8323	-1060.5333
			3551	-4415.9429	455.8365	93.8633	366.1164	2360.5498	-1359.5260
			3552	-6848.5044	62.3721	500.1208	-208.9460	4319.3921	-320.6660
			3553	-6848.8701	61.8719	500.6988	-210.2151	4320.1904	-320.9040
			3554	-4415.5771	456.3367	93.2852	367.3855	2359.7517	-1359.2881
			3555	-4524.4023	427.2021	105.1195	372.4858	2447.7788	-563.4138
			3556	-6740.0449	91.0064	488.8645	-215.3154	4232.1631	-1116.7783
			3557	-4524.0366	427.7024	104.5414	373.7549	2446.9807	-563.1757
			3558	-6740.4106	90.5062	489.4426	-216.5846	4232.9609	-1117.0164
			3601	-4662.2920	292.8185	267.1585	111.2777	2928.8357	-857.4106
			3602	-3694.5640	285.7522	239.4659	103.5589	2529.7361	-813.0060
			3603	-4586.2583	293.0018	318.6170	114.3087	3049.8652	-869.4890
			3604	-4738.3262	292.6353	215.7000	108.2467	2807.8062	-845.3323
			3605	-5630.0200	299.8849	294.8512	118.9966	3327.9353	-901.8152
			3611	-3446.0115	489.5507	64.0298	398.8089	1949.4142	-1376.8407
			3612	-5878.5728	96.0864	470.2873	-176.2535	3908.2573	-337.9806
			3613	-5878.9385	95.5861	470.8653	-177.5226	3909.0554	-338.2187
			3614	-3445.6455	490.0510	63.4517	400.0780	1948.6161	-1376.6027
			3615	-3554.4707	460.9164	75.2860	405.1783	2036.6434	-580.7284
			3616	-5770.1133	124.7207	459.0311	-182.6229	3821.0278	-1134.0929
			3617	-3554.1050	461.4166	74.7079	406.4475	2035.8453	-580.4904
			3618	-5770.4795	124.2205	459.6091	-183.8920	3821.8262	-1134.3309
			3621	-2478.2832	482.4843	36.3371	391.0901	1550.3148	-1332.4360
			3622	-4910.8447	89.0200	442.5946	-183.9724	3509.1577	-293.5760
			3623	-4911.2109	88.5198	443.1726	-185.2415	3509.9558	-293.8140
			3624	-2477.9175	482.9846	35.7590	392.3592	1549.5167	-1332.1980
			3625	-2586.7427	453.8500	47.5933	397.4595	1637.5439	-536.3238
			3626	-4802.3857	117.6543	431.3384	-190.3418	3421.9285	-1089.6882
			3627	-2586.3767	454.3502	47.0152	398.7286	1636.7458	-536.0857
			3628	-4802.7515	117.1541	431.9164	-191.6109	3422.7266	-1089.9263
			3631	-3369.9775	489.7340	115.4883	401.8399	2070.4441	-1388.9191
			3632	-5802.5386	96.2696	521.7457	-173.2225	4029.2866	-350.0590
			3633	-5802.9048	95.7694	522.3238	-174.4916	4030.0847	-350.2970
			3634	-3369.6116	490.2342	114.9102	403.1090	2069.6460	-1388.6810

	3635	-3478.4368	461.0996	126.7445	408.2094	2157.6731	-592.8068
	3636	-5694.0796	124.9040	510.4896	-179.5919	3942.0574	-1146.1713
	3637	-3478.0708	461.5999	126.1664	409.4785	2156.8750	-592.5687
	3638	-5694.4453	124.4037	511.0676	-180.8610	3942.8555	-1146.4094
	3641	-3522.0454	489.3674	12.5713	395.7779	1828.3848	-1364.7625
	3642	-5954.6069	95.9031	418.8288	-179.2845	3787.2273	-325.9022
	3643	-5954.9727	95.4028	419.4068	-180.5536	3788.0256	-326.1403
	3644	-3521.6797	489.8677	11.9932	397.0470	1827.5865	-1364.5242
	3645	-3630.5049	460.7331	23.8275	402.1473	1915.6139	-568.6500
	3646	-5846.1475	124.5374	407.5726	-185.6539	3699.9983	-1122.0145
	3647	-3630.1389	461.2333	23.2494	403.4165	1914.8158	-568.4119
	3648	-5846.5132	124.0372	408.1506	-186.9230	3700.7964	-1122.2527
	3651	-4413.7393	496.6171	91.7224	406.5277	2348.5137	-1421.2454
	3652	-6846.3008	103.1527	497.9799	-168.5347	4307.3569	-382.3852
	3653	-6846.6665	102.6525	498.5580	-169.8038	4308.1548	-382.6233
	3654	-4413.3735	497.1173	91.1444	407.7968	2347.7156	-1421.0073
	3655	-4522.1987	467.9827	102.9787	412.8972	2435.7429	-625.1330
	3656	-6737.8413	131.7870	486.7238	-174.9041	4220.1274	-1178.4976
	3657	-4521.8330	468.4829	102.4006	414.1663	2434.9448	-624.8950
	3658	-6738.2075	131.2868	487.3018	-176.1732	4220.9258	-1178.7356
	3701	-4665.5635	246.6612	268.8907	35.5365	2938.2771	-790.5723
	3702	-3697.8350	239.5948	241.1980	27.8177	2539.1777	-746.1677
	3703	-4589.5293	246.8445	320.3492	38.5675	3059.3066	-802.6506
	3704	-4741.5972	246.4779	217.4322	32.5055	2817.2476	-778.4939
	3705	-5633.2910	253.7275	296.5834	43.2554	3337.3767	-834.9769
	3711	-3449.2825	443.3933	65.7619	323.0677	1958.8557	-1310.0023
	3712	-5881.8438	49.9290	472.0195	-251.9947	3917.6987	-271.1422
	3713	-5882.2100	49.4288	472.5975	-253.2638	3918.4968	-271.3802
	3714	-3448.9167	443.8936	65.1839	324.3369	1958.0575	-1309.7643
	3715	-3557.7419	414.7590	77.0182	329.4372	2046.0850	-513.8900
	3716	-5773.3848	78.5633	460.7632	-258.3641	3830.4695	-1067.2545
	3717	-3557.3760	415.2592	76.4401	330.7063	2045.2867	-513.6519
	3718	-5773.7505	78.0631	461.3413	-259.6332	3831.2676	-1067.4927
	3721	-2481.5544	436.3270	38.0693	315.3489	1559.7562	-1265.5977
	3722	-4914.1152	42.8626	444.3268	-259.7135	3518.5991	-226.7376
	3723	-4914.4814	42.3624	444.9048	-260.9826	3519.3972	-226.9756
	3724	-2481.1885	436.8272	37.4912	316.6180	1558.9581	-1265.3597
	3725	-2590.0137	407.6927	49.3255	321.7183	1646.9855	-469.4854
	3726	-4805.6567	71.4970	433.0706	-266.0829	3431.3699	-1022.8499
	3727	-2589.6477	408.1929	48.7474	322.9875	1646.1873	-469.2473
	3728	-4806.0225	70.9967	433.6486	-267.3521	3432.1680	-1023.0880
	3731	-3373.2485	443.5766	117.2205	326.0988	2079.8855	-1322.0807
	3732	-5805.8101	50.1123	523.4780	-248.9637	4038.7280	-283.2206
	3733	-5806.1758	49.6120	524.0560	-250.2328	4039.5261	-283.4586
	3734	-3372.8826	444.0768	116.6424	327.3679	2079.0874	-1321.8427
	3735	-3481.7078	414.9423	128.4767	332.4682	2167.1145	-525.9684
	3736	-5697.3506	78.7466	512.2217	-255.3331	3951.4988	-1079.3329
	3737	-3481.3420	415.4425	127.8986	333.7373	2166.3164	-525.7303
	3738	-5697.7163	78.2464	512.7998	-256.6022	3952.2969	-1079.5709
	3741	-3525.3167	443.2101	14.3034	320.0368	1837.8262	-1297.9240
	3742	-5957.8779	49.7457	420.5610	-255.0257	3796.6689	-259.0638
	3743	-5958.2437	49.2455	421.1390	-256.2948	3797.4670	-259.3019
	3744	-3524.9507	443.7103	13.7254	321.3058	1837.0281	-1297.6859
	3745	-3633.7759	414.5757	25.5597	326.4062	1925.0553	-501.8116
	3746	-5849.4185	78.3801	409.3047	-261.3951	3709.4397	-1055.1761
	3747	-3633.4102	415.0760	24.9816	327.6753	1924.2572	-501.5736
	3748	-5849.7847	77.8798	409.8828	-262.6642	3710.2380	-1055.4142
	3751	-4417.0103	450.4597	93.4546	330.7866	2357.9551	-1354.4069
	3752	-6849.5718	56.9954	499.7121	-244.2758	4316.7983	-315.5468
	3753	-6849.9375	56.4951	500.2901	-245.5450	4317.5962	-315.7849
	3754	-4416.6445	450.9600	92.8766	332.0557	2357.1570	-1354.1689
	3755	-4525.4697	421.8254	104.7108	337.1560	2445.1843	-558.2946
	3756	-6741.1123	85.6297	488.4559	-250.6452	4229.5688	-1111.6592
	3757	-4525.1040	422.3256	104.1328	338.4251	2444.3862	-558.0565
	3758	-6741.4785	85.1295	489.0340	-251.9144	4230.3672	-1111.8972
GA02	3501	-4675.9448	252.0379	269.2993	70.8664	3130.7266	-618.0056
	3502	-3708.2166	244.9715	241.6067	63.1475	2712.1040	-578.5827
	3503	-4599.9106	252.2212	320.7578	73.8974	3288.0342	-629.9547
	3504	-4751.9790	251.8546	217.8409	67.8354	2973.4189	-606.0564
	3505	-5643.6729	259.1043	296.9920	78.5852	3549.3491	-657.4284
	3511	-3459.6641	448.7701	66.1706	358.3976	2008.1001	-998.7401
	3512	-5892.2256	55.3057	472.4281	-216.6649	4253.3530	-237.2710
	3513	-5892.5913	54.8055	473.0061	-217.9340	4254.5586	-237.8617
	3514	-3459.2983	449.2703	65.5925	359.6667	2006.8945	-998.1494
	3515	-3568.1235	420.1357	77.4268	364.7670	2103.2646	-222.8149
	3516	-5783.7661	83.9401	461.1719	-223.0343	4158.1885	-1013.1962
	3517	-3567.7576	420.6360	76.8487	366.0361	2102.0591	-222.2242
	3518	-5784.1318	83.4398	461.7499	-224.3034	4159.3940	-1013.7870
	3521	-2491.9360	441.7037	38.4779	350.6787	1589.4775	-959.3173
	3522	-4924.4976	48.2394	444.7354	-224.3837	3834.7302	-197.8481
	3523	-4924.8633	47.7391	445.3134	-225.6528	3835.9360	-198.4389
	3524	-2491.5701	442.2039	37.8999	351.9478	1588.2719	-958.7265
	3525	-2600.3953	413.0694	49.7341	357.0481	1684.6422	-183.3921
	3526	-4816.0381	76.8737	433.4792	-230.7531	3739.5654	-973.7734
	3527	-2600.0293	413.5696	49.1561	358.3173	1683.4366	-182.8013
	3528	-4816.4043	76.3735	434.0573	-232.0222	3740.7712	-974.3641
	3531	-3383.6301	448.9533	117.6291	361.4286	2165.4077	-1010.6893
	3532	-5816.1914	55.4890	523.8866	-213.6339	4410.6606	-249.2201
	3533	-5816.5571	54.9888	524.4646	-214.9030	4411.8662	-249.8109
	3534	-3383.2642	449.4536	117.0511	362.6977	2164.2019	-1010.0986
	3535	-3492.0894	420.3190	128.8853	367.7980	2260.5728	-234.7641

3536	-5707.7319	84.1234	512.6304	-220.0033	4315.4956	-1025.1454
3537	-3491.7236	420.8192	128.3073	369.0671	2259.3669	-234.1733
3538	-5708.0981	83.6231	513.2085	-221.2724	4316.7017	-1025.7360
3541	-3535.6982	448.5868	14.7121	355.3666	1850.7925	-986.7910
3542	-5968.2598	55.1225	420.9696	-219.6959	4096.0454	-225.3218
3543	-5968.6255	54.6222	421.5476	-220.9650	4097.2510	-225.9125
3544	-3535.3323	449.0870	14.1341	356.6357	1849.5868	-986.2003
3545	-3644.1575	419.9525	25.9683	361.7360	1945.9573	-210.8658
3546	-5859.8003	83.7568	409.7134	-226.0653	4000.8804	-1001.2470
3547	-3643.7917	420.4527	25.3902	363.0051	1944.7516	-210.2750
3548	-5860.1660	83.2566	410.2914	-227.3344	4002.0862	-1001.8377
3551	-4427.3921	455.8365	93.8633	366.1164	2426.7227	-1038.1630
3552	-6859.9536	62.3721	500.1208	-208.9460	4671.9756	-276.6938
3553	-6860.3193	61.8719	500.6988	-210.2151	4673.1812	-277.2845
3554	-4427.0264	456.3367	93.2852	367.3855	2425.5168	-1037.5721
3555	-4535.8516	427.2021	105.1195	372.4858	2521.8877	-262.2378
3556	-6751.4941	91.0064	488.8645	-215.3154	4576.8105	-1052.6189
3557	-4535.4854	427.7024	104.5414	373.7549	2520.6819	-261.6470
3558	-6751.8599	90.5062	489.4426	-216.5846	4578.0166	-1053.2097
3601	-4673.7412	292.8185	267.1585	111.2777	3117.1814	-650.9745
3602	-3706.0132	285.7522	239.4659	103.5589	2698.5588	-611.5517
3603	-4597.7075	293.0018	318.6170	114.3087	3274.4890	-662.9238
3604	-4749.7754	292.6353	215.7000	108.2467	2959.8738	-639.0254
3605	-5641.4692	299.8849	294.8512	118.9966	3535.8040	-690.3975
3611	-3457.4607	489.5507	64.0298	398.8089	1994.5551	-1031.7092
3612	-5890.0220	96.0864	470.2873	-176.2535	4239.8076	-270.2400
3613	-5890.3877	95.5861	470.8653	-177.5226	4241.0132	-270.8307
3614	-3457.0947	490.0510	63.4517	400.0780	1993.3495	-1031.1184
3615	-3565.9199	460.9164	75.2860	405.1783	2089.7197	-255.7840
3616	-5781.5625	124.7207	459.0311	-182.6229	4144.6431	-1046.1653
3617	-3565.5542	461.4166	74.7079	406.4475	2088.5142	-255.1932
3618	-5781.9287	124.2205	459.6091	-183.8920	4145.8486	-1046.7560
3621	-2489.7324	482.4843	36.3371	391.0901	1575.9324	-992.2863
3622	-4922.2935	89.0200	442.5946	-183.9724	3821.1853	-230.8171
3623	-4922.6592	88.5198	443.1726	-185.2415	3822.3909	-231.4078
3624	-2489.3665	482.9846	35.7590	392.3592	1574.7268	-991.6955
3625	-2598.1917	453.8500	47.5933	397.4595	1671.0972	-216.3611
3626	-4813.8345	117.6543	431.3384	-190.3418	3726.0203	-1006.7424
3627	-2597.8259	454.3502	47.0152	398.7286	1669.8915	-215.7703
3628	-4814.2007	117.1541	431.9164	-191.6109	3727.2261	-1007.3331
3631	-3381.4265	489.7340	115.4883	401.8399	2151.8628	-1043.6583
3632	-5813.9878	96.2696	521.7457	-173.2225	4397.1157	-282.1891
3633	-5814.3540	95.7694	522.3238	-174.4916	4398.3213	-282.7799
3634	-3381.0608	490.2342	114.9102	403.1090	2150.6570	-1043.0675
3635	-3489.8860	461.0996	126.7445	408.2094	2247.0276	-267.7331
3636	-5705.5288	124.9040	510.4896	-179.5919	4301.9507	-1058.1143
3637	-3489.5200	461.5999	126.1664	409.4785	2245.8218	-267.1424
3638	-5705.8945	124.4037	511.0676	-180.8610	4303.1563	-1058.7051
3641	-3533.4946	489.3674	12.5713	395.7779	1837.2473	-1019.7600
3642	-5966.0562	95.9031	418.8288	-179.2845	4082.5002	-258.2908
3643	-5966.4219	95.4028	419.4068	-180.5536	4083.7061	-258.8816
3644	-3533.1287	489.8677	11.9932	397.0470	1836.0417	-1019.1693
3645	-3641.9539	460.7331	23.8275	402.1473	1932.4122	-243.8348
3646	-5857.5967	124.5374	407.5726	-185.6539	3987.3352	-1034.2159
3647	-3641.5881	461.2333	23.2494	403.4165	1931.2064	-243.2440
3648	-5857.9624	124.0372	408.1506	-186.9230	3988.5410	-1034.8068
3651	-4425.1885	496.6171	91.7224	406.5277	2413.1777	-1071.1321
3652	-6857.7500	103.1527	497.9799	-168.5347	4658.4307	-309.6629
3653	-6858.1157	102.6525	498.5580	-169.8038	4659.6362	-310.2536
3654	-4424.8228	497.1173	91.1444	407.7968	2411.9719	-1070.5413
3655	-4533.6479	467.9827	102.9787	412.8972	2508.3425	-295.2068
3656	-6749.2905	131.7870	486.7238	-174.9041	4563.2656	-1085.5881
3657	-4533.2822	468.4829	102.4006	414.1663	2507.1367	-294.6161
3658	-6749.6563	131.2868	487.3018	-176.1732	4564.4712	-1086.1788
3701	-4677.0122	246.6612	268.8907	35.5365	3127.8442	-616.6770
3702	-3709.2842	239.5948	241.1980	27.8177	2709.2214	-577.2541
3703	-4600.9785	246.8445	320.3492	38.5675	3285.1519	-628.6262
3704	-4753.0464	246.4779	217.4322	32.5055	2970.5366	-604.7278
3705	-5644.7402	253.7275	296.5834	43.2554	3546.4670	-656.0999
3711	-3460.7317	443.3933	65.7619	323.0677	2005.2179	-997.4116
3712	-5893.2930	49.9290	472.0195	-251.9947	4250.4707	-235.9424
3713	-5893.6592	49.4288	472.5975	-253.2638	4251.6763	-236.5332
3714	-3460.3660	443.8936	65.1839	324.3369	2004.0121	-996.8208
3715	-3569.1912	414.7590	77.0182	329.4372	2100.3828	-221.4864
3716	-5784.8340	78.5633	460.7632	-258.3641	4155.3057	-1011.8676
3717	-3568.8252	415.2592	76.4401	330.7063	2099.1770	-220.8956
3718	-5785.1997	78.0631	461.3413	-259.6332	4156.5117	-1012.4584
3721	-2493.0034	436.3270	38.0693	315.3489	1586.5950	-957.9887
3722	-4925.5649	42.8626	444.3268	-259.7135	3831.8479	-196.5195
3723	-4925.9312	42.3624	444.9048	-260.9826	3833.0537	-197.1103
3724	-2492.6377	436.8272	37.4912	316.6180	1585.3894	-957.3979
3725	-2601.4629	407.6927	49.3255	321.7183	1681.7598	-182.0635
3726	-4817.1060	71.4970	433.0706	-266.0829	3736.6829	-972.4447
3727	-2601.0969	408.1929	48.7474	322.9875	1680.5541	-181.4727
3728	-4817.4717	70.9967	433.6486	-267.3521	3737.8887	-973.0355
3731	-3384.6978	443.5766	117.2205	326.0988	2162.5256	-1009.3608
3732	-5817.2593	50.1123	523.4780	-248.9637	4407.7783	-247.8916
3733	-5817.6250	49.6120	524.0560	-250.2328	4408.9839	-248.4823
3734	-3384.3318	444.0768	116.6424	327.3679	2161.3201	-1008.7700
3735	-3493.1570	414.9423	128.4767	332.4682	2257.6902	-233.4355
3736	-5708.7998	78.7466	512.2217	-255.3331	4312.6138	-1023.8168

3737	-3492.7913	415.4425	127.8986	333.7373	2256.4846	-232.8448
3738	-5709.1655	78.2464	512.7998	-256.6022	4313.8188	-1024.4076
3741	-3536.7656	443.2101	14.3034	320.0368	1847.9102	-985.4625
3742	-5969.3271	49.7457	420.5610	-255.0257	4093.1633	-223.9933
3743	-5969.6929	49.2455	421.1390	-256.2948	4094.3687	-224.5840
3744	-3536.3999	443.7103	13.7254	321.3058	1846.7046	-984.8716
3745	-3645.2251	414.5757	25.5597	326.4062	1943.0748	-209.5372
3746	-5860.8677	78.3801	409.3047	-261.3951	3997.9983	-999.9185
3747	-3644.8591	415.0760	24.9816	327.6753	1941.8693	-208.9465
3748	-5861.2334	77.8798	409.8828	-262.6642	3999.2041	-1000.5092
3751	-4428.4595	450.4597	93.4546	330.7866	2423.8406	-1036.8345
3752	-6861.0210	56.9954	499.7121	-244.2758	4669.0933	-275.3653
3753	-6861.3867	56.4951	500.2901	-245.5450	4670.2993	-275.9561
3754	-4428.0938	450.9600	92.8766	332.0557	2422.6350	-1036.2438
3755	-4536.9189	421.8254	104.7108	337.1560	2519.0056	-260.9093
3756	-6752.5615	85.6297	488.4559	-250.6452	4573.9287	-1051.2905
3757	-4536.5532	422.3256	104.1328	338.4251	2517.7998	-260.3185
3758	-6752.9277	85.1295	489.0340	-251.9144	4575.1343	-1051.8812

MEMBER STRESS AT MAX UNITY CHECK REPORT
LOAD CASE 3101-3348

MEMBER	GRP	MAXIMUM UNITY CHECK	CRITICAL COND.	LOAD COND NO.	DIST FROM END m	APPLIED STRESSES AXIAL N/mm2	** BENDING ** Y-Y N/mm2	Z-Z N/mm2	*** SHEAR *** Y N/mm2	Z N/mm2	* CM VALUES * Y	Z	* NEXT TWO HIGHEST CASES * UNITY CHECK	LOAD COND	UNITY CHECK	LOAD COND
1172-GB01	DM5	0.339	C<.15	3316	0.97	-27.92	-51.77	-9.10	6.28	-4.25	0.85	0.85	0.34	3318	0.33	3312
1272-GB02	DM5	0.399	C>.15B	3325	0.70	-33.01	-61.71	4.56	8.22	4.17	0.85	0.85	0.40	3327	0.39	3321
1372-GA01	DM5	0.362	C<.15	3331	0.97	-25.59	59.90	-14.07	6.92	2.49	0.85	0.85	0.36	3334	0.34	3335
1472-GA02	DM5	0.448	C>.15B	3342	0.70	-34.79	72.21	1.19	6.45	-3.39	0.85	0.85	0.45	3343	0.44	3346
LB02-0008	DYX	0.420	C>.15B	3312	0.00	-63.48	15.98	-24.34	16.95	-7.19	0.85	0.85	0.42	3313	0.41	3316
LB04-0013	DYX	0.410	C>.15B	3316	0.00	-62.49	24.99	12.27	15.42	-17.12	0.85	0.85	0.41	3318	0.38	3312
LB15-0014	DYX	0.477	C>.15B	3325	0.00	-67.78	31.41	-22.65	18.87	20.78	0.85	0.85	0.48	3327	0.46	3321
LB17-0005	DYX	0.508	C>.15B	3321	0.00	-80.21	17.72	25.51	21.00	10.17	0.85	0.85	0.51	3324	0.49	3325
LB28-0016	DYX	0.393	C>.15B	3335	0.00	-56.84	-16.86	-25.51	16.14	8.41	0.85	0.85	0.39	3337	0.38	3331
LB30-0007	DYX	0.422	C>.15B	3331	0.00	-63.27	-28.64	9.01	17.94	19.82	0.85	0.85	0.42	3334	0.38	3335
LB41-0015	DYX	0.495	C>.15B	3342	0.00	-72.09	-25.24	-28.20	18.18	-16.90	0.85	0.85	0.49	3343	0.48	3346
LB43-0006	DYX	0.515	C>.15B	3346	0.00	-83.54	-14.83	24.53	18.74	-7.70	0.85	0.85	0.51	3342	0.51	3343
GA01-LB29	GB1	1.881	TR+SFA	3331	0.00	-6.49	129.82	-64.66	1.71	-97.77	1.00	1.00	1.88	3334	1.58	3341
GB01-GA01	GB1	0.364	TN+BN	3311	0.00	1.11	53.00	31.69	-1.41	-2.62	1.00	1.00	0.36	3314	0.35	3315
LB03-GB01	GB1	1.768	TR+SFA	3312	0.82	-5.70	135.65	-73.26	-7.49	100.41	1.00	1.00	1.77	3313	1.70	3316
LB06-LB03	GB1	0.000	TN+BN	3101	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	3102	0.00	3103
LB29-LB32	GB1	0.000	TN+BN	3101	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	3102	0.00	3103
GA02-LB42	GB2	2.194	TR+SFA	3346	0.00	-5.17	125.58	60.06	-1.93	-101.38	1.00	1.00	1.87	3336	1.87	3338
GB02-GA02	GB2	0.380	TN+BN	3341	13.72	0.45	40.93	-40.66	-1.73	1.49	1.00	1.00	0.38	3344	0.38	3331
LB16-GB02	GB2	1.941	TR+SFA	3321	0.82	-6.16	114.07	95.63	9.82	96.01	1.00	1.00	1.94	3324	1.64	3341
LB19-LB16	GB2	0.000	TN+BN	3101	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	3102	0.00	3103
LB42-LB45	GB2	0.000	TN+BN	3101	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	3102	0.00	3103
LB01-LB02	GB3	0.000	SHEAR	3101	0.26	0.00	-0.01	0.00	0.00	-0.04	1.00	1.00	0.00	3102	0.00	3103
LB02-LB03	GB3	0.566	SHEAR	3312	0.00	-4.32	-15.09	-12.36	4.95	59.19	1.00	1.00	0.57	3313	0.51	3332
LB03-LB04	GB3	0.626	SHEAR	3316	0.75	-1.40	-16.12	26.69	-10.41	-57.42	1.00	1.00	0.63	3318	0.57	3336
LB04-LB05	GB3	0.055	TN+BN	3316	0.00	0.35	-9.24	-2.73	0.13	0.89	1.00	1.00	0.05	3318	0.05	3326
LB14-LB15	GB3	0.059	TN+BN	3325	0.26	0.35	-9.41	-3.99	-0.20	-0.90	1.00	1.00	0.06	3327	0.06	3345
LB15-LB16	GB3	0.703	SHEAR	3325	0.00	-1.70	-20.14	31.74	12.82	62.33	1.00	1.00	0.70	3327	0.67	3345
LB16-LB17	GB3	0.708	SHEAR	3321	0.75	-5.31	-17.11	-17.48	-6.43	-74.79	1.00	1.00	0.71	3324	0.65	3341
LB17-LB18	GB3	0.000	SHEAR	3101	0.00	0.00	-0.01	0.00	0.00	0.04	1.00	1.00	0.00	3102	0.00	3103
LB27-LB28	GB3	0.000	SHEAR	3101	0.26	0.00	-0.01	0.00	0.00	-0.04	1.00	1.00	0.00	3102	0.00	3103
LB28-LB29	GB3	0.523	SHEAR	3335	0.00	-3.97	-14.87	14.45	-5.57	52.99	1.00	1.00	0.52	3337	0.46	3315
LB29-LB30	GB3	0.654	SHEAR	3331	0.75	-3.15	-12.73	-30.32	12.15	-58.15	1.00	1.00	0.65	3334	0.59	3311
LB30-LB31	GB3	0.049	CM+BN	3322	0.00	-0.50	8.09	-3.37	0.17	-0.45	1.00	1.00	0.05	3323	0.05	3312
LB40-LB41	GB3	0.058	CM+BN	3311	0.26	-1.23	9.10	-4.06	-0.20	0.43	1.00	1.00	0.06	3314	0.06	3331
LB41-LB42	GB3	0.701	SHEAR	3342	0.00	-3.54	-22.26	-25.96	-10.63	66.36	1.00	1.00	0.70	3343	0.64	3322
LB42-LB43	GB3	0.718	SHEAR	3346	0.75	-4.74	-15.85	13.24	5.68	-77.90	1.00	1.00	0.65	3326	0.65	3328
LB43-LB44	GB3	0.000	SHEAR	3101	0.00	0.00	-0.01	0.00	0.00	0.04	1.00	1.00	0.00	3102	0.00	3103
0005-CPP1	GB6	0.148	CM+BN	3341	0.00	-0.14	6.34	26.49	-3.21	-0.92	1.00	1.00	0.15	3344	0.15	3321
0006-CPP2	GB6	0.141	SHEAR	3322	0.00	-0.08	0.12	-25.16	3.73	0.49	1.00	1.00	0.14	3323	0.14	3326
0007-CPP6	GB6	0.487	TR+SFA	3311	0.00	2.40	4.43	-77.30	17.08	-11.06	1.00	1.00	0.49	3314	0.48	3331

0008-CPP7	GB6	0.136	CM+BN	3312	0.00	-0.09	3.99	-26.77	2.45	-0.42	1.00	1.00	0.14	3313	0.13	3332
0013-0008	GB6	0.246	TN+BN	3312	1.50	5.87	-5.36	-44.95	-3.09	-4.04	1.00	1.00	0.25	3313	0.24	3332
0014-0005	GB6	0.298	TN+BN	3341	1.50	6.53	-8.14	52.60	4.04	-6.05	1.00	1.00	0.30	3344	0.30	3321
0015-0006	GB6	0.248	TN+BN	3326	1.50	5.85	-6.71	-43.67	-2.85	-4.97	1.00	1.00	0.25	3328	0.25	3346
0016-0007	GB6	0.251	TN+BN	3331	0.00	5.10	2.47	-50.11	3.48	-1.10	1.00	1.00	0.25	3334	0.25	3335
0016-CPP8	GB6	0.143	CM+BN	3331	0.00	-0.13	-2.68	30.02	-2.62	1.15	1.00	1.00	0.14	3334	0.14	3311
CPP1-LB26	GB6	0.019	TN+BN	3341	0.00	0.00	3.64	0.00	0.00	-1.71	1.00	1.00	0.02	3344	0.02	3321
CPP2-LB52	GB6	0.017	TN+BN	3326	0.00	0.00	3.11	0.00	0.00	-1.44	1.00	1.00	0.02	3328	0.02	3316
CPP3-0014	GB6	0.510	TR+SFA	3345	1.25	4.21	0.63	81.04	18.40	10.67	1.00	1.00	0.51	3347	0.50	3325
CPP3-CRP1	GB6	0.437	TN+BN	3335	0.52	4.00	-36.03	33.69	14.39	-11.51	1.00	1.00	0.44	3337	0.43	3345
CPP4-0015	GB6	0.422	TN+BN	3322	1.25	2.37	1.62	-69.44	-14.82	10.35	1.00	1.00	0.42	3323	0.42	3326
CPP5-0013	GB6	0.423	TN+BN	3336	1.25	3.22	3.04	-68.79	-14.41	11.04	1.00	1.00	0.42	3338	0.42	3316
CPP5-CRP3	GB6	0.374	TN+BN	3326	0.52	3.12	-34.99	-22.78	-11.42	-11.88	1.00	1.00	0.37	3328	0.37	3346
CPP6-CRP4	GB6	0.432	TN+BN	3341	0.52	2.18	-33.46	32.12	14.67	-11.89	1.00	1.00	0.43	3344	0.43	3321
CRP1-LB20	GB6	0.290	CM+BN	3345	0.52	-0.16	-38.33	19.73	-1.19	-12.48	1.00	1.00	0.29	3347	0.29	3325
CRP2-CPP4	GB6	0.391	TN+BN	3312	0.00	2.30	-34.14	24.27	-11.61	11.22	1.00	1.00	0.39	3313	0.38	3322
CRP3-LB13	GB6	0.274	CM+BN	3345	0.52	-0.16	36.21	18.70	-1.19	9.72	1.00	1.00	0.27	3347	0.27	3335
CRP4-LB39	GB6	0.279	CM+BN	3331	0.52	-2.00	-35.94	19.09	-1.18	-12.90	1.00	1.00	0.28	3334	0.28	3311
LB07-CPP7	GB6	0.068	TN+BN	3311	1.05	0.00	-2.53	8.02	1.81	-1.40	1.00	1.00	0.07	3314	0.07	3331
LB33-CPP8	GB6	0.069	TN+BN	3336	1.05	0.00	-2.89	-7.89	-1.78	-1.57	1.00	1.00	0.07	3338	0.07	3316
LB46-CRP2	GB6	0.297	CM+BN	3331	0.00	-2.00	39.33	-18.88	-1.18	-10.80	1.00	1.00	0.30	3334	0.30	3341
CPP1-CPP2	TPP	0.167	TN+BN	3341	15.35	5.10	3.99	-36.59	1.45	0.00	0.85	0.85	0.17	3344	0.16	3321
CPP3-CPP4	TPP	0.230	TN+BN	3341	0.00	7.05	5.49	50.36	1.70	0.25	0.85	0.85	0.23	3344	0.23	3321
CPP5-CPP6	TPP	0.202	TN+BN	3331	15.35	4.28	8.78	-46.10	1.65	0.22	0.85	0.85	0.20	3334	0.20	3335
CPP7-CPP8	TPP	0.138	TN+BN	3331	0.00	1.29	-1.14	34.07	1.35	0.00	0.85	0.85	0.14	3334	0.14	3311
CRP1-CRP5	TPP	0.371	TN+BN	3335	8.82	28.68	59.98	-2.08	1.60	-10.38	0.85	0.85	0.37	3337	0.37	3345
CRP3-CRP5	TPP	0.381	C>.15A	3341	0.00	-28.25	-43.98	35.98	2.37	4.57	0.85	0.85	0.38	3344	0.37	3321
CRP5-CRP2	TPP	0.372	C>.15A	3335	8.82	-27.73	-41.70	-36.66	2.32	4.55	0.85	0.85	0.37	3337	0.37	3315
CRP5-CRP4	TPP	0.372	TN+BN	3341	0.00	29.15	59.83	-0.25	1.55	-10.45	0.85	0.85	0.37	3344	0.37	3331
LB14-LB05	TPP	0.484	TN+BN	3325	0.00	1.69	-121.35	20.67	4.99	-2.58	0.85	0.85	0.48	3327	0.48	3345
LB20-LB13	TPP	0.918	C<.15	3345	0.00	-0.54	-224.71	74.09	12.86	-14.10	0.85	0.85	0.92	3347	0.92	3325
LB31-LB40	TPP	0.507	C<.15	3311	0.00	-5.91	-118.02	19.01	4.88	-1.92	0.85	0.85	0.51	3314	0.51	3331
LB39-LB46	TPP	0.957	C<.15	3331	0.00	-6.99	-225.35	71.75	12.85	-13.57	0.85	0.85	0.96	3334	0.96	3341
LB26-LB54	TRN	0.000	C<.15	3101	0.00	-0.01	0.00	0.00	0.00	0.00	0.85	0.85	0.00	3102	0.00	3103
LB52-LB55	TRN	0.000	C<.15	3101	0.00	-0.01	0.00	0.00	0.00	0.00	0.85	0.85	0.00	3102	0.00	3103

MEMBER STRESS AT MAX UNITY CHECK REPORT
LOAD CASE 3401-3405

MEMBER	GRP	MAXIMUM UNITY CHECK	CRITICAL COND.	LOAD COND NO.	DIST FROM END m	APPLIED STRESSES AXIAL N/mm2	** BENDING ** Y-Y N/mm2	Z-Z N/mm2	*** SHEAR *** Y N/mm2	Z N/mm2	* CM VALUES * Y	Z	* NEXT TWO HIGHEST CASES * UNITY CHECK	LOAD COND	UNITY CHECK	LOAD COND
CPP3-CPP4	CPP	0.138	TN+BN	3403	7.10	7.06	26.77	1.52	0.32	0.13	0.85	0.85	0.13	3405	0.13	3401
1172-GB01	DM5	0.088	C<.15	3402	0.00	-1.50	10.52	6.93	7.54	4.53	0.85	0.85	0.07	3404	0.07	3401
1272-GB02	DM5	0.433	C>.15B	3402	0.70	-33.14	-70.46	4.57	11.18	3.84	0.85	0.85	0.42	3403	0.38	3401
1372-GA01	DM5	0.383	C<.15	3402	0.97	-25.65	65.53	13.16	10.17	1.53	0.85	0.85	0.37	3404	0.32	3401
1472-GA02	DM5	0.175	C<.15	3405	0.00	-17.20	22.99	-5.20	5.63	2.37	0.85	0.85	0.10	3402	0.09	3403
LB02-0008	DYX	0.070	TN+BN	3402	0.00	2.89	-13.33	-1.60	9.13	0.47	0.85	0.85	0.05	3403	0.05	3401
LB04-0013	DYX	0.248	C<.15	3402	0.00	-4.28	-20.82	-14.98	24.94	9.23	0.85	0.85	0.19	3404	0.18	3401
LB15-0014	DYX	0.474	C>.15B	3402	0.00	-65.87	34.16	-21.12	19.34	11.96	0.85	0.85	0.47	3403	0.42	3401
LB17-0005	DYX	0.576	C>.15B	3402	0.00	-71.74	38.59	44.91	30.51	-11.12	0.85	0.85	0.56	3403	0.51	3401
LB28-0016	DYX	0.548	C>.15B	3402	0.00	-69.37	-49.60	-23.49	26.32	-18.59	0.85	0.85	0.51	3404	0.44	3401
LB30-0007	DYX	0.396	C>.15B	3404	0.00	-44.52	-32.36	33.84	17.42	8.04	0.85	0.85	0.39	3402	0.34	3401
LB41-0015	DYX	0.292	C>.15B	3405	0.00	-42.66	9.71	-19.95	16.76	2.18	0.85	0.85	0.24	3404	0.24	3401
LB43-0006	DYX	0.217	TN+BN	3402	0.58	18.79	10.76	30.83	18.30	-7.31	0.85	0.85	0.20	3405	0.13	3404
GA01-LB29	GB1	1.988	TR+SFA	3402	0.00	-10.04	114.34	-20.85	11.25	-100.42	1.00	1.00	1.76	3404	1.34	3401
GB01-GA01	GB1	0.329	TN+BN	3402	0.00	0.20	72.38	3.87	-0.10	-4.21	1.00	1.00	0.25	3403	0.24	3401
LB03-GB01	GB1	0.473	TN+BN	3402	0.82	5.02	22.43	64.08	17.92	1.56	1.00	1.00	0.37	3404	0.36	3401
LB06-LB03	GB1	0.000	TN+BN	3401	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	3402	0.00	3403
LB29-LB32	GB1	0.000	TN+BN	3401	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	3402	0.00	3403
GA02-LB42	GB2	0.765	TR+SFA	3402	0.00	4.75	24.61	-68.54	25.20	-2.51	1.00	1.00	0.67	3404	0.65	3401
GB02-GA02	GB2	0.273	TN+BN	3404	13.72	0.32	50.87	-9.87	-0.33	2.47	1.00	1.00	0.27	3402	0.24	3401
LB16-GB02	GB2	0.871	SHEAR	3403	0.00	-6.99	-26.80	3.43	14.10	101.83	1.00	1.00	0.82	3402	0.76	3401
LB19-LB16	GB2	0.000	TN+BN	3401	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	3402	0.00	3403
LB42-LB45	GB2	0.000	TN+BN	3401	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	3402	0.00	3403
LB01-LB02	GB3	0.000	SHEAR	3401	0.26	0.00	-0.01	0.00	0.00	-0.04	1.00	1.00	0.00	3402	0.00	3403
LB02-LB03	GB3	0.143	SHEAR	3402	0.00	0.62	0.50	0.80	-6.64	-2.73	1.00	1.00	0.11	3403	0.11	3401
LB03-LB04	GB3	0.199	CM+BN	3402	0.00	-6.00	9.38	-32.06	6.96	-4.52	1.00	1.00	0.15	3404	0.15	3401
LB04-LB05	GB3	0.039	TN+BN	3402	0.00	0.40	8.56	0.61	-0.02	-0.64	1.00	1.00	0.03	3404	0.03	3401
LB14-LB15	GB3	0.052	TN+BN	3402	0.26	0.40	-12.02	-0.31	-0.02	-1.09	1.00	1.00	0.04	3404	0.04	3401
LB15-LB16	GB3	0.772	TR+SFA	3402	0.75	-0.56	67.40	54.61	14.24	60.25	1.00	1.00	0.67	3403	0.61	3401
LB16-LB17	GB3	0.884	TR+SFA	3402	0.00	-7.28	70.69	47.04	-11.58	-66.78	1.00	1.00	0.73	3403	0.67	3401
LB17-LB18	GB3	0.000	SHEAR	3401	0.00	0.00	-0.01	0.00	0.00	0.04	1.00	1.00	0.00	3402	0.00	3403
LB27-LB28	GB3	0.000	SHEAR	3401	0.26	0.00	-0.01	0.00	0.00	-0.04	1.00	1.00	0.00	3402	0.00	3403
LB28-LB29	GB3	0.942	TR+SFA	3402	0.75	-5.66	77.10	-61.93	-12.42	64.57	1.00	1.00	0.82	3404	0.62	3401
LB29-LB30	GB3	0.529	SHEAR	3404	0.75	-2.08	-13.63	-14.31	12.41	-41.28	1.00	1.00	0.53	3402	0.45	3401
LB30-LB31	GB3	0.005	SHEAR	3402	0.00	-0.68	-0.16	-0.57	0.00	0.27	1.00	1.00	0.00	3403	0.00	3404
LB40-LB41	GB3	0.008	CM+BN	3402	0.00	-0.68	1.02	-0.38	0.00	-0.14	1.00	1.00	0.01	3404	0.01	3401
LB41-LB42	GB3	0.366	SHEAR	3405	0.00	-5.13	-13.78	3.54	1.87	39.59	1.00	1.00	0.35	3404	0.34	3401
LB42-LB43	GB3	0.290	TN+BN	3402	0.00	4.28	-20.42	30.32	-7.36	17.70	1.00	1.00	0.23	3405	0.18	3404
LB43-LB44	GB3	0.000	SHEAR	3401	0.00	0.00	-0.01	0.00	0.00	0.04	1.00	1.00	0.00	3402	0.00	3403
0005-CPP1	GB6	0.524	CM+BN	3402	0.00	-10.95	7.50	105.97	-11.76	-4.79	1.00	1.00	0.45	3404	0.45	3401
0006-CPP2	GB6	0.388	TN+BN	3402	0.00	7.40	-14.58	68.17	-7.01	6.16	1.00	1.00	0.30	3404	0.27	3401

0007-CPP6	GB6	0.631	TN+BN	3402	0.00	3.18	-8.73	-107.67	18.27	2.08	1.00	1.00	0.52	3404	0.50 3401
0008-CPP7	GB6	0.241	SHEAR	3402	0.00	-0.07	-0.79	32.24	-6.57	0.53	1.00	1.00	0.17	3403	0.17 3401
0013-0008	GB6	0.216	CM+BN	3402	0.00	-0.91	17.47	27.94	0.86	-4.65	1.00	1.00	0.16	3404	0.16 3401
0014-0005	GB6	0.367	CM+BN	3402	1.50	-0.91	-5.75	77.86	1.21	-4.38	1.00	1.00	0.31	3404	0.31 3403
0015-0006	GB6	0.291	TN+BN	3402	1.50	1.51	13.99	49.69	1.23	9.89	1.00	1.00	0.23	3404	0.20 3401
0016-0007	GB6	0.467	TN+BN	3402	0.00	4.32	-9.43	-93.72	1.72	6.88	1.00	1.00	0.38	3404	0.36 3401
0016-CPP8	GB6	0.656	CM+BN	3402	0.00	-3.48	8.27	140.74	-12.19	-2.52	1.00	1.00	0.54	3404	0.51 3401
CPP1-LB26	GB6	0.371	TR+SFA	3402	0.00	-11.01	-4.08	48.80	-11.00	-5.89	1.00	1.00	0.27	3404	0.27 3401
CPP2-LB52	GB6	0.250	TN+BN	3402	0.00	7.46	-0.42	34.42	-7.76	5.80	1.00	1.00	0.20	3404	0.18 3401
CPP3-0014	GB6	0.611	TR+SFA	3402	1.25	-2.23	-1.94	100.44	17.19	9.63	1.00	1.00	0.50	3404	0.49 3401
CPP3-CRP1	GB6	0.312	SHEAR	3402	0.00	-2.29	-24.96	-13.66	13.90	-10.33	1.00	1.00	0.26	3404	0.24 3401
CPP4-0015	GB6	0.334	CM+BN	3402	1.25	-4.33	11.97	60.40	9.77	2.30	1.00	1.00	0.25	3404	0.23 3401
CPP5-0013	GB6	0.591	CM+BN	3402	1.25	-9.74	64.43	51.29	8.69	3.65	1.00	1.00	0.45	3404	0.43 3401
CPP5-CRP3	GB6	0.378	CM+BN	3402	0.00	-9.65	56.12	-12.04	12.91	-4.38	1.00	1.00	0.29	3404	0.28 3401
CPP6-CRP4	GB6	0.228	SHEAR	3402	0.00	3.09	-4.78	-17.57	14.05	1.36	1.00	1.00	0.19	3403	0.19 3401
CRP1-LB20	GB6	0.253	SHEAR	3402	0.52	-6.09	-36.03	9.72	-0.59	-11.68	1.00	1.00	0.20	3404	0.20 3401
CRP2-CPP4	GB6	0.173	SHEAR	3402	0.00	-4.27	3.08	-16.21	13.06	3.18	1.00	1.00	0.14	3404	0.13 3401
CRP3-LB13	GB6	0.303	CM+BN	3402	0.00	-6.09	45.21	10.43	-0.59	-4.41	1.00	1.00	0.24	3404	0.23 3401
CRP4-LB39	GB6	0.101	SHEAR	3402	0.00	-0.70	0.06	9.25	-0.53	0.91	1.00	1.00	0.08	3404	0.07 3401
LB07-CPP7	GB6	0.002	SHEAR	3401	1.05	0.00	-0.23	0.00	0.00	-0.23	1.00	1.00	0.00	3402	0.00 3403
LB33-CPP8	GB6	0.674	TR+SFA	3402	1.05	-3.55	2.36	-83.22	-18.77	3.68	1.00	1.00	0.50	3404	0.47 3401
LB46-CRP2	GB6	0.126	SHEAR	3402	0.00	-0.70	-1.71	-8.94	-0.53	3.99	1.00	1.00	0.10	3404	0.09 3401
CPP1-CPP2	TPP	0.193	TN+BN	3402	0.00	1.19	-45.20	-17.33	2.30	-0.09	0.85	0.85	0.17	3404	0.16 3401
CPP5-CPP6	TPP	0.124	TN+BN	3402	0.00	6.71	-3.44	23.38	1.40	2.66	0.85	0.85	0.11	3404	0.10 3401
CPP7-CPP8	TPP	0.407	C<.15	3402	15.35	-10.44	-75.56	24.24	2.48	0.93	0.85	0.85	0.32	3404	0.32 3401
CRP1-CRP5	TPP	0.405	TN+BN	3402	8.82	26.58	71.41	-0.29	1.76	-12.79	0.85	0.85	0.34	3404	0.33 3401
CRP3-CRP5	TPP	0.265	C>.15A	3402	8.82	-24.78	-31.12	-2.25	1.75	-3.07	0.85	0.85	0.20	3404	0.19 3401
CRP5-CRP2	TPP	0.311	C>.15A	3402	8.82	-24.93	-38.07	-21.51	1.98	6.26	0.85	0.85	0.26	3404	0.25 3401
CRP5-CRP4	TPP	0.276	TN+BN	3402	3.53	26.68	37.16	-7.89	0.30	0.64	0.85	0.85	0.23	3404	0.23 3401
LB14-LB05	TPP	0.614	TN+BN	3402	0.00	1.93	-156.23	1.61	6.04	-2.88	0.85	0.85	0.48	3404	0.47 3401
LB20-LB13	TPP	1.186	C<.15	3402	0.00	-21.29	-270.84	36.47	14.11	-15.77	0.85	0.85	0.93	3404	0.90 3401
LB31-LB40	TPP	0.096	C<.15	3402	0.00	-3.27	-18.14	-2.97	1.34	-1.98	0.85	0.85	0.09	3404	0.08 3401
LB39-LB46	TPP	0.146	C<.15	3402	8.12	-2.44	-5.79	-33.52	1.85	-8.93	0.85	0.85	0.12	3404	0.12 3401
LB26-LB54	TRN	0.000	C<.15	3401	0.00	-0.01	0.00	0.00	0.00	0.00	0.85	0.85	0.00	3402	0.00 3403
LB52-LB55	TRN	0.000	C<.15	3401	0.00	-0.01	0.00	0.00	0.00	0.00	0.85	0.85	0.00	3402	0.00 3403

MEMBER STRESS AT MAX UNITY CHECK REPORT
LOAD CASE 3411-3415

MEMBER	GRP	MAXIMUM UNITY CHECK	CRITICAL COND.	LOAD COND NO.	DIST FROM END m	APPLIED STRESSES AXIAL N/mm2	** BENDING ** Y-Y N/mm2	Z-Z N/mm2	*** SHEAR *** Y N/mm2	Z N/mm2	* CM VALUES * Y	Z	* NEXT TWO HIGHEST CASES * UNITY CHECK	LOAD COND	UNITY CHECK	LOAD COND
1172-GB01	DM5	0.440	C>.15B	3413	0.97	-33.18	-71.28	-11.66	11.45	-5.74	0.85	0.85	0.43	3412	0.39	3411
1272-GB02	DM5	0.115	C<.15	3413	0.00	-2.17	20.23	-10.32	8.88	-6.95	0.85	0.85	0.09	3415	0.09	3411
1372-GA01	DM5	0.224	TN+BN	3413	0.97	12.34	-28.93	-31.16	10.49	-5.54	0.85	0.85	0.14	3415	0.13	3411
1472-GA02	DM5	0.566	C>.15B	3413	0.70	-38.94	92.94	-30.33	12.42	-3.78	0.85	0.85	0.54	3415	0.50	3411
LB02-0008	DYX	0.550	C>.15B	3413	0.00	-61.35	40.39	-51.46	28.61	9.77	0.85	0.85	0.54	3412	0.48	3411
LB04-0013	DYX	0.516	C>.15B	3413	0.00	-75.48	37.75	9.87	21.20	-14.79	0.85	0.85	0.50	3412	0.45	3411
LB15-0014	DYX	0.340	C<.15	3413	0.00	-5.33	-24.27	17.87	33.77	-13.08	0.85	0.85	0.27	3415	0.27	3411
LB17-0005	DYX	0.096	TN+BN	3413	0.00	3.19	-13.74	-1.92	10.21	-3.07	0.85	0.85	0.08	3412	0.08	3411
LB28-0016	DYX	0.441	TN+BN	3413	0.58	58.48	13.21	-38.85	24.89	7.34	0.85	0.85	0.33	3415	0.32	3411
LB30-0007	DYX	0.246	C<.15	3414	0.58	-28.62	7.01	-26.66	12.58	-5.84	0.85	0.85	0.24	3415	0.24	3411
LB41-0015	DYX	0.559	C>.15B	3415	0.00	-56.03	-41.33	-61.92	21.83	-11.35	0.85	0.85	0.55	3413	0.50	3411
LB43-0006	DYX	0.794	C>.15B	3413	0.00	-112.79	-59.50	24.64	35.91	20.05	0.85	0.85	0.74	3415	0.68	3411
GA01-LB29	GB1	1.956	TR+SFA	3413	0.00	7.47	-39.82	71.56	-23.64	47.41	1.00	1.00	1.25	3415	1.19	3411
GB01-GA01	GB1	0.223	TN+BN	3413	13.72	0.01	45.29	-2.14	-0.21	2.09	1.00	1.00	0.20	3415	0.19	3411
LB03-GB01	GB1	2.239	TR+SFA	3413	0.82	-10.09	157.75	-69.01	-20.01	125.97	1.00	1.00	1.52	3415	1.21	3412
LB06-LB03	GB1	0.000	TN+BN	3411	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	3412	0.00	3413
LB29-LB32	GB1	0.000	TN+BN	3411	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	3412	0.00	3413
GA02-LB42	GB2	3.942	TR+SFA	3413	0.00	-10.43	127.89	43.91	-18.07	-120.13	1.00	1.00	3.57	3415	3.07	3411
GB02-GA02	GB2	0.335	CM+BN	3413	0.00	-0.22	74.64	6.07	-0.32	-4.53	1.00	1.00	0.27	3412	0.26	3411
LB16-GB02	GB2	0.585	TN+BN	3413	0.82	4.67	20.37	-90.07	-21.75	1.94	1.00	1.00	0.46	3415	0.45	3411
LB19-LB16	GB2	0.000	TN+BN	3411	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	3412	0.00	3413
LB42-LB45	GB2	0.000	TN+BN	3411	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	3412	0.00	3413
LB01-LB02	GB3	0.000	SHEAR	3411	0.26	0.00	-0.01	0.00	0.00	-0.04	1.00	1.00	0.00	3412	0.00	3413
LB02-LB03	GB3	0.720	TR+SFA	3413	0.75	-6.57	55.66	45.71	11.99	57.09	1.00	1.00	0.66	3412	0.60	3411
LB03-LB04	GB3	0.952	TR+SFA	3413	0.00	0.82	76.85	61.98	-15.35	-69.00	1.00	1.00	0.89	3412	0.77	3411
LB04-LB05	GB3	0.086	TN+BN	3413	0.00	2.30	-18.09	-0.47	0.04	1.31	1.00	1.00	0.07	3415	0.07	3411
LB14-LB15	GB3	0.046	TN+BN	3413	0.26	2.30	7.66	0.93	0.04	0.86	1.00	1.00	0.04	3412	0.04	3411
LB15-LB16	GB3	0.231	CM+BN	3413	0.75	-6.56	7.04	-40.89	-8.01	5.71	1.00	1.00	0.18	3412	0.17	3411
LB16-LB17	GB3	0.146	SHEAR	3413	0.00	1.36	-1.59	-10.89	6.70	3.13	1.00	1.00	0.12	3412	0.11	3411
LB17-LB18	GB3	0.000	SHEAR	3411	0.00	0.00	-0.01	0.00	0.00	0.04	1.00	1.00	0.00	3412	0.00	3413
LB27-LB28	GB3	0.000	SHEAR	3411	0.26	0.00	-0.01	0.00	0.00	-0.04	1.00	1.00	0.00	3412	0.00	3413
LB28-LB29	GB3	0.622	SHEAR	3413	0.75	5.92	-71.10	35.67	9.55	-54.74	1.00	1.00	0.43	3415	0.41	3411
LB29-LB30	GB3	0.305	SHEAR	3414	0.75	-3.28	-2.16	9.70	-4.45	-26.50	1.00	1.00	0.30	3413	0.29	3415
LB30-LB31	GB3	0.008	SHEAR	3413	0.00	-0.15	0.44	-0.54	0.01	0.15	1.00	1.00	0.01	3415	0.01	3411
LB40-LB41	GB3	0.010	SHEAR	3413	0.26	-0.15	-1.50	-0.17	0.01	-0.31	1.00	1.00	0.01	3415	0.01	3411
LB41-LB42	GB3	0.668	SHEAR	3415	0.00	-2.55	-25.33	-19.66	-15.03	51.98	1.00	1.00	0.67	3413	0.60	3411
LB42-LB43	GB3	1.906	TR+SFA	3413	0.00	-8.24	131.44	-70.79	15.06	-105.08	1.00	1.00	1.70	3415	1.48	3411
LB43-LB44	GB3	0.000	SHEAR	3411	0.00	0.00	-0.01	0.00	0.00	0.04	1.00	1.00	0.00	3412	0.00	3413
0005-CPP1	GB6	0.239	SHEAR	3413	0.00	-0.07	-0.46	-30.41	6.28	0.52	1.00	1.00	0.18	3412	0.17	3411
0006-CPP2	GB6	0.826	TR+SFA	3413	0.00	-5.20	15.10	-161.84	14.59	-4.73	1.00	1.00	0.65	3415	0.62	3411
0007-CPP6	GB6	0.457	CM+BN	3413	0.00	-4.94	16.31	83.18	-13.63	-3.46	1.00	1.00	0.36	3415	0.34	3411

0008-CPP7	GB6	0.518	CM+BN	3413	0.00	-12.16	3.81	-108.38	11.81	-4.34	1.00	1.00	0.44	3412	0.43 3411
0013-0008	GB6	0.372	CM+BN	3413	1.50	-3.11	-1.02	-83.68	-1.62	-0.93	1.00	1.00	0.31	3412	0.31 3411
0014-0005	GB6	0.251	CM+BN	3413	0.00	-1.95	21.55	-30.40	-1.22	-5.24	1.00	1.00	0.19	3412	0.19 3411
0015-0006	GB6	0.581	TN+BN	3413	1.50	6.16	-16.85	-111.14	-2.27	-12.15	1.00	1.00	0.48	3415	0.47 3411
0016-0007	GB6	0.380	CM+BN	3413	0.00	-1.27	18.68	64.67	-1.64	-13.27	1.00	1.00	0.30	3415	0.28 3411
0016-CPP8	GB6	0.471	TN+BN	3413	0.00	6.89	-18.38	-83.24	9.06	6.86	1.00	1.00	0.37	3415	0.35 3411
CPP1-LB26	GB6	0.002	SHEAR	3411	0.00	0.00	-0.26	0.00	0.00	0.25	1.00	1.00	0.00	3412	0.00 3413
CPP2-LB52	GB6	0.794	TR+SFA	3413	0.00	-5.28	4.31	-92.56	20.87	-5.92	1.00	1.00	0.58	3415	0.56 3411
CPP3-0014	GB6	0.763	CM+BN	3413	1.25	-14.17	84.69	-63.48	-10.24	5.07	1.00	1.00	0.60	3415	0.60 3411
CPP3-CRP1	GB6	0.504	CM+BN	3413	0.00	-14.07	73.49	17.13	-16.10	-5.83	1.00	1.00	0.41	3415	0.40 3411
CPP4-0015	GB6	0.741	TN+BN	3413	1.25	4.09	-15.30	-130.31	-22.24	-3.88	1.00	1.00	0.62	3415	0.61 3411
CPP5-0013	GB6	0.681	TR+SFA	3413	1.25	-5.15	3.33	-110.82	-18.85	13.14	1.00	1.00	0.56	3412	0.56 3411
CPP5-CRP3	GB6	0.390	SHEAR	3413	0.00	-5.25	-27.95	18.85	-16.25	-13.81	1.00	1.00	0.32	3415	0.31 3411
CPP6-CRP4	GB6	0.199	SHEAR	3413	0.00	-4.83	7.72	18.89	-16.23	-4.25	1.00	1.00	0.15	3415	0.15 3411
CRP1-LB20	GB6	0.392	CM+BN	3413	0.00	-9.66	59.44	-11.14	0.61	-5.68	1.00	1.00	0.32	3415	0.31 3411
CRP2-CPP4	GB6	0.219	SHEAR	3413	0.00	3.98	-4.50	15.77	-16.38	-3.06	1.00	1.00	0.19	3412	0.18 3411
CRP3-LB13	GB6	0.316	SHEAR	3413	0.52	-9.66	-43.60	-9.88	0.61	-15.40	1.00	1.00	0.26	3415	0.26 3411
CRP4-LB39	GB6	0.168	SHEAR	3413	0.52	-0.43	-2.70	-9.53	0.58	-5.22	1.00	1.00	0.14	3415	0.14 3411
LB07-CPP7	GB6	0.408	TR+SFA	3413	1.05	-12.24	-6.69	52.24	11.78	5.49	1.00	1.00	0.32	3415	0.32 3411
LB33-CPP8	GB6	0.305	TN+BN	3413	1.05	6.97	-2.61	40.32	9.09	-6.54	1.00	1.00	0.24	3415	0.23 3411
LB46-CRP2	GB6	0.149	SHEAR	3413	0.52	-0.43	-1.28	10.38	0.58	-2.82	1.00	1.00	0.12	3415	0.12 3411
CPP1-CPP2	TPP	0.419	C<.15	3413	15.35	-9.98	-78.89	-27.32	2.56	-2.07	0.85	0.85	0.33	3412	0.33 3411
CPP3-CPP4	TPP	0.153	TN+BN	3413	0.00	9.30	-6.22	-27.26	1.53	-4.34	0.85	0.85	0.13	3415	0.12 3411
CPP5-CPP6	TPP	0.129	TN+BN	3413	0.00	4.13	9.31	-26.61	1.30	-0.26	0.85	0.85	0.13	3412	0.12 3414
CPP7-CPP8	TPP	0.214	TN+BN	3413	0.00	0.05	-50.80	21.95	2.45	0.09	0.85	0.85	0.19	3415	0.18 3411
CRP1-CRP5	TPP	0.370	C>.15A	3413	8.82	-30.69	-49.13	4.41	2.29	3.98	0.85	0.85	0.29	3411	0.28 3415
CRP3-CRP5	TPP	0.476	TN+BN	3413	8.82	30.89	84.56	-1.14	2.38	15.58	0.85	0.85	0.40	3415	0.40 3411
CRP5-CRP2	TPP	0.328	TN+BN	3413	5.29	31.05	44.41	12.40	0.41	-1.96	0.85	0.85	0.28	3415	0.27 3411
CRP5-CRP4	TPP	0.385	C>.15A	3413	8.82	-30.80	-48.22	22.14	2.08	-7.56	0.85	0.85	0.31	3415	0.31 3412
LB14-LB05	TPP	0.808	TN+BN	3413	12.20	11.07	-195.01	2.42	7.29	5.00	0.85	0.85	0.67	3415	0.66 3411
LB20-LB13	TPP	1.511	C>.15B	3413	8.12	-33.75	-346.50	37.16	17.59	19.30	0.85	0.85	1.25	3415	1.22 3411
LB31-LB40	TPP	0.099	C<.15	3413	12.20	-0.73	-24.17	-0.89	1.55	4.64	0.85	0.85	0.09	3415	0.09 3411
LB39-LB46	TPP	0.149	C<.15	3413	0.00	-1.51	-5.94	-35.80	2.00	12.31	0.85	0.85	0.12	3415	0.12 3411
LB26-LB54	TRN	0.000	C<.15	3411	0.00	-0.01	0.00	0.00	0.00	0.00	0.85	0.85	0.00	3412	0.00 3413
LB52-LB55	TRN	0.000	C<.15	3411	0.00	-0.01	0.00	0.00	0.00	0.00	0.85	0.85	0.00	3412	0.00 3413

MEMBER STRESS AT MAX UNITY CHECK REPORT
LOAD CASE 3421-3425

MEMBER	GRP	MAXIMUM UNITY CHECK	CRITICAL COND.	LOAD COND NO.	DIST FROM END m	APPLIED STRESSES AXIAL N/mm2	** BENDING ** Y-Y N/mm2	Z-Z N/mm2	*** SHEAR *** Y N/mm2	Z N/mm2	* CM VALUES * Y	Z	* NEXT TWO HIGHEST CASES * UNITY CHECK	LOAD COND	UNITY CHECK	LOAD COND
1172-GB01	DM5	0.347	C<.15	3424	0.97	-26.48	-54.50	15.19	8.36	-3.59	0.85	0.85	0.33	3422	0.29	3421
1272-GB02	DM5	0.139	C<.15	3423	0.70	-16.07	-14.79	5.26	1.88	-2.44	0.85	0.85	0.08	3425	0.08	3422
1372-GA01	DM5	0.079	C<.15	3424	0.00	-0.62	0.24	4.93	6.67	-4.17	0.85	0.85	0.06	3425	0.06	3421
1472-GA02	DM5	0.463	C>.15B	3424	0.70	-34.64	76.38	2.30	8.56	-2.82	0.85	0.85	0.45	3425	0.41	3421
LB02-0008	DYX	0.517	C>.15B	3424	0.00	-71.04	39.17	-21.97	24.68	11.99	0.85	0.85	0.48	3422	0.42	3421
LB04-0013	DYX	0.377	C>.15B	3422	0.00	-43.02	26.53	34.59	14.20	-8.33	0.85	0.85	0.37	3424	0.32	3421
LB15-0014	DYX	0.241	C>.15B	3423	0.00	-38.32	-4.43	-13.67	10.67	-3.44	0.85	0.85	0.19	3425	0.19	3421
LB17-0005	DYX	0.192	C<.15	3423	0.00	-23.71	-1.01	19.71	2.29	-2.01	0.85	0.85	0.18	3424	0.10	3425
LB28-0016	DYX	0.053	TN+BN	3424	0.00	2.88	9.77	-2.72	6.14	-0.64	0.85	0.85	0.05	3425	0.04	3421
LB30-0007	DYX	0.204	C<.15	3424	0.58	-4.00	5.18	-47.50	21.25	-6.81	0.85	0.85	0.15	3425	0.15	3421
LB41-0015	DYX	0.488	C>.15B	3425	0.00	-69.73	-23.74	-31.01	16.55	-7.69	0.85	0.85	0.49	3424	0.43	3421
LB43-0006	DYX	0.560	C>.15B	3424	0.00	-72.36	-31.72	44.13	26.08	9.63	0.85	0.85	0.55	3425	0.50	3421
GA01-LB29	GB1	0.394	TN+BN	3424	0.00	3.33	16.21	55.20	-16.37	-1.21	1.00	1.00	0.32	3425	0.31	3421
GB01-GA01	GB1	0.151	CM+BN	3424	13.72	-0.78	35.80	-0.29	-0.15	1.32	1.00	1.00	0.11	3425	0.09	3421
LB03-GB01	GB1	2.179	TR+SFA	3424	0.82	-8.28	122.43	-41.42	-14.17	100.57	1.00	1.00	1.93	3422	1.52	3421
LB06-LB03	GB1	0.000	TN+BN	3421	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	3422	0.00	3423
LB29-LB32	GB1	0.000	TN+BN	3421	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	3422	0.00	3423
GA02-LB42	GB2	0.898	SHEAR	3425	0.82	-5.84	-22.42	2.27	-6.74	-105.64	1.00	1.00	0.85	3424	0.79	3421
GB02-GA02	GB2	0.234	TN+BN	3422	0.00	0.65	44.60	7.13	-0.31	-2.06	1.00	1.00	0.23	3424	0.22	3421
LB16-GB02	GB2	0.603	TN+BN	3424	0.82	3.29	13.04	-53.51	-13.36	-1.34	1.00	1.00	0.56	3422	0.55	3421
LB19-LB16	GB2	0.000	TN+BN	3421	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	3422	0.00	3423
LB42-LB45	GB2	0.000	TN+BN	3421	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	3422	0.00	3423
LB01-LB02	GB3	0.000	SHEAR	3421	0.26	0.00	-0.01	0.00	0.00	-0.04	1.00	1.00	0.00	3422	0.00	3423
LB02-LB03	GB3	0.892	TR+SFA	3424	0.75	-5.77	79.68	44.51	9.91	66.13	1.00	1.00	0.67	3422	0.59	3421
LB03-LB04	GB3	0.484	SHEAR	3422	0.75	-1.13	-15.16	14.48	-9.95	-39.88	1.00	1.00	0.48	3424	0.41	3421
LB04-LB05	GB3	0.010	TN+BN	3424	0.00	0.17	-1.62	0.31	-0.01	0.27	1.00	1.00	0.01	3422	0.01	3421
LB14-LB15	GB3	0.007	TN+BN	3423	0.26	0.28	-1.10	-0.11	-0.01	-0.21	1.00	1.00	0.01	3422	0.01	3424
LB15-LB16	GB3	0.308	SHEAR	3423	0.00	-2.67	-10.44	-6.02	-0.43	35.55	1.00	1.00	0.28	3422	0.28	3421
LB16-LB17	GB3	0.228	SHEAR	3424	0.00	2.65	-23.16	-12.90	4.46	17.23	1.00	1.00	0.18	3423	0.08	3422
LB17-LB18	GB3	0.000	SHEAR	3421	0.00	0.00	-0.01	0.00	0.00	0.04	1.00	1.00	0.00	3422	0.00	3423
LB27-LB28	GB3	0.000	SHEAR	3421	0.26	0.00	-0.01	0.00	0.00	-0.04	1.00	1.00	0.00	3422	0.00	3423
LB28-LB29	GB3	0.099	SHEAR	3424	0.00	0.42	-0.19	-1.11	4.46	-2.72	1.00	1.00	0.08	3425	0.07	3421
LB29-LB30	GB3	0.152	CM+BN	3424	0.00	-5.62	9.81	21.71	-4.55	-4.16	1.00	1.00	0.12	3425	0.12	3421
LB30-LB31	GB3	0.042	TN+BN	3424	0.00	0.01	8.42	-0.98	0.04	-0.57	1.00	1.00	0.04	3425	0.03	3421
LB40-LB41	GB3	0.048	TN+BN	3424	0.26	0.01	-10.45	0.49	0.04	-1.02	1.00	1.00	0.03	3425	0.03	3421
LB41-LB42	GB3	0.699	SHEAR	3424	0.00	-2.21	-22.51	-15.06	-11.35	64.82	1.00	1.00	0.67	3425	0.61	3421
LB42-LB43	GB3	0.718	SHEAR	3424	0.75	-6.27	-24.73	-16.55	9.71	-67.47	1.00	1.00	0.71	3425	0.64	3421
LB43-LB44	GB3	0.000	SHEAR	3421	0.00	0.00	-0.01	0.00	0.00	0.04	1.00	1.00	0.00	3422	0.00	3423
0005-CPP1	GB6	0.234	TN+BN	3424	0.00	3.84	-10.33	-38.77	3.81	4.04	1.00	1.00	0.15	3422	0.13	3421
0006-CPP2	GB6	0.419	CM+BN	3424	0.00	-8.04	4.55	-87.01	9.99	-3.18	1.00	1.00	0.35	3425	0.34	3421
0007-CPP6	GB6	0.488	CM+BN	3424	0.00	-8.39	58.28	35.98	-5.79	-3.23	1.00	1.00	0.36	3425	0.36	3421

0008-CPP7 GB6	0.514	CM+BN	3424	0.00	-4.15	9.17	-105.98	9.46	-2.99	1.00	1.00	0.40	3422	0.38	3421
0013-0008 GB6	0.387	TN+BN	3424	1.50	3.81	-10.15	-75.67	-1.64	-7.34	1.00	1.00	0.30	3422	0.29	3421
0014-0005 GB6	0.210	TN+BN	3424	1.50	0.18	10.23	-35.62	-1.19	7.26	1.00	1.00	0.14	3422	0.13	3421
0015-0006 GB6	0.287	TN+BN	3424	1.50	0.61	-3.28	-62.66	-0.88	-2.64	1.00	1.00	0.25	3425	0.24	3421
0016-0007 GB6	0.168	CM+BN	3424	1.50	-0.63	16.18	18.75	-0.65	4.48	1.00	1.00	0.13	3425	0.12	3421
0016-CPP8 GB6	0.146	SHEAR	3424	0.00	-0.05	-1.19	-21.27	4.34	0.67	1.00	1.00	0.10	3425	0.09	3421
CPP1-LB26 GB6	0.153	TN+BN	3424	0.00	3.90	-1.20	-22.04	4.97	3.59	1.00	1.00	0.10	3422	0.09	3421
CPP2-LB52 GB6	0.257	SHEAR	3424	0.00	-8.09	-3.22	-39.16	8.83	-4.19	1.00	1.00	0.21	3425	0.21	3421
CPP3-0014 GB6	0.272	CM+BN	3424	1.25	-3.12	8.86	-50.56	-7.81	1.86	1.00	1.00	0.19	3422	0.17	3421
CPP3-CRP1 GB6	0.116	SHEAR	3424	0.00	-3.05	4.09	13.89	-10.52	-2.63	1.00	1.00	0.08	3425	0.08	3421
CPP4-0015 GB6	0.461	TR+SFA	3424	1.25	-2.45	-0.15	-79.96	-13.63	9.20	1.00	1.00	0.30	3425	0.29	3421
CPP5-0013 GB6	0.524	TN+BN	3424	1.25	2.82	-9.27	-91.88	-15.64	-2.27	1.00	1.00	0.41	3422	0.40	3421
CPP5-CRP3 GB6	0.159	SHEAR	3424	0.00	2.75	-4.83	14.42	-11.09	1.57	1.00	1.00	0.14	3425	0.13	3421
CPP6-CRP4 GB6	0.340	CM+BN	3424	0.00	-8.32	50.91	10.56	-10.35	-3.98	1.00	1.00	0.26	3422	0.26	3421
CRP1-LB20 GB6	0.113	SHEAR	3424	0.52	-0.23	-2.10	-5.40	0.34	-3.52	1.00	1.00	0.09	3422	0.08	3421
CRP2-CPP4 GB6	0.274	SHEAR	3424	0.00	-2.52	-32.01	11.51	-10.92	10.00	1.00	1.00	0.22	3422	0.21	3421
CRP3-LB13 GB6	0.093	SHEAR	3424	0.00	-0.23	-0.76	-6.44	0.34	1.10	1.00	1.00	0.07	3422	0.06	3421
CRP4-LB39 GB6	0.268	CM+BN	3424	0.00	-5.48	41.37	-7.43	0.41	-4.03	1.00	1.00	0.20	3425	0.20	3421
LB07-CPP7 GB6	0.446	TR+SFA	3424	1.05	-4.20	2.08	61.20	13.80	4.01	1.00	1.00	0.30	3422	0.30	3421
LB33-CPP8 GB6	0.002	SHEAR	3421	1.05	0.00	-0.23	0.00	0.00	-0.23	1.00	1.00	0.00	3422	0.00	3423
LB46-CRP2 GB6	0.225	SHEAR	3424	0.00	-5.48	-33.54	6.55	0.41	11.26	1.00	1.00	0.18	3425	0.18	3421
CPP1-CPP2 TPP	0.165	TN+BN	3424	15.35	1.85	-36.34	-17.29	2.05	0.06	0.85	0.85	0.14	3422	0.14	3421
CPP3-CPP4 TPP	0.126	TN+BN	3425	8.25	6.00	25.00	1.51	0.31	-0.15	0.85	0.85	0.12	3423	0.12	3421
CPP5-CPP6 TPP	0.111	TN+BN	3424	6.91	7.24	19.50	-1.75	0.51	-2.37	0.85	0.85	0.11	3422	0.10	3421
CPP7-CPP8 TPP	0.285	C<.15	3424	0.00	-6.90	-53.53	18.17	2.07	-0.80	0.85	0.85	0.22	3425	0.21	3421
CRP1-CRP5 TPP	0.266	C<.15	3424	0.00	-19.87	-34.88	-11.51	1.82	-6.00	0.85	0.85	0.20	3422	0.20	3421
CRP3-CRP5 TPP	0.240	TN+BN	3424	5.62	20.93	35.51	-5.51	0.29	-0.64	0.85	0.85	0.20	3422	0.20	3421
CRP5-CRP2 TPP	0.363	TN+BN	3424	0.00	20.76	67.90	0.14	1.76	11.50	0.85	0.85	0.30	3422	0.30	3421
CRP5-CRP4 TPP	0.236	C<.15	3424	0.00	-19.76	-28.92	-3.19	1.71	2.96	0.85	0.85	0.16	3422	0.16	3421
LB14-LB05 TPP	0.074	TN+BN	3424	12.20	0.84	-17.99	-1.63	1.33	3.32	0.85	0.85	0.07	3422	0.07	3421
LB20-LB13 TPP	0.088	C<.15	3424	8.12	-0.79	-3.56	21.33	1.29	8.30	0.85	0.85	0.07	3422	0.07	3421
LB31-LB40 TPP	0.557	TN+BN	3424	12.20	0.04	-143.85	2.55	5.63	3.74	0.85	0.85	0.46	3425	0.46	3421
LB39-LB46 TPP	1.083	C<.15	3424	8.12	-19.14	-248.90	24.63	12.98	13.53	0.85	0.85	0.83	3425	0.83	3421
LB26-LB54 TRN	0.000	C<.15	3421	0.00	-0.01	0.00	0.00	0.00	0.00	0.85	0.85	0.00	3422	0.00	3423
LB52-LB55 TRN	0.000	C<.15	3421	0.00	-0.01	0.00	0.00	0.00	0.00	0.85	0.85	0.00	3422	0.00	3423

MEMBER STRESS AT MAX UNITY CHECK REPORT
LOAD CASE 3431-3435

MEMBER	GRP	MAXIMUM UNITY CHECK	CRITICAL COND.	LOAD COND NO.	DIST FROM END m	APPLIED STRESSES AXIAL N/mm2	** BENDING ** Y-Y N/mm2	Z-Z N/mm2	*** SHEAR *** Y N/mm2	Z N/mm2	* CM VALUES * Y	Z	* NEXT TWO HIGHEST CASES * UNITY CHECK	LOAD COND	UNITY CHECK	LOAD COND
1172-GB01	DM5	0.179	C<.15	3432	0.97	-17.26	-24.42	-2.93	1.78	-0.23	0.85	0.85	0.14	3434	0.13	3431
1272-GB02	DM5	0.245	C<.15	3433	0.70	-22.83	-34.54	-3.60	3.77	-0.30	0.85	0.85	0.21	3435	0.20	3431
1372-GA01	DM5	0.206	C<.15	3434	0.97	-15.22	33.81	-5.53	3.09	-1.01	0.85	0.85	0.17	3432	0.16	3431
1472-GA02	DM5	0.281	C<.15	3435	0.70	-24.23	41.58	-7.75	3.37	0.38	0.85	0.85	0.25	3433	0.24	3431
LB02-0008	DYX	0.235	C>.15B	3432	0.00	-31.13	5.89	-21.02	7.26	-0.34	0.85	0.85	0.18	3434	0.17	3431
LB04-0013	DYX	0.243	C>.15B	3432	0.00	-36.57	5.72	16.16	8.39	-4.12	0.85	0.85	0.19	3434	0.18	3431
LB15-0014	DYX	0.317	C>.15B	3433	0.00	-42.21	10.47	-27.27	10.83	1.38	0.85	0.85	0.26	3435	0.25	3431
LB17-0005	DYX	0.334	C>.15B	3433	0.00	-48.81	12.61	21.87	11.96	-4.27	0.85	0.85	0.28	3435	0.27	3431
LB28-0016	DYX	0.225	C<.15	3434	0.00	-27.01	-10.11	-21.91	8.27	-4.12	0.85	0.85	0.17	3432	0.17	3431
LB30-0007	DYX	0.234	C>.15B	3434	0.00	-35.50	-7.80	14.22	8.86	1.06	0.85	0.85	0.18	3432	0.18	3431
LB41-0015	DYX	0.357	C>.15B	3435	0.00	-46.15	-7.47	-33.79	14.72	-4.99	0.85	0.85	0.30	3434	0.30	3431
LB43-0006	DYX	0.328	C>.15B	3435	0.00	-50.47	-6.17	20.82	8.26	-0.96	0.85	0.85	0.27	3434	0.27	3431
GA01-LB29	GB1	0.633	SHEAR	3434	0.82	-2.61	-9.99	3.33	-3.23	-57.95	1.00	1.00	0.53	3435	0.52	3431
GB01-GA01	GB1	0.132	TN+BN	3432	0.00	0.71	27.77	3.09	-0.10	-0.73	1.00	1.00	0.11	3433	0.10	3431
LB03-GB01	GB1	0.597	SHEAR	3432	0.00	-1.19	-7.74	-2.35	0.92	62.75	1.00	1.00	0.49	3434	0.48	3431
LB06-LB03	GB1	0.000	TN+BN	3431	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	3432	0.00	3433
LB29-LB32	GB1	0.000	TN+BN	3431	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	3432	0.00	3433
ANS6-GA02	GB2	0.114	TN+BN	3435	9.76	0.45	17.10	-8.56	-0.34	-0.49	1.00	1.00	0.11	3434	0.09	3433
GA02-LB42	GB2	0.709	SHEAR	3435	0.82	-1.53	-7.07	6.47	7.51	-71.37	1.00	1.00	0.61	3433	0.60	3431
GB02-ANS6	GB2	0.107	TN+BN	3433	0.00	0.61	17.90	6.63	-0.33	0.41	1.00	1.00	0.09	3432	0.08	3431
LB16-GB02	GB2	0.659	SHEAR	3433	0.00	-2.78	-10.34	-4.97	2.77	67.20	1.00	1.00	0.56	3435	0.54	3431
LB19-LB16	GB2	0.000	TN+BN	3431	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	3432	0.00	3433
LB42-LB45	GB2	0.000	TN+BN	3431	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	3432	0.00	3433
LB01-LB02	GB3	0.000	SHEAR	3431	0.26	0.00	-0.01	0.00	0.00	-0.04	1.00	1.00	0.00	3432	0.00	3433
LB02-LB03	GB3	0.267	SHEAR	3432	0.00	-1.89	-9.95	-0.59	1.86	29.01	1.00	1.00	0.20	3434	0.19	3431
LB03-LB04	GB3	0.325	SHEAR	3432	0.75	-2.23	-8.78	2.95	-1.37	-33.97	1.00	1.00	0.26	3434	0.25	3431
LB04-LB05	GB3	0.023	SHEAR	3432	0.00	-0.12	-0.03	-4.13	1.24	0.15	1.00	1.00	0.02	3434	0.02	3431
LB14-LB15	GB3	0.011	TN+BN	3433	0.26	0.66	-1.60	0.34	0.02	-0.17	1.00	1.00	0.01	3432	0.01	3431
LB15-LB16	GB3	0.384	SHEAR	3433	0.00	-1.87	-14.65	2.72	4.35	39.21	1.00	1.00	0.32	3435	0.31	3431
LB16-LB17	GB3	0.440	SHEAR	3433	0.75	-2.88	-11.88	7.35	-4.41	-45.50	1.00	1.00	0.38	3435	0.36	3431
LB17-LB18	GB3	0.000	SHEAR	3431	0.00	0.00	-0.01	0.00	0.00	0.04	1.00	1.00	0.00	3432	0.00	3433
LB27-LB28	GB3	0.000	SHEAR	3431	0.26	0.00	-0.01	0.00	0.00	-0.04	1.00	1.00	0.00	3432	0.00	3433
LB28-LB29	GB3	0.260	SHEAR	3434	0.00	-1.92	-10.29	-7.08	-3.38	25.17	1.00	1.00	0.20	3432	0.19	3431
LB29-LB30	GB3	0.316	SHEAR	3434	0.75	-3.11	-6.33	-2.95	3.71	-33.01	1.00	1.00	0.25	3432	0.25	3431
LB30-LB31	GB3	0.017	CM+BN	3433	0.00	-1.19	1.95	-1.37	0.08	0.11	1.00	1.00	0.02	3432	0.02	3431
LB40-LB41	GB3	0.024	CM+BN	3434	0.26	-0.99	1.37	3.56	1.21	-0.15	1.00	1.00	0.02	3432	0.02	3431
LB41-LB42	GB3	0.406	SHEAR	3435	0.00	-4.82	-16.09	-5.16	-2.29	42.90	1.00	1.00	0.34	3433	0.34	3431
LB42-LB43	GB3	0.418	SHEAR	3435	0.75	-2.09	-10.22	1.64	2.53	-47.05	1.00	1.00	0.36	3433	0.35	3431
LB43-LB44	GB3	0.000	SHEAR	3431	0.00	0.00	-0.01	0.00	0.00	0.04	1.00	1.00	0.00	3432	0.00	3433
0005-CPP1	GB6	0.154	CM+BN	3435	0.00	-0.92	1.08	33.94	-4.55	-0.07	1.00	1.00	0.15	3433	0.14	3431
0006-CPP2	GB6	0.077	SHEAR	3433	0.00	0.00	-0.86	-11.27	2.24	0.65	1.00	1.00	0.07	3435	0.07	3431

0007-CPP6 GB6	0.131	SHEAR	3432	0.00	-1.43	0.88	-18.92	4.16	0.49	1.00	1.00	0.12	3434	0.12 3431
0008-CPP7 GB6	0.059	TN+BN	3434	0.00	0.44	-1.68	-9.31	1.22	0.98	1.00	1.00	0.06	3432	0.04 3431
0013-0008 GB6	0.061	TN+BN	3432	1.50	2.94	1.08	-11.18	-0.75	0.65	1.00	1.00	0.06	3434	0.05 3431
0014-0005 GB6	0.111	TN+BN	3435	1.50	2.40	-1.66	22.56	0.49	-1.22	1.00	1.00	0.11	3433	0.10 3431
0015-0006 GB6	0.066	TN+BN	3435	1.50	2.88	0.43	-13.22	-0.68	0.27	1.00	1.00	0.06	3433	0.06 3431
0016-0007 GB6	0.094	TN+BN	3434	0.00	1.33	1.53	-19.28	0.30	-1.03	1.00	1.00	0.09	3432	0.08 3431
0016-CPP8 GB6	0.139	CM+BN	3434	0.00	-1.32	-1.51	29.69	-3.48	0.39	1.00	1.00	0.13	3432	0.12 3431
CPP1-LB26 GB6	0.070	SHEAR	3435	0.00	-0.92	0.59	10.65	-2.40	-0.85	1.00	1.00	0.07	3434	0.07 3431
CPP2-LB52 GB6	0.002	SHEAR	3432	1.05	0.00	0.01	0.00	0.00	-0.29	1.00	1.00	0.00	3433	0.00 3431
CPP3-0014 GB6	0.135	SHEAR	3435	0.00	-0.39	-0.43	-6.16	5.50	-0.41	1.00	1.00	0.13	3433	0.12 3431
CPP3-CRP1 GB6	0.037	CM+BN	3435	0.52	-0.40	-0.51	7.80	1.21	-0.16	1.00	1.00	0.04	3434	0.04 3431
CPP4-0015 GB6	0.120	SHEAR	3433	0.00	-2.32	2.00	2.63	-4.58	-0.81	1.00	1.00	0.11	3435	0.11 3431
CPP5-0013 GB6	0.107	TN+BN	3434	1.25	0.03	0.69	-16.08	-3.55	0.09	1.00	1.00	0.11	3432	0.09 3431
CPP5-CRP3 GB6	0.025	TN+BN	3432	0.52	0.03	-0.64	-3.68	-0.57	-0.86	1.00	1.00	0.03	3434	0.02 3431
CPP6-CRP4 GB6	0.036	CM+BN	3434	0.52	-1.50	1.59	5.42	1.23	-0.31	1.00	1.00	0.03	3432	0.03 3431
CRP1-LB20 GB6	0.080	SHEAR	3435	0.52	-0.86	0.55	5.51	-0.49	-0.77	1.00	1.00	0.08	3433	0.07 3431
CRP2-CPP4 GB6	0.035	CM+BN	3433	0.00	-2.31	2.27	3.83	-0.32	-0.23	1.00	1.00	0.03	3435	0.03 3431
CRP3-LB13 GB6	0.075	SHEAR	3434	0.52	-0.17	-0.64	-2.56	0.34	-1.56	1.00	1.00	0.07	3432	0.07 3431
CRP4-LB39 GB6	0.078	SHEAR	3432	0.52	-1.82	2.36	4.11	-0.46	-1.02	1.00	1.00	0.08	3434	0.07 3431
LB07-CPP7 GB6	0.022	TN+BN	3432	1.05	0.35	0.24	3.17	0.72	-0.25	1.00	1.00	0.02	3434	0.01 3431
LB33-CPP8 GB6	0.084	SHEAR	3434	0.00	-1.33	-1.93	0.00	-2.88	0.63	1.00	1.00	0.08	3432	0.08 3431
LB46-CRP2 GB6	0.078	SHEAR	3433	0.00	-2.50	3.44	3.12	0.43	0.40	1.00	1.00	0.07	3432	0.07 3435
0009-0010 TPP	0.032	TN+BN	3434	0.00	0.33	-7.75	0.71	0.88	0.09	0.85	0.85	0.03	3435	0.03 3431
0009-LB13 TPP	0.018	C<.15	3434	0.00	-0.59	-1.13	-3.01	0.47	1.97	0.85	0.85	0.02	3432	0.02 3431
0010-0020 TPP	0.078	TN+BN	3434	4.33	0.60	-0.84	-19.48	1.69	-0.83	0.85	0.85	0.08	3432	0.08 3431
0011-0012 TPP	0.035	TN+BN	3432	0.00	0.50	8.33	0.78	0.95	0.18	0.85	0.85	0.03	3433	0.03 3431
0011-LB46 TPP	0.053	C<.15	3435	0.00	-6.30	-2.91	-4.12	0.60	2.21	0.85	0.85	0.05	3434	0.05 3431
0012-0025 TPP	0.098	C<.15	3432	4.33	-3.20	-0.47	-20.89	1.79	-0.85	0.85	0.85	0.10	3434	0.09 3431
0020-0025 TPP	0.066	C<.15	3432	0.00	-3.40	5.40	3.52	0.11	0.67	0.85	0.85	0.06	3434	0.06 3431
0020-LB05 TPP	0.086	C<.15	3432	1.77	-0.56	-3.02	21.32	4.45	3.15	0.85	0.85	0.08	3434	0.08 3431
0022-0010 TPP	0.063	TN+BN	3435	4.33	3.02	-0.42	12.47	0.96	1.19	0.85	0.85	0.06	3434	0.06 3431
0024-0012 TPP	0.084	C<.15	3433	4.33	-5.57	-5.06	13.05	1.30	1.85	0.85	0.85	0.08	3432	0.08 3431
0024-0022 TPP	0.029	C<.15	3433	17.39	-0.42	5.17	-3.29	0.11	-0.47	0.85	0.85	0.03	3432	0.02 3431
0025-LB40 TPP	0.097	C<.15	3434	1.77	-4.75	-4.31	18.37	4.34	1.60	0.85	0.85	0.09	3432	0.09 3431
ANS1-CPP2 TPP	0.084	TN+BN	3433	6.82	3.56	17.00	-2.16	0.01	0.00	0.85	0.85	0.08	3435	0.08 3431
ANS2-CPP4 TPP	0.111	TN+BN	3435	6.29	6.83	20.22	0.92	0.08	0.02	0.85	0.85	0.11	3433	0.11 3431
ANS4-CRP5 TPP	0.086	TN+BN	3434	7.44	3.09	18.43	-1.13	0.12	-1.91	0.85	0.85	0.09	3435	0.09 3431
CPP1-ANS1 TPP	0.058	TN+BN	3435	0.00	3.41	-10.42	-2.61	1.37	0.00	0.85	0.85	0.06	3434	0.05 3431
CPP3-ANS2 TPP	0.059	TN+BN	3433	1.37	6.76	5.96	3.08	0.99	0.01	0.85	0.85	0.06	3435	0.05 3431
CPP5-CPP6 TPP	0.098	TN+BN	3434	7.49	4.97	19.09	-0.48	0.01	-0.01	0.85	0.85	0.10	3432	0.09 3431
CPP7-CPP8 TPP	0.070	TN+BN	3432	15.35	0.97	-16.14	5.09	1.44	-0.01	0.85	0.85	0.07	3433	0.07 3431
CRP1-ANS4 TPP	0.058	TN+BN	3434	0.00	3.09	-10.51	3.82	1.42	-1.91	0.85	0.85	0.05	3432	0.05 3431
CRP3-CRP5 TPP	0.079	TN+BN	3432	8.60	1.65	18.33	0.96	0.06	2.01	0.85	0.85	0.08	3434	0.08 3431
CRP5-CRP2 TPP	0.080	TN+BN	3432	0.00	1.60	18.56	0.47	0.05	1.81	0.85	0.85	0.08	3434	0.08 3431
CRP5-CRP4 TPP	0.086	TN+BN	3434	0.00	3.07	18.39	-0.63	0.00	-1.92	0.85	0.85	0.09	3435	0.09 3431
LB13-0010 TPP	0.039	TN+BN	3434	0.00	0.01	0.10	-10.03	0.79	2.37	0.85	0.85	0.04	3432	0.04 3431

LB14-0022 TPP	0.041	TN+BN	3433	0.00	3.20	-6.24	-1.77	0.77	-1.46	0.85	0.85	0.04	3435	0.04 3431
LB20-0009 TPP	0.037	C<.15	3435	0.00	-0.68	-1.87	8.46	0.73	-2.20	0.85	0.85	0.04	3433	0.04 3431
LB20-0010 TPP	0.072	C<.15	3435	0.00	-2.48	-0.38	15.31	0.98	-2.12	0.85	0.85	0.07	3433	0.07 3431
LB31-0024 TPP	0.056	C<.15	3433	0.00	-5.73	-1.07	-7.11	0.51	1.92	0.85	0.85	0.05	3432	0.05 3431
LB39-0011 TPP	0.055	C<.15	3434	0.00	-5.99	0.27	6.16	0.55	-1.97	0.85	0.85	0.05	3435	0.05 3431
LB39-0012 TPP	0.054	C<.15	3432	0.00	-0.80	1.27	12.81	0.95	-2.32	0.85	0.85	0.05	3434	0.05 3431
LB46-0012 TPP	0.062	C<.15	3433	0.00	-3.01	0.80	-11.91	0.96	2.76	0.85	0.85	0.06	3435	0.06 3431
LB26-LB54 TRN	0.000	C<.15	3431	0.00	-0.01	0.00	0.00	0.00	0.00	0.85	0.85	0.00	3432	0.00 3433
LB52-LB55 TRN	0.000	C<.15	3431	0.00	-0.01	0.00	0.00	0.00	0.00	0.85	0.85	0.00	3432	0.00 3433

MEMBER STRESS AT MAX UNITY CHECK REPORT
LOAD CASE 3501-3758

MEMBER	GRP	MAXIMUM UNITY CHECK	CRITICAL COND.	LOAD COND NO.	DIST FROM END m	APPLIED STRESSES AXIAL N/mm2	** BENDING ** Y-Y N/mm2	Z-Z N/mm2	*** SHEAR *** Y N/mm2	Z N/mm2	* CM VALUES * Y	Z	* NEXT TWO HIGHEST CASES * UNITY CHECK	LOAD COND	UNITY CHECK	LOAD COND
1172-GB01	DM5	0.260	C<.15	3528	0.97	-22.81	-38.26	-5.54	4.00	-1.93	0.85	0.85	0.26	3728	0.26	3526
1272-GB02	DM5	0.324	C<.15	3637	0.70	-28.08	-48.54	0.54	6.00	2.40	0.85	0.85	0.32	3537	0.32	3635
1372-GA01	DM5	0.283	C<.15	3644	0.97	-20.58	46.20	-9.98	4.76	0.07	0.85	0.85	0.28	3544	0.28	3641
1472-GA02	DM5	0.369	C<.15	3553	0.70	-29.76	58.10	-3.60	4.46	-1.54	0.85	0.85	0.37	3552	0.37	3753
LB02-0008	DYX	0.362	C>.15B	3622	0.00	-50.48	16.40	-25.66	17.19	-0.40	0.85	0.85	0.36	3623	0.36	3626
LB04-0013	DYX	0.356	C>.15B	3726	0.00	-58.46	16.43	9.59	16.83	-7.03	0.85	0.85	0.35	3728	0.34	3722
LB15-0014	DYX	0.420	C>.15B	3737	0.00	-64.25	20.95	-19.09	18.36	12.60	0.85	0.85	0.42	3735	0.41	3734
LB17-0005	DYX	0.437	C>.15B	3634	0.00	-67.27	13.10	25.67	19.42	5.02	0.85	0.85	0.44	3631	0.43	3637
LB28-0016	DYX	0.339	C>.15B	3745	0.00	-44.47	-17.81	-26.61	16.55	-0.23	0.85	0.85	0.34	3747	0.33	3741
LB30-0007	DYX	0.365	C>.15B	3641	0.00	-58.85	-19.72	6.50	18.54	9.48	0.85	0.85	0.36	3644	0.34	3645
LB41-0015	DYX	0.444	C>.15B	3653	0.00	-68.18	-15.07	-25.51	20.50	-9.31	0.85	0.85	0.44	3652	0.44	3658
LB43-0006	DYX	0.442	C>.15B	3758	0.00	-70.32	-10.16	24.44	16.89	-3.13	0.85	0.85	0.44	3756	0.44	3753
GA01-LB29	GB1	1.267	TR+SFA	3644	0.00	-5.09	104.52	-15.73	-1.65	-78.39	1.00	1.00	1.27	3641	1.25	3544
GB01-GA01	GB1	0.237	TN+BN	3621	0.00	0.24	39.77	15.85	-0.68	-1.65	1.00	1.00	0.24	3624	0.23	3521
LB03-GB01	GB1	0.820	SHEAR	3726	0.00	-4.14	-17.88	-16.20	-3.23	84.22	1.00	1.00	0.82	3728	0.82	3626
LB06-LB03	GB1	0.000	TN+BN	3501	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	3502	0.00	3503
LB29-LB32	GB1	0.000	TN+BN	3501	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	3502	0.00	3503
GA02-LB42	GB2	1.502	TR+SFA	3558	0.00	-3.43	112.21	21.26	2.01	-87.08	1.00	1.00	1.50	3556	1.50	3758
GB02-GA02	GB2	0.260	TN+BN	3754	13.72	0.51	28.50	-27.95	-1.19	0.45	1.00	1.00	0.26	3751	0.26	3744
LB16-GB02	GB2	1.297	TR+SFA	3634	0.82	-4.43	101.05	56.87	6.28	81.99	1.00	1.00	1.30	3631	1.30	3534
LB19-LB16	GB2	0.000	TN+BN	3501	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	3502	0.00	3503
LB42-LB45	GB2	0.000	TN+BN	3501	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	3502	0.00	3503
LB01-LB02	GB3	0.000	SHEAR	3501	0.26	0.00	-0.01	0.00	0.00	-0.04	1.00	1.00	0.00	3502	0.00	3503
LB02-LB03	GB3	0.466	SHEAR	3622	0.00	-4.47	-15.77	-0.69	4.38	47.06	1.00	1.00	0.46	3623	0.45	3522
LB03-LB04	GB3	0.541	SHEAR	3726	0.75	2.60	-25.43	11.47	-6.79	-53.99	1.00	1.00	0.54	3728	0.48	3746
LB04-LB05	GB3	0.085	TN+BN	3728	0.00	6.51	-15.79	-0.63	0.04	0.55	1.00	1.00	0.08	3726	0.08	3738
LB14-LB15	GB3	0.091	TN+BN	3737	0.26	6.52	-15.97	-2.19	-0.10	-0.57	1.00	1.00	0.09	3735	0.09	3757
LB15-LB16	GB3	0.613	SHEAR	3737	0.00	2.63	-28.63	19.46	8.74	59.38	1.00	1.00	0.61	3735	0.55	3734
LB16-LB17	GB3	0.585	SHEAR	3634	0.75	-5.04	-16.72	-8.62	-5.05	-62.72	1.00	1.00	0.58	3631	0.57	3534
LB17-LB18	GB3	0.000	SHEAR	3501	0.00	0.00	-0.01	0.00	0.00	0.04	1.00	1.00	0.00	3502	0.00	3503
LB27-LB28	GB3	0.000	SHEAR	3501	0.26	0.00	-0.01	0.00	0.00	-0.04	1.00	1.00	0.00	3502	0.00	3503
LB28-LB29	GB3	0.431	SHEAR	3745	0.00	-4.15	-15.53	-0.39	-5.26	41.45	1.00	1.00	0.43	3747	0.42	3545
LB29-LB30	GB3	0.564	SHEAR	3641	0.75	1.16	-22.39	-15.07	8.41	-54.35	1.00	1.00	0.56	3644	0.50	3621
LB30-LB31	GB3	0.074	TN+BN	3644	0.00	5.22	-13.51	1.23	-0.09	0.55	1.00	1.00	0.07	3641	0.07	3624
LB40-LB41	GB3	0.077	TN+BN	3653	0.26	5.57	-14.35	1.17	0.07	-0.57	1.00	1.00	0.08	3652	0.08	3633
LB41-LB42	GB3	0.610	SHEAR	3653	0.00	0.47	-31.11	-14.83	-6.67	63.04	1.00	1.00	0.61	3652	0.55	3633
LB42-LB43	GB3	0.592	SHEAR	3758	0.75	-4.41	-15.26	5.37	4.23	-65.57	1.00	1.00	0.59	3756	0.58	3558
LB43-LB44	GB3	0.000	SHEAR	3501	0.00	0.00	-0.01	0.00	0.00	0.04	1.00	1.00	0.00	3502	0.00	3503
0005-CPP1	GB6	0.267	TN+BN	3757	0.00	29.69	-7.55	24.08	-3.48	0.78	1.00	1.00	0.27	3755	0.26	3737
0006-CPP2	GB6	0.261	TN+BN	3633	0.00	29.75	-8.82	-21.05	3.63	1.05	1.00	1.00	0.26	3632	0.26	3653
0007-CPP6	GB6	0.349	TN+BN	3621	0.00	14.82	10.99	-54.07	10.59	-12.64	1.00	1.00	0.35	3624	0.35	3641

0008-CPP7	GB6	0.259	TN+BN	3724	1.25	23.27	-4.31	37.86	4.72	3.92	1.00	1.00	0.26	3744	0.25 3714
0013-0008	GB6	0.234	TN+BN	3754	1.50	16.20	15.38	26.33	3.53	9.58	1.00	1.00	0.23	3751	0.23 3734
0014-0005	GB6	0.273	TN+BN	3757	1.50	27.90	9.98	35.61	2.14	4.71	1.00	1.00	0.27	3755	0.27 3737
0015-0006	GB6	0.245	TN+BN	3653	1.50	27.82	11.55	-27.16	-1.09	5.87	1.00	1.00	0.25	3633	0.25 3652
0016-0007	GB6	0.291	TN+BN	3644	0.00	20.40	12.74	-39.87	1.44	-7.29	1.00	1.00	0.29	3641	0.29 3624
0016-CPP8	GB6	0.322	TN+BN	3624	0.00	22.85	-11.67	42.01	-4.72	3.62	1.00	1.00	0.32	3644	0.31 3614
CPP1-LB26	GB6	0.114	TN+BN	3723	0.00	29.78	-7.77	0.00	0.00	0.82	1.00	1.00	0.11	3722	0.11 3743
CPP2-LB52	GB6	0.116	TN+BN	3647	0.00	29.78	-8.29	0.00	0.00	1.08	1.00	1.00	0.12	3645	0.12 3657
CPP3-0014	GB6	0.413	TN+BN	3757	1.25	23.25	6.31	54.62	12.22	9.58	1.00	1.00	0.41	3755	0.40 3737
CPP3-CRP1	GB6	0.333	TN+BN	3538	0.52	18.13	42.65	-6.57	-5.21	14.35	1.00	1.00	0.33	3536	0.33 3528
CPP4-0015	GB6	0.361	TN+BN	3633	1.25	20.92	7.55	-44.45	-8.80	9.40	1.00	1.00	0.36	3632	0.35 3653
CPP5-0013	GB6	0.343	TN+BN	3746	1.25	15.28	9.82	-42.43	-7.74	12.55	1.00	1.00	0.34	3748	0.34 3726
CPP5-CRP3	GB6	0.253	TN+BN	3728	0.52	15.29	-33.38	-8.83	-6.25	-13.35	1.00	1.00	0.25	3726	0.25 3738
CPP6-CRP4	GB6	0.292	TN+BN	3654	0.52	14.69	-32.38	16.16	9.40	-13.50	1.00	1.00	0.29	3651	0.29 3634
CRP1-LB20	GB6	0.354	TN+BN	3528	0.52	19.55	54.12	-4.13	0.27	13.90	1.00	1.00	0.35	3526	0.35 3548
CRP2-CPP4	GB6	0.352	TN+BN	3544	0.00	13.88	44.91	-18.22	8.29	-14.71	1.00	1.00	0.35	3541	0.35 3554
CRP3-LB13	GB6	0.311	TN+BN	3728	0.52	13.55	-42.25	-4.36	0.26	-14.23	1.00	1.00	0.31	3726	0.31 3748
CRP4-LB39	GB6	0.325	TN+BN	3644	0.52	12.08	-40.15	9.35	-0.61	-14.27	1.00	1.00	0.32	3641	0.32 3624
LB07-CPP7	GB6	0.348	TN+BN	3744	0.00	23.26	2.46	-57.60	4.63	-3.29	1.00	1.00	0.35	3724	0.33 3747
LB33-CPP8	GB6	0.286	TN+BN	3628	0.00	23.43	2.63	44.83	-4.62	-3.52	1.00	1.00	0.29	3648	0.28 3623
LB46-CRP2	GB6	0.422	TN+BN	3544	0.00	16.27	55.77	-10.21	-0.61	-14.27	1.00	1.00	0.42	3541	0.42 3524
CPP1-CPP2	TPP	0.119	TN+BN	3754	15.35	5.39	1.75	-23.88	1.30	-0.01	0.85	0.85	0.12	3751	0.12 3757
CPP3-CPP4	TPP	0.153	TN+BN	3554	0.00	7.30	3.36	30.28	1.38	0.13	0.85	0.85	0.15	3551	0.15 3534
CPP5-CPP6	TPP	0.109	TN+BN	3528	6.72	4.67	22.38	-1.56	0.35	-0.12	0.85	0.85	0.11	3526	0.11 3548
CPP7-CPP8	TPP	0.113	C<.15	3635	15.35	-0.48	-27.68	-4.05	1.69	0.01	0.85	0.85	0.11	3535	0.11 3735
CRP1-CRP5	TPP	0.246	TN+BN	3747	8.82	18.02	40.54	-6.80	1.03	-6.36	0.85	0.85	0.25	3745	0.25 3757
CRP3-CRP5	TPP	0.233	C<.15	3554	0.00	-16.47	-29.01	17.45	1.91	3.45	0.85	0.85	0.23	3551	0.23 3534
CRP5-CRP2	TPP	0.241	C<.15	3547	8.82	-16.22	-28.17	-22.73	1.97	3.88	0.85	0.85	0.24	3545	0.24 3527
CRP5-CRP4	TPP	0.243	TN+BN	3654	0.00	18.38	39.92	1.73	0.78	-6.31	0.85	0.85	0.24	3651	0.24 3644
LB14-LB05	TPP	0.409	TN+BN	3737	0.00	31.41	-65.60	11.37	3.06	-1.32	0.85	0.85	0.41	3735	0.41 3757
LB20-LB13	TPP	0.702	TN+BN	3757	0.00	47.55	-114.23	42.91	6.98	-7.66	0.85	0.85	0.70	3755	0.70 3737
LB31-LB40	TPP	0.385	TN+BN	3653	12.20	26.83	-65.81	6.07	3.06	2.43	0.85	0.85	0.39	3652	0.38 3643
LB39-LB46	TPP	0.665	TN+BN	3633	8.12	44.15	-114.70	21.68	6.75	6.71	0.85	0.85	0.66	3632	0.66 3623
LB26-LB54	TRN	1.221	C<.15	3701	0.35	0.00	0.00	-227.38	81.54	0.00	0.85	0.85	1.22	3702	1.22 3703
LB52-LB55	TRN	1.221	C<.15	3601	0.35	0.00	0.00	-227.38	81.54	0.00	0.85	0.85	1.22	3602	1.22 3603

MEMBER FORCES AND MOMENTS REPORT
LOAD CASE 3435 AS A CRITICAL CONDITION

MEMBER NUMBER	MEMBER END	GROUP ID	LOAD COND	FORCE(X) (kN)	FORCE(Y) (kN)	FORCE(Z) (kN)	MOMENT(X) (kN-m)	MOMENT(Y) (kN-m)	MOMENT(Z) (kN-m)
1272-GB02	1272	DM5	3435	-8873.6992	-1067.8186	-1385.3812	748.9852	-6083.7158	-1642.7316
	GB02		3435	-8885.1484	-1067.8186	-1385.3812	748.9852	-7060.4048	-2395.5398
GB02-ANS6	GB02	GB2	3435	-160.8546	-22.8027	534.9111	-122.5814	-2659.8276	85.7306
	ANS6		3435	-160.8546	-22.8027	491.5853	-122.5814	-627.3685	-4.5678
CPP1-ANS1	CPP1	TPP	3435	-343.7669	4.9652	30.6940	9.9700	-230.2921	-64.6783
	ANS1		3435	-343.7669	4.9652	28.2497	9.9700	-189.8862	-57.8711
CPP3-ANS2	CPP3	TPP	3435	282.2314	-11.8544	12.2176	22.0220	8.3190	89.4500
	ANS2		3435	282.2314	-11.8544	9.7734	22.0220	23.3938	73.1977
CRP1-ANS4	CRP1	TPP	3435	821.4628	-6.2827	4.7151	8.9463	111.5152	61.9098
	ANS4		3435	821.4628	-6.2827	2.2708	8.9463	116.3040	53.2963
LB14-ANS5	LB14	TPP	3435	32.8111	0.7432	17.4960	-16.7773	-59.6729	-7.3729
	ANS5		3435	32.8111	0.7432	14.8220	-16.7773	-37.5190	-6.3540
LB20-ANS3	LB20	TPP	3435	-14.9998	-26.6591	6.8980	-65.9675	-6.3008	108.6404
	ANS3		3435	-14.9998	-26.6591	4.2241	-65.9675	1.3234	72.0908

LAMPIRAN E
PERHITUNGAN UJI KAPASITAS
SKIDSHOE

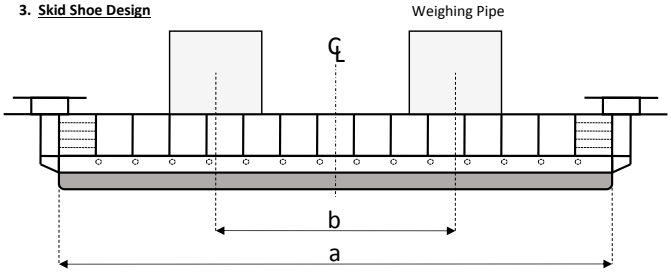
1. Preface

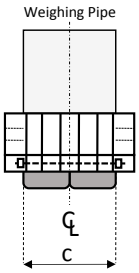
This section purposes are to check the skid shoes during fabrication, weighing, load out.

2. Design Load

Description	Maximum Reaction (T)
Fabrication	681.23
Weighing	681.23
Load Out	929.69

3. Skid Shoe Design

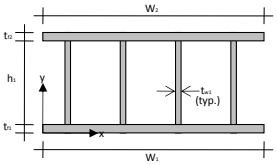




Where: a = 600 cm c = 98 cm
b = 150 cm

Shoe Frame Properties

- Material Grade Fy = 36 Ksi = 2531.05 kg/cm^2
- Allowable Bending Stress Fb = 0.66 x Fy = 1670.49 kg/cm^2
- Allowable Shear Stress Fs = 0.40 x Fy = 1012.42 kg/cm^2
- Allowable Bearing Stress FBr = 0.90 x Fy = 2277.95 kg/cm^2



t_{f1} = 2.50 cm
t_{f2} = 2.50 cm
h_1 = 55.00 cm
w_1 = 98.00 cm
w_2 = 98.00 cm
t_{w1} = 2.50 cm

A1 = w_1 x t_{f1} = 245.00 cm^2 A_1 x Y_1 = 306.25 cm^3 A Total = 1040.00 cm^2

A2 = t_{w1} x h_1 = 137.50 cm^2 A_2 x Y_2 = 4125.00 cm^3 A x Y Total = 31200.00 cm^3

A3 = t_{w1} x h_1 = 137.50 cm^2 A_3 x Y_3 = 4125.00 cm^3

A4 = t_{w1} x h_1 = 137.50 cm^2 A_4 x Y_4 = 4125.00 cm^3

A5 = t_{w1} x h_1 = 137.50 cm^2 A_5 x Y_5 = 4125.00 cm^3

A6 = w_2 x t_{f2} = 245.00 cm^2 A_6 x Y_6 = 14393.75 cm^3

$$Y_{fab} = \frac{A \times Y\ Total}{A\ Total} = 30.00 \text{ cm}$$

$$Ix_1 = \frac{1}{12} \times w_1 \times t_{f1}^3 + A_1 \times (Y - Y_1)^2 = 202635.42 \text{ cm}^4$$

$$Ix_2 = \frac{1}{12} \times t_{w1} \times h_1^3 + A_2 \times (Y - Y_2)^2 = 34661.46 \text{ cm}^4$$

$$Ix_3 = \frac{1}{12} \times t_{w1} \times h_1^3 + A_3 \times (Y - Y_3)^2 = 34661.46 \text{ cm}^4$$

$$Ix_4 = \frac{1}{12} \times t_{w1} \times h_1^3 + A_4 \times (Y - Y_4)^2 = 34661.46 \text{ cm}^4$$

$$Ix_5 = \frac{1}{12} \times t_{w1} \times h_1^3 + A_5 \times (Y - Y_5)^2 = 34661.46 \text{ cm}^4$$

$$Ix_6 = \frac{1}{12} \times w_2 \times t_{f2}^3 + A_6 \times (Y - Y_6)^2 = 202635.42 \text{ cm}^4$$

Ix Total = 543916.67 cm^4

Shoe Timber Properties

- Timber Material = **Damar Laut Class - 1**

Class	Dry Spesific Density (Y)	Ultimate Bent Stress (kg/cm^2)	Ultimate Comp. Stress (kg/cm^2)
I	≥ 0.90	≥ 1100	≥ 650
II	0.9 - 0.6	1100 -725	650 -425
III	0.6 - 0.4	725 -500	425 -300
IV	0.4 - 0.3	500 -360	300 -215
V	≤ 0.3	≤ 360	≤ 215

Proven Compressive Stress (*) σ_{max} = 646.25 kg/cm^2

Allowable Compressive Stress (**) σ_{all} = 40.00 x γ

Specific Gravity (*) γ = 1.00

σ_{all} = 40.00 kg/cm^2

Allowable Shear Stress (**) τ_{allw} = 20.00 x γ

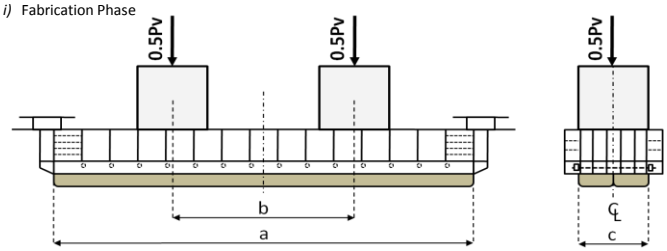
τ_{allw} = 20.00 kg/cm^2

*) Taken from document "*Laporan Hasil Pengujian* ".
Test result by Research Center for Physics Indonesian Institute of Sciences (LIPI) with standard test ASTM D 143.

**) Taken from document "*Buku Teknik Sipil* ", page 188 & 189.

4. Skid Shoe Design Check

i) Fabrication Phase



a = 600.00 cm
b = 150.00 cm
c = 98.00 cm

Pv = Fabrication Load

$$M_{max} = \frac{0.5\,Pv \times C}{2} = \frac{340614 \times 98.00}{2} = 16690073.36 \text{ kg.cm}$$

Shoe Frame Check

Shear Check

$$fv = \frac{V\,Fab}{As} = 327.51 \text{ kg/cm}^2 < 1012.42 \text{ kg/cm}^2$$ **SECURE**

Bending Check

$$fv = \frac{M_{max} \times Y_{fab}}{Ix} = 715.77 \text{ kg/cm}^2 < 1670.49 \text{ kg/cm}^2$$ **SECURE**

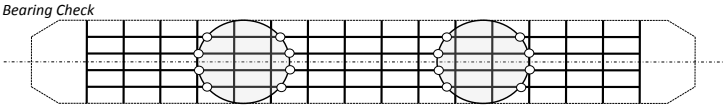
Web Crippling Check

Distance between Stiffeners **<** 1.50 x h1

37.5 < 82.50

Web Crippling does not need to be checked

Bearing Check



N = Pipe Support thickness

N = 2.54 cm n = 8.00

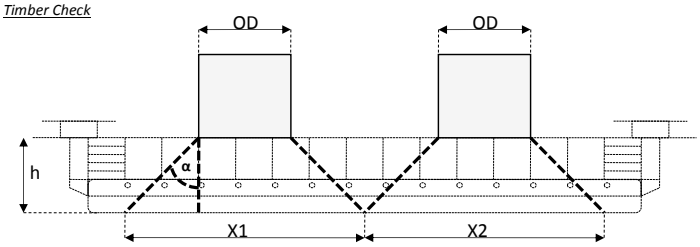
$k = t_{f2} + (0.707 \times t_{w1})$ = 4.27 cm

$Ab = (t_{w1} \times (N + 5k) \times n)$ = 477.55 cm^2

$$fb = \frac{Pv}{Ab}$$, for one pipe support contact area

$$= \frac{340613.742}{477.55} = 713.25 \text{ kg/cm}^2 < 2277.95 \text{ kg/cm}^2$$ **SECURE**

Timber Check



OD	=	76.20	cm	X1	=	217.20	cm
α	=	45.00	deg	X2	=	217.20	cm
h	=	70.50	cm				

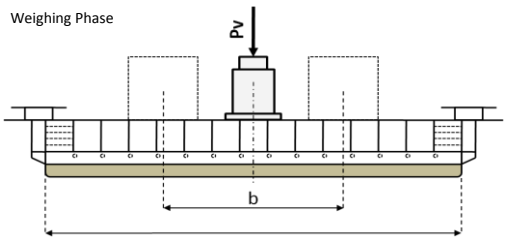
Bearing Check

Ab = (X1 + X2) x c = 42571.20 cm^2

$$fb = \frac{Pv}{Ab}$$

$$= \frac{681227.484}{42571.20} = 16.00 \text{ kg/cm}^2 < 40.00 \text{ kg/cm}^2$$ **SECURE**

ii) Weighing Phase



a	=	600.00	cm
b	=	170.00	cm
c	=	76.20	cm

Jack Diameter:
estimated : 40 cm

Pv = Weighing Load

$$M\ max = \frac{0.5\ Pv \times Jack\ dmtr}{2}$$

$$= \frac{340614 \times 40.00}{2}$$

= 6812274.842 kg.cm

Shoe Frame Check

Shear Check

$$fv = \frac{V\ Wei}{As} = 655.03 \text{ kg/cm}^2 < 1012.42 \text{ kg/cm}^2$$ **SECURE**

Bending Check

$$fv = \frac{M_{max} \times Y_{fab}}{Ix} = 751.47 \text{ kg/cm}^2 < 1670.49 \text{ kg/cm}^2$$ **SECURE**

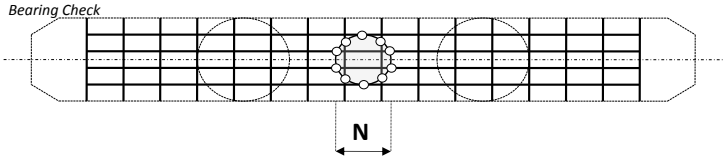
Web Crippling Check

Distance between Stiffeners < 1.50 x h1

37.5 < 82.50

Web Crippling does not need to be checked

Bearing Check



Ab = (t_{w1} x (N +5k) x n) = 613.38 cm^2

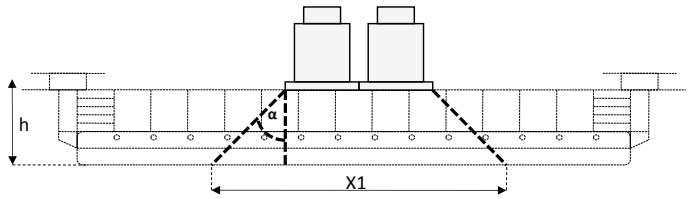
N	=	40.00	cm	n	=	4.00	
k	=	t_{f2} + (0.707 x t_{w1})	=	4.27	cm		

$$fb = \frac{Pv}{Ab}$$

$$= \frac{681227.48}{613.38} = 1110.62 \text{ kg/cm}^2 < 2277.95 \text{ kg/cm}^2$$ **SECURE**

Timber Check

Use 2 weighing jack and additional shim plate to increase bearing area



OD	=	115.00	cm	X1	=	266.00	cm	h Shimplate	=	5.00	cm
α	=	45.00	deg	h	=	70.50	cm				

Bearing Check

Ab = X1 x c = 26068.00 cm^2

$$fb = \frac{Pv}{Ab}$$

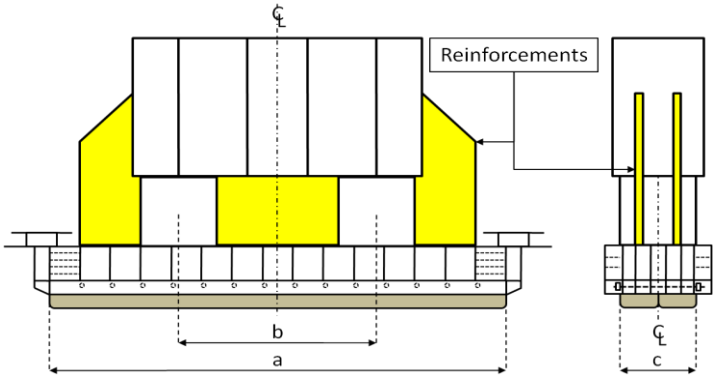
$$= \frac{681227.48}{26068.00} = 26.13 \text{ kg/cm}^2 < 40.00 \text{ kg/cm}^2$$ **SECURE**

iii) Load Out Phase

The Skid Shoes plan to be use on Load Out Operation are plan to be modify to accommodate the load derived from the structure during operation.

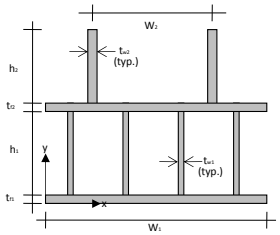
For load out phase, the skid shoes will be check on two condition:

a. Normal Case, which the skid shoes are modelled seated perfectly on the ground.
b. Worst Case, the condition when there are some miss on the ballasting system, causing the unlevelness between the jetty level and barge level. On this case, the skid shoes will be checked on condition having two support with 3/4 skidshoe total length span.



Shoe Frame Properties

- Material Grade	Fy	=	36	Ksi	=	2531.05	kg/cm²
- Allowable Bending Stress	Fb	=	0.66 x Fy		=	1670.49	kg/cm²
- Allowable Shear Stress	Fs	=	0.40 x Fy		=	1012.42	kg/cm²
- Allowable Bearing Stress	FBr	=	0.90 x Fy		=	2277.95	kg/cm²



t_{f1}	=	2.50	cm
t_{f2}	=	2.50	cm
h_1	=	34.50	cm
w_1	=	98.00	cm
w_2	=	35.00	cm
t_{w1}	=	2.50	cm
t_{w2}	=	3.00	cm
h_2	=	177.00	cm

A1	=	w_1	x	t_{f1}	=	245.00	cm^2		A_1	x	Y_1	=	306.25	cm^3
A2	=	t_{w1}	x	h_1	=	86.25	cm^2		A_2	x	Y_2	=	1703.44	cm^3
A3	=	t_{w1}	x	h_1	=	86.25	cm^2		A_3	x	Y_3	=	1703.44	cm^3
A4	=	t_{w1}	x	h_1	=	86.25	cm^2		A_4	x	Y_4	=	1703.44	cm^3
A5	=	t_{w1}	x	h_1	=	86.25	cm^2		A_5	x	Y_5	=	1703.44	cm^3
A6	=	w_2	x	t_{f2}	=	87.50	cm^2		A_6	x	Y_6	=	3346.88	cm^3
A7	=	h_2	x	t_{w2}	=	531.00	cm^2		A_7	x	Y_7	=	67968.00	cm^3
A8	=	h_2	x	t_{w2}	=	531.00	cm^2		A_8	x	Y_8	=	67968.00	cm^3

A Total = 1739.50 cm^2

A x Y Total = 146402.88 cm^3

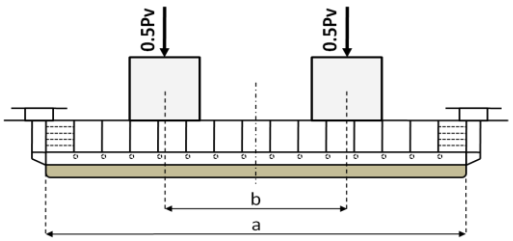
$$Y_{lo} = \frac{\text{A x Y Total}}{\text{A Total}}$$

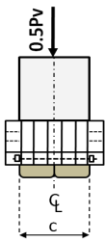
$$= 84.16 \text{ cm}$$

Ix_1	=	$\frac{1}{12}$	x	w_1	x	t_{f1}^3	+	A_1	x	(	Y	-	Y_1	) ^{2}	=	202635.42 cm^4
Ix_2	=	$\frac{1}{12}$	x	t_{w1}	x	h_1^3	+	A_2	x	(	Y	-	Y_2	) ^{2}	=	34661.46 cm^4
Ix_3	=	$\frac{1}{12}$	x	t_{w1}	x	h_1^3	+	A_3	x	(	Y	-	Y_3	) ^{2}	=	34661.46 cm^4
Ix_4	=	$\frac{1}{12}$	x	t_{w1}	x	h_1^3	+	A_4	x	(	Y	-	Y_4	) ^{2}	=	34661.46 cm^4
Ix_5	=	$\frac{1}{12}$	x	t_{w1}	x	h_1^3	+	A_5	x	(	Y	-	Y_5	) ^{2}	=	34661.46 cm^4
Ix_6	=	$\frac{1}{12}$	x	w_2	x	t_{f2}^3	+	A_6	x	(	Y	-	Y_6	) ^{2}	=	202635.42 cm^4
Ix_7	=	$\frac{1}{12}$	x	t_{w2}	x	h_2^3	+	A_7	x	(	Y	-	Y_7	) ^{2}	=	2406685.93 cm^4
Ix_8	=	$\frac{1}{12}$	x	t_{w2}	x	h_2^3	+	A_8	x	(	Y	-	Y_8	) ^{2}	=	2406685.93 cm^4

Ix Total = 5357288.52 cm^4

NORMAL CASE





a = 600.00 cm
b = 170.00 cm
c = 76.20 cm

Pv = Loadout Load

$$M_{max} = \frac{0.5\,Pv \times C}{2}$$

$$= \frac{464843 \times 76.20}{2}$$

$$= 17710528.21 \text{ kg.cm}$$

Shoe Frame Check

Shear Check

$$fv = \frac{V\,Lo}{As} = 446.96 \text{ kg/cm}^2 < 1012.42 \text{ kg/cm}^2$$ **SECURE**

Bending Check

$$fv = \frac{M_{max} \times Y_{lo}}{Ix} = 278.23 \text{ kg/cm}^2 < 1670.49 \text{ kg/cm}^2$$ **SECURE**

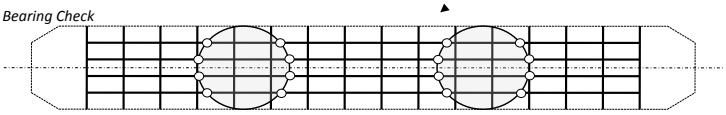
Web Crippling Check

Distance between Stiffeners < 1.50 x h1

37.5 < 51.75

Web Crippling does not need to be checked

Bearing Check



Ab = (t_{w1} x (N +5k) x n) = 477.55 cm^2

N = Pipe Support thickness

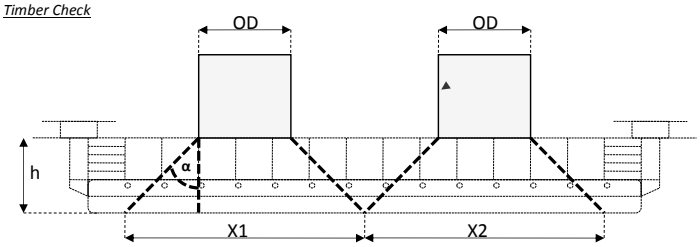
N = 2.54 cm n = 8.00

k = t_{f2} + (0.707 x t_{w1}) = 4.27 cm

$$fb = \frac{Pv}{Ab}$$

$$= \frac{464843.26}{477.55} = 973.39 \text{ kg/cm}^2 < 2277.95 \text{ kg/cm}^2$$ **SECURE**

Timber Check



OD = 76.20 cm X1 = 217.20 cm h = 70.50 cm

α = 45.00 deg X2 = 217.20 cm

Bearing Check

Ab = (X1 + X2) x c = 42571.20 cm^2

$$fb = \frac{Pv}{Ab}$$

$$= \frac{929686.52}{42571.20} = 21.84 \text{ kg/cm}^2 < 40.00 \text{ kg/cm}^2$$ **SECURE**

Shear Check

Contact Surfaces = Teflon - Grease - Wood

Friction Coefficient = Static Coefficient μ = 0.25 *(initial skidding)*

Dynamic Coefficient μ = 0.06 *(moving)*

As = a x c = 58800.00 cm^2

$$fs = \frac{Pv \times \mu}{As}$$

$$= \frac{232421.63}{58800.00} = 3.95 \text{ kg/cm}^2 < 20.00 \text{ kg/cm}^2$$ **SECURE**

Roundbar on Shoe Timber Check

Square Bar Properties :

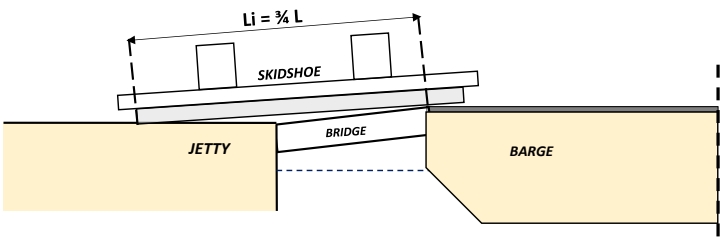
Material Grade	Fy	=	36.00	ksi	=	2531.05	kg/cm²	Allowable Shear : 1012.42 kg/cm²
Diameter	L	=	1.00	in	=	2.54	cm	
Quantity	n	=	40.00	ea				
Area	As	=	6.45	cm²				

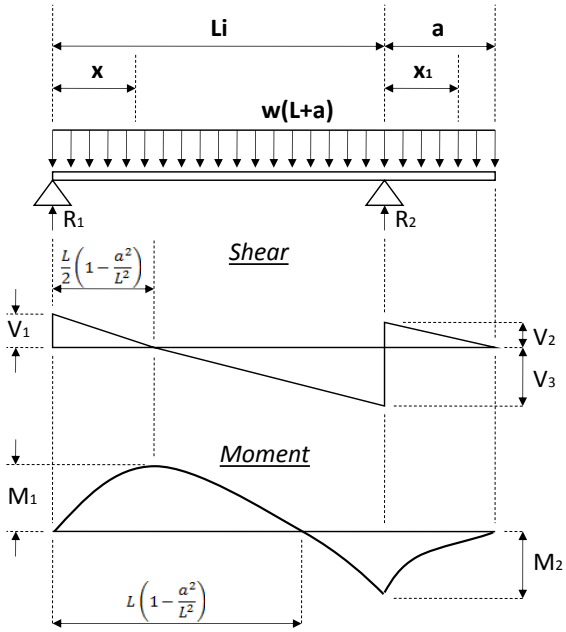
Shear Check

$$fs = \frac{Pv \times \mu}{As \times n}$$

$$= \frac{232421.63}{258.06} = 900.64 \text{ kg/cm}^2 < 1012.42 \text{ kg/cm}^2$$ **SECURE**

WORST CASE





L = 600.00 cm
Li = 450.00 cm
a = 150.00 cm
P = 929686.52 kg
w = 1549.48 kg/cm

$R1 = \frac{w}{2L}(L^2 - a^2)$ = 309895.51 kg

$R2 = \frac{w}{2L}(L + a)^2$ = 619791.01 kg

$V1 = \frac{w}{2L}(L^2 - a^2)$ = 309895.51 kg/cm

V2 = w x a = 232421.63 kg/cm

$V3 = \frac{w}{2L}(L^2 + a^2)$ = 387369.38 kg/cm

$M1 = \frac{w}{8L^2}(L + a)^2 (L - a)^2$

= 30989550.67 kg/cm^2

M2 = $wa^2 / 2$

= 17431622.25 kg/cm^2

Shear Check

$fv = \frac{Vmax}{As}$ = 356.30 kg/cm^2 < 1012.42 kg/cm^2 SECURE

Mmax = highest between M1 & M2

Bending Check

$fv = \frac{Mmax \times Yo}{Ix}$ = 486.85 kg/cm^2 < 1670.49 kg/cm^2 SECURE

5. Design Summary

No.	Description	Allowable	Actual	Safety Factor	Remarks
A	**Fabrication Phase**				
1	Shear Check - Shoe Frame	1012.42	327.51	3.09	Secure!
2	Bending Check - Shoe Frame	1670.49	715.77	2.33	Secure!
3	Web Crippling Check - Shoe Frame	82.50	37.5	2.20	Secure!
4	Bearing Check - Shoe Frame	2277.95	713.25	3.19	Secure!
5	Bearing Check - Timber	40.00	16.00	2.50	Secure!
B	**Weighing Phase**				
1	Shear Check - Shoe Frame	1012.42	655.03	1.55	Secure!
2	Bending Check - Shoe Frame	1670.49	751.47	2.22	Secure!
3	Web Crippling Check - Shoe Frame	82.50	37.5	2.20	Secure!
4	Bearing Check - Shoe Frame	2277.95	1110.62	2.05	Secure!
5	Bearing Check - Timber	40.00	26.13	1.53	Secure!
C.1	**Load Out Phase - Normal Case**				
1	Shear Check - Shoe Frame	1012.42	446.96	2.27	Secure!
2	Bending Check - Shoe Frame	1670.49	278.23	6.00	Secure!
3	Web Crippling Check - Shoe Frame	82.50	37.5	2.20	Secure!
4	Bearing Check - Shoe Frame	2277.95	973.39	2.34	Secure!
5	Bearing Check - Timber	40.00	21.84	1.83	Secure!
6	Shear Check - Timber	20.00	3.95	5.06	Secure!
7	Shear Check - Roundbar	1012.42	900.64	1.12	Secure!
C.2	**Load Out Phase - Worst Case**				
1	Shear Check - Shoe Frame	1012.42	356.30	2.84	Secure!
2	Bending Check - Shoe Frame	1670.49	486.85	3.43	Secure!

LAMPIRAN F
PERHITUNGAN UJI KAPASITAS *SKIDWAY*

1. LOAD DESIGN

- Maximum load on skidshoe during loadout phase:

Case	REACTION (T)			
	ROW A1	ROW B1	ROW A2	ROW B2
3101	281.937	309.905	490.882	433.055
3102	282.243	412.832	397.576	423.128
3103	192.145	296.157	487.674	539.803
3104	371.729	323.652	494.091	326.307
3105	281.631	206.977	584.189	442.982
3201	414.514	197.514	358.305	545.445
3202	149.360	422.294	623.459	320.665
3203	149.360	422.294	623.459	320.665
3204	414.514	197.514	358.305	545.445
3205	394.327	178.215	378.492	564.745
3206	169.547	441.594	603.272	301.365
3207	394.327	178.215	378.492	564.745
3208	169.547	441.594	603.272	301.365
3211	414.820	300.442	264.998	535.518
3212	149.666	525.222	530.153	310.738
3213	149.666	525.222	530.153	310.738
3214	414.820	300.442	264.998	535.518
3215	394.633	281.143	285.186	554.818
3216	169.853	544.522	509.966	291.438
3217	394.633	281.143	285.186	554.818
3218	169.853	544.522	509.966	291.438
3221	324.722	183.767	355.096	652.193
3222	59.568	408.547	620.251	427.413
3223	59.568	408.547	620.251	427.413
3224	324.722	183.767	355.096	652.193
3225	304.535	164.467	375.284	671.493
3226	79.755	427.846	600.064	408.114
3227	304.535	164.467	375.284	671.493
3228	79.755	427.846	600.064	408.114
3231	504.306	211.262	361.513	438.697
3232	239.152	436.042	626.668	213.917
3233	239.152	436.042	626.668	213.917
3234	504.306	211.262	361.513	438.697
3235	484.119	191.963	381.701	457.996
3236	259.339	455.342	606.481	194.617
3237	484.119	191.963	381.701	457.996
3238	259.339	455.342	606.481	194.617
3241	414.208	94.587	451.611	555.372
3242	149.054	319.367	716.766	330.592
3243	149.054	319.367	716.766	330.592
3244	414.208	94.587	451.611	555.372
3245	394.021	75.287	471.799	574.672
3246	169.241	338.666	696.579	311.293
3247	394.021	75.287	471.799	574.672
3248	169.241	338.666	696.579	311.293
3301	547.091	85.124	225.728	657.835
3302	16.783	534.684	756.036	208.275
3303	16.783	534.684	756.036	208.275
3304	547.091	85.124	225.728	657.835
3305	506.717	46.525	266.102	696.434
3306	57.157	573.284	715.662	169.676
3307	506.717	46.525	266.102	696.434
3308	57.157	573.284	715.662	169.676
3311	547.397	188.052	132.421	647.908
3312	17.089	637.612	662.730	198.348
3313	17.089	637.612	662.730	198.348
3314	547.397	188.052	132.421	647.908
3315	507.023	149.453	172.796	686.507
3316	57.463	676.212	622.355	159.748
3317	507.023	149.453	172.796	686.507
3318	57.463	676.212	622.355	159.748
3321	457.299	71.377	222.519	764.583
3322	-73.010	520.937	752.828	315.023

Case	REACTION (T)			
	ROW A1	ROW B1	ROW A2	ROW B2
3323	-73.010	520.937	752.828	315.023
3324	457.299	71.377	222.519	764.583
3325	416.925	32.777	262.894	803.183
3326	-32.635	559.536	712.453	276.424
3327	416.925	32.777	262.894	803.183
3328	-32.635	559.536	712.453	276.424
3331	636.884	98.872	228.936	551.086
3332	106.575	548.432	759.245	101.527
3333	106.575	548.432	759.245	101.527
3334	636.884	98.872	228.936	551.086
3335	596.509	60.273	269.311	589.686
3336	146.949	587.031	718.871	62.927
3337	596.509	60.273	269.311	589.686
3338	146.949	587.031	718.871	62.927
3341	546.786	-17.804	319.034	667.762
3342	16.477	431.756	849.343	218.202
3343	16.477	431.756	849.343	218.202
3344	546.786	-17.804	319.034	667.762
3345	506.411	-56.403	359.409	706.361
3346	56.851	470.356	808.969	179.603
3347	506.411	-56.403	359.409	706.361
3348	56.851	470.356	808.969	179.603
3401	555.975	0.000	216.844	742.959
3402	647.977	0.000	31.842	835.960
3403	453.826	0.000	225.992	835.960
3404	658.124	0.000	207.696	649.959
3405	463.973	0.000	401.847	649.959
3411	-103.465	742.959	876.284	0.000
3412	-94.189	835.960	774.008	0.000
3413	-288.301	835.960	968.120	0.000
3414	81.372	649.959	784.448	0.000
3415	-112.740	649.959	978.560	0.000
3421	0.000	555.531	772.819	187.428
3422	0.000	658.855	679.818	177.105
3423	0.000	462.403	679.819	373.557
3424	0.000	648.659	865.820	1.300
3425	0.000	452.207	865.820	197.752
3431	772.819	-123.948	0.000	866.908
3432	679.819	61.359	0.000	774.601
3433	679.818	-134.915	0.000	970.875
3434	865.820	-112.982	0.000	762.940
3435	865.820	-309.255	0.000	959.214
3501	282.663	308.060	490.101	434.955
3502	283.110	410.848	396.632	425.189
3503	192.613	294.568	487.136	541.462
3504	372.714	321.552	493.066	328.447
3505	282.217	205.272	583.570	444.720
3511	420.645	190.263	352.574	552.296
3512	144.682	425.856	627.627	317.613
3513	145.137	425.400	627.691	317.551
3514	420.190	190.720	352.510	552.358
3515	400.460	170.945	372.761	571.613
3516	164.867	445.175	607.441	298.296
3517	400.005	171.401	372.697	571.675
3518	165.322	444.718	607.504	298.234
3521	421.091	293.052	259.105	542.531
3522	145.129	528.644	534.158	307.848
3523	145.583	528.188	534.222	307.786
3524	420.636	293.508	259.041	542.593
3525	400.906	273.733	279.292	561.848
3526	165.314	547.963	513.971	288.531
3527	400.452	274.189	279.228	561.910
3528	165.768	547.507	514.035	288.469

Case	REACTION (T)			
	ROW A1	ROW B1	ROW A2	ROW B2
3531	330.594	176.772	349.609	658.804
3532	54.632	412.364	624.662	424.120
3533	55.086	411.908	624.726	424.058
3534	330.139	177.228	349.545	658.866
3535	310.409	157.453	369.796	678.121
3536	74.817	431.683	604.475	404.804
3537	309.955	157.909	369.732	678.183
3538	75.271	431.227	604.539	404.742
3541	510.695	203.755	355.539	445.789
3542	234.733	439.348	630.592	211.106
3543	235.187	438.892	630.656	211.044
3544	510.241	204.212	355.475	445.851
3545	490.510	184.437	375.726	465.106
3546	254.918	458.667	610.406	191.789
3547	490.056	184.893	375.662	465.168
3548	255.372	458.210	610.469	191.727
3551	420.198	87.476	446.043	562.062
3552	144.236	323.068	721.096	327.378
3553	144.691	322.612	721.160	327.316
3554	419.744	87.932	445.979	562.124
3555	400.013	68.157	466.230	581.379
3556	164.421	342.387	700.910	308.061
3557	399.559	68.613	466.166	581.440
3558	164.875	341.930	700.973	307.999
3601	283.378	308.271	489.384	434.746
3602	283.824	411.059	395.915	424.981
3603	193.327	294.779	486.419	541.254
3604	373.428	321.763	492.349	328.239
3605	282.931	205.483	582.853	444.512
3611	421.359	190.475	351.857	552.088
3612	145.396	426.067	626.910	317.405
3613	145.851	425.611	626.974	317.343
3614	420.904	190.931	351.794	552.150
3615	401.174	171.156	372.044	571.405
3616	165.581	445.386	606.724	298.088
3617	400.719	171.612	371.980	571.467
3618	166.036	444.929	606.787	298.026
3621	421.805	293.263	258.388	542.323
3622	145.843	528.855	533.441	307.639
3623	146.297	528.399	533.505	307.578
3624	421.351	293.719	258.324	542.385
3625	401.620	273.944	278.575	561.640
3626	166.028	548.174	513.255	288.323
3627	401.166	274.400	278.511	561.702
3628	166.482	547.717	513.318	288.261
3631	331.308	176.983	348.892	658.596
3632	55.346	412.575	623.945	423.912
3633	55.800	412.119	624.009	423.850
3634	330.854	177.439	348.829	658.657
3635	311.123	157.664	369.079	677.912
3636	75.531	431.894	603.759	404.595
3637	310.669	158.120	369.015	677.974
3638	75.985	431.438	603.822	404.533
3641	511.409	203.967	354.822	445.581
3642	235.447	439.559	629.876	210.897
3643	235.902	439.103	629.939	210.835
3644	510.955	204.423	354.759	445.642
3645	491.224	184.648	375.009	464.898
3646	255.632	458.878	609.689	191.580
3647	490.770	185.104	374.945	464.959
3648	256.086	458.421	609.752	191.518
3651	420.912	87.687	445.327	561.853
3652	144.950	323.279	720.380	327.170
3653	145.405	322.823	720.443	327.108
3654	420.458	88.143	445.263	561.915
3655	400.727	68.368	465.513	581.170

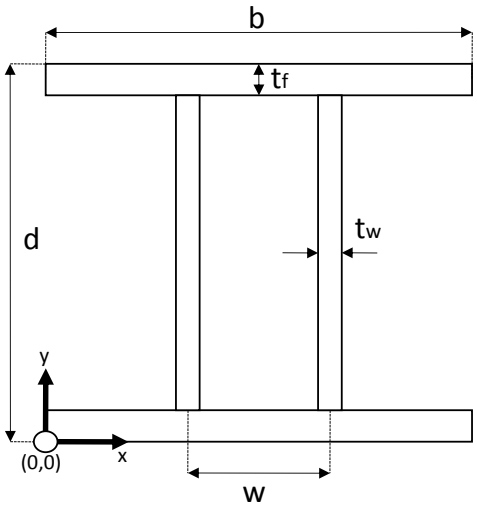
Case	REACTION (T)			
	ROW A1	ROW B1	ROW A2	ROW B2
3656	165.135	342.598	700.193	307.853
3657	400.273	68.824	465.450	581.232
3658	165.589	342.141	700.257	307.791
3701	282.886	308.530	489.880	434.483
3702	283.332	411.318	396.411	424.717
3703	192.835	295.038	486.915	540.990
3704	372.936	322.022	492.846	327.975
3705	282.439	205.742	583.350	444.248
3711	420.867	190.734	352.354	551.824
3712	144.905	426.326	627.407	317.141
3713	145.359	425.870	627.471	317.079
3714	420.412	191.190	352.290	551.886
3715	400.682	171.415	372.541	571.141
3716	165.089	445.645	607.220	297.824
3717	400.227	171.871	372.477	571.203
3718	165.544	445.189	607.284	297.762
3721	421.313	293.522	258.885	542.059
3722	145.351	529.114	533.938	307.375
3723	145.805	528.658	534.002	307.314
3724	420.859	293.978	258.821	542.121
3725	401.128	274.203	279.071	561.376
3726	165.536	548.433	513.751	288.059
3727	400.674	274.660	279.008	561.438
3728	165.990	547.977	513.815	287.997
3731	330.816	177.242	349.389	658.332
3732	54.854	412.834	624.442	423.648
3733	55.308	412.378	624.506	423.586
3734	330.362	177.698	349.325	658.394
3735	310.631	157.923	369.576	677.649
3736	75.039	432.153	604.255	404.331
3737	310.177	158.380	369.512	677.710
3738	75.493	431.697	604.319	404.269
3741	510.917	204.226	355.319	445.317
3742	234.955	439.818	630.372	210.633
3743	235.410	439.362	630.436	210.572
3744	510.463	204.682	355.255	445.379
3745	490.732	184.907	375.506	464.634
3746	255.140	459.137	610.185	191.316
3747	490.278	185.363	375.442	464.696
3748	255.595	458.681	610.249	191.255
3751	420.420	87.946	445.823	561.589
3752	144.458	323.538	720.876	326.906
3753	144.913	323.082	720.940	326.844
3754	419.966	88.402	445.759	561.651
3755	400.235	68.627	466.010	580.906
3756	164.643	342.857	700.690	307.589
3757	399.781	69.083	465.946	580.968
3758	165.098	342.401	700.753	307.527

2. SKIDWAY PROPERTIES

Plate A36

- Material Grade	Fy	=	36	Ksi	=	2531.05	kg/cm^2
- Allowable Bending Stress	Fb	=	0.66 x Fy		=	1670.49	kg/cm^2
- Allowable Shear Stress	Fs	=	0.40 x Fy		=	1012.42	kg/cm^2
- Allowable Bearing Stress	FBr	=	0.90 x Fy		=	2277.95	kg/cm^2

Skidbeam section



Where:

d	=	640.00	mm	=	64.00	cm
b	=	710.00	mm	=	71.00	cm
tf	=	25.00	mm	=	2.50	cm
tw	=	20.00	mm	=	2.00	cm
w	=	410.00	mm	=	41.00	cm

Section Area:

A_1	=	2.5	x	71.0	=	177.50	cm^2
A_2	=	2.0	x	59.0	=	118.00	cm^2
A_3	=	2.0	x	59.0	=	118.00	cm^2
A_4	=	2.5	x	71.0	=	177.50	cm^2
				A_{TOTAL}	=	**591.00**	**cm^2**

Neutral Axis:

X	=	35.50	cm
Y	=	32.00	cm

Moment of Inertia

$$I_{x1} = \frac{1}{12} \times 71 \times 3^3 + 178 \times 30.75^2 = 167929.79 \text{ cm}^4$$

$$I_{x2} = \frac{1}{12} \times 2 \times 59^3 + 118 \times 0^2 = 34229.83 \text{ cm}^4$$

$$I_{x3} = \frac{1}{12} \times 2 \times 59^3 + 118 \times 0^2 = 34229.83 \text{ cm}^4$$

$$I_{x4} = \frac{1}{12} \times 71 \times 3^3 + 178 \times -30.75^2 = 167929.79 \text{ cm}^4$$

$$I_{TOTAL} = \mathbf{404319.25 \text{ cm}^4}$$

Section Modulus

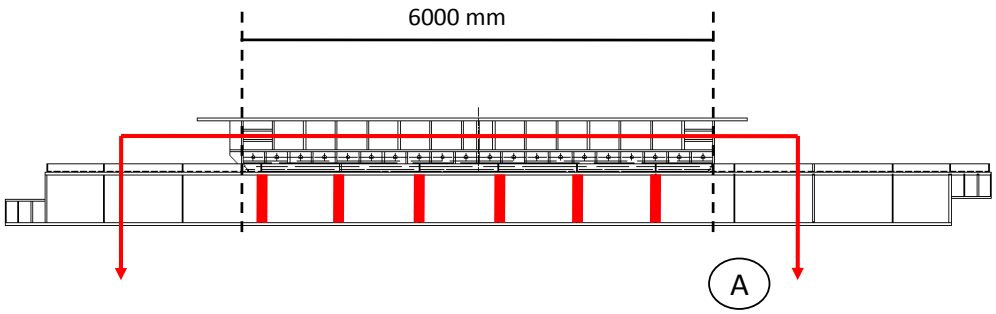
$$S_x = \frac{\text{Ix Total}}{Y} = \frac{404319.25}{32.00} = \mathbf{12634.98 \text{ cm}^3}$$

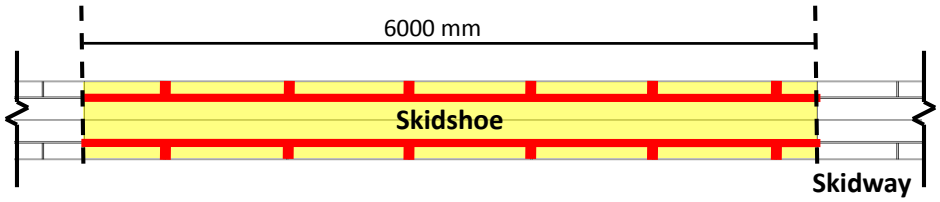
Shear Area

A_{sy}	=	64.00	x	2.00	x	2	= 256.00 cm^2
A_{sx}	=	71.00	x	2.50	x	2	= 355.00 cm^2

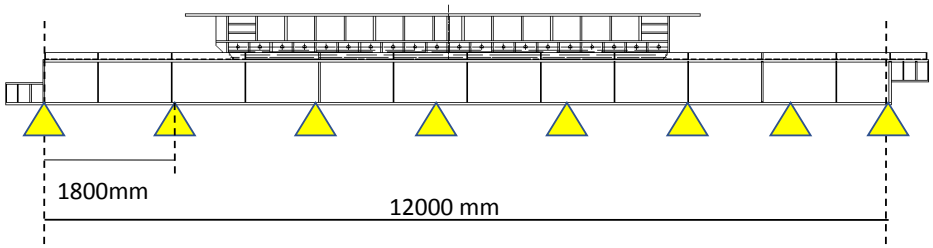
2. ANALYSIS APPROACH

Skidbeam 12 m length will be checked under loadut at the middle of skidbeam.





The skidbeam shall be modeled as a simple beam with 12 m span, supported at interval of 1.8 m. The loading of skidshoe is modelled as distributed load with length of 6 m. All modelling shall be done using SACS.



The force from analysis result shall be used to calculate stress that occur in skidbeam

Loadout Condition

Maximum reaction load	=	978.56	T
Weight of skid frame at one support location	=	13.67	T
Length of distributed load	=	6000	mm
Width of distributed load	=	762	mm
Applied pressure load on skidbeam	=	0.00022	T/mm2

3. ANALYSIS

Below is the maximum force that occur in Skidbeam from SACS analysis

Case	Member Force Frame					
	P (axial)	V maj	M maj	V min	M min	Pv (bearing)
	kg	kg	kg . cm	kg	kg . cm	kg
Skidbeam	0.00	137188.70	1711452.13			978560.10

Bearing Stress

$Ab1 = (t_{w1} \times (N + 5k) \times n1) = 2478.28 \ cm^2$

$N = 600.00 \ cm \qquad n1 = 2.00$

$k = t_f + (0.707 \times t_{w1}) = 3.91 \ cm$

$Ab2 = t_{w2} \times L_2 \times n2 = 345.60 \ cm^2$

$n2 = 12.00$

$L_2 = 14.40 \ cm$

$Ab_{tot} = Ab1 + Ab2$

$= 2478.28 + 345.60$

$= 2823.88 \ cm^2$

$$fb = \frac{Pv}{Ab_{tot}}$$

$$= \frac{978560.10}{2823.88} = 346.53 \ kg/cm^2 < 2277.95 \ kg/cm^2$$ **SECURE**

Shear Stress

$Asy = 256.00 \ cm^2$

$V\ maj = 137188.70 \ kg$

$$fs = \frac{V\ maj}{Asy}$$

$$= \frac{137188.70}{256.00} = 535.89 \ kg/cm^2 < 1012.42 \ kg/cm^2$$ **SECURE**

Bending Stress

Sx = 12634.98 cm^2
M maj = 4162905.00 kg.cm

$$fbend = \frac{M\ maj}{Sx} = \frac{1711452.13}{12634.98} = 135.45\ kg/cm^2 < 1670.49\ kg/cm^2$$ **SECURE**

Local Flange Bending Check

$$t_f > 0.4 \times \frac{Pbf}{Fytf}$$, where Pbf = 5/3 Pv

V = 137188.70 Kg
= 302.36 Kips

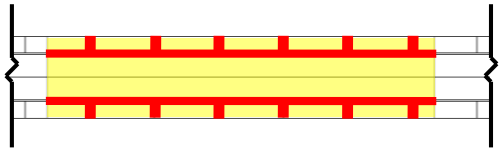
$$t_f > 0.4 \times \sqrt{\frac{5 / 3 \times 302.36}{36}}$$

0.98 < 1.50 inch

1.77 > 1.50 inch

Secure...!!!!

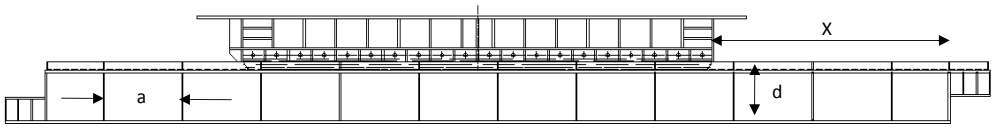
Local Web Yielding Check



Pv ≤ tw x (N + 5k) x 0.66 Fytw
Pv ≤ 0.79 x 555.88 x 30.89
2156.75 ≤ 13519.75 Kips

Secure, No Need Bearing Stiffener!

Web Cripling (≤ d/2 ... K1.5)



a = 1000.00 mm = 39.37 inch
d/2 = 320.00 mm = 12.60 inch

a = 3000.00 mm = 118.11 inch
Since there are two webs, tw becomes 2 x tw

Since, a > d/2 and X > d/2

$$Pv \le 67.5\ tw^2 \times [\,1 + 3\,(N/d)\,(tw/tf)^{1.5}\,] \sqrt{\frac{Fyw \times tf}{tw}}$$

$$2156.75 \le 167.4 \times [\,1 + 3\ 9.375\ 2.02386\,] \sqrt{\frac{46.8 \times 0.98425}{0.787401575}}$$

2156.75 ≤ 167.4 x [57.92099788] 7.64852927
2156.75 ≤ 74160.09726

Secure, No Need Bearing Stiffener!

Sidesway Web Buckling

$$\frac{dc/tw}{l/bf} > 1.70$$

dc = (d - 2 (tf + k)) = 22.92 inch
l = unbraced length = 16.14 inch

50.41 > 1.70

Secure, Sidesway buckling not occured!

Compression buckling of the web

$$dc < \frac{4100 \times t_{wc}^3 \times (F_{yc})^{0.5}}{P_{bf}}$$, Since there are two webs, tw becomes 2 x tw

22.92 < 46.95

Secure...!!!

4. DESIGN SUMMARY

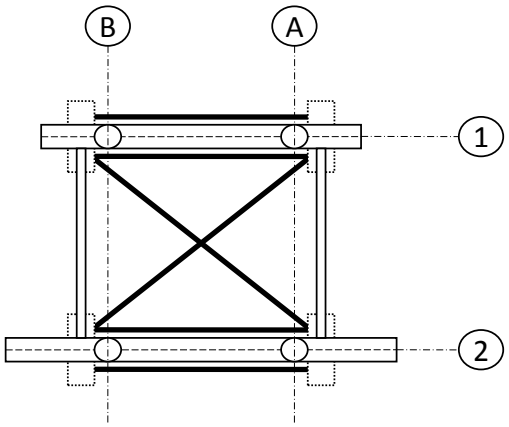
No.	Description	Allowable	Actual	Safety Factor	Remarks
A.	**GLOBAL CHECK**				
1	Bearing Stress	2277.95	346.53	6.57	**Secure!**
2	Shear Stress	1012.42	535.89	1.89	**Secure!**
3	Bending Stress	1670.49	135.45	12.33	**Secure!**
B.	**LOCAL CHECK**				
1	Local Flange Bending Check	1.77	1.50	1.18	**Secure!**
2	Local Web Yielding Check	13519.75	2156.75	6.27	**Secure!**
3	Web Cripling (≤ d/2 … K1.5)	74160.10	2156.75	34.39	**Secure!**
4	Sidesway Web Buckling	50.41	1.70	29.65	**Secure!**
5	Compression buckling of the web	46.95	22.92	2.05	**Secure!**

LAMPIRAN G
PERHITUNGAN DESAIN DAN UJI KAPASITAS *STIFFENER*

Preface

This section purposes are to check the temporary support integrity during fabrication and weighing.

Design Load



SUPPORT	Centre of Gravity Location					MAX REACTION	Contingency 1.1
	Initial CoG	Shift-1	Shift-2	Shift-3	Shift-4		
	MT	MT	MT	MT	MT	MT	MT
A1	301.46	227.30	302.78	289.78	**386.00**	386.00	424.60
A2	509.61	485.78	410.30	**619.30**	523.07	619.30	681.23
B1	275.39	267.41	**356.21**	204.94	272.99	356.21	391.83
B2	465.53	**571.51**	482.71	437.99	369.94	571.51	628.66
TOTAL	1552.00	1552.00	1552.00	1552.00	1552.00		

**Contingency 1.1 to account for any temporary equipment placed on topside during construction*

Support Weight at Row - 1 = 13.67 MT

Support Weight at Row - 2 = 13.39 MT

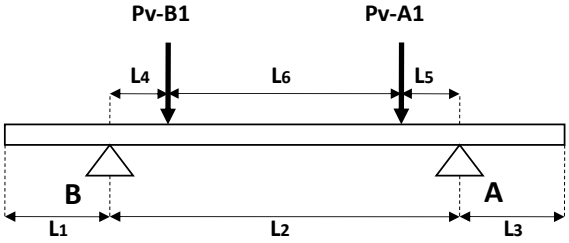
Design Integrity Check

a. Material Properties:

- Material Grade Fy = 50 Ksi = 3515.35 kg/cm^2
- Allowable Bending Stress Fb = 0.66 x Fy = 2320.13 kg/cm^2
- Allowable Shear Stress Fs = 0.40 x Fy = 1406.14 kg/cm^2
- Allowable Bearing Stress FBr = 0.90 x Fy = 3163.82 kg/cm^2

b. Cross Beam Diagram on Row - 2

L1 = 136.40 cm
L2 = 1535.50 cm
L3 = 136.40 cm
L4 = 81.95 cm
L5 = 81.95 cm
L6 = 1371.60 cm
Pv-B1 = 405217.53 kg
Pv-A1 = 438266.84 kg



Therefore:

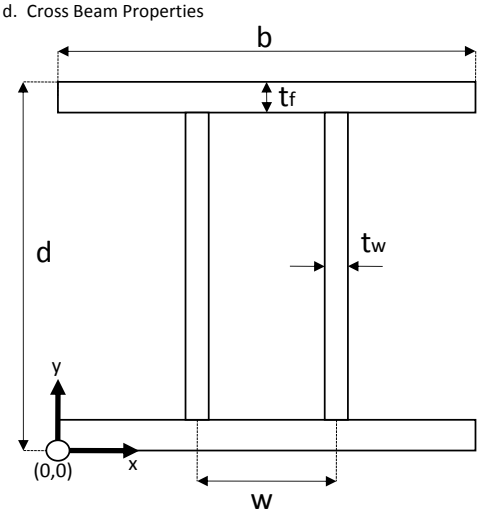
$$Ra = \frac{(Pv\text{-}B1 \times L4) + (Pv\text{-}A1 \times (L4 + L6))}{L2} = 436502.99 \text{ Kg} = 436.50 \text{ T}$$

$$Rb = \frac{(Pv\text{-}A1 \times L5) + (Pv\text{-}B1 \times (L5 + L6))}{L2} = 406981.38 \text{ Kg} = 406.98 \text{ T}$$

$$Ma = Ra \times L5 = 35771.42 \text{ T-cm}$$

$$Mb = Rb \times L4 = 33352.12 \text{ T-cm}$$

d. Cross Beam Properties



Where:

d	=	1320.00	mm	=	132.00	cm
b	=	800.00	mm	=	80.00	cm
tf	=	30.00	mm	=	3.00	cm
tw	=	30.00	mm	=	3.00	cm
w	=	380.00	mm	=	38.00	cm

Section Area:

A_1	=	3.0	x	80.0	=	240.00	cm^2
A_2	=	3.0	x	126.0	=	378.00	cm^2
A_3	=	3.0	x	126.0	=	378.00	cm^2
A_4	=	3.0	x	80.0	=	240.00	cm^2
				A_{TOTAL}	=	**1236.00**	**cm^2**

Neutral Axis:

X	=	40.00	cm
Y	=	66.00	cm

Moment of Inertia

$$I_{x1} = \frac{1}{12} \times 80 \times 3^3 + 240 \times 64.5^2 = 998640.00 \ cm^4$$

$$I_{x2} = \frac{1}{12} \times 3 \times 126^3 + 378 \times 0^2 = 500094.00 \ cm^4$$

$$I_{x3} = \frac{1}{12} \times 3 \times 126^3 + 378 \times 0^2 = 500094.00 \ cm^4$$

$$I_{x4} = \frac{1}{12} \times 80 \times 3^3 + 240 \times (-64.5)^2 = 998640.00 \ cm^4$$

$$I_{TOTAL} = \mathbf{2997468.00 \ cm^4}$$

Section Modulus

$$S_x = \frac{Ix\ Total}{Y} = \frac{2997468.00}{66.00} = \mathbf{45416.18 \ cm^3}$$

Shear Area

$$A_{sy} = 132.00 \times 3.00 \times 2 = 792.00 \ cm^2$$

$$A_{sx} = 80.00 \times 3.00 \times 2 = 480.00 \ cm^2$$

e. Bending Stress Check

Crossbeam on Row - 2

$$f_b = \frac{Mx\ Max}{Sx} < 0.66 \times Fy$$

$$= \frac{35771.42}{45416.18} < 0.66 \times 3515.35$$

$$= 787.64 \ kg/cm^2 < 2320.13 \ kg/cm^2$$ ***Secure...!!!!***

f. Shear Stress Check

Crossbeam on Row - 2

$$f_s = \frac{Vy\ Max}{Asy} < 0.4 \times Fy$$

$$= \frac{438266.84}{792.00} < 0.4 \times 3515.35$$

$$= 553.37 \ kg/cm^2 < 1406.14 \ kg/cm^2$$ ***Secure...!!!!***

g. Deflection Check

Crossbeam on Row - 2

$$\delta_1 = \frac{Pv_{Max} \times a \times (3L^2-4a^2)}{24\ E\ Ix}$$

$$= \frac{438.27 \times 136.40 \times 7046417.54}{24 \times 2100 \times 2997468.00}$$

$$= 2.79 \text{ cm}$$

$$\delta_2 = \frac{5}{384} \times \frac{Q}{E} \times \frac{L^4}{Ix}, \quad Q = \frac{\text{Support Weight}}{\text{Support Length}} = \frac{59.97}{1808.30} = 0.033162 \text{ T/cm}$$

$$= \frac{5.00 \times 0.03 \times 5559033396480}{384 \times 2100 \times 2997468.00}$$

$$= 0.38 \text{ cm}$$

$$\delta_1 + \delta_2 < \frac{L}{360}$$

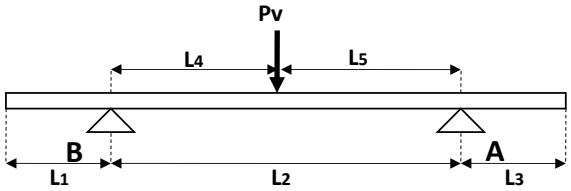
$$2.79 + 0.38 < \frac{1808.30}{360}$$

$$3.17 < 5.02$$

Secure...!!!!

h. Weighing Beam Diagram

L1	=	25.60	cm
L2	=	300.00	cm
L3	=	25.60	cm
L4	=	150.00	cm
L5	=	12.80	cm
Pv	=	694613.95	kg



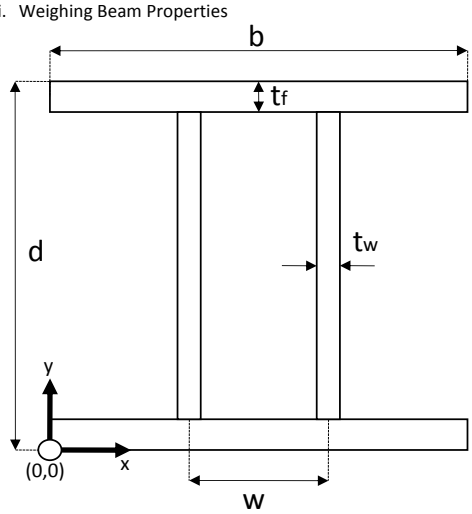
Therefore:

$$Ra = \frac{P}{2} = 347306.97 \text{ Kg} = 347.31 \text{ T}$$

$$Rb = \frac{P}{2} = 347306.97 \text{ Kg} = 347.31 \text{ T}$$

$$M\ max = \frac{Pv \times L2}{4} = 52096045.89 \text{ T-cm}$$

i. Weighing Beam Properties



Where:

d	=	1050.00	mm	=	105.00	cm
b	=	780.00	mm	=	78.00	cm
tf	=	30.00	mm	=	3.00	cm
tw	=	30.00	mm	=	3.00	cm
w	=	400.00	mm	=	40.00	cm

Section Area:

A_1	=	3.0	x 78.0	=	234.00	cm^2
A_2	=	3.0	x 99.0	=	297.00	cm^2
A_3	=	3.0	x 99.0	=	297.00	cm^2
A_4	=	3.0	x 78.0	=	234.00	cm^2
			A_{TOTAL}	=	**1062.00**	**cm^2**

Neutral Axis:

X	=	39.00	cm
Y	=	52.50	cm

Moment of Inertia

$I_{x1} = \frac{1}{12} \times 78 \times 3^3 + 234 \times 51^2 = 608809.50 \text{ cm}^4$

$I_{x2} = \frac{1}{12} \times 3 \times 99^3 + 297 \times 0^2 = 242574.75 \text{ cm}^4$

$I_{x3} = \frac{1}{12} \times 3 \times 99^3 + 297 \times 0^2 = 242574.75 \text{ cm}^4$

$I_{x4} = \frac{1}{12} \times 78 \times 3^3 + 234 \times -51^2 = 608809.50 \text{ cm}^4$

$I_{TOTAL} = \mathbf{1702768.50 \text{ cm}^4}$

Section Modulus

$S_x = \frac{\text{Ix Total}}{Y} = \frac{1702768.50}{52.50} = \mathbf{32433.69 \text{ cm}^3}$

Shear Area

$A_{sy} = 105.00 \times 3.00 \times 2 = 630.00 \text{ cm}^2$

$A_{sx} = 78.00 \times 3.00 \times 2 = 468.00 \text{ cm}^2$

Weighing Beam bending stress check

$f_b = \frac{Mx\ Max}{Sx} < 0.66 \times Fy$

$= \frac{52096045.89}{32433.69} < 0.66 \times 3515.35$

$= 1606.23 \text{ kg/cm}^2 < 2320.13 \text{ kg/cm}^2$ ***Secure...!!!!***

Weighing Beam shear stress check

$f_s = \frac{Vy\ Max}{Asy} < 0.4 \times Fy$

$= \frac{347306.97}{630.00} < 0.4 \times 3515.35$

$= 551.28 \text{ kg/cm}^2 < 1406.14 \text{ kg/cm}^2$ ***Secure...!!!!***

Weighing Beam deflection check

$\delta_1 = \frac{Pv_{Max} \times L^3}{24\ E\ Ix}$

$= \frac{694.61 \times 3375000.00}{24 \times 2100 \times 1702768.50}$

$= 0.02732 \text{ cm}$

$\delta_2 = \frac{5 \times Q \times L^4}{384 \times E \times Ix}$, $Q = \frac{\text{Support Weight}}{\text{Support Length}} = \frac{13.39}{162.80} = 0.082226 \text{ T/cm}$

$= \frac{5.00 \times 0.08 \times 702453535}{384 \times 2100 \times 1702768.50}$

$= 0.00021 \text{ cm}$

$\delta_1 + \delta_2 < \frac{L}{360}$

$0.02732 + 0.00021 < \frac{162.80}{360}$

$0.02753 < 0.45$ ***Secure...!!!!***

j. Local Check - *related to concentrated load from dummy leg.*

1. Crossbeam on Row - 1

i) Local Flange Bending

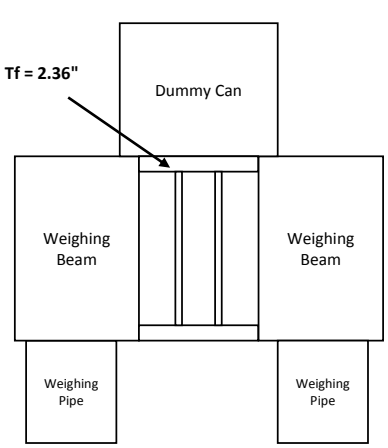
$$t_f > 0.4 \times \frac{Pbf}{Fytf}$$, where Pbf = 5/3 Pv

Pv = 438266.84 Kg = 965.94 Kips

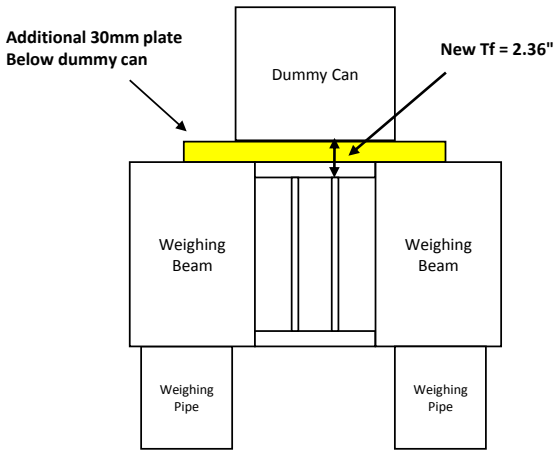
$$t_f > 0.4 \times \sqrt{\frac{5 / 3 \times 965.94}{50}}$$

1.18	<	2.27	inch	*Stiffener shall be provided*
2.36	**>**	**2.27**	**inch**	*Secure...!!!!*

** Additonal 30mm Plate Below Dummy Can*

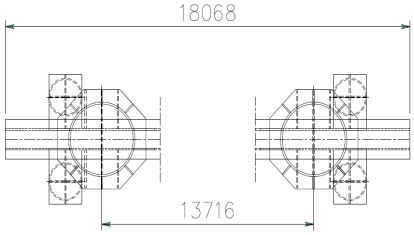


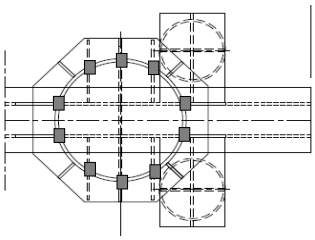
Before



After

ii) Local Web Yielding





tw Crossbeam	=	30.00	mm	=	1.18	inch
t pipe	=	40.00	mm	=	1.57	inch
t stiffener	=	0.00	mm	=	0.00	inch
tf Crossbeam	=	30.00	mm	=	1.18	inch

Pv	≤	tw	x	(N + 5k)	x	0.66 Fytw
Pv	≤	1.18	x	78.91	x	33.00
965.94	≤	3075.45		Kips		

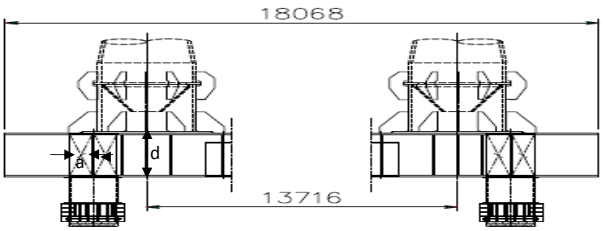
Secure, No Need Bearing Stiffener!

iii) Web Cripling (≤ d/2 ... K1.5)

a	=	370.00	mm	=	14.57 inch
d/2	=	660.00	mm	=	25.98 inch

Since, a < d/2

Secure, No Need Bearing Stiffener!



iv) Sidesway Web Buckling

$$\frac{dc/tw}{l/bf} > 1.70$$

dc = (d - 2 (tf + k)) = 47.94 inch

l = unbraced length = 14.96 inch

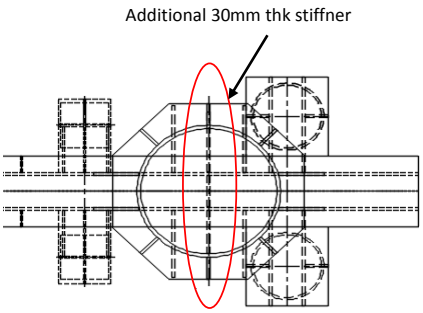
85.44 > 1.70

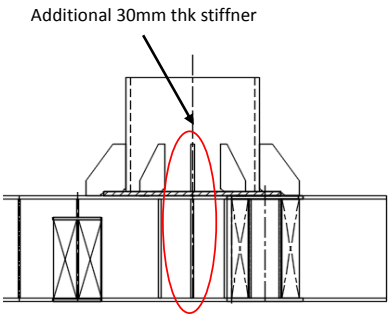
Secure, Sidesway buckling not occured!

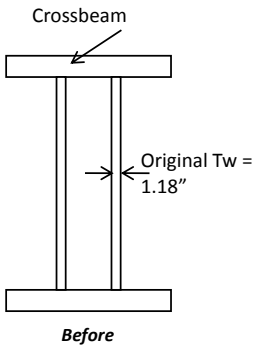
v) Compression buckling of the web

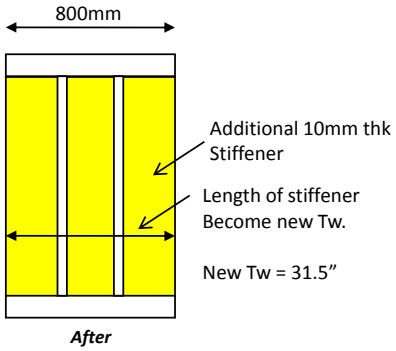
$$dc > \frac{4100 \times t_{wc}^{3} \times (F_{yc})^{0.5}}{P_{bf}}$$

47.94	>	29.67	***Stiffener shall be provided***	
47.94	**<**	**562650.51**	***Secure…!!!***	**** Additonal stiffener is provided***









k. Local Check of Weighing Beam - *related to concentrated reaction from weighing pipe.*

1. Crossbeam on Row - 1

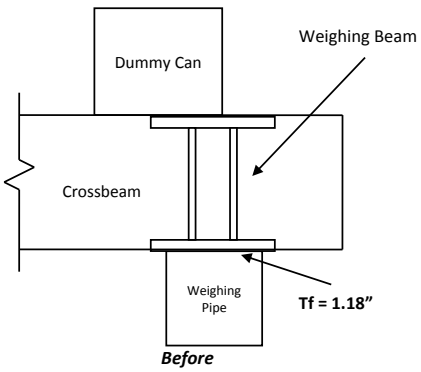
i) Local Flange Bending

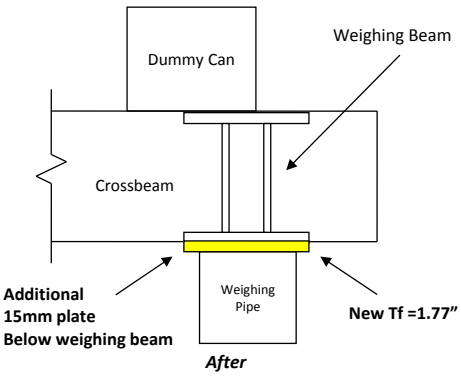
$$t_f > 0.4 \times \frac{Pbf}{Fytf}$$, where Pbf = 5/3 Pv

Pv = 219133.42 Kg
= 482.97 Kips

$$t_f > 0.4 \times \sqrt{\frac{5 / 3 \times 482.97}{50}}$$

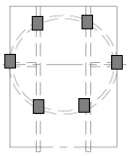
1.18	<	1.60	inch	***Stiffener shall be provided***
1.77	>	1.60	inch	***Secure…!!!!*** **** Additonal 20mm Plate Below Weighing Beam***





ii) Local Web Yielding

tw Weighing Beam	=	30.00	mm	=	1.18	inch
t pipe	=	25.40	mm	=	1.00	inch
t stiffener	=	30.00	mm	=	1.18	inch
tf Crossbeam	=	30.00	mm	=	1.18	inch

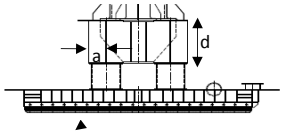


Pv	≤	tw	x	(N + 5k)	x	0.66 Fytw
Pv	≤	1.18	x	61.48	x	33.00
482.97	≤			2396.43		Kips

Secure, No Need Bearing Stiffener!

iii) Web Cripling (≤ d/2 … K1.5)

a	=	450.00	mm	=	17.72	inch
d/2	=	660.00	mm	=	25.98	inch



Since, a < d/2

Secure, No Need Bearing Stiffener!

iv) Sidesway Web Buckling

$$\frac{dc/tw}{l/bf} > 1.70$$

dc = (d - 2 (tf + k)) = 47.94 inch

l = unbraced length = 17.72 inch

72.15 > 1.70

Secure, Sidesway buckling not occured!

v) Compression buckling of the web

$$dc < \frac{4100 \times t_{wc}^{3} \times (F_{yc})^{0.5}}{P_{bf}}$$

47.94 < 59.34

Secure…!!!

i. Local Check - *related to concentrated reaction from weighing jack.*

Crossbeam on Row - 1

i) Local Flange Bending

$$t_f > 0.4 \times \frac{Pbf}{Fytf}$$, where Pbf = 5/3 Pv

Pv = 438266.84 Kg = 965.94 Kips

$$t_f > 0.4 \times \sqrt{\frac{5 / 3 \times 965.94}{50.00}}$$

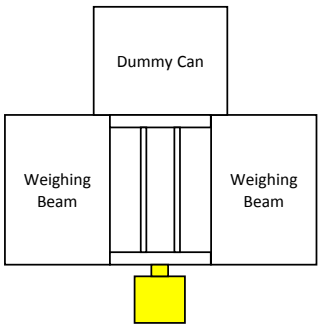
1.18 < 2.27 inch

Stiffener shall be provided

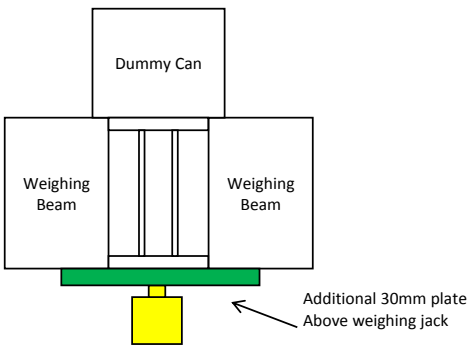
2.36 < 2.27 inch

Secure…!!!!

**** Additonal 30mm Plate above Weighing Jack***



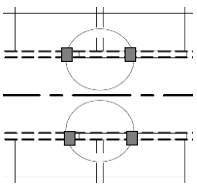
Before



After

ii) Local Web Yielding

tw Weighing Beam	=	30.00	mm	=	1.18	inch
t pipe	=	25.40	mm	=	1.00	inch
t stiffener	=	30.00	mm	=	1.18	inch
tf Crossbeam	=	30.00	mm	=	1.18	inch

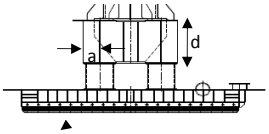


Pv	≤	tw	x	(N + 5k)	x	0.66 Fytw
Pv	≤	1.18	x	41.32	x	33.00
965.94	≤			1610.61		Kips

Secure, No Need Bearing Stiffener!

iii) Web Cripling (≤ d/2 … K1.5)

a	=	450.00	mm	=	17.72	inch
d/2	=	660.00	mm	=	25.98	inch



Since, a < d/2

Secure, No Need Bearing Stiffener!

iv) Sidesway Web Buckling

$$\frac{dc/tw}{l/bf} > 1.70$$

dc = (d - 2 (tf + k)) = 47.94 inch

l = unbraced length = 17.72 inch

72.15 > 1.70

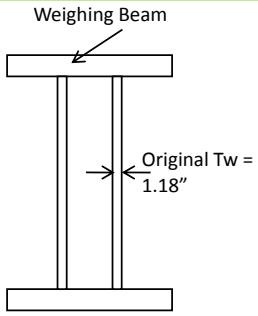
Secure, Sidesway buckling not occured!

v) Compression buckling of the web

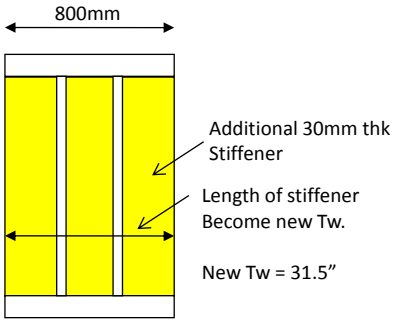
$$dc > \frac{4100 \times t_{wc}^{3} \times (F_{yc})^{0.5}}{P_{bf}}$$

47.94 > 29.67 ***Stiffener shall be provided***

47.94 < 8545819475.30 ***Secure…!!!***



Before

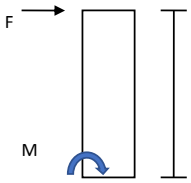


After

I. **Local Check - Weighing Pipe**

i) Material Properties

- Material Grade	Fy	=	50 Ksi	=	3515.35	kg/cm^2	
- Allowable Bending Stress	Fb	=	0.66 x Fy	=	2320.13	kg/cm^2	
- Allowable Shear Stress	Fs	=	0.40 x Fy	=	1406.14	kg/cm^2	
- Allowable Bearing Stress	FBr	=	0.90 x Fy	=	3163.82	kg/cm^2	
- Outside Diameter	D	=	30 inch	=	76.20	cm	
- Wall Thickness	t	=	1.00 inch	=	2.54	cm	
- Inside Diameter	d	=	28 inch	=	71.12	cm	
- Length	L	=	20 inch	=	50.80	cm	
- K-Value	k	=	1.00				
- Section Area	Ap	=	$\pi (D^2-d^2) / 4$	=	587.48	cm^2	*(Pipe)*
- Shear Area	Asp	=	π r t	=	303.87	cm^2	*(Pipe)*
- Inertia Moment	Ip	=	$\pi (D^4 - d^4) / 64$	=	398918.90	cm^4	*(Pipe)*
- Section Modulus	Sp	=	I / (1/2 D)	=	10470.31	cm^3	*(Pipe)*



L = 31" = 50.80 cm

F is assumed as 15% Pv = 15% x 438.27 MT

= 65.740 MT

= 65740.026 Kg

There are 2 weighing pipe, F = 32870.013 Kg

ii) Shear Check

$$fs = \frac{F}{Asp} < 0.40 \times Fy$$

$$= \frac{32870.013}{303.87} < 0.40 \times Fy$$

= 108.17 kg/cm^2 < 1406.14 kg/cm^2 ***Secure…!!!!***

iii) Axial Check

Axial Compression:

$$r^2 = \frac{Ix\ tot}{A\ tot} \qquad \frac{K \times Lk}{r} = \frac{1.00 \times 50.80}{26.06} \qquad Cc = \sqrt{\frac{2\pi^2 E}{Fy}} = 108.54$$

$$r^2 = \frac{398918.90}{} \qquad = 1.95 \text{ cm} \qquad \frac{K \times Lk}{} < Cc$$

r	=	587.48			=	1.93	cm	r	<	Cc	
r^2	=	679.03	cm^2	E	=	2100000	kg/cm^2	Ca	=	0.5972	
r	=	26.06	cm	$\frac{K \times Lk / r}{Cc}$	=	0.0180		(Please see Table 3 - AISC ASD)			

$$f_{ac} = \frac{Pv}{A\ tot} < F_{ac}$$

$$= \frac{219133.4202}{587.48} < Ca \times Fy$$

$$= 373.00\ kg/cm^2 < 2099.38\ kg/cm^2$$ ***Secure...!!!!***

iv) Bending Check

$$fb = \frac{M}{Sx} < 0.66 \times Fy$$

$$= \frac{1669796.662}{10470.31} < 0.66 \times Fy$$

$$= 159.48\ kg/cm^2 < 2320.13\ kg/cm^2$$ ***Secure...!!!!***

v) Combined Stress

Bending and Compression:

$$\frac{fa}{Fc} + \frac{fb}{Fb} < 1.00$$

$$\frac{373.00}{2099.38} + \frac{159.48}{2320.13} < 1.00$$

$$0.2464 < 1.00$$ ***Secure...!!!!***

vii) Base plate check

- Material Grade	Fy	=	50 Ksi	=	3515.35	kg/cm^2	
- Allowable Bending Stress	Fb	=	0.66 x Fy	=	2320.13	kg/cm^2	
- Allowable Shear Stress	Fs	=	0.40 x Fy	=	1406.14	kg/cm^2	
- Allowable Bearing Stress	FBr	=	0.90 x Fy	=	3163.82	kg/cm^2	
- Section Area	Ap	=	$\pi (D^2-d^2) / 4$	=	587.48	cm^2	*(Pipe)*

Bearing Check

$$fBr = \frac{Pv}{Ap}$$

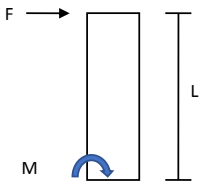
$$= \frac{219133.4202}{587.48}$$

$$= 373.00\ kg/cm^2 < 3163.82\ kg/cm^2$$ ***Secure...!!!!***

m. Local Check - Dummy Can

i) Material Properties

- Material Grade	Fy	=	50 Ksi	=	3515.35	kg/cm^2	
- Allowable Bending Stress	Fb	=	0.66 x Fy	=	2320.13	kg/cm^2	
- Allowable Shear Stress	Fs	=	0.40 x Fy	=	1406.14	kg/cm^2	
- Allowable Bearing Stress	FBr	=	0.90 x Fy	=	3163.82	kg/cm^2	
- Outside Diameter	D	=	59 inch	=	150.01	cm	
- Wall Thickness	t	=	2.00 inch	=	5.08	cm	
- Inside Diameter	d	=	55 inch	=	139.85	cm	
- Length	L	=	58 inch	=	100.00	cm	
- K-Value	k	=	1.00				
- Section Area	Ap	=	$\pi (D^2-d^2) / 4$	=	2311.85	cm^2	*(Pipe)*
- Shear Area	Asp	=	π r t	=	1196.44	cm^2	*(Pipe)*
- Inertia Moment	Ip	=	$\pi (D^4 - d^4) / 64$	=	6077613.17	cm^4	*(Pipe)*
- Section Modulus	Sp	=	I / (1/2 D)	=	81028.14	cm^3	*(Pipe)*



F is assumed as 15% Pv = 15% x 438.27 MT
= 65.740 MT
= 65740.026 Kg

ii) Shear Check

$fs = \frac{F}{Asp} < 0.40 \times Fy$

$= \frac{65740.026}{1196.44} < 0.40 \times Fy$

$= 54.95$ kg/cm^2 < 1406.14 kg/cm^2 ***Secure...!!!!***

iii) Axial Check

Axial Compression:

$r^2 = \frac{Ix\ tot}{A\ tot}$ $\frac{K \times Lk}{r} = \frac{1.00 \times 100.00}{51.27}$ $Cc = \sqrt{\frac{2\pi^2 E}{Fy}} = 108.54$

$r^2 = \frac{6077613.17}{2311.85}$ $= 1.95$ cm $\frac{K \times Lk}{r} < Cc$

$r^2 = 2628.90$ cm^2 $E = 2100000$ kg/cm^2 $Ca = 0.5972$

$r = 51.27$ cm $\frac{K \times Lk / r}{Cc} = 0.0180$ (Please see Table 3 - AISC ASD)

$f_{ac} = \frac{Pv}{A\ tot} < F_{ac}$

$= \frac{438266.84}{2311.85} < Ca \times Fy$

$= 189.57$ kg/cm^2 < 2099.38 kg/cm^2 ***Secure...!!!!***

iv) Bending Check

$fb = \frac{M}{Sx} < 0.66 \times Fy$

$= \frac{4930909.542}{81028.14} < 0.66 \times Fy$

$= 60.85$ kg/cm^2 < 3515.35 kg/cm^2 ***Secure...!!!!***

v) Combined Stress

Bending and Compression:

$\frac{fa}{Fc} + \frac{fb}{Fb} < 1.00$

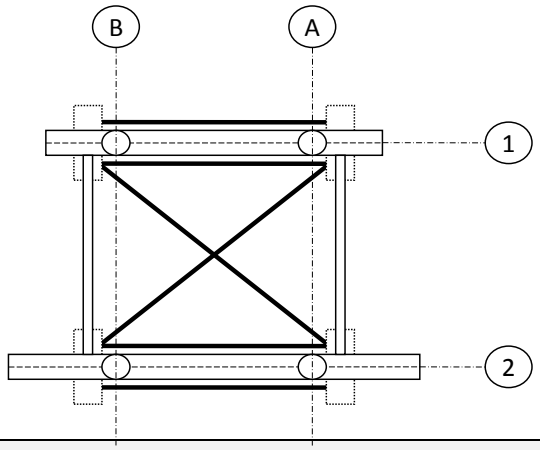
$\frac{189.57}{2099.38} + \frac{60.85}{3515.35} < 1.00$

$0.1076 < 1.00$ ***Secure...!!!!***

4. Design Summary

No.	Description	Allowable	Actual	Safety Factor	Remarks
A.	**Global Check**				
I	Bending Stress Check				
	Crossbeam on Row - 1	2320.13	787.64	2.95	**Secure!**
	Weighing Beam	2320.13	1606.23	1.44	**Secure!**
II	Shear Stress Check				
	Crossbeam on Row - 1	1406.14	553.37	2.54	**Secure!**
	Weighing Beam	1406.14	551.28	2.55	**Secure!**
III	Deflection Check				
	Crossbeam on Row - 1	5.02	3.17	1.58	**Secure!**
	Weighing Beam	0.45	0.0275	16.43	**Secure!**
B.	**Local Check**				
I	Related to concentrated load from Dummy Leg (Crossbeam on Row - 1)				
	Local Flange Bending	2.36	2.27	1.04	**Secure!**
	Local Web Yielding	3075.45	965.94	3.18	**Secure!**
	Web Cripling	25.98	14.57	1.78	**Secure!**
	Sidesway Web Buckling	85.44	1.70	50.26	**Secure!**
	Compression Buckling of the Web	562650.51	47.94	11737.48	**Secure!**
III	Related to concentrated reaction from weighing pipe (Crossbeam on Row - 1)				
	Local Flange Bending	1.77	1.60	1.10	**Secure!**
	Local Web Yielding	2396.43	482.97	4.96	**Secure!**
	Web Cripling	25.98	17.72	1.47	**Secure!**
	Sidesway Web Buckling	72.15	1.70	42.44	**Secure!**
	Compression Buckling of the Web	59.34	47.94	1.24	**Secure!**
V	Weighing Pipe				
	Shear Stress	1406.14	108.17	13.00	**Secure!**
	Axial Stress	2099.38	373.00	5.63	**Secure!**
	Bending Stress	2320.13	159.48	14.55	**Secure!**
	Combined Stress	1.00	0.25	4.06	**Secure!**
VI	Dummy Can				
	Shear Stress	1406.14	54.95	25.59	**Secure!**
	Axial Stress	2099.38	189.57	11.07	**Secure!**
	Bending Stress	3515.35	60.85	57.77	**Secure!**
	Combined Stress	1.00	0.11	9.29	**Secure!**

1. Design Load



LOAD CONDITION Maximum Fx Condition							
MEMBER	**END**	**Fz (T)**	**Fx (T)**	**Fy (T)**	**Mz (T-mm)**	**Mx (T-mm)**	**My (T-mm)**
GA02-1472	GA02	929.69	48.76	105.24	51.47	701.98	209.23
	1472	928.54	48.76	105.24	51.47	627.79	174.85
GB02-1272	GB02	28.43	65.71	40.50	86.71	133.47	25.15
	1272	27.29	65.71	40.50	86.71	104.91	71.48
GA01-1372	GA01	113.14	76.17	58.91	73.81	121.00	210.12
	1372	114.72	76.17	58.91	73.81	63.56	135.85
GB01-1172	GB01	588.84	59.22	86.83	73.47	463.20	87.78
	1172	587.25	59.22	86.83	73.47	378.54	145.53

Support Weight at Row - 1 = 13.67 MT

Support Weight at Row - 2 = 13.39 MT

**FX stated above is in local axes of SACS and is in vertical direction. Negative values in FX indicates gravity direction*

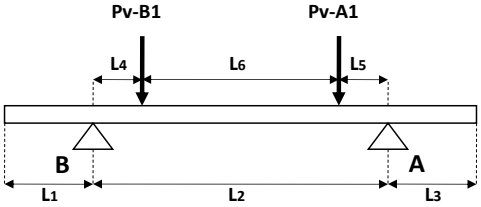
3. Design Integrity Check

a. Material Properties:

- Material Grade Fy = 50 Ksi = 3515.35 kg/cm^2
- Allowable Bending Stress Fb = 0.66 x Fy = 2320.13 kg/cm^2
- Allowable Shear Stress Fs = 0.40 x Fy = 1406.14 kg/cm^2
- Allowable Bearing Stress FBr = 0.90 x Fy = 3163.82 kg/cm^2

b. Cross Beam Diagram on Row - 1

L1 = 338.00 cm
L2 = 1535.50 cm
L3 = 338.00 cm
L4 = 81.95 cm
L5 = 81.95 cm
L6 = 1371.60 cm
Pv-B1 = 41819.02 kg
Pv-A1 = 943355.41 kg



Therefore:

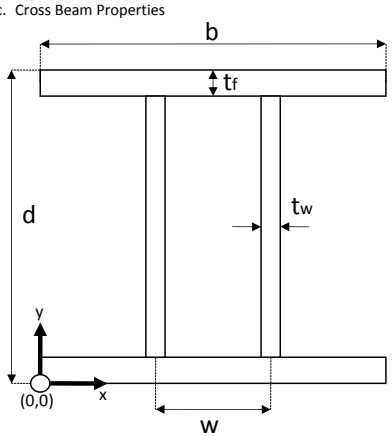
$$Ra = \frac{(Pv\text{-}B1 \times L4) + (Pv\text{-}A1 \times (L4 + L6))}{L2} = 895240.19 \text{ Kg} = 895.24 \text{ T}$$

$$Rb = \frac{(Pv\text{-}A1 \times L5) + (Pv\text{-}B1 \times (L5 + L6))}{L2} = 89934.24 \text{ Kg} = 89.93 \text{ T}$$

Ma = Ra x L5 = 73364.94 T-cm

Mb = Rb x L4 = 7370.11 T-cm

c. Cross Beam Properties



Where:

d	=	1050.00	mm	=	105.00	cm
b	=	780.00	mm	=	78.00	cm
tf	=	30.00	mm	=	3.00	cm
tw	=	30.00	mm	=	3.00	cm
w	=	400.00	mm	=	40.00	cm

Section Area:

A_1 = 3.0 x 78.0 = 234.00 cm^2

A_2 = 3.0 x 99.0 = 297.00 cm^2

A_3 = 3.0 x 99.0 = 297.00 cm^2

A_4 = 3.0 x 78.0 = 234.00 cm^2

A_{TOTAL} = 1062.00 cm^2

Neutral Axis:

X = 39.00 cm

Y = 52.50 cm

Moment of Inertia

$I_{x1} = \frac{1}{12} \times 78 \times 3^3 + 234 \times 51^2 = 608809.50 \text{ cm}^4$

$I_{x2} = \frac{1}{12} \times 3 \times 99^3 + 297 \times 0^2 = 242574.75 \text{ cm}^4$

$I_{x3} = \frac{1}{12} \times 3 \times 99^3 + 297 \times 0^2 = 242574.75 \text{ cm}^4$

$I_{x4} = \frac{1}{12} \times 78 \times 3^3 + 234 \times -51^2 = 608809.50 \text{ cm}^4$

$I_{TOTAL} = \mathbf{1702768.50 \text{ cm}^4}$

Section Modulus

$S_x = \frac{\text{Ix Total}}{Y} = \frac{1702768.50}{52.50} = \mathbf{32433.69 \text{ cm}^3}$

Shear Area

$A_{sy} = 105.00 \times 3.00 \times 2 = 630.00 \text{ cm}^2$

$A_{sx} = 78.00 \times 3.00 \times 2 = 468.00 \text{ cm}^2$

e. Bending Stress Check

Crossbeam on Row - 2

$f_b = \frac{Mx\ Max}{Sx} < 0.66 \times Fy$

$= \frac{7370.11}{32433.69} < 0.66 \times 3515.35$

$= 227.24 \text{ kg/cm}^2 < 2320.13 \text{ kg/cm}^2$ ***Secure...!!!!***

f. Shear Stress Check

Crossbeam on Row - 2

$f_s = \frac{Vy\ Max}{Asy} < 0.4 \times Fy$

$= \frac{943355.41}{630.00} < 0.4 \times 3515.35$

$= 1361.26 \text{ kg/cm}^2 < 1406.14 \text{ kg/cm}^2$ ***Secure...!!!!***

g. Deflection Check

Crossbeam on Row - 2

$\delta_1 = \frac{Pv_{Max} \times a \times (3L^2-4a^2)}{24 \text{ E Ix}}$

$= \frac{943.36 \times 1535.50 \times 315868.78}{24 \times 2100 \times 1702768.50}$

$= 5.33 \text{ cm}$

$\delta_2 = \frac{5}{384} \times \frac{Q}{E} \times \frac{L^4}{Ix}$, $Q = \frac{\text{Support Weight}}{\text{Support Length}} = \frac{27.06}{1955.45} = 0.01384 \text{ T/cm}$

$= \frac{5.00 \times 0.01 \times 13051691536}{384 \times 2100 \times 1702768.50}$

$= 0.00 \text{ cm}$

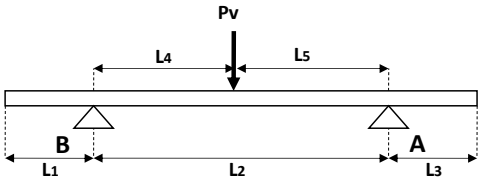
$\delta_1 + \delta_2 < \frac{L}{360}$

$5.33 + 0.00 < \frac{1955.45}{360}$

$5.33 < 5.43$ ***Secure...!!!!***

h. Weighing Beam Diagram

L1 = 0.00 cm
L2 = 25.60 cm
L3 = 300.00 cm
L4 = 25.60 cm
L5 = 150.00 cm
Pv = 943355.41 kg



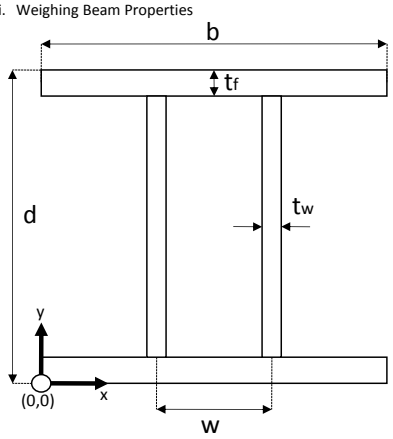
Therefore:

$Ra = \frac{P}{2} = 471677.71 \text{ Kg} = 471.68 \text{ T}$

$Rb = \frac{P}{2} = 471677.71 \text{ Kg} = 471.68 \text{ T}$

$M\ max = \frac{Pv \times L2}{4} = 6037474.65 \text{ T-cm}$

i. Weighing Beam Properties



Where:

d	=	1050.00	mm	=	105.00	cm
b	=	780.00	mm	=	78.00	cm
tf	=	30.00	mm	=	3.00	cm
tw	=	30.00	mm	=	3.00	cm
w	=	400.00	mm	=	40.00	cm

Section Area:

A_1	=	3.0	x	78.0	=	234.00	cm^2
A_2	=	3.0	x	99.0	=	297.00	cm^2
A_3	=	3.0	x	99.0	=	297.00	cm^2
A_4	=	3.0	x	78.0	=	234.00	cm^2
				A_{TOTAL}	=	**1062.00**	**cm^2**

Neutral Axis:

X	=	39.00	cm
Y	=	52.50	cm

Moment of Inertia

$$I_{x1} = \frac{1}{12} \times 78 \times 3^3 + 234 \times 51^2 = 608809.50 \ cm^4$$

$$I_{x2} = \frac{1}{12} \times 3 \times 99^3 + 297 \times 0^2 = 242574.75 \ cm^4$$

$$I_{x3} = \frac{1}{12} \times 3 \times 99^3 + 297 \times 0^2 = 242574.75 \ cm^4$$

$$I_{x4} = \frac{1}{12} \times 78 \times 3^3 + 234 \times -51^2 = 608809.50 \ cm^4$$

$$I_{TOTAL} = \mathbf{1702768.50 \ cm^4}$$

Section Modulus

$$S_x = \frac{\text{Ix Total}}{\text{Y}} = \frac{1702768.50}{52.50} = \mathbf{32433.69 \ cm^3}$$

Shear Area

$$A_{sy} = 105.00 \times 3.00 \times 2 = 630.00 \ cm^2$$

$$A_{sx} = 78.00 \times 3.00 \times 2 = 468.00 \ cm^2$$

Weighing Beam bending stress check

$$f_b = \frac{\text{Mx Max}}{\text{Sx}} < 0.66 \times \text{Fy}$$

$$= \frac{6037474.65}{32433.69} < 0.66 \times 3515.35$$

$$= 186.15 \ kg/cm^2 < 2320.13 \ kg/cm^2$$ ***Secure...!!!!***

Weighing Beam shear stress check

$$f_s = \frac{\text{Vy Max}}{\text{Asy}} < 0.4 \times \text{Fy}$$

$$= \frac{471677.71}{630.00} < 0.4 \times 3515.35$$

$$= 748.69 \ kg/cm^2 < 1406.14 \ kg/cm^2$$ ***Secure...!!!!***

Weighing Beam deflection check

$$\delta_1 = \frac{Pv_{Max} \times L^3}{24 \ E \ Ix}$$

$$= \frac{0.38 \times 56623104.00}{24 \times 2100 \times 1702768.50}$$

$$= 0.00025 \ cm$$

$$\delta_2 = \frac{5}{384} \times \frac{Q}{E} \times \frac{L^4}{Ix}, \quad Q = \frac{\text{Support Weight}}{\text{Support Length}} = \frac{13.39}{389.00} = 0.03441 \ T/cm$$

$$= \frac{5.00 \times 0.03 \times 22898045041}{384 \times 2100 \times 1702768.50}$$

$$= 0.00287 \ cm$$

$$\delta_1 + \delta_2 < \frac{L}{360}$$

$$0.00025 + 0.00287 < \frac{389.00}{360}$$

$$0.00312 < 1.08$$ ***Secure...!!!!***

j. Local Check - *related to concentrated load from dummy leg.*

Crossbeam on Row - 1

i) Local Flange Bending

$t_f > 0.4 \times \frac{Pbf}{Fytf}$, where Pbf = 5/3 Pv

Pv = 943355.41 Kg = 2079.16 Kips

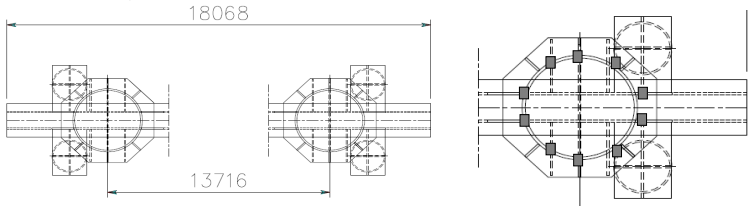
$t_f > 0.4 \times \sqrt{\frac{5 / 3 \times 2079.16}{50}}$

1.18 < 3.33 inch — ***Stiffener shall be provided***

3.35 > 3.33 inch — ***Secure...!!!!***

** Additonal 50mm Plate Below Dummy Can*

ii) Local Web Yielding



tw Crossbeam	=	30.00	mm	=	1.18 inch
t pipe	=	40.00	mm	=	1.57 inch
t stiffener	=	30.00	mm	=	1.18 inch
tf Crossbeam	=	30.00	mm	=	1.18 inch

Pv ≤ tw x (N + 5k) x 0.66 Fytw

Pv ≤ 1.18 x 103.96 x 33.00

2079.16 ≤ 4051.86 Kips — ***Secure, No Need Bearing Stiffener!***

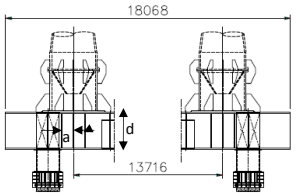
iii) Web Cripling (≤ d/2 ... K1.5)

a = 370.00 mm = 14.57 inch

d/2 = 660.00 mm = 25.98 inch

Since, a < d/2

Secure, No Need Bearing Stiffener!



iv) Sidesway Web Buckling

$\frac{dc/tw}{l/bf} > 1.70$

dc = (d - 2 (tf + k)) = 37.31 inch

l = unbraced length = 15.75 inch

61.59 > 1.70 — ***Secure, Sidesway buckling not occured!***

v) Compression buckling of the web

$dc > \frac{4100 \times t_{wc}^3 \times (F_{yc})^{0.5}}{P_{bf}}$

37.31 > 13.78 — ***Stiffener shall be provided***

37.31 < 242279.03 — ***Secure...!!!***

** Additonal stiffener is provided*

d

k. Local Check of Weighing Beam - *related to concentrated reaction from weighing pipe.*

Crossbeam on Row - 1

i) Local Flange Bending

$t_f > 0.4 \times \frac{Pbf}{Fytf}$, where Pbf = 5/3 Pv

Pv = 471677.71 Kg = 1039.58 Kips

$t_f > 0.4 \times \sqrt{\frac{5 / 3 \times 1039.58}{50}}$

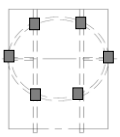
1.18 < 2.35 inch — ***Stiffener shall be provided***

2.36 > 2.35 inch — ***Secure...!!!!***

** Additonal 30mm Plate Below Weighing Beam*

ii) Local Web Yielding

tw Weighing Beam	=	30.00	mm	=	1.18 inch
t pipe	=	25.40	mm	=	1.00 inch
t stiffener	=	30.00	mm	=	1.18 inch
tf Crossbeam	=	30.00	mm	=	1.18 inch



Pv ≤ tw x (N + 5k) x 0.66 Fytw

Pv ≤ 1.18 x 102.81 x 33.00

1039.58 ≤ 4007.05 Kips — ***Secure, No Need Bearing Stiffener!***

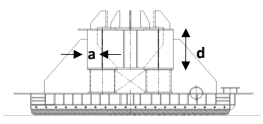
iii) Web Cripling (≤ d/2 ... K1.5)

a = 450.00 mm = 17.72 inch

d/2 = 660.00 mm = 25.98 inch

Since, a < d/2

Secure, No Need Bearing Stiffener!



iv) Sidesway Web Buckling

$\frac{dc/tw}{l/bf}$ > 1.70 | dc = (d - 2 (tf + k)) = 37.31 inch | l = unbraced length = 17.72 inch

54.75 > 1.70 — ***Secure, Sidesway buckling not occured!***

v) Compression buckling of the web

$dc > \frac{4100 \times t_{wc}^{3} \times (F_{yc})^{0.5}}{P_{bf}}$

37.31 > 27.57 — ***Stiffener shall be provided***

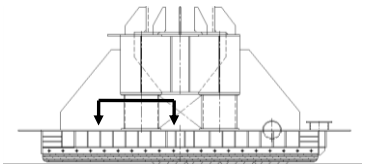
37.31 < 918150675.58 — ***Secure...!!!***

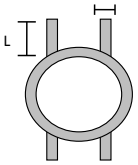
I. Local Check - Reinforced Weighing Pipe

i) Material Properties

- Material Grade	Fy	=	50 Ksi	=	3515.35	kg/cm^2
- Allowable Bending Stress	Fb	=	0.66 x Fy	=	2320.13	kg/cm^2
- Allowable Shear Stress	Fs	=	0.40 x Fy	=	1406.14	kg/cm^2
- Allowable Bearing Stress	FBr	=	0.90 x Fy	=	3163.82	kg/cm^2
- Outside Diameter	D	=	30 inch	=	76.20	cm
- Wall Thickness	t	=	1.00 inch	=	2.54	cm
- Inside Diameter	d	=	28 inch	=	71.12	cm
- Length	L	=	20 inch	=	50.80	cm
- K-Value	k	=	1.00			

- Section Area	Ap	=	$(\pi (D^2-d^2) / 4)$	+	(t x l x 2)	=	869.48	cm^2 *(Pipe)*
- Shear Area	Asp	=	π r t	+	2 (l x t)	=	585.87	cm^2 *(Pipe)*
- Inertia Moment	Ip	=	$\pi (D^4 - d^4) / 64$	+	(1/12 x b x h^3)	=	502741.90	cm^4 *(Pipe)*
- Section Modulus	Sp	=	I / C			=	8161.39	cm^3 *(Pipe)*





T Stiffener = 3.00 cm

L Stiffener = 47.00 cm

ii) Shear Check

$fs = \frac{F}{Asp} < 0.40 \times Fy$, *Shear is the resultant between Fy and Fz stated in above table divided by 2*

$= \frac{115985.195}{585.87} < 0.40 \times Fy$

= 197.97 kg/cm^2 < 1406.14 kg/cm^2 — ***Secure...!!!!***

iii) Axial Check

Axial Compression:

$r^2 = \frac{Ix\ tot}{A\ tot}$ | $\frac{K \times Lk}{r} = \frac{1.00 \times 50.80}{24.05}$ | $Cc = \sqrt{\frac{2\pi^2 E}{Fy}}$ = 108.54

$r^2 = \frac{502741.90}{869.48}$ = 2.11 cm | $\frac{K \times Lk}{r} < Cc$

r^2 = 578.21 cm^2 | E = 2100000 kg/cm^2 | Ca = 0.5971

r = 24.05 cm | $\frac{K \times Lk / r}{Cc}$ = 0.0195 | (Please see Table 3 - AISC ASD)

$f_{ac} = \frac{Pv}{A\ tot} < F_{aC}$

$= \frac{485346.602}{869.48} < Ca \times Fy$

= 558.20 kg/cm^2 < 2098.85 kg/cm^2 — ***Secure...!!!!***

iv) Bending Check

$fb = \frac{M}{Sx} < 0.66 \times Fy$, *M is the resultant between My and Mz stated in above table divided by 2*

$= \frac{36625.0111}{8161.39} < 0.66 \times Fy$

= 4.49 kg/cm^2 < 2320.13 kg/cm^2 — ***Secure...!!!!***

v) Combined Stress

Bending and Compression:

$\frac{fa}{Fc} + \frac{fb}{Fb} < 1.00$

$\frac{558.20}{2098.85} + \frac{4.49}{2320.13} < 1.00$

0.2679 < 1.00 — ***Secure...!!!!***

vi) Base Plate Check

- Material Grade	Fy	=	50	Ksi	=	3515.35	kg/cm^2	
- Allowable Bending Stress	Fb	=	0.66 x Fy		=	2320.13	kg/cm^2	
- Allowable Shear Stress	Fs	=	0.40 x Fy		=	1406.14	kg/cm^2	
- Allowable Bearing Stress	FBr	=	0.90 x Fy		=	3163.82	kg/cm^2	
- Bearing Area	Ap	=	π (D^2-d^2) / 4		=	587.48	cm^2	*(The bearing area is contact area with weighingPipe)*
- Width	w	=	86	cm				
- Length	L	=	86	cm				
- Thickness	th	=	2	cm				

Bearing Check

$$fBr = \frac{Pv}{Ap} = \frac{485346.602}{587.48} = 826.15 \text{ kg/cm}^2 < 3163.82 \text{ kg/cm}^2$$

Secure...!!!!

m. Local Check - Dummy Can

i) Material Properties

- Material Grade	Fy	=	50	Ksi	=	3515.35	kg/cm^2	
- Allowable Bending Stress	Fb	=	0.66 x Fy		=	2320.13	kg/cm^2	
- Allowable Shear Stress	Fs	=	0.40 x Fy		=	1406.14	kg/cm^2	
- Allowable Bearing Stress	FBr	=	0.90 x Fy		=	3163.82	kg/cm^2	
- Outside Diameter	D	=	59	inch	=	150.01	cm	
- Wall Thickness	t	=	2.00	inch	=	5.08	cm	
- Inside Diameter	d	=	55	inch	=	139.85	cm	
- Length	L	=	58	inch	=	100.00	cm	
- K-Value	k	=	1.00					
- Section Area	Ap	=	π (D^2-d^2) / 4		=	2311.85	cm^2	*(Pipe)*
- Shear Area	Asp	=	π r t		=	1196.44	cm^2	*(Pipe)*
- Inertia Moment	Ip	=	π (D^4 - d^4) / 64		=	6077613.17	cm^4	*(Pipe)*
- Section Modulus	Sp	=	I / (1/2 D)		=	81028.14	cm^3	*(Pipe)*

ii) Shear Check

$$fs = \frac{F}{Asp} = \frac{231970.391}{1196.44} < 0.40 \times Fy$$

$$= 193.88 \text{ kg/cm}^2 < 1406.14 \text{ kg/cm}^2$$

Secure...!!!!

iii) Axial Check

Axial Compression:

$$r^2 = \frac{Ix\ tot}{A\ tot} = 6077613.17 / 2311.85 = 2628.90 \text{ cm}^2$$

$$r = 51.27 \text{ cm}$$

$$\frac{K \times Lk}{r} = \frac{1.00 \times 100.00}{51.27} = 1.95 \text{ cm}$$

$$Cc = \frac{2\pi^2 E}{Fy} = 108.54$$

$$E = 2100000 \text{ kg/cm}^2$$

$$\frac{K \times Lk}{r} < Cc$$

$$Ca = 0.5972$$

$$\frac{K \times Lk / r}{Cc} = 0.0180$$

(Please see Table 3 - AISC ASD)

$$f_{ac} = \frac{Pv}{A\ tot} = \frac{485346.602}{2311.85} < Ca \times Fy < F_{ac}$$

$$= 209.94 \text{ kg/cm}^2 < 2099.38 \text{ kg/cm}^2$$

Secure...!!!!

iv) Bending Check

$$fb = \frac{M}{Sx} = \frac{73250.0223}{81028.14} < 0.66 \times Fy$$

$$= 0.90 \text{ kg/cm}^2 < 3515.35 \text{ kg/cm}^2$$

Secure...!!!!

v) Combined Stress

Bending and Compression:

$$\frac{fa}{Fc} + \frac{fb}{Fb} < 1.00$$

$$\frac{209.94}{2099.38} + \frac{0.90}{3515.35} < 1.00$$

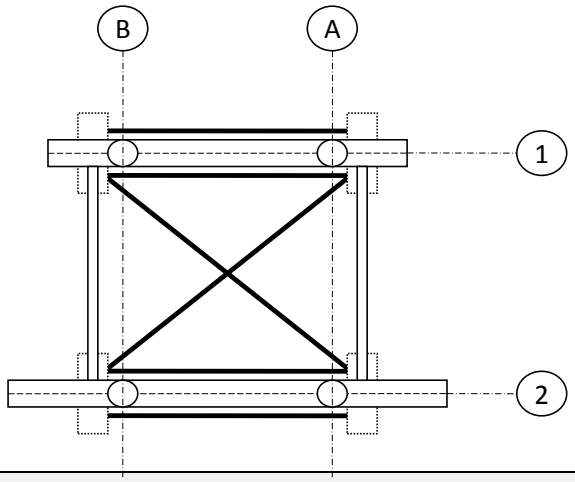
$$0.1003 < 1.00$$

Secure...!!!!

4. Design Summary

No.	Description	Allowable	Actual	Safety Factor	Remarks
A.	**Global Check**				
I	Bending Stress Check				
	Crossbeam on Row - 2	2320.13	227.24	10.21	Secure!
	Weighing Beam	2320.13	186.15	12.46	Secure!
II	Shear Stress Check				
	Crossbeam on Row - 2	1406.14	1361.26	1.03	Secure!
	Weighing Beam	1406.14	748.69	1.88	Secure!
III	Deflection Check				
	Crossbeam on Row - 2	5.43	5.33	1.02	Secure!
	Weighing Beam	1.08	0.0031	346.04	Secure!
B.	**Local Check**				
I	Related to concentrated load from Dummy Leg (Crossbeam on Row - 2)				
	Local Flange Bending	3.35	3.33	1.00	Secure!
	Local Web Yielding	4051.86	2079.16	1.95	Secure!
	Web Cripling	25.98	14.57	1.78	Secure!
	Sidesway Web Buckling	61.59	1.70	36.23	Secure!
	Compression Buckling of the Web	242279.03	37.31	6494.32	Secure!
II	Related to concentrated reaction from weighing pipe (Crossbeam on Row - 2)				
	Local Flange Bending	2.36	2.35	1.00	Secure!
	Local Web Yielding	4007.05	1039.58	3.85	Secure!
	Web Cripling	25.98	17.72	1.47	Secure!
	Sidesway Web Buckling	54.75	1.70	32.21	Secure!
III	Weighing Pipe				
	Shear Stress	1406.14	197.97	7.10	Secure!
	Axial Stress	2098.85	558.20	3.76	Secure!
	Bending Stress	2320.13	4.49	517.01	Secure!
	Combined Stress	1.00	0.27	3.73	Secure!
IV	Dummy Can				
	Shear Stress	1406.14	193.88	7.25	Secure!
	Axial Stress	2099.38	209.94	10.00	Secure!
	Bending Stress	3515.35	0.90	3888.63	Secure!
	Combined Stress	1.00	0.10	9.97	Secure!

1. Design Load



LOAD CONDITION Maximum Fy and Fz Condition							
MEMBER	**END**	**Fz (T)**	**Fx (T)**	**Fy (T)**	**Mz (T-mm)**	**Mx (T-mm)**	**My (T-mm)**
GA02-1472	GA02	51.87	146.00	84.28	102.64	178.89	97.67
	1472	50.73	146.00	84.28	102.64	119.47	200.59
GB02-1272	GB02	893.15	103.93	137.32	76.66	705.07	229.56
	1272	892.00	103.93	137.32	76.66	608.27	156.29
GA01-1372	GA01	781.85	52.83	138.28	45.82	677.93	148.67
	1372	780.27	52.83	138.28	45.82	543.10	200.17
GB01-1172	GB01	293.05	94.89	83.32	87.20	320.91	242.86
	1172	294.64	94.89	83.32	87.20	239.68	150.34

Support Weight at Row - 1 = 13.67 MT

Support Weight at Row - 2 = 13.39 MT

**FX stated above is in local axes of SACS and is in vertical direction. Negative values in FX indicates gravity direction*

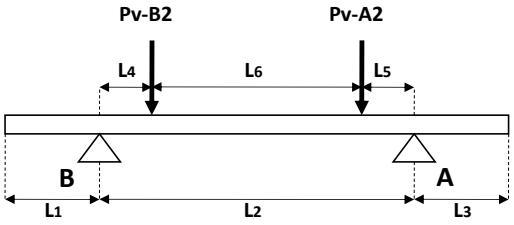
3. Design Integrity Check

a. Material Properties:

- Material Grade Fy = 50 Ksi = 3515.35 kg/cm^2
- Allowable Bending Stress Fb = 0.66 x Fy = 2320.13 kg/cm^2
- Allowable Shear Stress Fs = 0.40 x Fy = 1406.14 kg/cm^2
- Allowable Bearing Stress FBr = 0.90 x Fy = 3163.82 kg/cm^2

b. Cross Beam Diagram on Row - 1

L1 = 338.00 cm
L2 = 1535.50 cm
L3 = 338.00 cm
L4 = 81.95 cm
L5 = 81.95 cm
L6 = 1371.60 cm
Pv-B2 = 906534.02 kg
Pv-A2 = 65540.30 kg



Therefore:

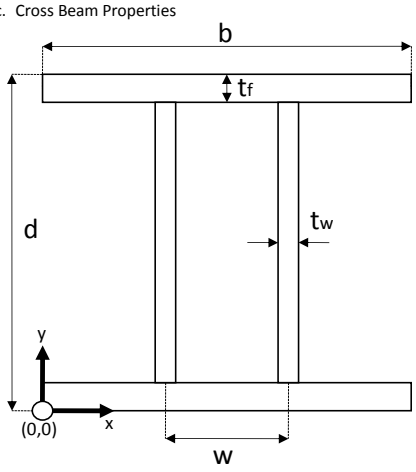
$$Ra = \frac{(Pv\text{-}B2 \times L4) + (Pv\text{-}A1 \times (L4 + L6))}{L2} = 110424.34 \text{ Kg} = 110.42 \text{ T}$$

$$Rb = \frac{(Pv\text{-}A2 \times L5) + (Pv\text{-}B1 \times (L5 + L6))}{L2} = 861649.98 \text{ Kg} = 861.65 \text{ T}$$

Ma = Ra x L5 = 9049.28 T-cm

Mb = Rb x L4 = 70612.22 T-cm

c. Cross Beam Properties



Where:

d	=	1050.00	mm	=	105.00	cm
b	=	780.00	mm	=	78.00	cm
tf	=	30.00	mm	=	3.00	cm
tw	=	30.00	mm	=	3.00	cm
w	=	400.00	mm	=	40.00	cm

Section Area:

A_1	=	3.0	x	78.0	=	234.00	cm^2
A_2	=	3.0	x	99.0	=	297.00	cm^2
A_3	=	3.0	x	99.0	=	297.00	cm^2
A_4	=	3.0	x	78.0	=	234.00	cm^2
				A_{TOTAL}	=	**1062.00**	**cm^2**

Neutral Axis:

X	=	39.00	cm
Y	=	52.50	cm

Moment of Inertia

I_{x1}	=	$\frac{1}{12}$	x	78	x	3	^{3}	+	234	x	51	^{2}	=	608809.50 cm^4
I_{x2}	=	$\frac{1}{12}$	x	3	x	99	^{3}	+	297	x	0	^{2}	=	242574.75 cm^4
I_{x3}	=	$\frac{1}{12}$	x	3	x	99	^{3}	+	297	x	0	^{2}	=	242574.75 cm^4
I_{x4}	=	$\frac{1}{12}$	x	78	x	3	^{3}	+	234	x	-51	^{2}	=	608809.50 cm^4
												I_{TOTAL}	=	**1702768.50** **cm^4**

Section Modulus

$$S_x = \frac{\text{Ix Total}}{\text{Y}} = \frac{1702768.50}{52.50} = \mathbf{32433.69}\ \mathbf{cm^3}$$

Shear Area

A_{sy}	=	105.00	x	3.00	x	2	=	630.00 cm^2
A_{sx}	=	78.00	x	3.00	x	2	=	468.00 cm^2

e. Bending Stress Check

Crossbeam on Row - 2

$$f_b = \frac{\text{Mx Max}}{\text{Sx}} < 0.66 \times \text{Fy}$$

$$= \frac{70612.22}{32433.69} < 0.66 \times 3515.35$$

$$= 2177.13\ kg/cm^2 < 2320.13\ kg/cm^2$$ ***Secure...!!!!***

f. Shear Stress Check

Crossbeam on Row - 2

$$f_s = \frac{\text{Vy Max}}{\text{Asy}} < 0.4 \times \text{Fy}$$

$$= \frac{861649.98}{630.00} < 0.4 \times 3515.35$$

$$= 1367.70\ kg/cm^2 < 1406.14\ kg/cm^2$$ ***Secure...!!!!***

g. Deflection Check

Crossbeam on Row - 2

$$\delta_1 = \frac{Pv_{Max} \times a \times (3L^2-4a^2)}{24\ E\ Ix}$$

$$= \frac{906.53 \times 81.95 \times 7046417.53}{24 \times 2100 \times 1702768.50}$$

$$= 5.55\ cm$$

$$\delta_2 = \frac{5}{384} \times Q \times \frac{L^4}{Ix} \qquad Q = \frac{\text{Support Weight}}{\text{Support Length}} = \frac{27.06}{2211.50} = 0.01223 \text{ T/cm}$$

$$= \frac{5.00}{384} \times 0.01 \times \frac{5559033396480}{1702768.50}$$

$$= 0.25 \text{ cm}$$

$$\delta_1 + \delta_2 < \frac{L}{360}$$

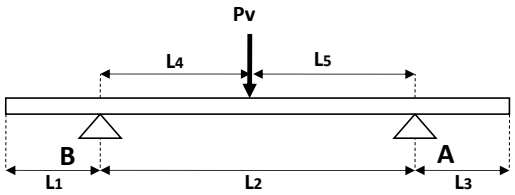
$$5.55 + 0.25 < \frac{2211.50}{360}$$

$$5.79 < 6.14$$

Secure...!!!!

h. Weighing Beam Diagram

L1	=	25.60 cm
L2	=	300.00 cm
L3	=	25.60 cm
L4	=	150.00 cm
L5	=	12.80 cm
Pv	=	906534.02 kg



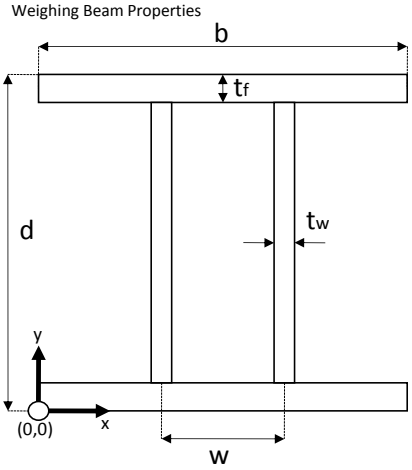
Therefore:

$$Ra = \frac{P}{2} = 453267.01 \text{ Kg} = 453.27 \text{ T}$$

$$Rb = \frac{P}{2} = 453267.01 \text{ Kg} = 453.27 \text{ T}$$

$$M\ max = \frac{Pv \times L2}{4} = 67990051.57 \text{ T-cm}$$

i. Weighing Beam Properties



Where:

d	=	1050.00	mm	=	105.00 cm
b	=	780.00	mm	=	78.00 cm
tf	=	30.00	mm	=	3.00 cm
tw	=	30.00	mm	=	3.00 cm
w	=	400.00	mm	=	40.00 cm

Section Area:

A_1	=	3.0	x	78.0	=	234.00 cm^2
A_2	=	3.0	x	99.0	=	297.00 cm^2
A_3	=	3.0	x	99.0	=	297.00 cm^2
A_4	=	3.0	x	78.0	=	234.00 cm^2
				A_{TOTAL}	=	**1062.00** **cm^2**

Neutral Axis:

X	=	39.00	cm
Y	=	52.50	cm

Moment of Inertia

$$I_{x1} = \frac{1}{12} \times 78 \times 3^3 + 234 \times 51^2 = 608809.50 \text{ cm}^4$$

$$I_{x2} = \frac{1}{12} \times 3 \times 99^3 + 297 \times 0^2 = 242574.75 \text{ cm}^4$$

$$I_{x3} = \frac{1}{12} \times 3 \times 99^3 + 297 \times 0^2 = 242574.75 \text{ cm}^4$$

$$I_{x4} = \frac{1}{12} \times 78 \times 3^3 + 234 \times -51^2 = 608809.50 \text{ cm}^4$$

$$I_{TOTAL} = \mathbf{1702768.50} \text{ } \mathbf{cm^4}$$

Section Modulus

$$S_x = \frac{Ix\ Total}{Y} = \frac{1702768.50}{52.50} = \mathbf{32433.69} \text{ } \mathbf{cm^3}$$

Shear Area

$$A_{sy} = 105.00 \times 3.00 \times 2 = 630.00 \text{ cm}^2$$

$$A_{sx} = 78.00 \times 3.00 \times 2 = 468.00 \text{ cm}^2$$

Weighing Beam bending stress check

$f_b = \frac{Mx\ Max}{Sx} < 0.66 \times Fy$

$= \frac{67990051.57}{32433.69} < 0.66 \times 3515.35$

$= 2096.28\ kg/cm^2 < 2320.13\ kg/cm^2$ ***Secure...!!!!***

Weighing Beam shear stress check

$f_s = \frac{Vy\ Max}{Asy} < 0.4 \times Fy$

$= \frac{453267.01}{630.00} < 0.4 \times 3515.35$

$= 719.47\ kg/cm^2 < 1406.14\ kg/cm^2$ ***Secure...!!!!***

Weighing Beam deflection check

$\delta_1 = \frac{Pv_{Max} \times L^3}{24\ E\ Ix}$

$= \frac{906.53 \times 3375000.00}{24 \times 2100 \times 1702768.50}$

$= 0.03565$ cm

$\delta_2 = \frac{5 \times Q \times L^4}{384 \times E \times Ix}$, $Q = \frac{\text{Support Weight}}{\text{Support Length}} = \frac{13.39}{162.80} = 0.08223$ T/cm

$= \frac{5.00 \times 0.08 \times 702453535}{384 \times 2100 \times 1702768.50}$

$= 0.00021$ cm

$\delta_1 + \delta_2 < \frac{L}{360}$

$0.03565 + 0.00021 < \frac{162.80}{360}$

$0.03586 < 0.45$ ***Secure...!!!!***

j. Local Check - *related to concentrated load from dummy leg.*

Crossbeam on Row - 1

i) Local Flange Bending

$t_f > 0.4 \times \frac{Pbf}{Fytf}$, where Pbf = 5/3 Pv

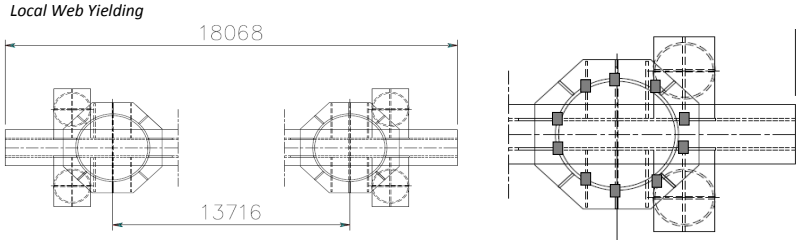
$t_f > 0.4 \times \sqrt{\frac{5 / 3 \times 1998.00}{50}}$

Pv = 906534.02 Kg = 1998.00 Kips

1.18 < 3.26 inch ***Stiffener shall be provided***

3.35 > 3.26 inch ***Secure...!!!!*** **** Additonal 50mm Plate Below Dummy Can***

ii) Local Web Yielding



tw Crossbeam	=	30.00	mm	=	1.18 inch
t pipe	=	40.00	mm	=	1.57 inch
t stiffener	=	30.00	mm	=	1.18 inch
tf Crossbeam	=	30.00	mm	=	1.18 inch

$Pv \le tw \times (N + 5k) \times 0.66\ Fytw$

$Pv \le 1.18 \times 103.96 \times 33.00$

$1998.00 \le 4051.86$ Kips ***Secure, No Need Bearing Stiffener!***

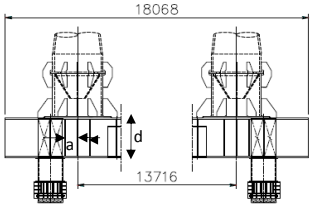
iii) Web Cripling (≤ d/2 ... K1.5)

a = 370.00 mm = 14.57 inch

d/2 = 660.00 mm = 25.98 inch

Since, a < d/2

Secure, No Need Bearing Stiffener!



iv) Sidesway Web Buckling

dc/tw / l/bf	>	1.70						
			dc	=	(d - 2 (tf + k))	=	37.31	inch
			l	=	unbraced length	=	15.75	inch
61.59	>	1.70	***Secure, Sidesway buckling not occured!***					

v) Compression buckling of the web

$$dc > \frac{4100 \times t_{wc}^{3} \times (F_{yc})^{0.5}}{P_{bf}}$$

37.31	>	14.34	***Stiffener shall be provided***
37.31	**<**	**252119.87**	***Secure...!!!***

** Additonal stiffener is provided*

d

k. Local Check of Weighing Beam - *related to concentrated reaction from weighing pipe.*

Crossbeam on Row - 1

i) Local Flange Bending

$$t_f > 0.4 \times \frac{Pbf}{Fytf}$$, where Pbf = 5/3 Pv

Pv = 453267.01 Kg = 999.00 Kips

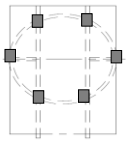
$$t_f > 0.4 \times \sqrt{\frac{5 / 3 \times 999.00}{50}}$$

1.18	<	2.31	inch	***Stiffener shall be provided***
2.36	**>**	**2.31**	**inch**	***Secure...!!!!***

**** Additonal 30mm Plate Below Weighing Beam***

ii) Local Web Yielding

tw Weighing Beam	=	30.00	mm	=	1.18	inch
t pipe	=	25.40	mm	=	1.00	inch
t stiffener	=	0.00	mm	=	0.00	inch
tf Crossbeam	=	30.00	mm	=	1.18	inch

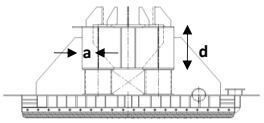


Pv	≤	tw	x	(N + 5k)	x	0.66 Fytw
Pv	≤	1.18	x	77.76	x	33.00
999.00	≤	3030.64		Kips		

Secure, No Need Bearing Stiffener!

iii) Web Cripling (≤ d/2 ... K1.5)

a	=	450.00	mm	=	17.72	inch
d/2	=	660.00	mm	=	25.98	inch



Since, a < d/2

Secure, No Need Bearing Stiffener!

iv) Sidesway Web Buckling

dc/tw / l/bf	>	1.70						
			dc	=	(d - 2 (tf + k))	=	37.31	inch
			l	=	unbraced length	=	17.72	inch
54.75	>	1.70	***Secure, Sidesway buckling not occured!***					

v) Compression buckling of the web

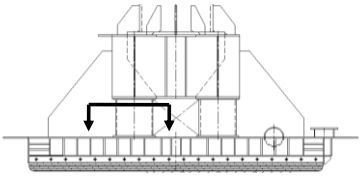
$$dc > \frac{4100 \times t_{wc}^{3} \times (F_{yc})^{0.5}}{P_{bf}}$$

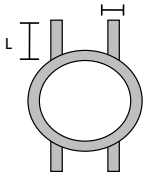
37.31	>	28.69	***Stiffener shall be provided***
37.31	<	955443911.80	***Secure...!!!***

l. Local Check - Reinforced Weighing Pipe

i) Material Properties

- Material Grade	Fy	=	50 Ksi	=	3515.35	kg/cm^2		
- Allowable Bending Stress	Fb	=	0.66 x Fy	=	2320.13	kg/cm^2		
- Allowable Shear Stress	Fs	=	0.40 x Fy	=	1406.14	kg/cm^2		
- Allowable Bearing Stress	FBr	=	0.90 x Fy	=	3163.82	kg/cm^2		
- Outside Diameter	D	=	30 inch	=	76.20	cm		
- Wall Thickness	t	=	1.00 inch	=	2.54	cm		
- Inside Diameter	d	=	28 inch	=	71.12	cm		
- Length	L	=	20 inch	=	50.80	cm		
- K-Value	k	=	1.00					
- Section Area	Ap	=	$\pi (D^2-d^2) / 4$	+	(t x l x 2)	=	3407.48	cm^2 *(Pipe)*
- Shear Area	Asp	=	π r t	+	2 (l x t)	=	3123.87	cm^2 *(Pipe)*
- Inertia Moment	Ip	=	$\pi (D^4 - d^4) / 64$	+	(1/12 x b x h^3)	=	1437148.90	cm^4 *(Pipe)*
- Section Modulus	Sp	=	I / C			=	23330.34	cm^3 *(Pipe)*





T Stiffener	=	30.00	cm
L Stiffener	=	47.00	cm

ii) Shear Check

$fs = \frac{F}{Asp} < 0.40 \times Fy$, *Shear is the resultant between Fy and Fz stated in above table divided by 2*

$= \frac{168579.234}{3123.87} < 0.40 \times Fy$

$= 53.96\ kg/cm^2 < 1406.14\ kg/cm^2$ ***Secure...!!!!***

iii) Axial Check

Axial Compression:

$r^2 = \frac{Ix\ tot}{A\ tot}$ $\frac{K \times Lk}{r} = \frac{1.00 \times 50.80}{20.54}$ $Cc = \sqrt{\frac{2\pi^2 E}{Fy}} = 108.54$

$r^2 = \frac{1437148.90}{3407.48}$ $= 2.47\ cm$ $\frac{K \times Lk}{r} < Cc$

$r^2 = 421.76\ cm^2$ $E = 2100000\ kg/cm^2$ $Ca = 0.5967$

$r = 20.54\ cm$ $\frac{K \times Lk / r}{Cc} = 0.0228$ (Please see Table 3 - AISC ASD)

$f_{ac} = \frac{Pv}{A\ tot} < F_{ac}$

$= \frac{466935.905}{3407.48} < Ca \times Fy$

$= 137.03\ kg/cm^2 < 2097.68\ kg/cm^2$ ***Secure...!!!!***

iv) Bending Check

$fb = \frac{M}{Sx} < 0.66 \times Fy$, *M is the resultant between My and Mz stated in above table divided by 2*

$= \frac{10190.5241}{23330.34} < 0.66 \times Fy$

$= 0.44\ kg/cm^2 < 2320.13\ kg/cm^2$ ***Secure...!!!!***

v) Combined Stress

Bending and Compression:

$\frac{fa}{Fc} + \frac{fb}{Fb} < 1.00$

$\frac{137.03}{2097.68} + \frac{0.44}{2320.13} < 1.00$

$0.0655 < 1.00$ ***Secure...!!!!***

vi) Base Plate Check

- Material Grade	Fy	= 50 Ksi	= 3515.35	kg/cm²	
- Allowable Bending Stress	Fb	= 0.66 x Fy	= 2320.13	kg/cm²	
- Allowable Shear Stress	Fs	= 0.40 x Fy	= 1406.14	kg/cm²	
- Allowable Bearing Stress	FBr	= 0.90 x Fy	= 3163.82	kg/cm²	
- Bearing Area	Ap	= π (D²-d²) / 4	= 587.48	cm²	*(The bearing area is contact area with weighingPipe)*
- Width	w	= 86 cm			
- Length	L	= 86 cm			
- Thickness	th	= 2 cm			

Bearing Check

$fBr = \frac{Pv}{Ap}$

$= \frac{466935.905}{587.48}$

$= 794.81\ kg/cm^2 < 3163.82\ kg/cm^2$ ***Secure...!!!!***

m. Local Check - Dummy Can

i) Material Properties

- Material Grade	Fy	= 50 Ksi	= 3515.35	kg/cm²	
- Allowable Bending Stress	Fb	= 0.66 x Fy	= 2320.13	kg/cm²	
- Allowable Shear Stress	Fs	= 0.40 x Fy	= 1406.14	kg/cm²	
- Allowable Bearing Stress	FBr	= 0.90 x Fy	= 3163.82	kg/cm²	
- Outside Diameter	D	= 59 inch	= 150.01	cm	
- Wall Thickness	t	= 2.00 inch	= 5.08	cm	
- Inside Diameter	d	= 55 inch	= 139.85	cm	
- Length	L	= 58 inch	= 100.00	cm	
- K-Value	k	= 1.00			
- Section Area	Ap	= π (D²-d²) / 4	= 2311.85	cm²	*(Pipe)*
- Shear Area	Asp	= π r t	= 1196.44	cm²	*(Pipe)*
- Inertia Moment	Ip	= π (D⁴ - d⁴) / 64	= 6077613.17	cm⁴	*(Pipe)*
- Section Modulus	Sp	= I / (1/2 D)	= 81028.14	cm³	*(Pipe)*

ii) Shear Check

$$fs = \frac{F}{Asp} < 0.40 \times Fy$$

$$= \frac{337158.468}{1196.44} < 0.40 \times Fy$$

$$= 281.80 \text{ kg/cm}^2 < 1406.14 \text{ kg/cm}^2$$ ***Secure...!!!!***

iii) Axial Check

Axial Compression:

$$r^2 = \frac{Ix\ tot}{A\ tot} \qquad \frac{K \times Lk}{r} = \frac{1.00 \times 100.00}{51.27} \qquad Cc = \frac{2\pi^2 E}{Fy} = 108.54$$

$$r^2 = \frac{6077613.17}{2311.85} = 1.95 \text{ cm} \qquad \frac{K \times Lk}{r} < Cc$$

$$r^2 = 2628.90 \text{ cm}^2 \qquad E = 2100000 \text{ kg/cm}^2 \qquad Ca = 0.5972$$

$$r = 51.27 \text{ cm} \qquad \frac{K \times Lk / r}{Cc} = 0.0180$$ (Please see Table 3 - AISC ASD)

$$f_{aC} = \frac{Pv}{A\ tot} < F_{aC}$$

$$= \frac{466935.905}{2311.85} < Ca \times Fy$$

$$= 201.98 \text{ kg/cm}^2 < 2099.38 \text{ kg/cm}^2$$ ***Secure...!!!!***

iv) Bending Check

$$fb = \frac{M}{Sx} < 0.66 \times Fy$$

$$= \frac{20381.0482}{81028.14} < 0.66 \times Fy$$

$$= 0.25 \text{ kg/cm}^2 < 3515.35 \text{ kg/cm}^2$$ ***Secure...!!!!***

v) Combined Stress

Bending and Compression:

$$\frac{fa}{Fc} + \frac{fb}{Fb} < 1.00$$

$$\frac{201.98}{2099.38} + \frac{0.25}{3515.35} < 1.00$$

$$0.0963 < 1.00$$ ***Secure...!!!!***

4. Design Summary

No.	Description	Allowable	Actual	Safety Factor	Remarks
A.	**Global Check**				
I	Bending Stress Check				
	Crossbeam on Row - 2	2320.13	2177.13	1.07	Secure!
	Weighing Beam	2320.13	2096.28	1.11	Secure!
II	Shear Stress Check				
	Crossbeam on Row - 2	1406.14	1367.70	1.03	Secure!
	Weighing Beam	1406.14	719.47	1.95	Secure!
III	Deflection Check				
	Crossbeam on Row - 2	6.14	5.79	1.06	Secure!
	Weighing Beam	0.45	0.0359	12.61	Secure!
B.	**Local Check**				
I	Related to concentrated load from Dummy Leg (Crossbeam on Row - 1)				
	Local Flange Bending	3.35	3.26	1.03	Secure!
	Local Web Yielding	4051.86	1998.00	2.03	Secure!
	Web Cripling	25.98	14.57	1.78	Secure!
	Sidesway Web Buckling	61.59	1.70	36.23	Secure!
	Compression Buckling of the Web	252119.87	37.31	6758.10	Secure!
II	Related to concentrated reaction from weighing pipe (Crossbeam on Row - 1)				
	Local Flange Bending	2.36	2.31	1.02	Secure!
	Local Web Yielding	3030.64	999.00	3.03	Secure!
	Web Cripling	25.98	17.72	1.47	Secure!
	Sidesway Web Buckling	54.75	1.70	32.21	Secure!
III	Weighing Pipe				
	Shear Stress	1406.14	53.96	26.06	Secure!
	Axial Stress	2097.68	137.03	15.31	Secure!
	Bending Stress	2320.13	0.44	5311.74	Secure!
	Combined Stress	1.00	0.07	15.26	Secure!
IV	Dummy Can				
	Shear Stress	1406.14	281.80	4.99	Secure!
	Axial Stress	2099.38	201.98	10.39	Secure!
	Bending Stress	3515.35	0.25	13975.84	Secure!
	Combined Stress	1.00	0.10	10.39	Secure!

BIODATA PENULIS

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Fajri Karim Abidin lahir di Manchester, 22 Juli 1995. Penulis menempuh pendidikan formal dimulai dari SD Darul Hikam Bandung (*lulus tahun 2007*), kemudian melanjutkan SMP Darul Hikam Bandung (*lulus tahun 2010*), dan lulus dari SMA Darul Hikam Bandung tahun 2013. Hingga akhirnya penulis menempuh masa Pendidikan Tinggi Strata I di Departemen Teknik Kelautan, Fakultas Teknologi Kelautan, Institut Teknologi Sepuluh Nopember Surabaya (ITS) melalui jalur SBMPTN dan terdaftar sebagai mahasiswa dengan NRP 0431134100116. Selama menempuh masa perkuliahannya, penulis aktif dibeberapa organisasi kemahasiswaan yang berhubungan dengan internal mahasiswa dan media informasi. Dalam organisasi kemahasiswaan, penulis pernah mengemban amanah sebagai Ketua Divisi Kreativitas Departemen Komunikasi dan Informasi Badan Eksekutif Mahasiswa (BEM) FTK ITS, Ketua Komisi Pelihan Umum (KPU) HIMATEKLA FTK ITS, Koordinator Fakultas Teknologi Kelautan di Forum Daerah Bandung ITS (BandITS), Wakil Ketua *Ocean Under Water Robotic Club* HIMATEKLA FTK ITS dan Ketua Kepengurusan Laboratorium Perancangan dan Konstruksi Bangunan Laut Departemen Teknik Kelautan ITS. Penulis pernah mendapatkan kesempatan untuk melaksanakan Kerja Praktek di PT. Guna Nusa Utama Fabricators selama 2 bulan dan menyelesaikan perhitungan mengenai *rigging* saat proses *loadout*. Sampai akhirnya penulis terus mendalami pemahaman tentang prosedur *loadout* dan dalam kesempatan ini, syukur alhamdulillah penulis diberikan ketekunan serta motivasi yang tinggi sehingga penulis dapat menyelesaikan tugas akhir yang berjudul "**Analisa Tegangan Kritis *Skid Frame* Saat *Skidding Load Out* Struktur *Wellhead Platform***".

Semoga apa yang telah ditulis oleh penulis dalam tugas akhir ini dapat memberikan kontribusi positif terhadap ilmu pengetahuan tentang dunia kelautan. Akhir kata penulis mengucapkan terimakasih telah meluangkan waktunya untuk membaca tugas akhir ini.

Kontak Penulis

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