



HIWIN
HYUNDAI-WISON

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	
UNIT: INTERCONNECTIONS	HYUNDAI-WISON DOC. No. N/A
AREA: MACOTAL AREA	
PHASE: DETAILED ENGINEERING	
DISCIPLINE: CIVIL	REV.A DATE : 08-08-13
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	PAGE 1 OF 140
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	

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RPLC DEEP CONVERSION PROJECT

CALCULATION NOTES FOR UNIT 66C INTERCONNECTING
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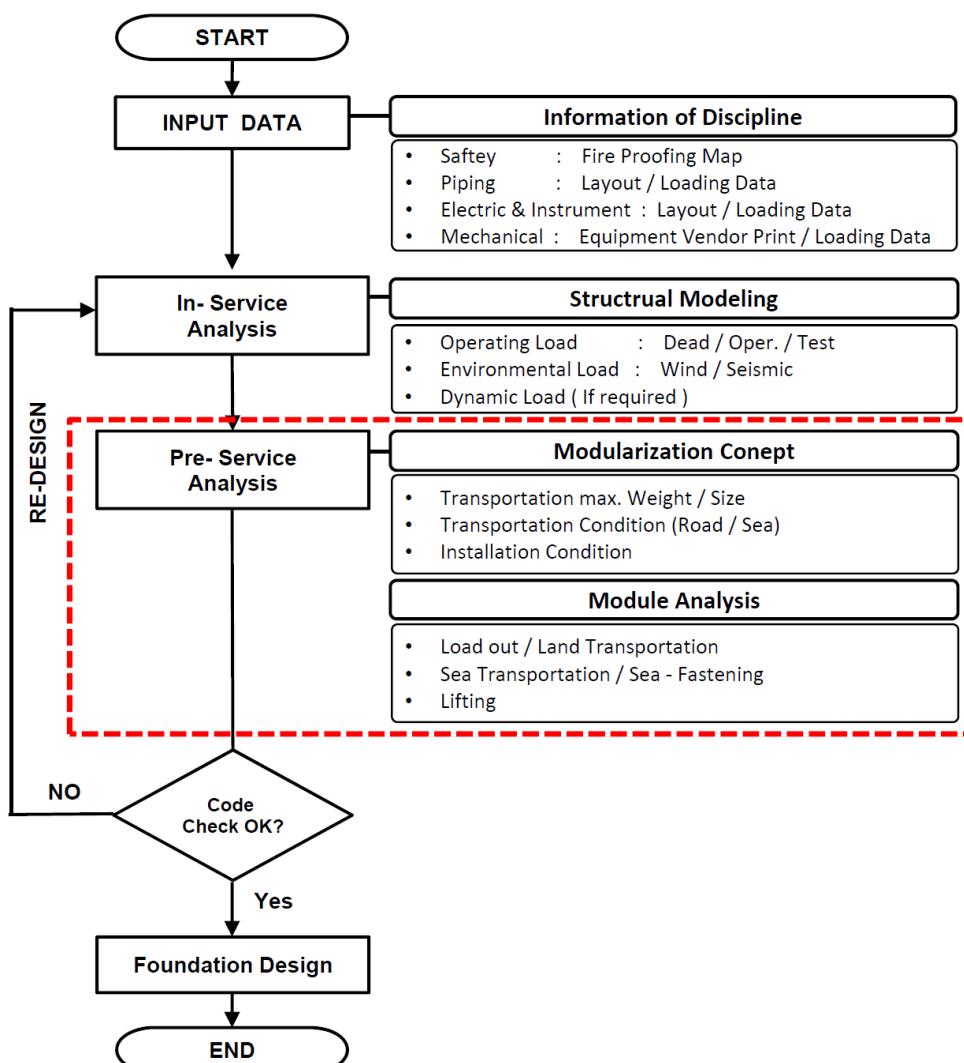
1 GENERAL

1.1 INTRODUCTION

The purpose of this calculation report is to provide the proper methodology and structural analysis results of pre-service design for **UNIT 66C of Interconnecting Pipe Rack structure, Module C30PR03**, for RPLC DEEP CONVERSION PROJECT. This report covers pre-service analysis for steel framing and related device, attachments and verification of mobilized equipment capacity. The report shall be read in conjunction with issued drawing for construction 3006-500A-DC263021~DC263029 Rev.0

In-service structural analysis and connection detail calculation will be separated and provided in another volumes.

The overall procedure for module analysis is shown below chart.



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This report consists of 3 parts of pre-service design stage ; load out, sea / land transportation, lifting.

1) For the load-out analysis, this structure will be transported to quayside by means of SPMT, called Modular Transporter after being fabricated on the assembly yard. Then, the module structure will be transfer to the vessel by means of crane. But, the load out and transferring procedure will be analyzed in lifting stage, and this part, load-out analysis is performed for land transportation from assembly yard to quayside, load-in quayside to construction site in accordance with design specification (3006-500A-DC117301).

In general the reinforced beam, called loading beam is considered in order to support the overall structure during load-out and inland transportation. Therefore the analysis for load-out will be carried out in order to verify or check the strength of loading beams and the structure.

2) For the sea-transportation and sea fastening analysis, this report includes strength check of pipe rack structure with lashings to resist forces that are induced due to ship motion, such as roll, pitch and heaving. The lashings and sea-fastenings shall be defined and calculated in detail after confirming the transportation barges or vessels in the final stage.

Lashings and sea-fastenings are designed to withstand the global loadings as considered in the sea-transportation analysis. Furthermore the calculation for lashings and sea-fastenings will be done based on the results from the sea-transportation analysis.

3) For the lifting analysis, this structure will be lifted by a crane for load-in or load-out in fabrication yard or construction site according to conditions.

The concept of lifting analysis is one-hook lifting with a lifting spreader bar to protect the module structures from the distortion due to unequal distribution of sling forces during the lifting status. The analysis method is in accordance with Noble Denton Guidelines according to the Project Doc. No. 3006-500A-DC117301, 'Design Specification for Module Structure' and the details are explained in the following section 2.3.

The 3-dimensional structural analysis will be performed using "SACS" (Structural Analysis Computer System) computer program developed by Engineering Dynamic Inc. U.S.A.

The basic structural modeling has been extracted from in-service STAAD and converted to SACS model. Pre-service design result

Vertical and horizontal diagonal braces will be added in order to support the structure during load-out and inland & sea transportation if required.

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1.2 REFERENCES

This Pre-service shall be formed in accordance with following documents and standards;

3006-500A-DG140001 BASIC ENGINEERING DESIGN DATE

3006-500A-DC117301 DESIGN SPECIFICATION FOR MODULE STRUCTURE

3006-500A-DG5B6004 ACCELERATION ANALYSIS FOR MODULE TRANSPORT (SEA)

ANSI/AISC 360-10 Specification For Structural Steel Buildings, LRFD Design (2010)

ASTM A572 / A572M Standard Specification For High-Strength Low-Alloy Columbium-Vanadium Structural Steel

ANSI / AWS D1.1 / D1.1M : 2010 Structural Welding Code - Steel

AWS D1.8 : 2009 Structural Welding Code – Seismic Supplement

GL Noble Denton (0013/ND) Guidelines for Load-outs

GL Noble Denton (0030/ND) Guidelines for Marine Transportation

GL Noble Denton (0027/ND) Guidelines for Marine Lifting Operations

1.3 MATERIALS

(1) Structural Steel : GB 1591 Q345B

- Minimum Yield Strength : $F_y = 345 \text{ MPa}$
- Modulus of Elasticity : $E_s = 200,000 \text{ MPa}$
- Coefficient of Thermal Expansion : $\alpha = 12.0 \times 10^{-6} / ^\circ\text{C}$
- Poisson's Ratio : $\nu = 0.3$

(2) High Strength Bolt : ASTM A325 Type I

(3) Welding Electrode

Electrodes for manual welding shall conform to AWS A5.1, E70 series.

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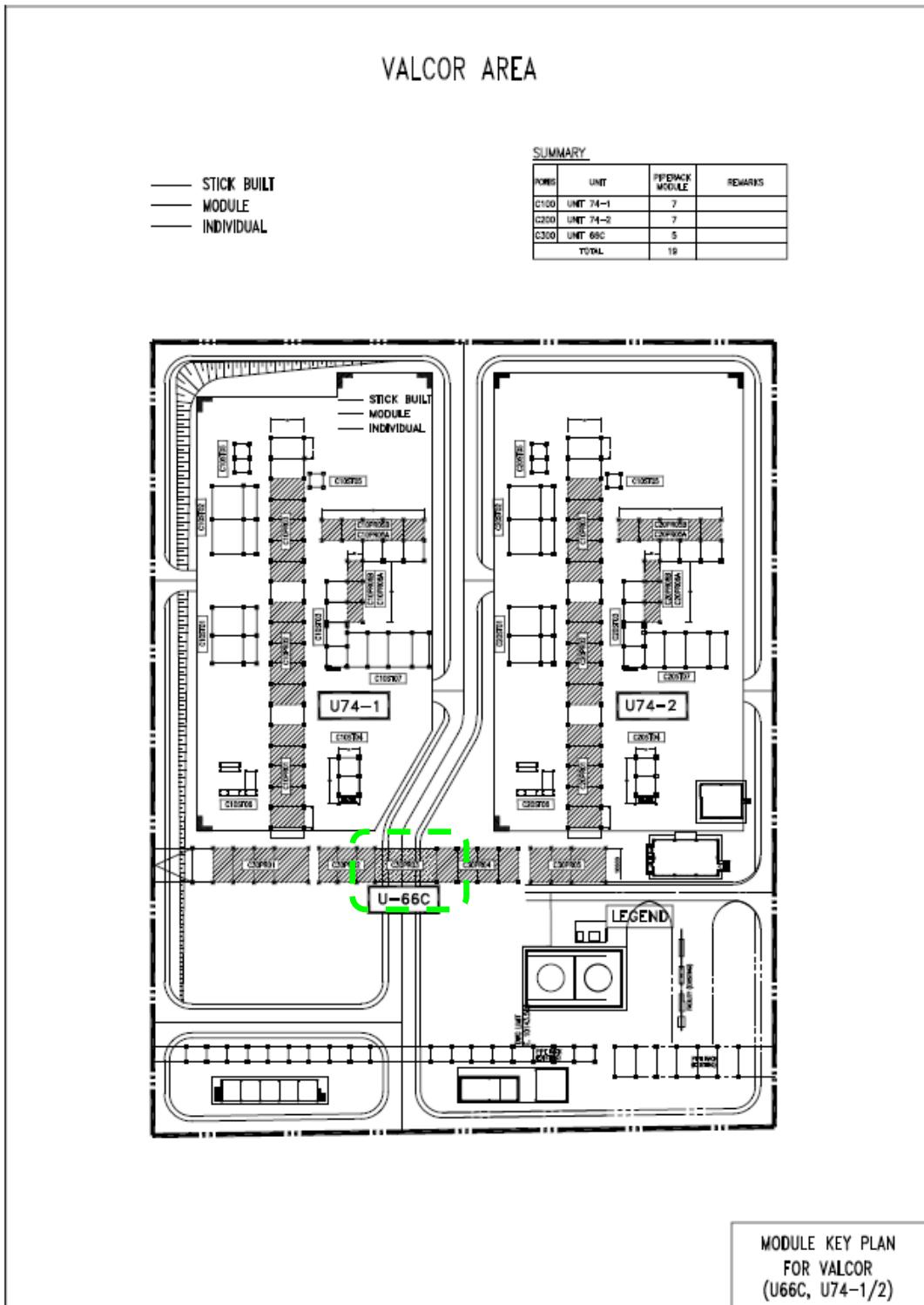
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1.4 LOCATION PLAN FOR PIPE RACK MODULE (C30PR03)


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2 DESIGN CRITERIA AND METHODOLOGY

2.1 LOAD-OUT/LAND TRANSPORTATION ANALYSIS

2.1.1 PROCEDURE FOR LOAD-OUT/ LAND TRANSPORTATION

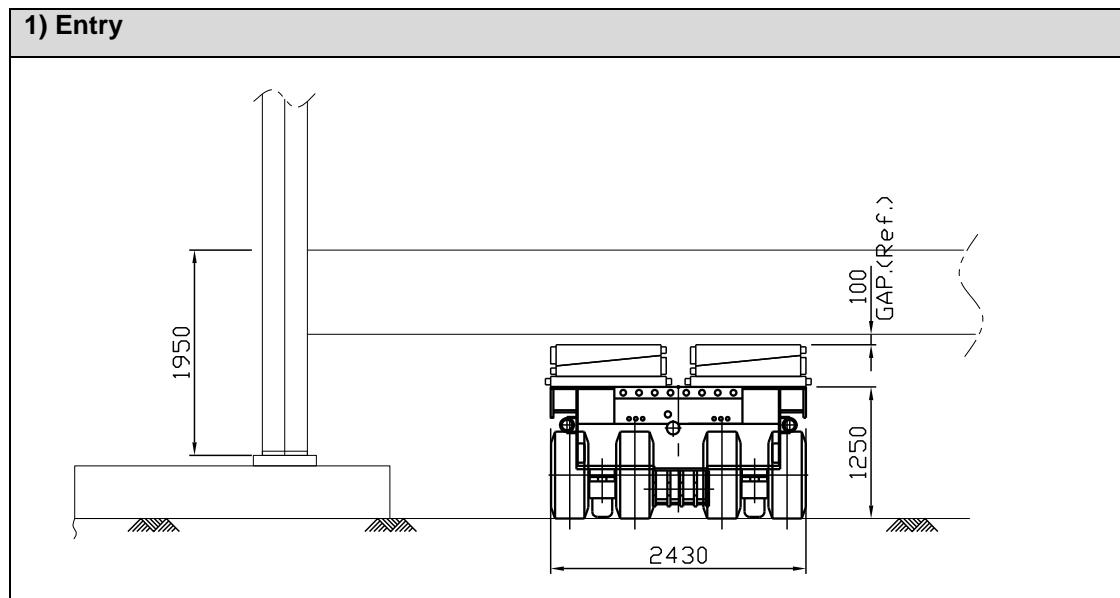
The load-out/ land transportation operation of the structure will be performed by using SPMT which has several axles of wheels to be arranged properly to support the whole weight distribution. In general a pair of SPMT will be used not to lean to one side. The SPMT will be synchronized to share load distribution and adjust the centre of gravity of the structure to transporter's centre between two rows.

The general specification for transporters is assumed as below.

Modular Transporter – KAMAG Type 2400 (Hold)

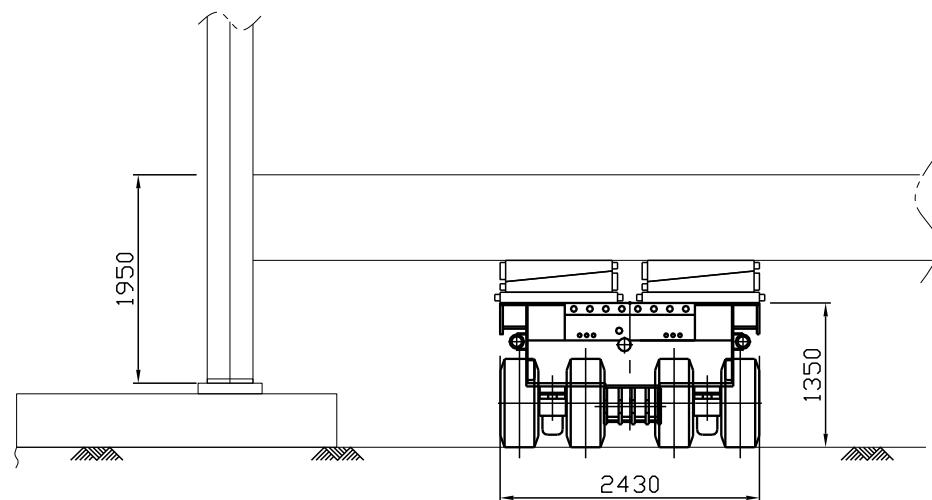
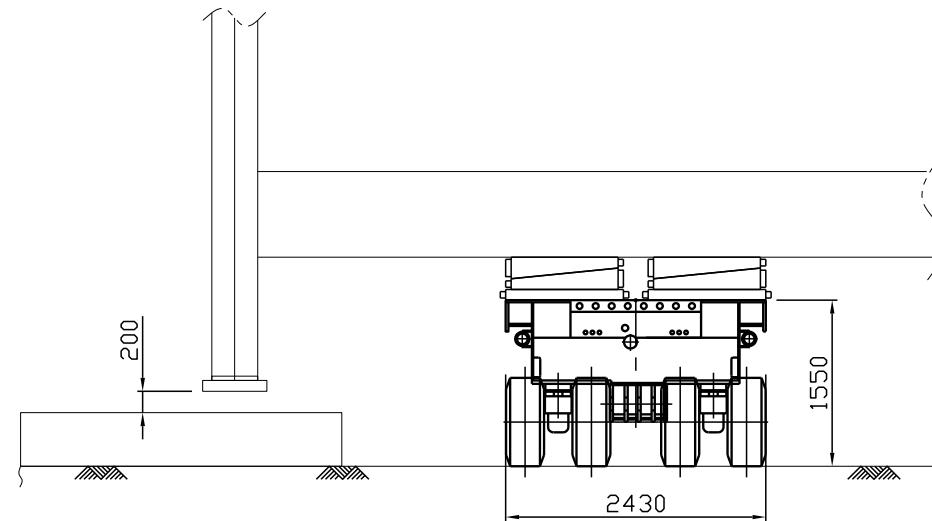
	Power Pack	6-Axle	4-Axle	2-Axle
Max. Payload	-	178Ton	118Ton	58Ton
Number of Train or Unit	7	12	4	2
Dead Weight	7Ton	25Ton	18Ton	10Ton
Overall Length	4000mm	8400mm	5600mm	2800mm
Width		2430mm		
Height	1130mm		1490 ± 350 mm	
Axle Load per axle line	-		34Ton	
Wheel Load per wheel	-		8.5Ton	
Tire Size	-		355/65-R15 x PR24	
Speed (Full Load)	-		4.5 km/h (when unloaded : 8~9 km/h)	

The procedure for load-out/land transportation is shown below.



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2) Loading

3) Up-Lift


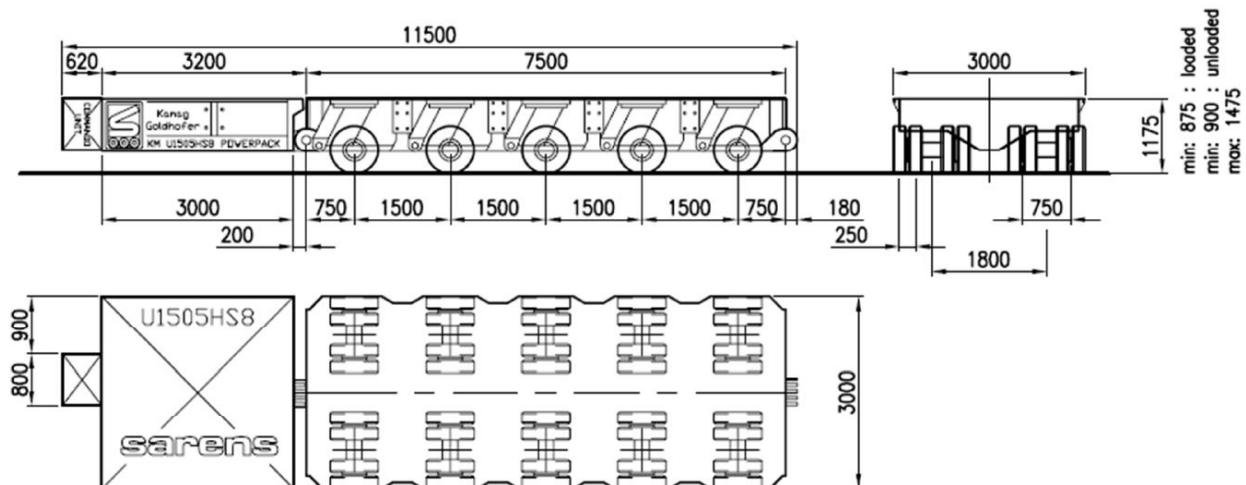
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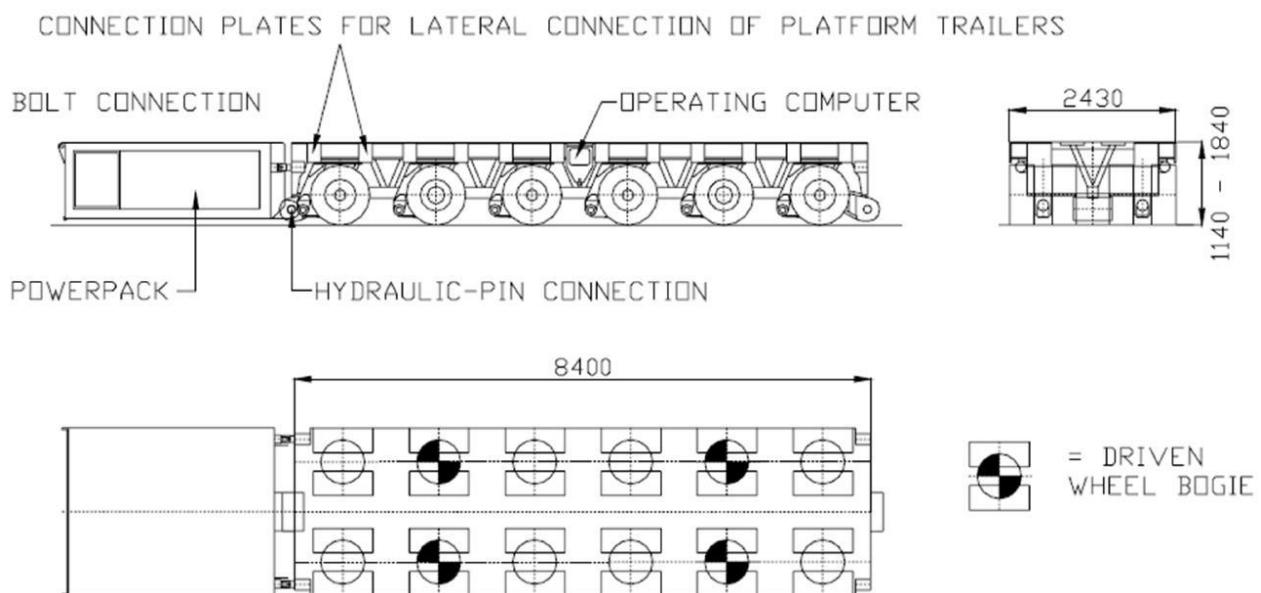
2.1.2 SPMT SPECIFICATION

The general specification of modular transporter, Type 2400, for load-out / land transportation operation has been shown below.

2.1.2.1 General Configuration of Kamag / Goldhofer SPMT



2.1.2.2 General Configuration of Kamag 2406 SPMT



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2.1.2.3 Detail Information

MODULAR TRANSPORTER - TYPE 2400

POWER PACK	6-AXLE	4-AXLE	2-AXLE

Description	Type	POWER PACK	6-AXLE	4-AXLE	2-AXLE
Max. payload	Ton	-	178(191)	118	58
Nos. of Train / Unit		7	12	4	2
Dead weight	Ton	7	25	18	10
Overall Length	MM	4000	8400	5600	2800
Width	MM		2430		
Height	MM	1130		1490±350	
Axle load per Axle line	Ton	-		34	
Wheel load per Wheel	Ton	-		8.5	
Tire size		-		355/65-R15 X PR24	
Speed (full load)	Km/h	-		4.5 (unloaded: 8-9 km/h)	

TECHNICAL MERITS

FLEXIBLE COUPLING	360° MANEUVERABILITY
THE MODULE TRANSPORTER IS FREELY COUPLING CONFIGURATION, CONFORMING TO THE SHAPE, STRUCTURE, WEIGHT AND CENTER OF GRAVITY OF LOAD.	IN ADDITION TO NORMAL FORWARD/BACKWARD DRIVES, THE COMPUTERIZED STEERING SYSTEM ENABLES TRANSVERSAL, DIAGONAL AND CIRCULAR DRIVES.

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2.1.3 ANALYSIS METHODOLOGY

The analysis will be carried out according to the following steps in accordance with transporter function and actual load-out / land transportation operation concept.

<<Loadout analysis for RPLC Project>>
- STEP OF DESIGN METHODOLOGT -
STEP – “1”

Finding the location of C.O.G through static analysis.

((Refer to the section 2.3.1 for step "1"))


STEP – “2”

Forming 3-separate hydraulic group(zone A,B,C) as per the C.O.G location in order to provide stabilized lifting. operation

((Refer to the section 2.3.2 for step "2"))


STEP – “3”

Calculation of loads for each hydraulic group and consideration of C.O.G shift case.

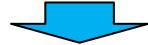
((Refer to the section 2.3.3 for step "3"))


STEP – “4”

Calculation the load distribution for each hydraulic group

This means the portion that each zone shares.

((Refer to the section 2.3.4 for step "4"))


STEP – “5”

Analysis execution : Input Data = sacinp, output Data = saclst.

((Refer to the attached sacs input & output data))


STEP – “6”

Output review : Checking restrained joint force(spring force), Member unity check.

This means the portion that each zone shares.

((Refer to the attached output results))

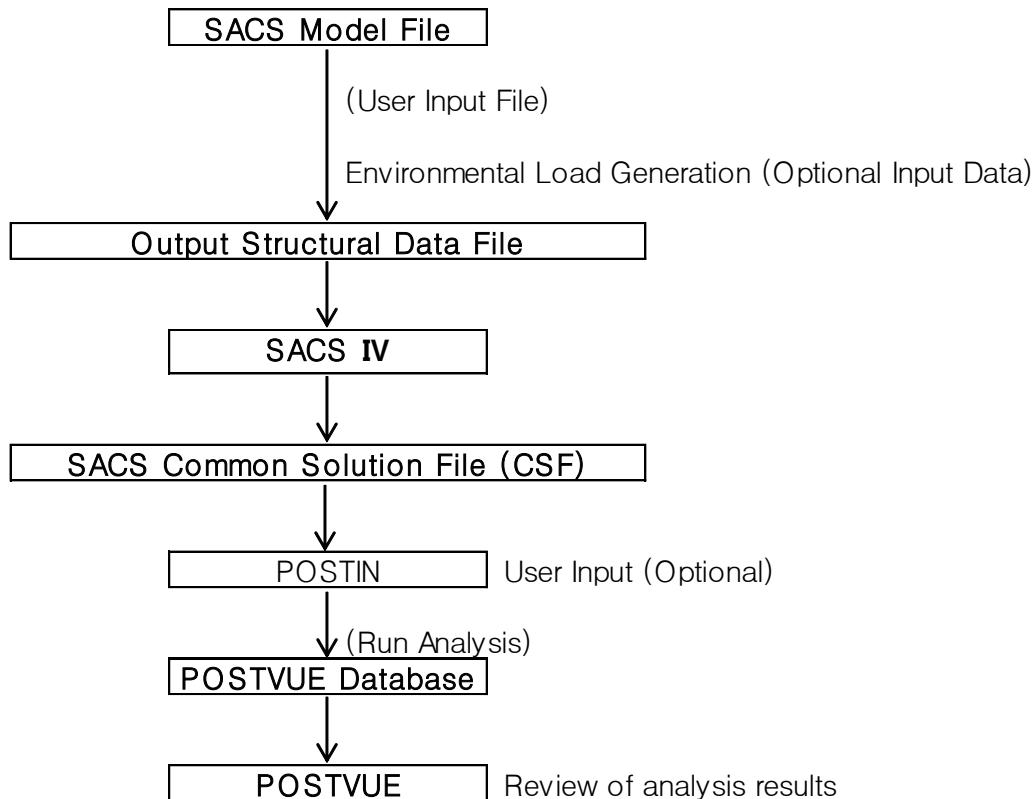
The static analysis for load-out / land transportation is done by SACS as shown in below brief chart.

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SACS

Static Analysis Flow Chart



2.1.3.1 Step 1 – Define Weight & C.O.G for Load-out / Land transportation

This step defines structural weight and centre of gravity for load-out / land transportation by means of load-out / land transportation analysis using SACS computer program. The weight of other facilities for load-out / land transportation will be included in the SACS structural model as proper loading condition.

This step is used in order to obtain the current C.O.G considering only basic load combinations without factors.

2.1.3.2 Step 2 – Make-up Hydraulic Jack group

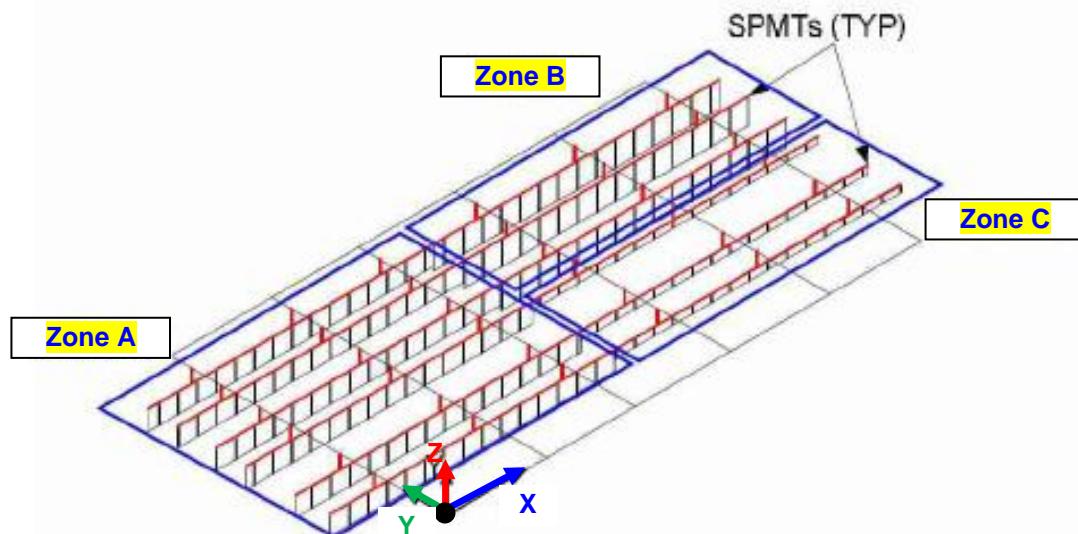
All of the axles of the modular transporters does not move simultaneously though being synchronized. Therefore the condition that axles are not harmonized should be considered, because the load distribution of each zone shall be different and the critical load distribution on a hydraulic jack group shall be critical to the stability of load-out / land transportation acting.

This step is used in order to consider the un-harmonized condition for each axles by making up three hydraulic group zone A, zone B and C. As shown in the following figure, the each zone of modular transporter is defined in this step. By doing this, the current C.O.G is shifted according

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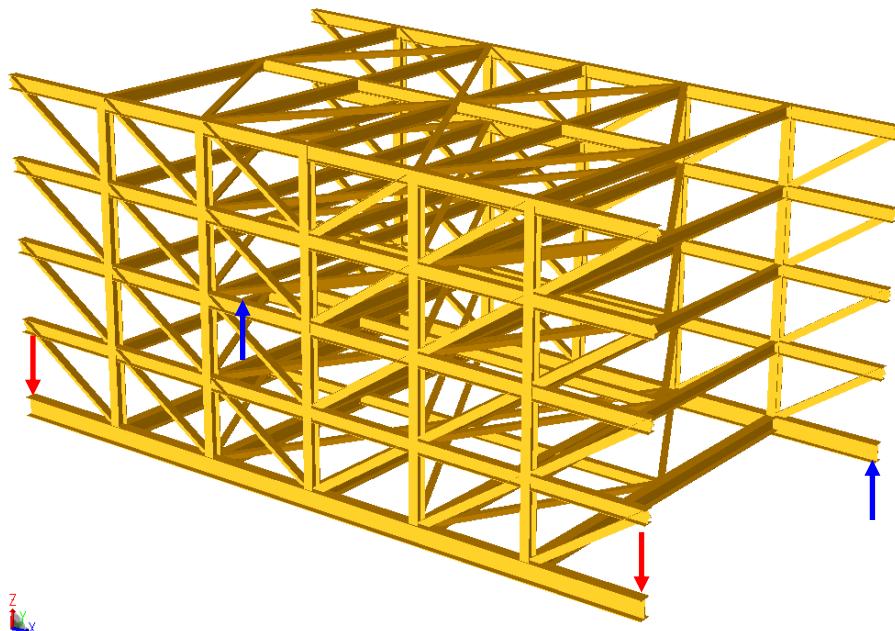
to the C.O.G distance of each grouping in the next step.



2.1.3.3 Step 3 – Calculation of zone load & Uniform load applied to each transporter

This step is used in order to calculate the reaction force to each zone by using the matrix for the equilibrium equation. The distance between C.O.G of each jack zone and the current C.O.G is used to obtain the C.O.G shift length. By doing this, the unit moments are applied for C.O.G adjustment as shown below.

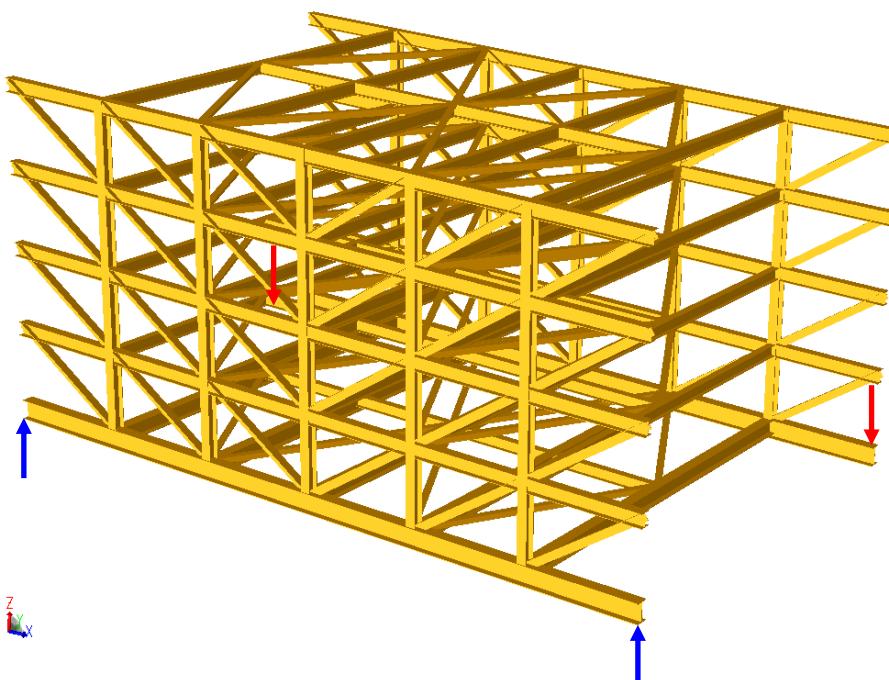
Positive Unit M_x (+ M_x)



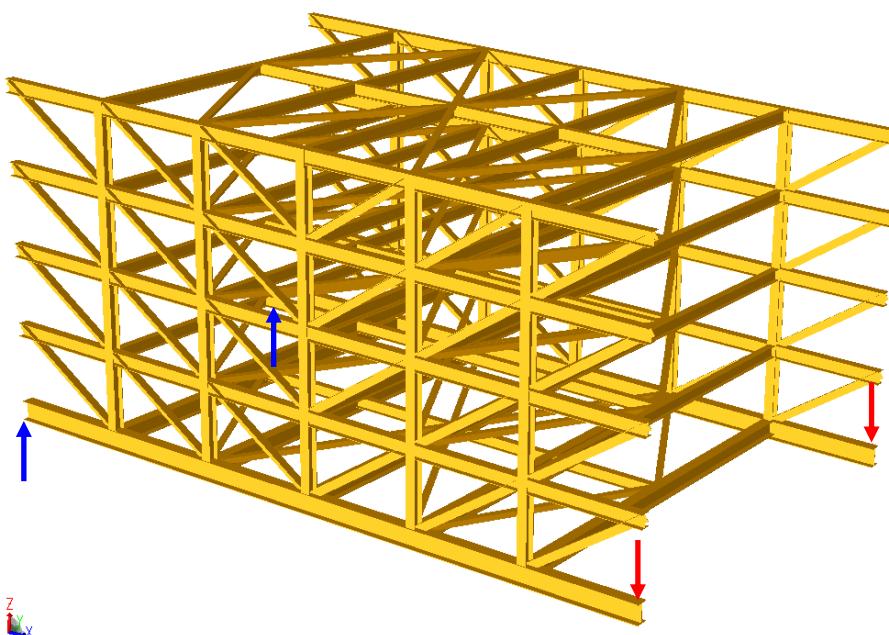
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② Negative Unit M_x (- M_x)



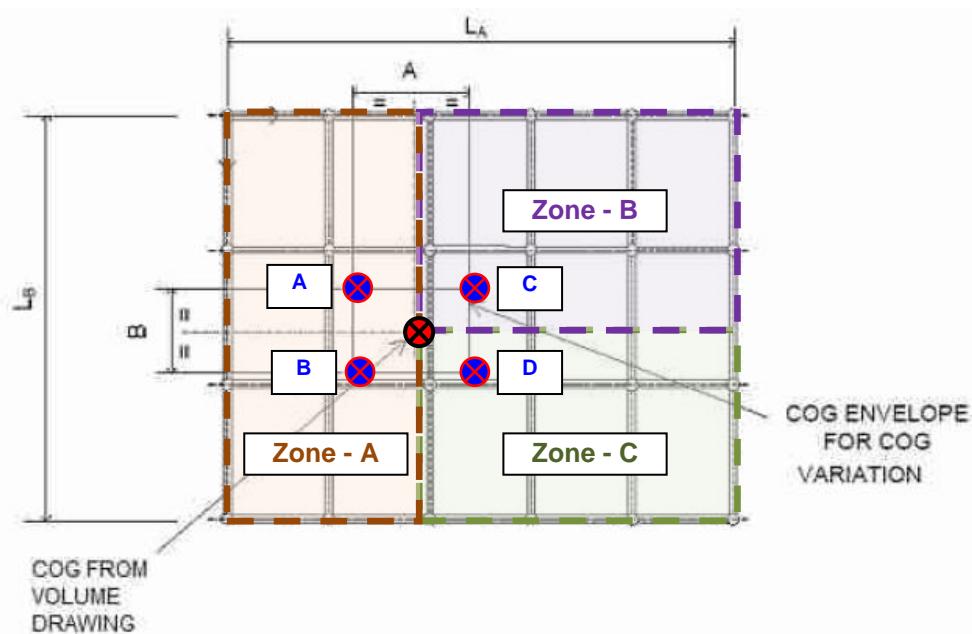
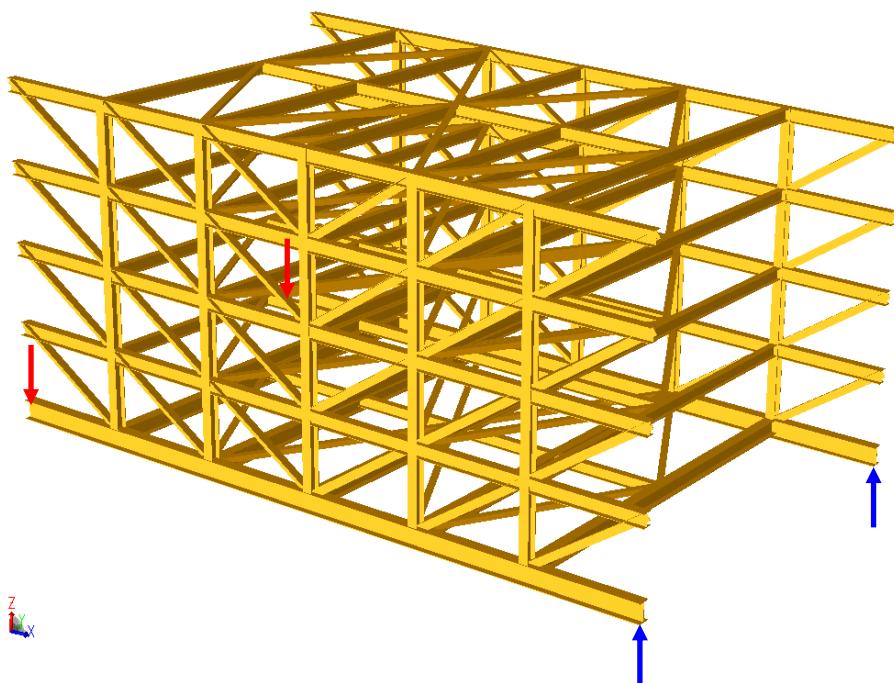
③ Positive Unit M_y (+ M_y)



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④ Negative Unit My (-My)



<Unit Moments and C.O.G Envelope for Variation>

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Load case 9A (C.O.G Shift to Point 'A', direction -X,+Y) : - Mx + My

Load case 9B (C.O.G Shift to Point 'B', direction -X,-Y) : - Mx - My

Load case 9C (C.O.G Shift to Point 'C', direction +X,+Y) : +Mx + My

Load case 9D (C.O.G Shift to Point 'D', direction +X,-Y) : + Mx – My

To cover future variation of the C.O.G during design, a C.O.G tolerance envelope will be considered as shown in the figure above, where:

$$A = 0.1*L_A \text{ or } 2m, \text{ whichever is less}$$

$$B = 0.1*L_B \text{ or } 2m, \text{ whichever is less}$$

2.1.3.4 Step 4 – Verification the weight portion that each zone shares

This step is used in order to verify whether the weight portion that each jack group shares. This portion is used in order to check the capacity ratio for the modular transporters. In this step, we can anticipate the distribution for weight per each group.

2.1.3.5 Step 5 – Run ‘Structural Static Analysis’

The load combinations for the analysis are summarized in the section 3.2.

2.1.3.6 Step 6 – Review the structural analysis result

The SACS computer analysis results will be reviewed in this step.

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

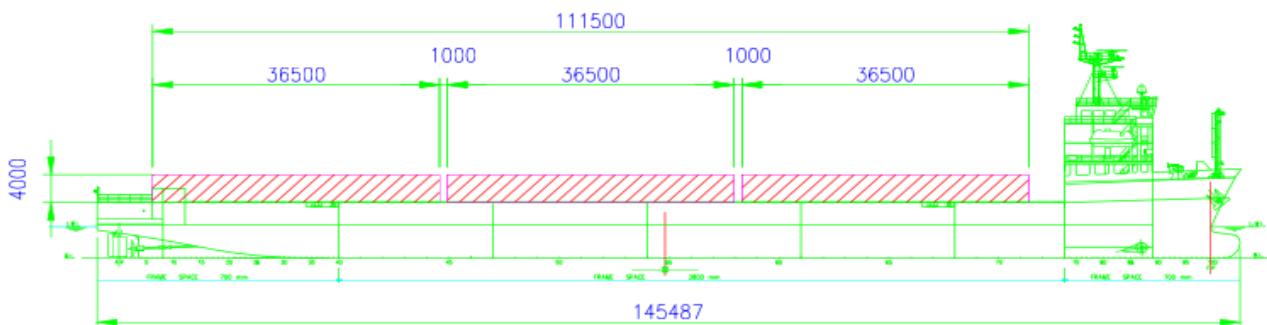
PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
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2.2 SEA-TRANSPORTATION/FASTENING ANALYSIS
2.2.1 Shipping Arrangement Plan (Hold)

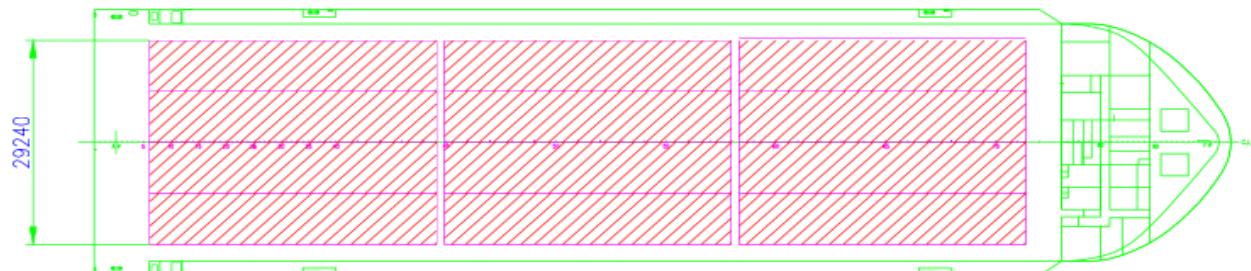
The preliminary shipping arrangement plan for sea transportation is shown below.

At the moment the data and specifications of vessel or barge are not confirmed yet so all the details of shipment schedule, stowage plan and sea-fastening design shall be performed after vessels or barges are selected later.

Therefore, the shipping arrangement plan herewith is just a preliminary concept only for information.



ELEVATION



PLAN

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2.2.2 Vessel Motion Parameters

According to "Guidelines for Marine Transportation" issued by "GL Noble Denton", if neither a motions study nor model tests are performed, then for standard configurations and subject to satisfactory marine procedures, the following motion criteria may be acceptable.

Table 7-2 Default Motion Criteria

Nature of Transportation	Case	LOA (m)	B ^[1] (m)	L/B ^[1]	Block Coeff	Full cycle period (secs)	Single amplitude		Heave
							Roll	Pitch	
Unrestricted	1	> 140 and > 30	n/a	< 0.9	< 0.9	10	20°	10°	0.2 g
	2	> 76 and > 23	n/a	any	any	10	20°	12.5°	0.2 g
	3	≤ 76 or ≤ 23	≥ 2.5	< 0.9	< 0.9	10	30°	15°	0.2 g
	4						25°		
	5	≤ 76 or ≤ 23	≤ 2.5	< 0.9	> 0.9	10	30°	30°	0.2 g
	6						25°	25°	
Weather restricted operations in non-benign areas for a duration <24 hours (see Section 7.9.2.d. For L/B < 1.4 use unrestricted case.)	7	any	≥ 2.5	any	any	10	10°	5°	0.1 g
	8	any	≤ 2.5, ≥ 1.4	any	any	10	10°	10°	0.1 g
Weather restricted operations in benign areas (see Section 7.9.2.e). For L/B < 1.4 use unrestricted case.	9	any	≥ 2.5	any	any	10	5°	2.5°	0.1 g
	10	any	≤ 2.5, ≥ 1.4	any	any	10	5°	5°	0.1 g
Inland and sheltered water transportations (see Section 7.9.2.f). For L/B < 1.4 use unrestricted case.	11	any	≥ 1.4	any	Static	Equivalent to 0.1 g in both directions			0.0
Independent leg jack-ups, ocean tow on own hull.	12	n/a	> 23	< 1.4	n/a	10	20°	20°	0.0
Independent leg jack-ups, 24-hour or location move.	13	n/a	> 23	< 1.4	n/a	10	10°	10°	0.0
Mat-type jack-ups, ocean tow on own hull.	14	n/a	> 23	< 1.4	n/a	13	16°	16°	0.0
Mat-type jack-ups, 24-hour or location move.	15	n/a	> 23	< 1.4	n/a	13	8°	8°	0.0

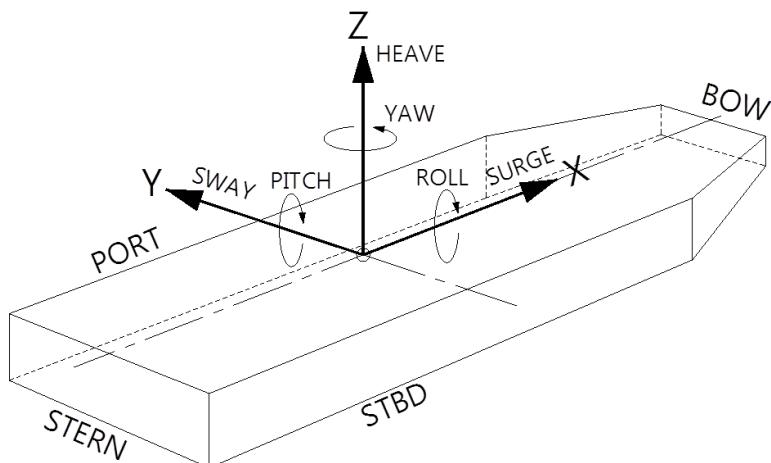
In reference to 3006-500A-DG5B6004, Acceleration Analysis for Module Transport (Sea), Motion Criteria developed Noble Denton is deemed acceptable to implement. Relative to actual barge size, unrestricted case 2 was assumed (highlighted above).

Default motion criteria shall only be applied in accordance with the following:

- Roll and Pitch axes shall be assumed to pass through the center of floatation.
- Heave shall be assumed to be parallel to the global vertical axis. Therefore, the component of heave parallel to deck at the roll or pitch angles shown above is additive to the forces caused by the static gravity component and by the roll or pitch acceleration.
- Phasing shall be assumed to combine, as separate load cases, the most severe combinations of roll +heave or pitch +heave.

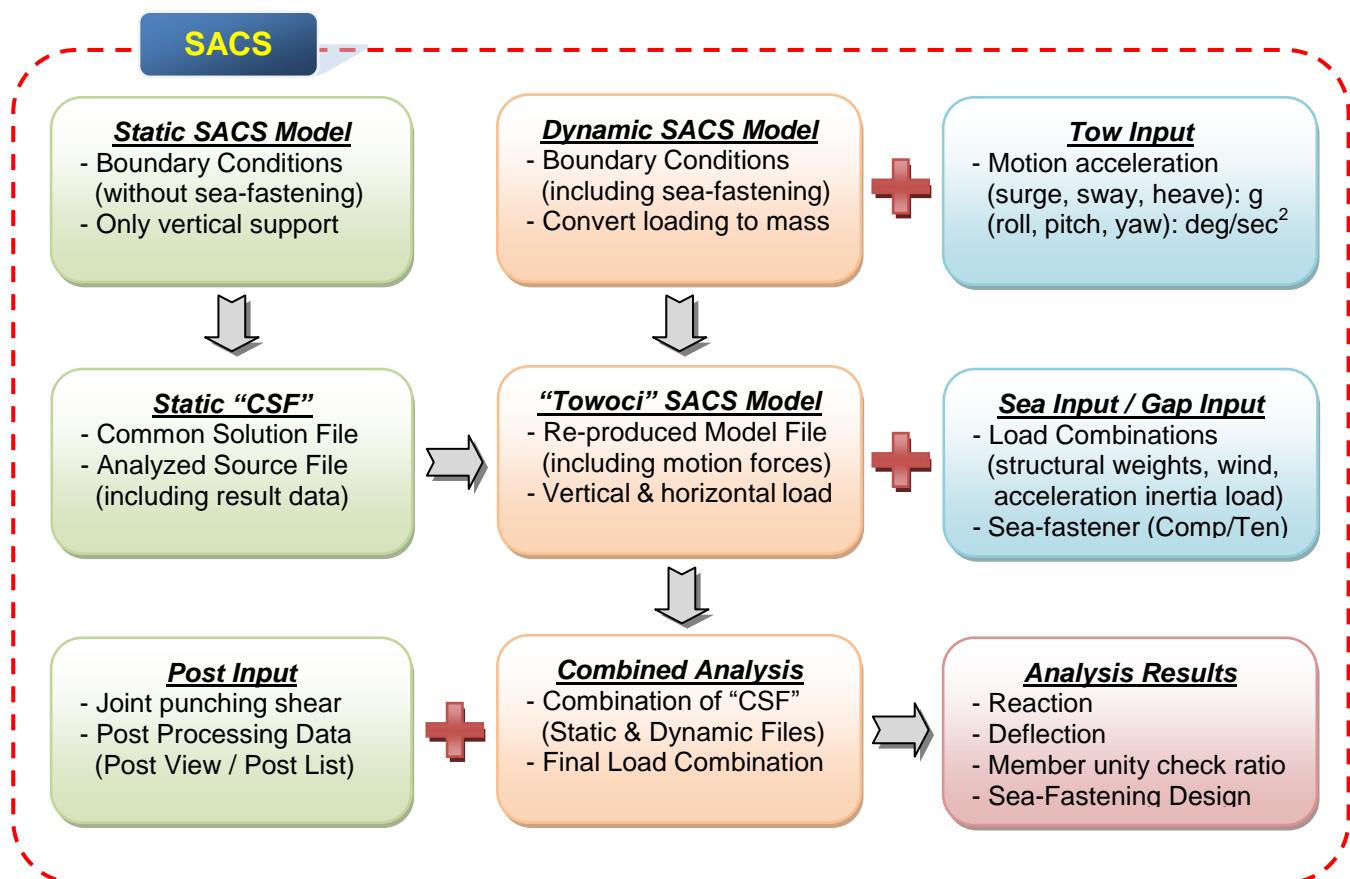
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2.2.3 Sea-Transportation / Sea-Fastening Design

The general concept for sea-transportation / sea-fastening design is shown as follows.



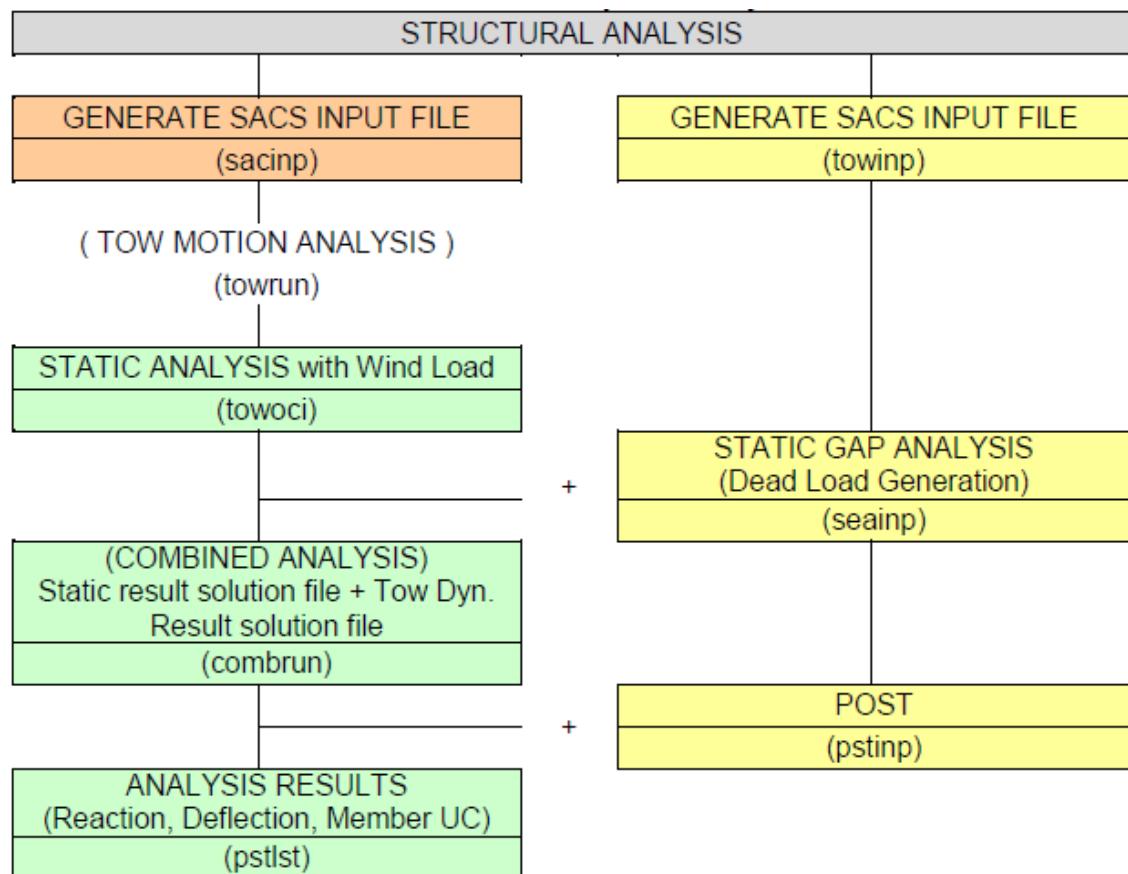
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2.2.3.1 Flow Chart for Sea-Transportation Analysis

Basically, combined analysis method has been used to consider the dead load of the module structure and the inertia force due to sea acceleration motion of the transportation vessel by using SACS program. To generate the individual loads, two separated models have been used in this analysis.

One is static model, the other is dynamic model that are analyzed by simple static module and tow module in SACS program separately. The final common solution files are combined by the combination module of SACS program as follow flow chart.



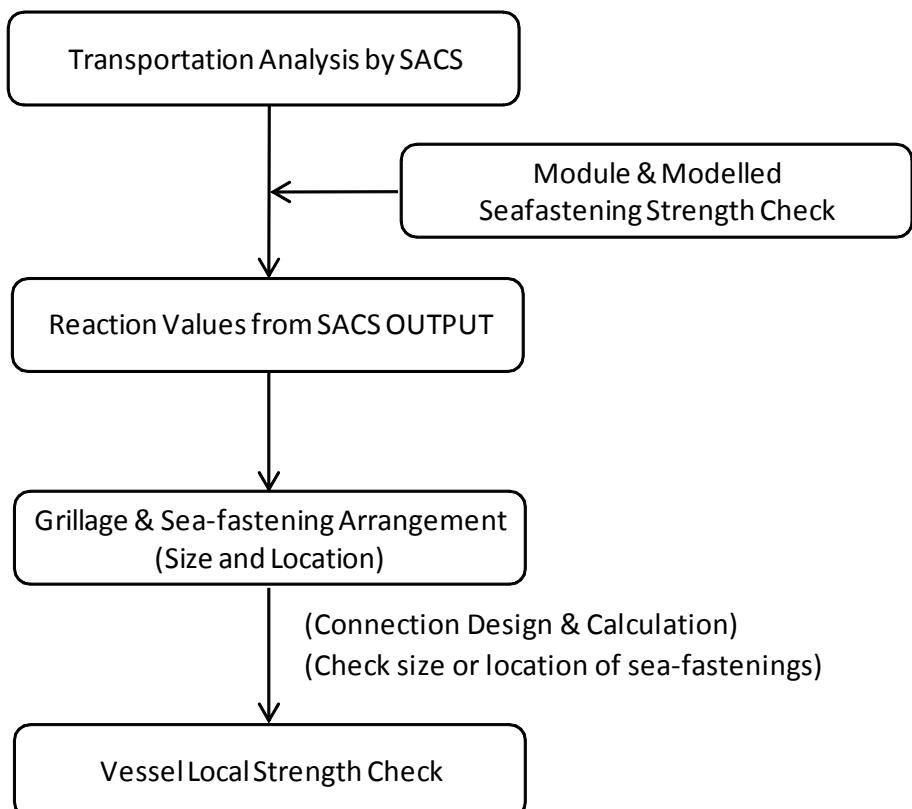
REFINING MAJOR PROJECTS GENERAL MANAGEMENT

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2.2.3.2 Flow Chart for Sea-Fastening Member Design

After the Sea-Transportation analysis by SACS program, the reactions from the output shall be used to design the temporary support members and foundations such as grillage beams, sea-fastening members, stoppers and so on.

Shown as the flow chart below, the procedure of sea-fastening design is as follows.



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2.3 LIFTING ANALYSIS

2.3.1 ANALYSIS METHODOLOGY

In accordance with Noble Denton Guidelines, load factor of 1.6 shall be used for Limit State code checking.

Target member unity check ration shall be in the range 0.90. Members will be re-sized where necessary in conjunction with result from other analysis.

The consequence factors of final load combination for member check are as follows:

- 1.15 for members directly supporting or framing in to lift points (columns with lifting lug)
- 1.00 for other structural members

The slings have been modelled in the analysis by representative elements and all sling element moments, with the exception of torsion, are to be released at both the hook and lift point joints. The minimum sling angle shall be 60° to horizontal.

Rotation of the structure is to be restrained horizontally using spring elements support with 10kN/m stiffness for numerical stability at two joints at rigid points of the structure.

The member forces derived from the above static analysis are used to check members for their adequacy using SACS POST module.

2.3.2 LIFTING LOAD FACTORS

2.3.2.1 C.O.G Inaccuracy

In reference to Chapter 5.5.3 of Noble Denton Guidelines for Marine Lifting Operations, C.O.G inaccuracy factor of 1.10 shall be applied if a C.O.G envelope is not used.

2.3.2.2 Skewing Effects

Skewing effect is to account for sling length mismatch in a statically indeterminate lift. In reference to Chapter 5.7.4 of Noble Denton Guidelines for Marine Lifting Operation, Skew Load Factor of 1.10 shall be used.

2.3.2.3 Dynamic Amplification Factors (DAFs)

DAF is the factor by which gross weight is multiplied, to account for accelerations and impacts during lifting operation. Chapter 5.6.1 of Noble Denton Guidelines for Marine Lifting Operation states that DAF factor of 1.0 have to be applied for onshore static lifts, where crane movement is limited to lifting or lowering.

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2.3.2.4 Consequence Factors

This is a factor to ensure that main structural members, lift points and spreader bars/frames have an increased factor of safety related to the consequence of failure.

Lifting lug	1.30
Attachments of lift points to structure	1.30
Members directly supporting or framing in to lift points (Columns with lifting lug)	1.15
Other structural members	1.00

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3 LOAD-OUT/LAND TRANSPORTATION

3.1 STRUCTURAL SIMULATION

3.1.1 STRUCTURAL MODEL

The module structure has been modeled including girders, columns, and supporting and reinforced beams as shown below. The self-weight of structural steel forming the primary structure is generated by the software. Secondary steel and all functional loads are applied as a distributed member loads and concentrated point loads in load cases. The other facilities are applied as an additional load case.

Global Coordinate System Definitions:

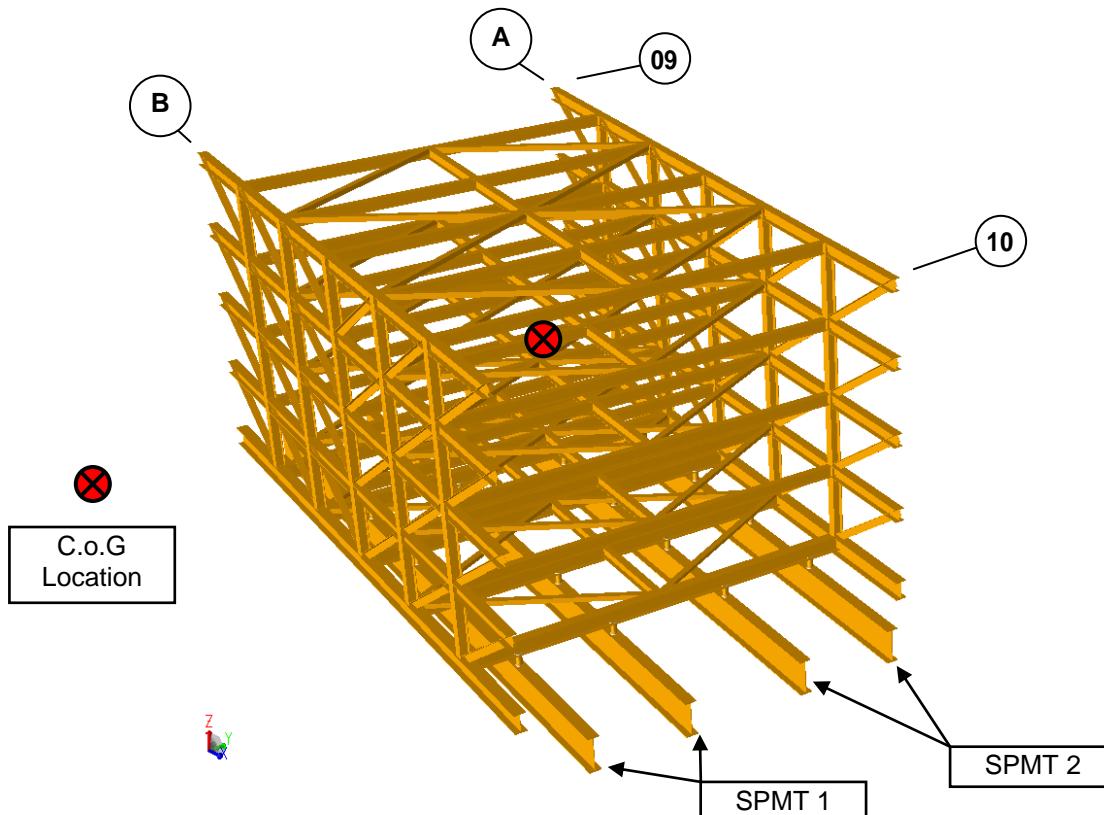
The location for origin coordinate (0,0,0) is assumed to the C.O.G of the module.

(+) X-direction : Load-out / Land transportation direction

(+) Y-direction : Transverse direction of load-out / land transportation

(+) Z-direction : Vertical direction from ground

The modeled configuration is figured as follows.



PIPE RACK UNIT 66C – 3D Model View of Module C30PR03

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3.1.2 BOUNDARY CONDITION

The boundary conditions for the analysis are applied as follows.

3.1.2.1 Against Translation

In the vertical direction (Z-dir.), the boundary condition is restrained because the structural weight acts downward.

In the horizontal direction (X or Y dir.), the boundary condition is restrained because the friction forces by timbers acts horizontally.

3.1.2.2 Against Rotation

In all the direction, the rotational boundary conditions are free.

3.1.2.3 Light Spring Constant

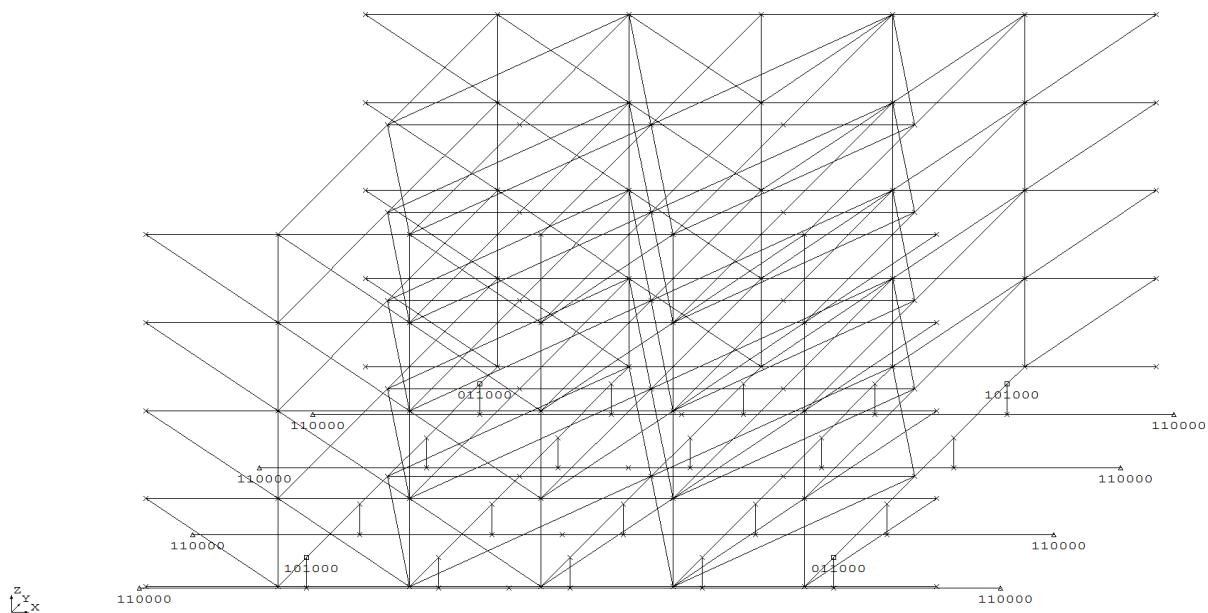
The spring constant shall be considered to prevent the rigid body motion because the up loading structure has some lateral and rotational resistance. In general, the diagonally opposite points are coupled in the same directions. Light spring constant is applied as the following values (10 kN/m)

Joint No.	SPRING CONSTANT			TRANSLATION			ROTATION		
	X(kN/m)	Y(kN/m)	Z(kN/m)	X	Y	Z	X	Y	Z
0000	-	10	10	0	0	0	0	0	0
0019	-	10	10	0	0	0	0	0	0
0004	10	-	10	0	0	0	0	0	0
0019	10	-	10	0	0	0	0	0	0
0040	-	-	-	1	1	0	0	0	0
0041	-	-	-	1	1	0	0	0	0
0042	-	-	-	1	1	0	0	0	0
0043	-	-	-	1	1	0	0	0	0
0044	-	-	-	1	1	0	0	0	0
0045	-	-	-	1	1	0	0	0	0
0046	-	-	-	1	1	0	0	0	0
0047	-	-	-	1	1	0	0	0	0

Note: 1 (Fixed), 0 (Free) in Translation and Rotation

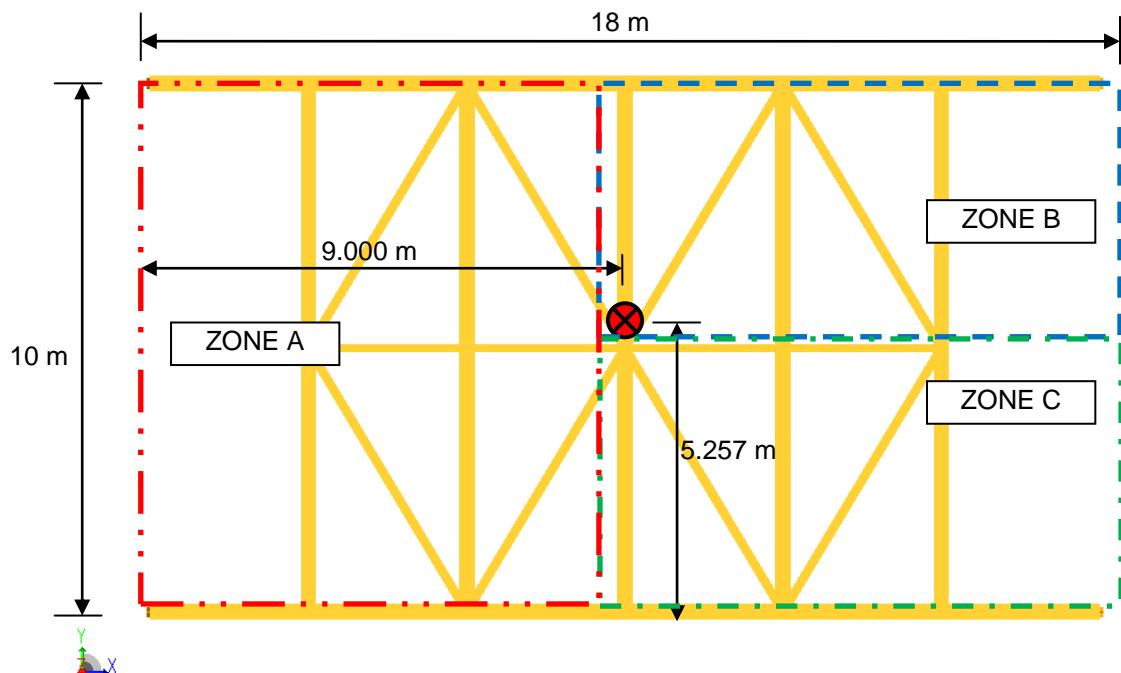
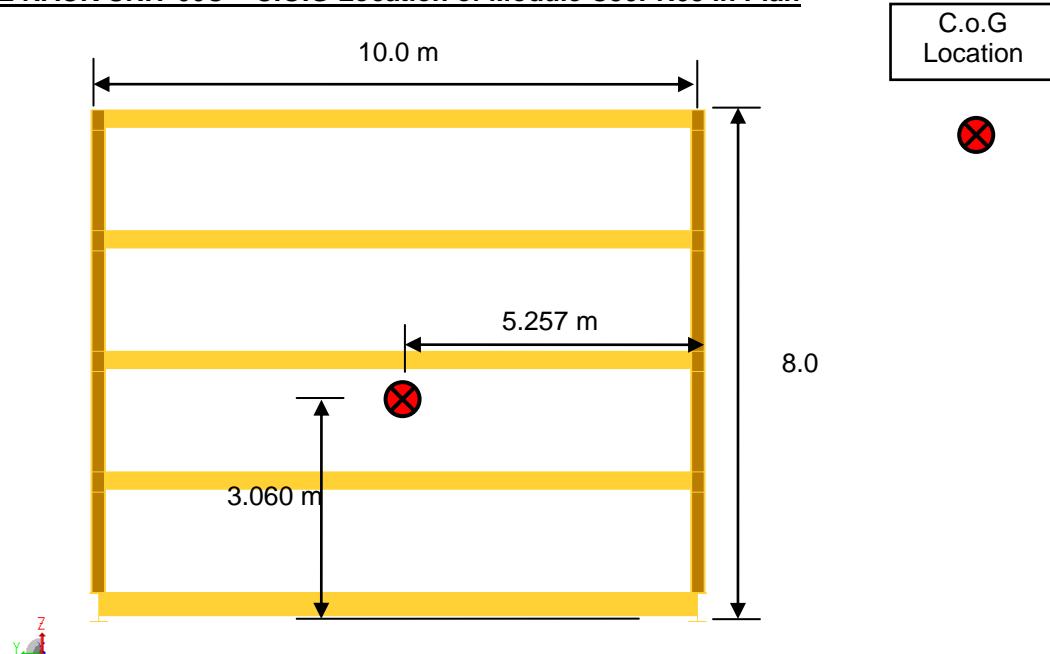
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3.1.3 INFORMATION OF C.O.G LOCATION

PIPE RACK UNIT 66C – C.O.G Location of Module C30PR03 in Plan

PIPE RACK UNIT 66C – C.O.G Location of Module C30PR03 in Section View

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Table 3.1.3.1:Weight Information

Description	Weight (kN)
Self-Weight(Structure Weight x CF1.10)	567.055
Cable Tray Load	10.948
Piping & Equipment Empty Load	308.700
Total	886.703

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3.1.4 COUPLE FORCE CALCULATION OF UNIT MOMENT FOR C.O.G ENVELOP

The couple force to generate unit moments about global X and Y is calculated to move C.O.G to the unfavourable points in each corner as follows;

COG Adjust Calculation for Analysis: COG SHIFT-A
FABRICATION STAGE

SACS COG	kN	kN-m	kN-m
x(m)	y(m)	Fz	Mx
0.0	0.0	-931.037	-0.357
			0.001

SHIFTED COG

x(m)	y(m)	Mx	My
-0.9	0.5	-465.876	-837.932

COG distance shall be moved

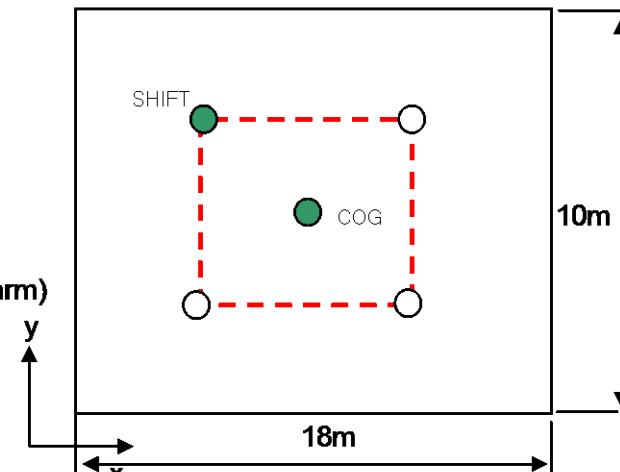
x	y
0.9	0.5

Needed Moments for COG Shift

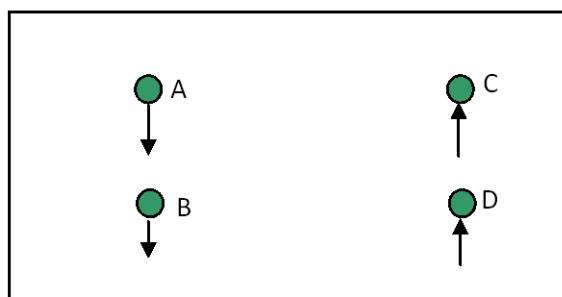
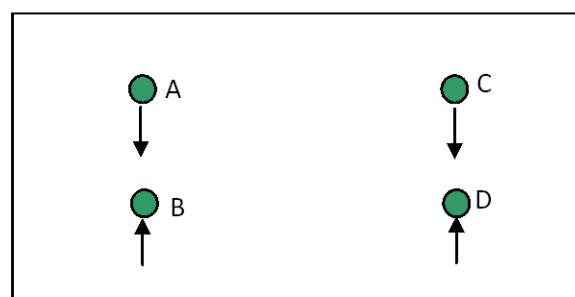
Mx	My
465.519	837.933

Distance between loading (coupling force arm)

x distance(m)	y distance(m)
18	10


Force shall be applied.

Fz(kN) for X direction	Fz(kN) for Y direction
23.276	23.276


X-direction move

Y-direction move

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COG Adjust Calculation for Analysis: COG SHIFT-B
FABRICATION STAGE
SACS COG

x(m)	y(m)	Fz	Mx	My
0.0	0.0	-931.037	-0.357	0.001

SHIFTED COG

x(m)	y(m)	Mx	My
-0.9	-0.5	465.162	-837.932

COG distance shall be moved

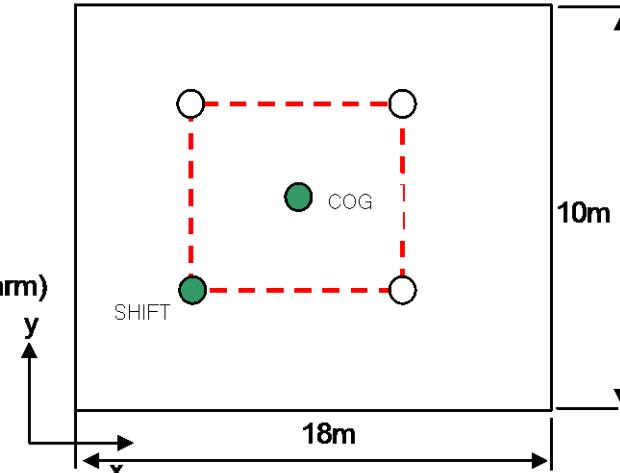
x	y
0.9	0.5

Needed Moments for COG Shift

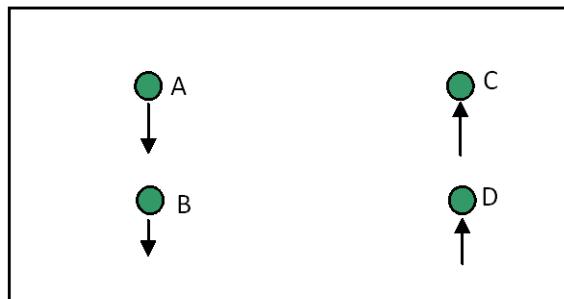
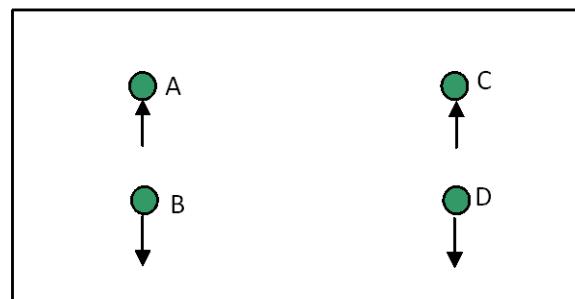
Mx	My
465.519	837.933

Distance between loading (coupling force arm)

x distance(m)	y distance(m)
18	10


Force shall be applied.

Fz(kN) for X direction	Fz(kN) for Y direction
23.276	23.276


X-direction move

Y-direction move

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COG Adjust Calculation for Analysis: COG SHIFT-C
FABRICATION STAGE
SACS COG

x(m)	y(m)	Fz	Mx	My
0.0	0.0	-931.037	-0.357	0.001

SHIFTED COG

x(m)	y(m)	Mx	My
0.9	0.5	-465.876	837.934

COG distance shall be moved

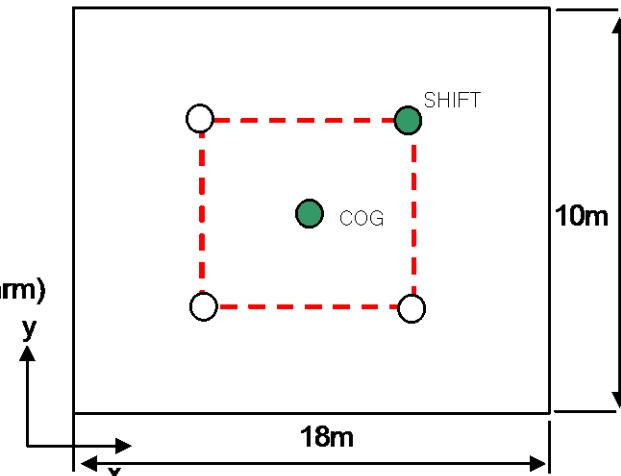
x	y
0.9	0.5

Needed Moments for COG Shift

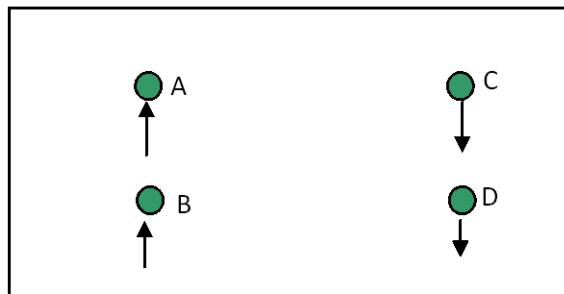
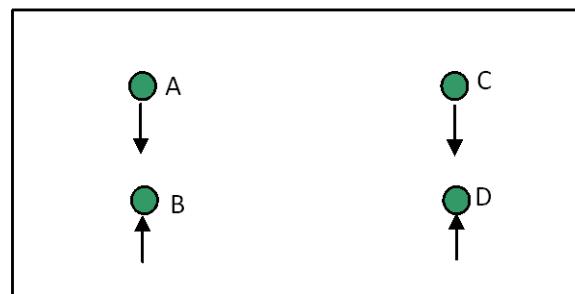
Mx	My
465.519	837.933

Distance between loading (coupling force arm)

x distance(m)	y distance(m)
18	10


Force shall be applied.

Fz(kN) for X direction	Fz(kN) for Y direction
23.276	23.276


X-direction move

Y-direction move

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121	
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A	
UNIT: INTERCONNECTIONS	REV.A DATE : 08-08-13	
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COG Adjust Calculation for Analysis: COG SHIFT-D
FABRICATION STAGE
SACS COG

x(m)	y(m)	Fz	Mx	My
0.0	0.0	-931.037	-0.357	0.001

SHIFTED COG

x(m)	y(m)	Mx	My
0.9	-0.5	465.162	837.934

COG distance shall be moved

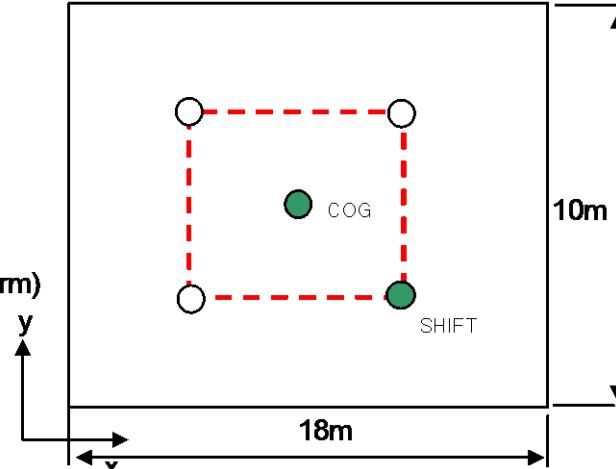
x	y
0.9	0.5

Needed Moments for COG Shift

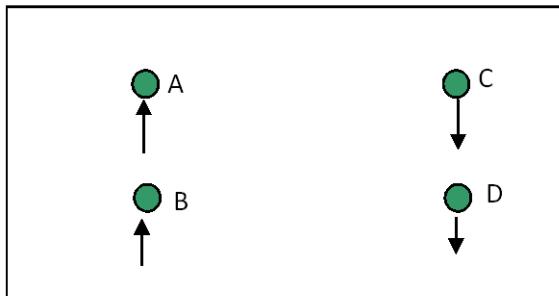
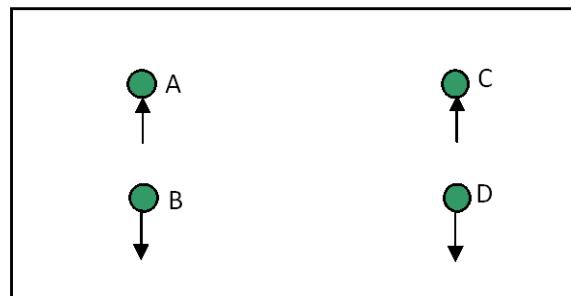
Mx	My
465.519	837.933

Distance between loading (coupling force arm)

x distance(m)	y distance(m)
18	10


Force shall be applied.

Fz(kN) for X direction	Fz(kN) for Y direction
23.276	23.276


X-direction move

Y-direction move

The obtained applied jack load in this step shall be combined in the SACS analysis input files.

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3.1.5 JACK FORCE CALCULATION OF ZONES ACCORDING TO C.O.G ENVELOP
LOADCASE 60

	X	Y	Fz	Mx	My
CoG	0.000	0.000	-931.037	-0.357	0.001
Jack Group					
	Jack Load		Jacking Group CoG		
	(KN)	(KN/m)	X	Y	Length
A	-399.016	-11.8755	-5.600	0.000	33.600
B	-266.076	-11.8784	4.200	2.728	22.400
C	-265.945	-11.8726	4.200	-2.728	22.400
Total	-931.037				

LOADCASE 61

	X	Y	Fz	Mx	My
CoG	-0.900	0.500	-931.037	-465.877	-837.935
Jack Group					
	Jack Load		Jacking Group CoG		
	(KN)	(KN/m)	X	Y	Length
A	-484.519	-14.4202	-5.600	0.000	33.600
B	-308.647	-13.7789	4.200	2.728	22.400
C	-137.871	-6.1549	4.200	-2.728	22.400
Total	-931.037				

LOADCASE 62

	X	Y	Fz	Mx	My
CoG	-0.900	-0.500	-931.037	465.163	-837.935
Jack Group					
	Jack Load		Jacking Group CoG		
	(KN)	(KN/m)	X	Y	Length
A	-484.519	-14.4202	-5.600	0.000	33.600
B	-138.002	-6.1608	4.200	2.728	22.400
C	-308.516	-13.7730	4.200	-2.728	22.400
Total	-931.037				

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	REV.A DATE : 08-08-13
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LOADCASE 63

	X	Y	Fz	Mx	My
CoG	0.900	0.500	-931.037	-465.877	837.937

Jack Group	Jack Load		Jacking Group CoG		Length
	(KN)	(KN/m)	X	Y	
A	-313.512	-9.3307	-5.600	0.000	33.600
B	-394.150	-17.5960	4.200	2.728	22.400
C	-223.374	-9.9721	4.200	-2.728	22.400
Total	-931.037				

LOADCASE 64

	X	Y	Fz	Mx	My
CoG	0.900	-0.500	-931.037	465.163	837.937

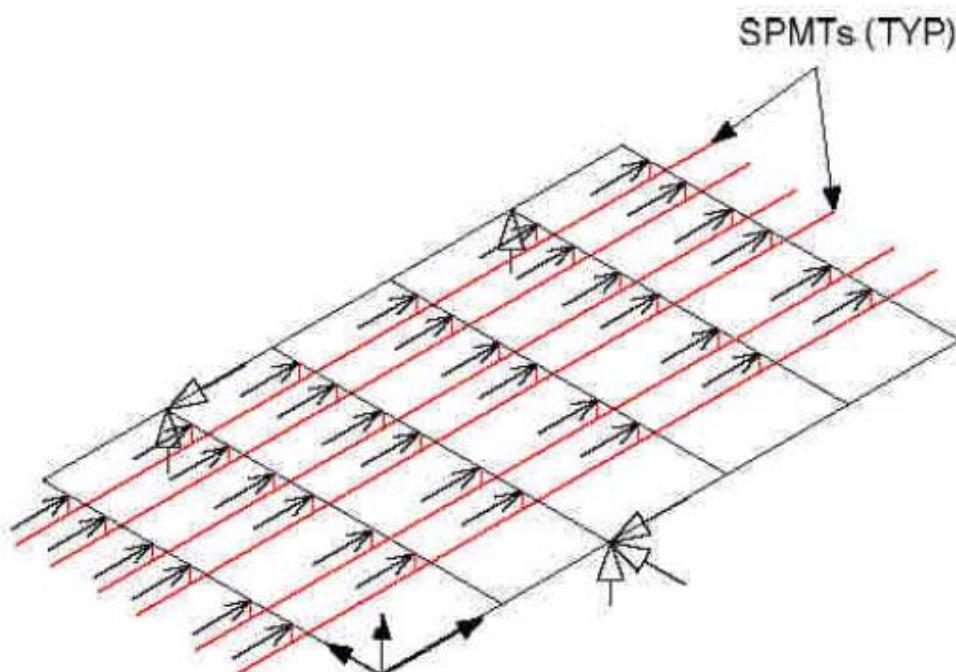
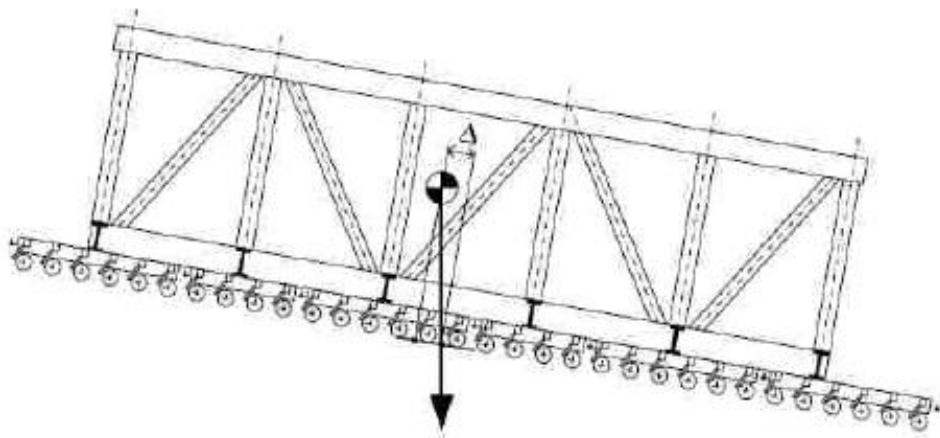
Jack Group	Jack Load		Jacking Group CoG		Length
	(KN)	(KN/m)	X	Y	
A	-313.512	-9.3307	-5.600	0.000	33.600
B	-223.505	-9.9779	4.200	2.728	22.400
C	-394.020	-17.5902	4.200	-2.728	22.400
Total	-931.037				

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121	
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A	
UNIT: INTERCONNECTIONS	REV.A	
AREA: MACOTAL AREA	DATE : 08-08-13	
PHASE: DETAILED ENGINEERING	TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
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3.1.6 LONGITUDINAL FORCE DUE TO EFFECT OF MODULE TILT AND ACCELERATION

Moving the module on an inclined roadway produces an apparent C.O.G shift, Δ with respect to the SPMT shown as below. The analysis shall consider a 12% tilt in each longitudinal direction to cover movement on an incline (7%) and acceleration (0.05g = 5%).



REFINING MAJOR PROJECTS GENERAL MANAGEMENT

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SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	REV.A DATE : 08-08-13
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3.1.7 TRANSVERSE FORCE DUE TO ACCELERATION

Acceleration of 0.02g (2%) shall be considered for transverse direction.

Transverse force due to acceleration fo 2% shall be treated same as Longitudinal Load which will be loaded as horizontal loads at the deck joints in the transverse direction.

3.1.8 VERTICAL IMPACT LOAD

Vertical impact load of 5% shall be considered as an increase in Gravity Loads of the Module and will be included in the analysis. Additional 5% impact load will be incorporated in load combination.

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121	
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A	
UNIT: INTERCONNECTIONS	REV.A	
AREA: MACOTAL AREA	DATE : 08-08-13	
PHASE: DETAILED ENGINEERING	TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
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3.2 DESIGN LOAD CONDITIONS

3.2.1 BASIC LOAD CONDITIONS

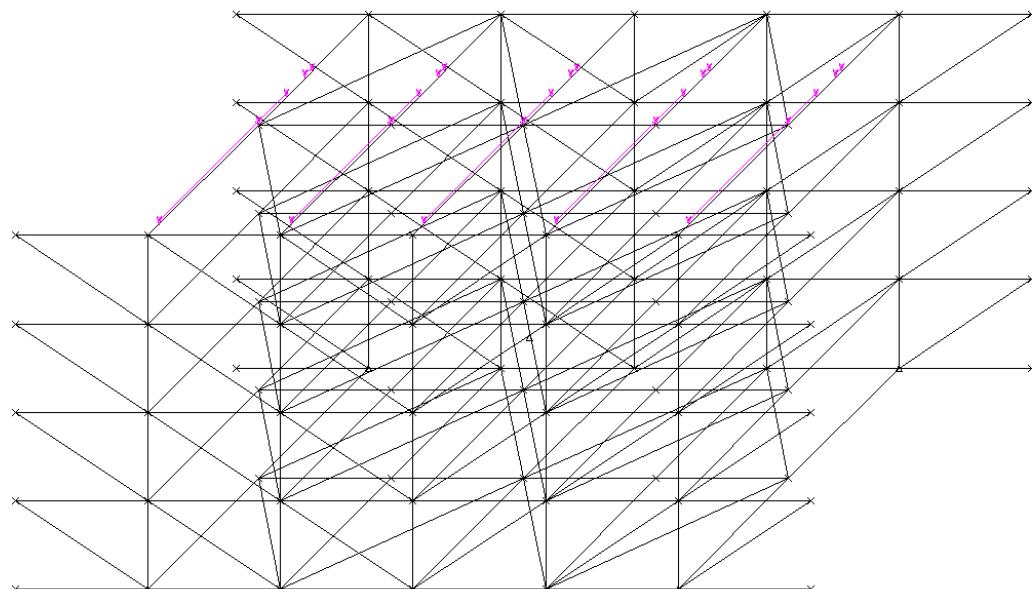
Following load cases are considered in structural analysis for load-out / land transportation condition.

Load case 1 : Self-Weight

The self-weight including dead weight for structural steel is generated automatically by the SACS computer program.

Load case 2 : Cable Tray Load

Cable Tray Load, the structural element of the cable tray not included in the model, is given by the electrical and instrument department and is applied on proper locations of members in the design.

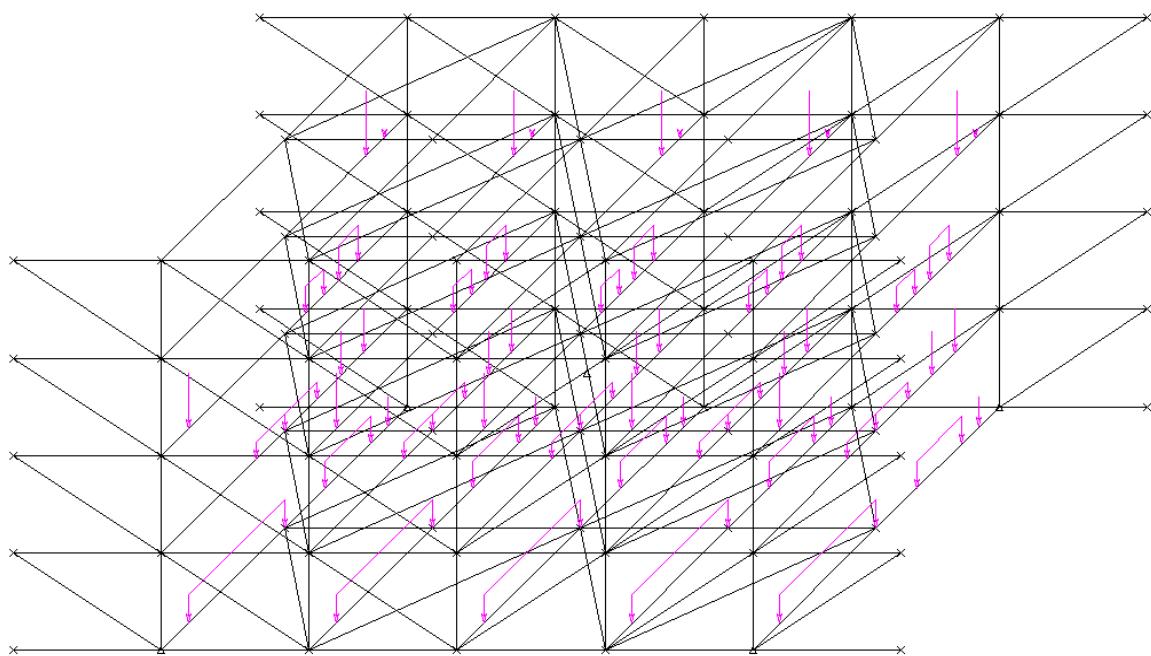


REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	
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Load case 4 : Piping Empty Load

Empty weight shall be defined as the weight of all pipes, insulation and valves as dead load.

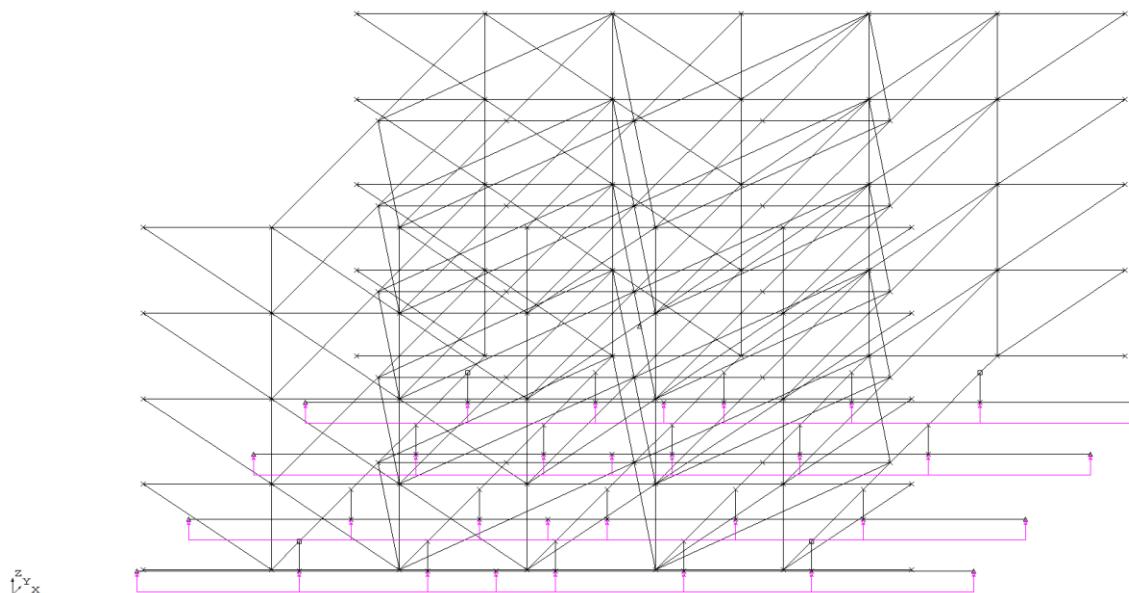


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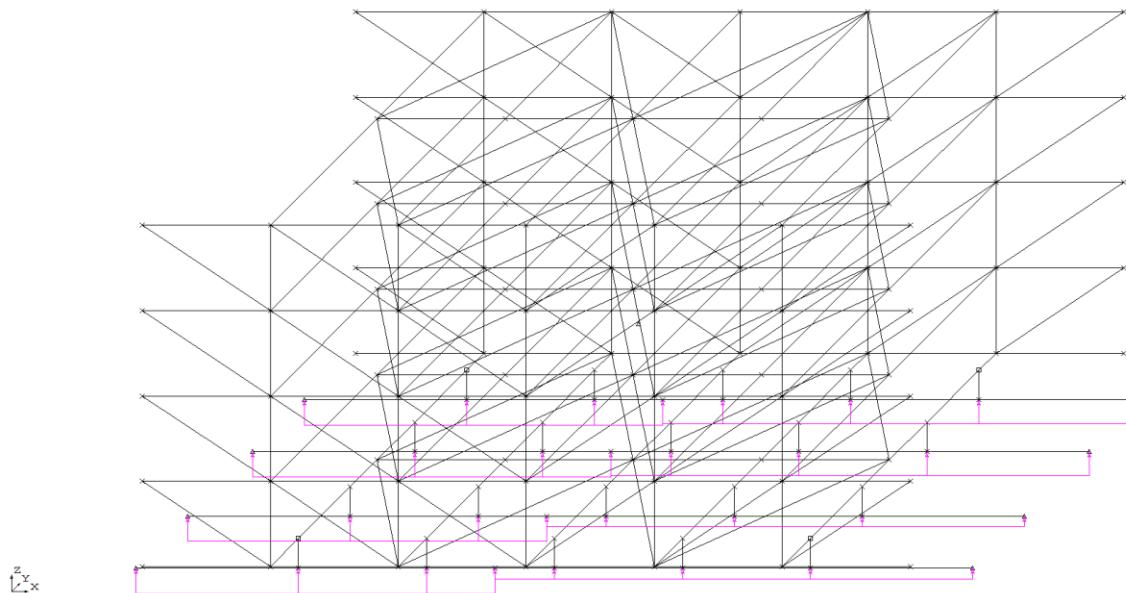
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UNIT: INTERCONNECTIONS	REV.A	
AREA: MACOTAL AREA	DATE : 08-08-13	
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Load case 60 : Jacking Load

Have No Consideration for C.O.G Shift


Load case 61 : Jacking Load

Have a Consideration for C.O.G Shift direction +X,+Y

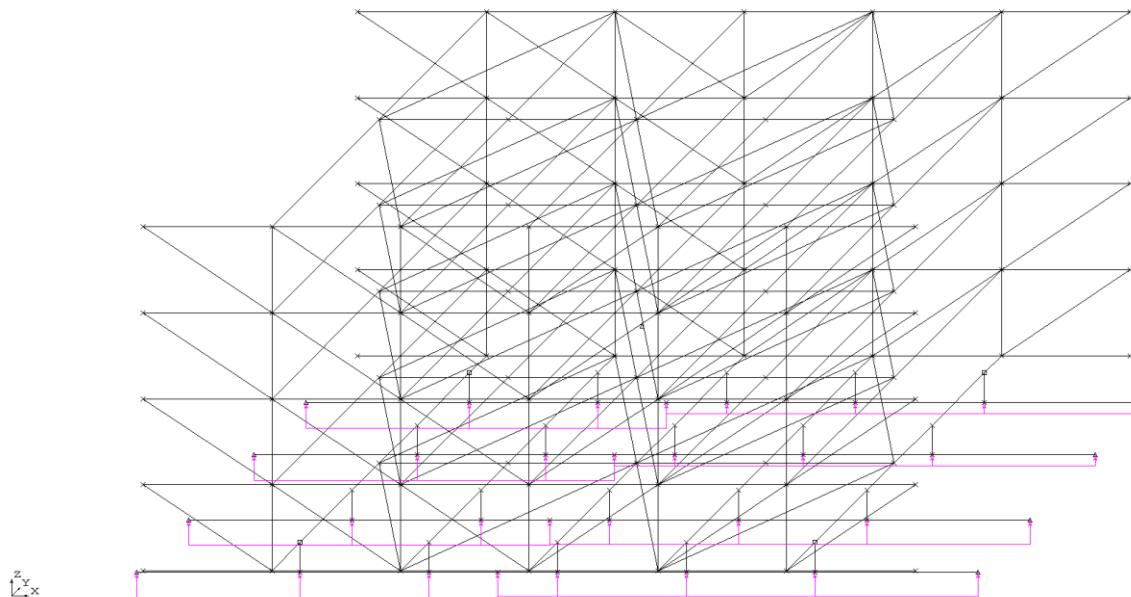


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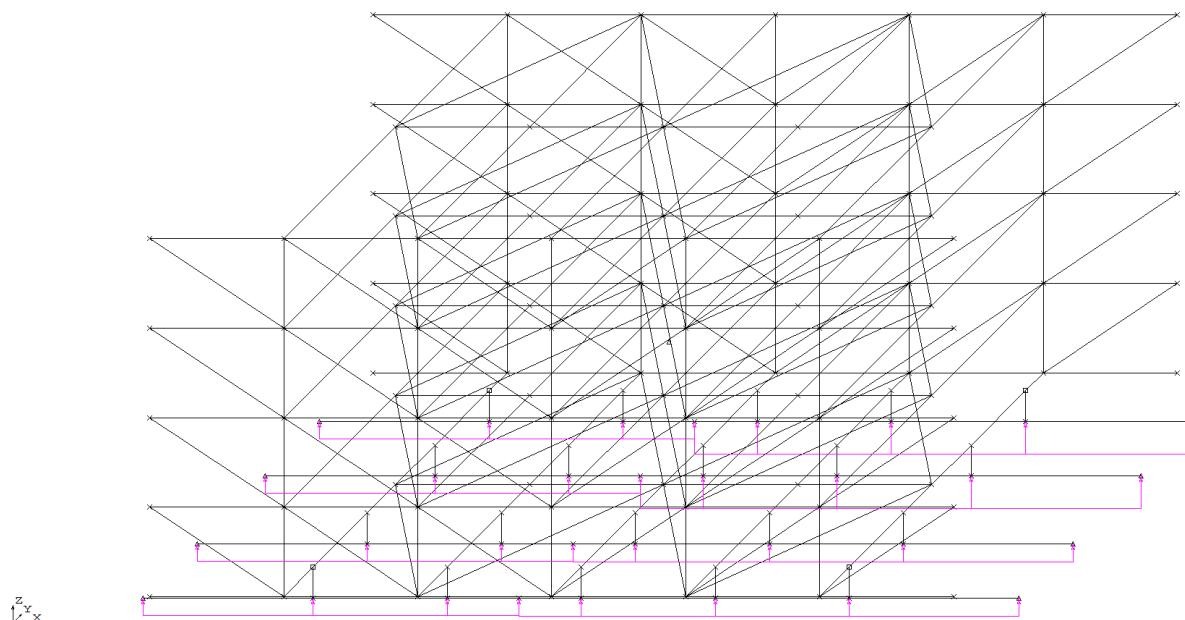
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SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	
PHASE: DETAILED ENGINEERING	
DISCIPLINE: CIVIL	REV.A DATE : 08-08-13
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Load case 62 : Jacking Load

Have a Consideration for C.O.G Shift direction +X,-Y


Load case 63 : Jacking Load

Have a Consideration for C.O.G Shift direction -X,+Y

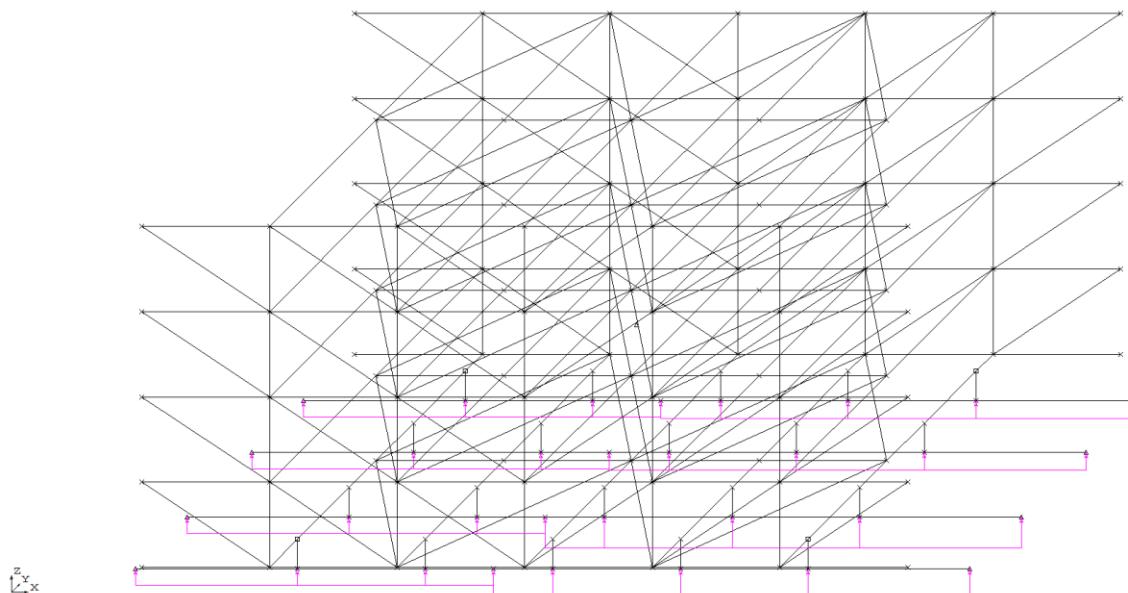


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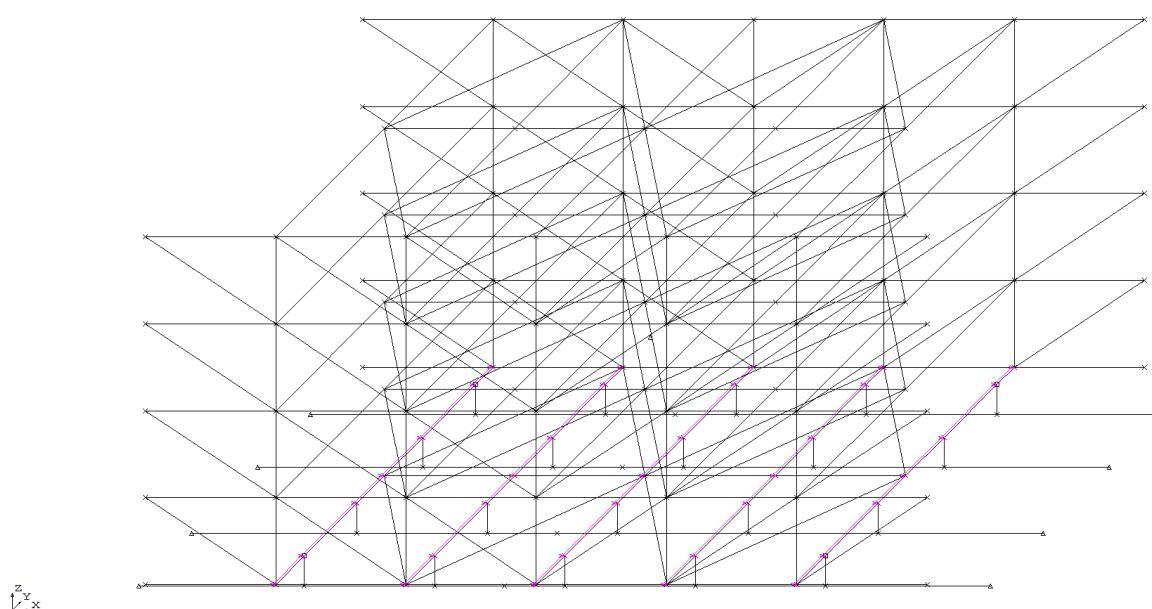
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SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	
PHASE: DETAILED ENGINEERING	
DISCIPLINE: CIVIL	REV.A DATE : 08-08-13
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Load case 64 : Jacking Load

Have a Consideration for C.O.G Shift direction -X,-Y


Load case 70 : Acceleration Load (X Direction)

The Acceleration Load, Have a Consideration for Longitudinal Force due to tilt and acceleration.

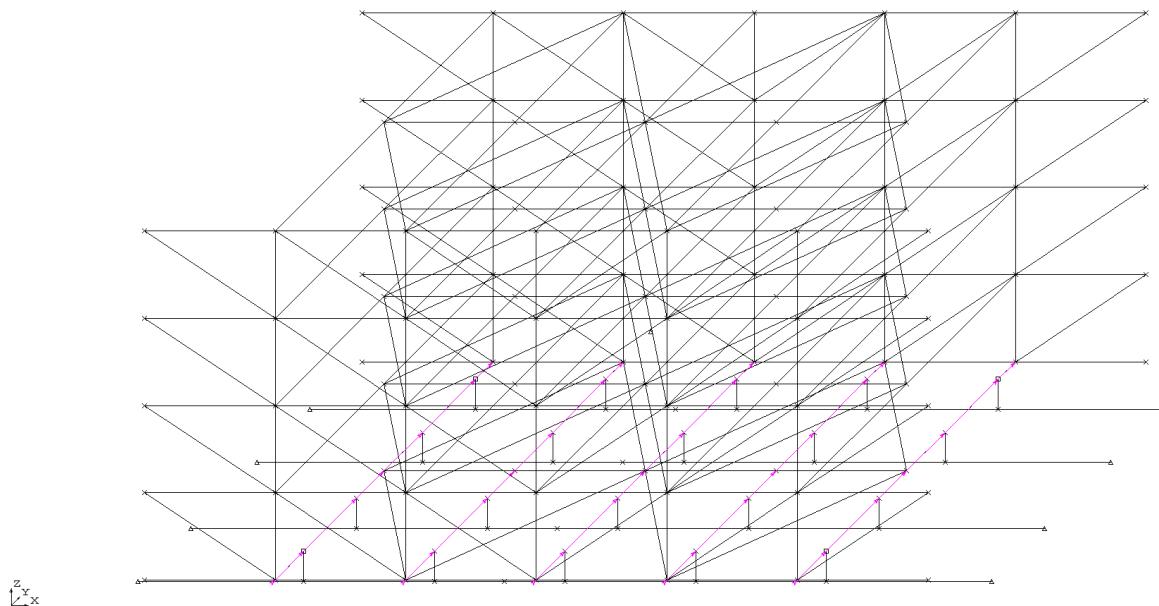


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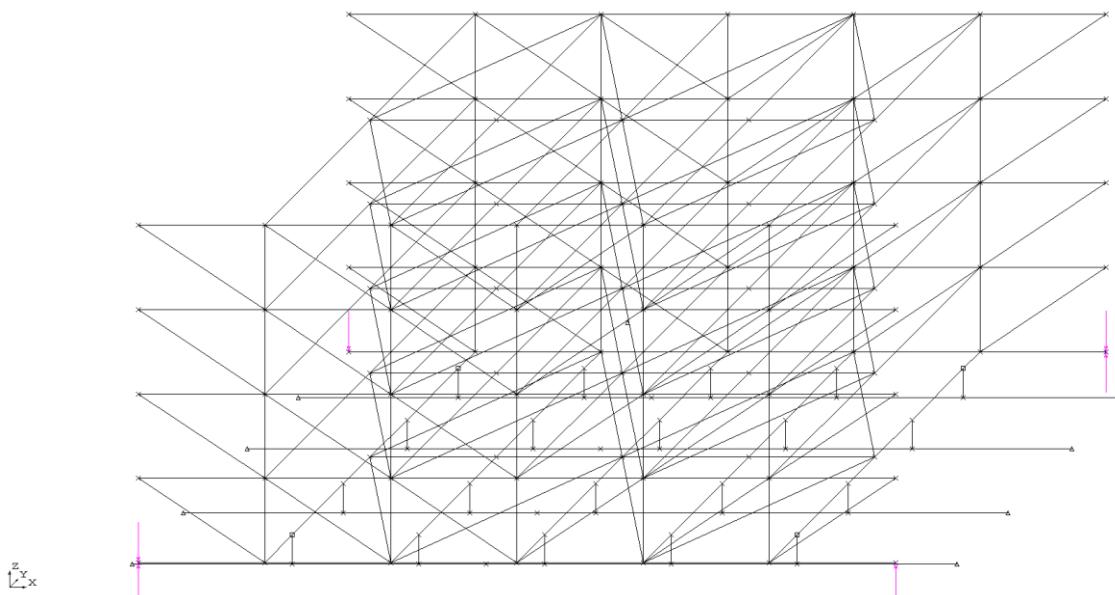
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SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A	
UNIT: INTERCONNECTIONS	REV.A	
AREA: MACOTAL AREA	DATE : 08-08-13	
PHASE: DETAILED ENGINEERING	TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
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Load case 71 : Acceleration Load(Y Direction)

The Acceleration Load, Have a Consideration for Longitudinal Force due to tilt and acceleration.


Load case 9A : Couple Force

Have a Consideration for C.O.G Shift direction -X,+Y

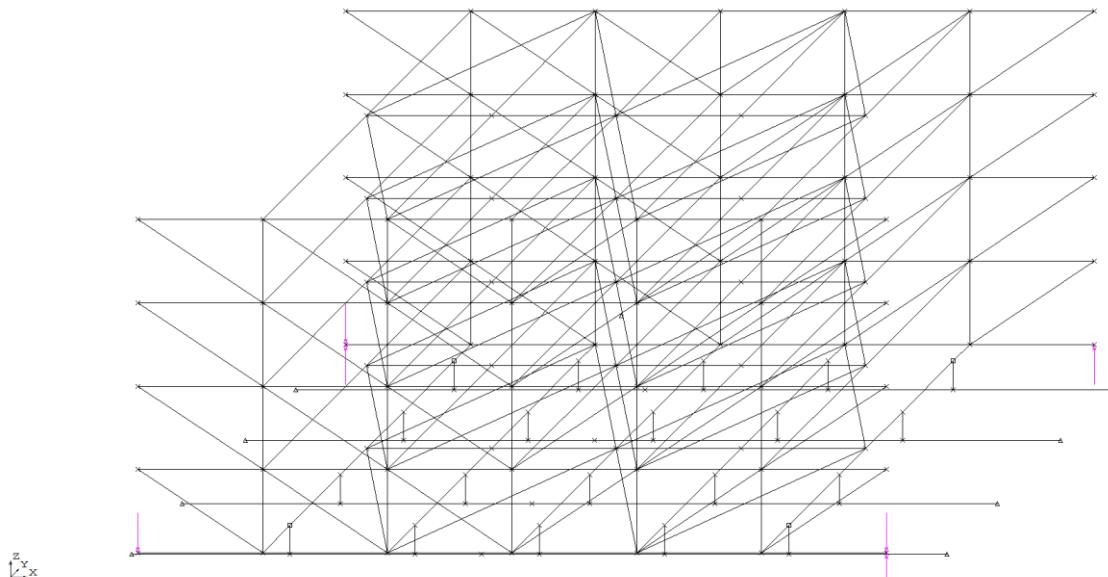


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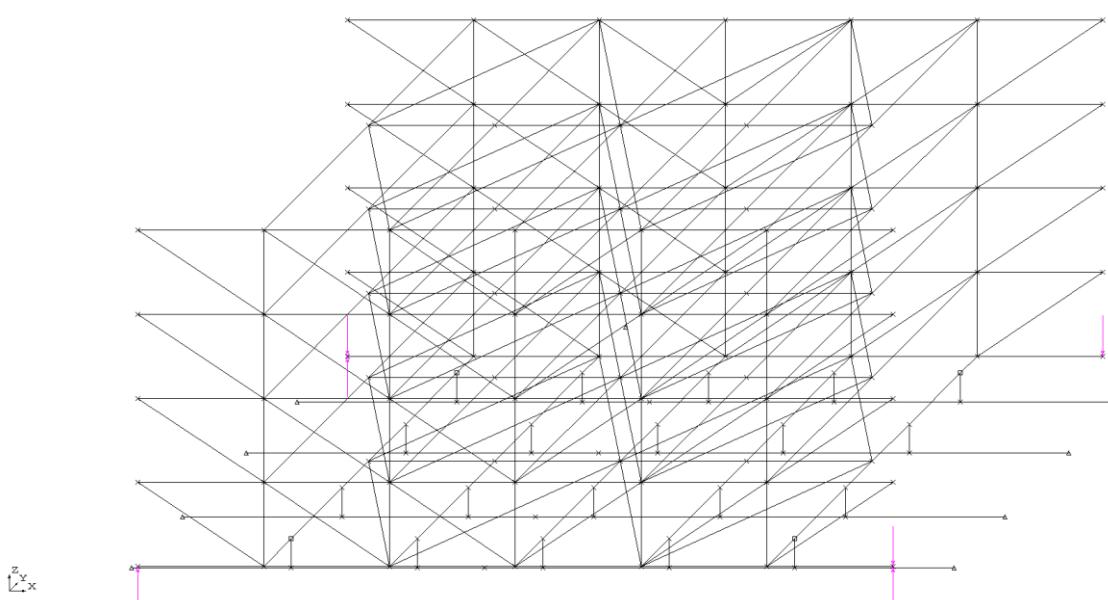
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SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	REV.A DATE : 08-08-13
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Load case 9B : Couple Force

Have a Consideration for C.O.G Shift direction -X,-Y


Load case 9C : Couple Force

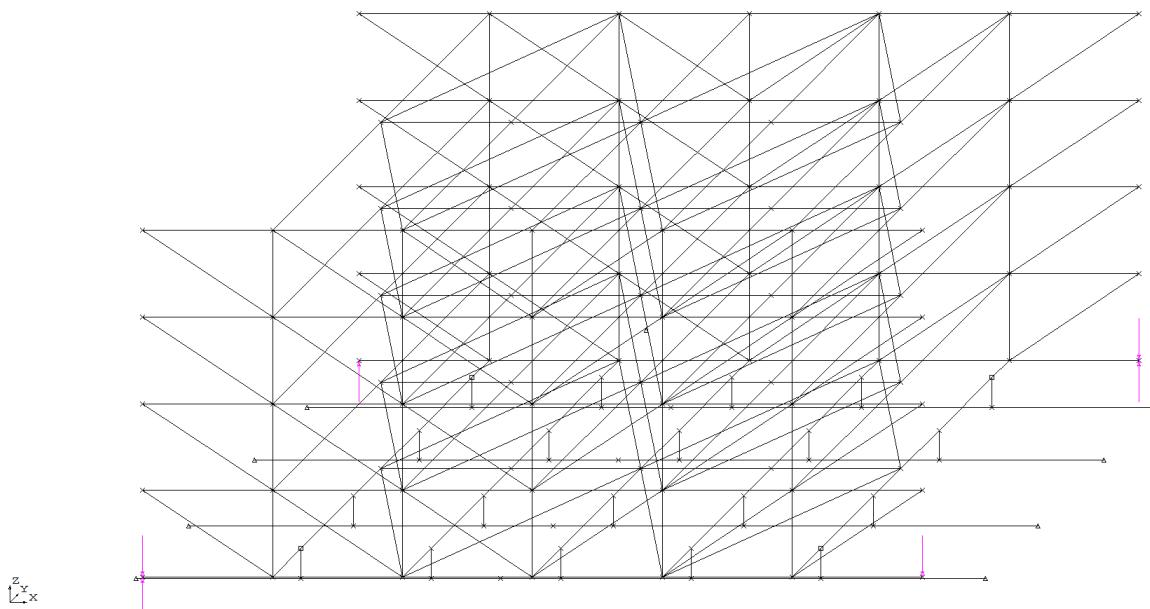
Have a Consideration for C.O.G Shift direction +X,+Y


Load case 9D : Couple Force

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
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UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	
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Have a Consideration for C.O.G Shift direction +X,-Y



The basic loads for SPMT Load-out analysis are shown below.

No.	Description	FX (kN)	FY (kN)	FZ (kN)
1	Self-Weight	0.000	0.000	-515.500
2	Cable tray Load	0.000	0.000	-10.950
4	Piping & Equipment Empty Load	0.000	0.000	-308.700
60	Jacking load for No C.O.G Shift	0.000	0.000	931.040
61	Jacking load for C.O.G Shift direction +X, +Y	0.000	0.000	931.040
62	Jacking load for C.O.G Shift direction +X, -Y	0.000	0.000	931.040
63	Jacking load for C.O.G Shift direction -X, +Y	0.000	0.000	931.040
64	Jacking load for C.O.G Shift direction -X, -Y	0.000	0.000	931.040
70	Longitudinal Force due to tilt and acceleration	46.550	0.000	0.000
71	Transverse Force due to acceleration	0.000	18.620	0.000
9A	Couple Force for C.O.G Shift direction +X, +Y	0.000	0.000	0.000
9B	Couple Force for C.O.G Shift direction +X, -Y	0.000	0.000	0.000
9C	Couple Force for C.O.G Shift direction -X, +Y	0.000	0.000	0.000
9D	Couple Force for C.O.G Shift direction -X, -Y	0.000	0.000	0.000

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

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PHASE: DETAILED ENGINEERING	REV.A DATE : 08-08-13
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3.2.2 LOAD COMBINATIONS

Following load combinations are considered in structural analysis for SPMT Load-out / Land transportation conditions respectively.

Table 3.2.2.1:Load-out Combinations

Combined Load Case	Description
10 (Base)	Basic load combination (permanent structural loadings without contingency) LC#1 x 1.10 + LC#2 x 1.00 + LC#4 x 1.00
15	Vertical impact load LC#10 x 1.05
100	Factored load combination with jacking loads (without C.O.G shift effect) LC#15 x 1.00 + LC#60 x 1.00
101	Factored load combination with jacking loads (with C.O.G shift effect, -X,+Y, Acceleration load -X,+Y) LC#15 x 1.00 + LC#9Ax 1.00 + LC#61x 1.00 + LC#70x -1.00 + LC#71x 1.00
102	Factored load combination with jacking loads (with C.O.G shift effect, -X,-Y, Acceleration load -X,-Y) LC#15 x 1.00 + LC#9Cx 1.00 + LC#62x 1.00 + LC#70x -1.00 + LC#71x -1.00
103	Factored load combination with jacking loads (with C.O.G shift effect, +X,+Y, Acceleration load +X,+Y) LC#15 x 1.00 + LC#9Bx 1.00 + LC#63x 1.00 + LC#70x 1.00 + LC#71x 1.00
104	Factored load combination with jacking loads (with C.O.G shift effect, +X,-Y, Acceleration load +X,-Y) LC#15 x 1.00 + LC#9Dx 1.00 + LC#64x 1.00 + LC#70x 1.00 + LC#71x -1.00
110	Factored load combination (LRFD factor for Load out/Transportation design of 1.60) LC#100 x 1.60
111	Factored load combination (LRFD factor for Load out/Transportation design of 1.60) LC#101 x 1.60
112	Factored load combination (LRFD factor for Load out/Transportation design of 1.60) LC#102 x 1.60
113	Factored load combination (LRFD factor for Load out/Transportation design of 1.60) LC#103 x 1.60
114	Factored load combination (LRFD factor for Load out/Transportation design of 1.60) LC#104 x 1.60

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	REV.A DATE : 08-08-13
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The combined load cases are shown below.

Table 3.2.2.3:Load-out Combinations Summary

LDCN	FX (kN)	FY (kN)	FZ (kN)	Mx (kN-m)	My (kN-m)	Mz (kN-m)	Remark
10	0.000	0.000	-886.700	-0.300	0.000	0.000	
15	0.000	0.000	-931.040	-0.400	0.000	0.000	
100	0.000	0.000	0.000	0.000	0.000	0.000	
101	-46.550	18.620	0.000	3.600	9.100	-12.000	With C.o.G Shift, Acceleration Load & Jacking Loads
102	-46.550	-18.620	0.000	-3.600	9.100	-12.000	
103	46.550	18.620	0.000	3.600	-9.100	12.000	
104	46.550	-18.620	0.000	-3.600	-9.100	12.000	
110	0.000	0.000	0.000	0.000	0.000	0.000	
111	-74.480	29.790	0.000	5.800	14.500	-19.100	LRFD factor for Load out/Transportation design
112	-74.480	-29.790	0.000	-5.800	14.500	-19.100	
113	74.480	29.790	0.000	5.800	-14.500	19.100	
114	74.480	-29.790	0.000	-5.800	-14.500	19.100	

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT SUBPROJECT: OFFSITES UNIT: INTERCONNECTIONS AREA: MACOTAL AREA PHASE: DETAILED ENGINEERING DISCIPLINE: CIVIL TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE) PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	PDVSA DOC. No. 3006-466C-DC406121
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3.3 SUMMARY OF ANALYSIS RESULT

3.3.1 Summary for Load

The applied weights are summarized as below.

Structural Weight	Structural Weight From STAAD (kN)	Structural Weight From SACS(kN)	Difference (kN)
Dead Load (Steel Self Weight)	515.191	515.500	0.309
Cable Tray	11.030	10.950	-0.080
Piping & Equipment Load - Empty	308.870	308.700	-0.170
TOTAL	835.091	835.150	0.059

3.3.2 Check Capacity of Modular Transporters (Hold)

The applied weights are summarized as below.

- Capacity per 1 axle : 34 Ton
- Cargo weight : 90.3 Ton
- Total quantity of axle : 28 axles (2 Rows)
- Limitation of capacity : 14 axles x 2 rows x 34 Ton = 952 Ton
- Ratio of loading : $90.3 / 952.0 = 9.48\%$ (Should be less than $80 \pm 3\%$, OK)

3.3.3 REACTION FORCES SUMMARY

The Maximum reaction forces at spring conditions are shown below.

Joint No.	Load Case	Fx (kN)	Fy (kN)	Fz (kZ)
0000	114	0.000	0.273	-2.479
0004	112	0.178	0.000	-2.416
0015	113	-0.183	0.000	-2.465
0019	111	0.000	-0.281	-2.398
Sum		-0.005	-0.008	-9.758

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

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UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	
PHASE: DETAILED ENGINEERING	
DISCIPLINE: CIVIL	REV.A DATE : 08-08-13
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The Maximum reaction forces at boundary conditions for land transportation are shown below.

Joint No.	Load Case	Fx (kN)	Fy (kN)	Fz (kZ)
0040	112	-154.706	0.123	0.000
0041	114	-206.521	2.982	0.000
0042	113	-201.589	-2.981	0.000
0043	111	-134.613	-0.074	0.000
0044	112	162.574	3.165	0.000
0045	112	227.611	4.031	0.000
0046	111	223.245	-4.144	0.000
0047	111	136.528	-3.399	0.000
Sum		52.529	-0.297	0.000

3.3.4 MEMBER UNITY CHECK RESULT

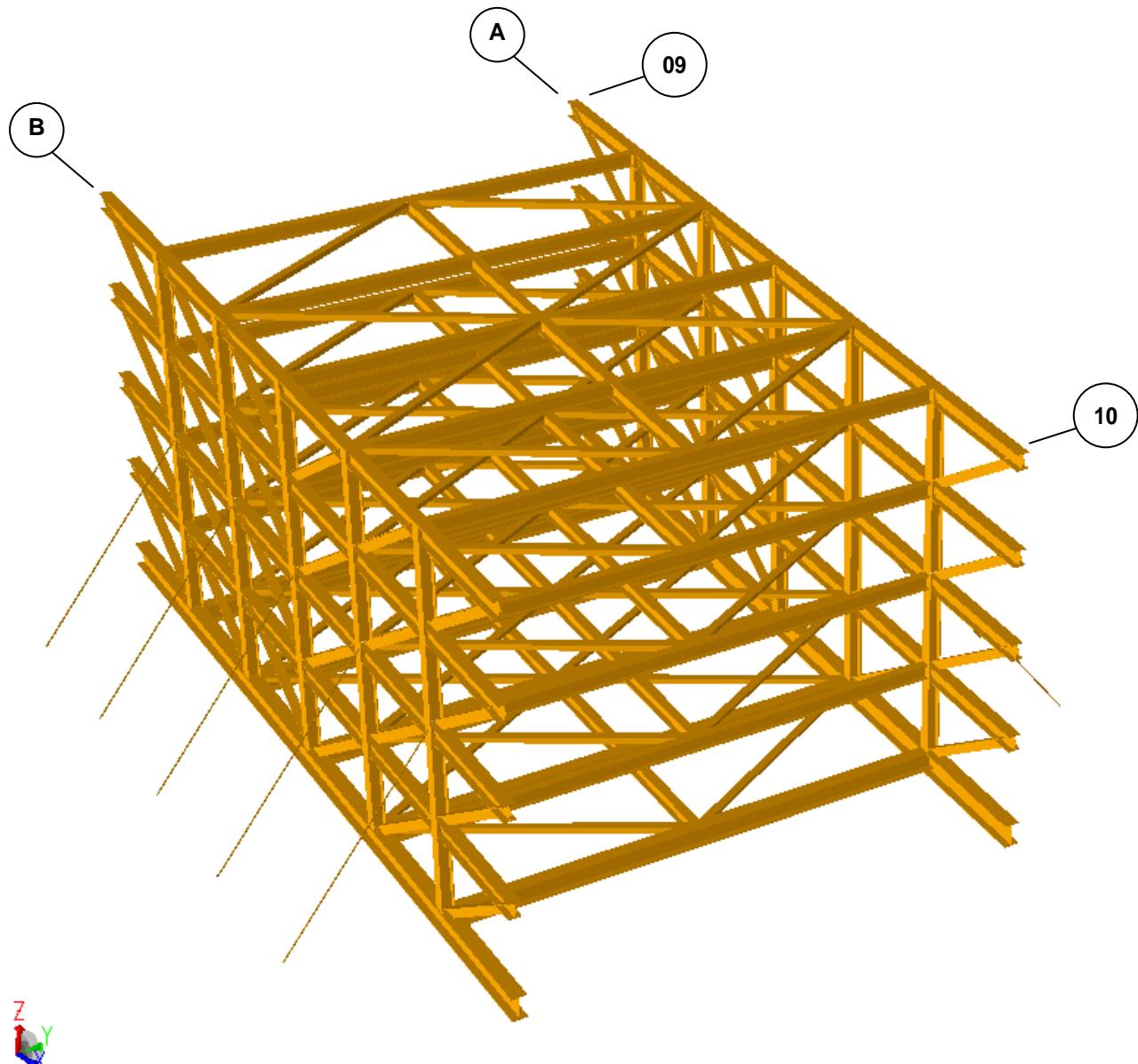
The maximum unity check ratio of each member group is shown below and limited not to exceed 1.0.

Table 3.3.4.1:Load-out/Land-transportation Result

GROUP LABEL	SECTION	MEMBER	LOAD CASE	MAXIMUM UNITY CHECK	REMARK
G1	H488x300x11x18	3XY- 113	111	0.260	O.K
G2	H340x250x9x14	222- 225	112	0.040	O.K
G3	H390x300x10x16	126-0014	114	0.790	O.K
G4	H294x200x8x12	213- 214	112	0.310	O.K
G5	T175x175x7x11	511- 513	113	0.050	O.K
G6	H250x250x9x14	213- 113	114	0.260	O.K
G7	T200x200x8x13	338- 218	112	0.040	O.K

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

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4 SEA-TRANSPORTATION/FASTENING
4.1 STRUCTURAL SIMULATION
4.1.1 STRUCTURAL MODEL

PIPE RACK UNIT 66C – 3D Model View of Module C30PR03

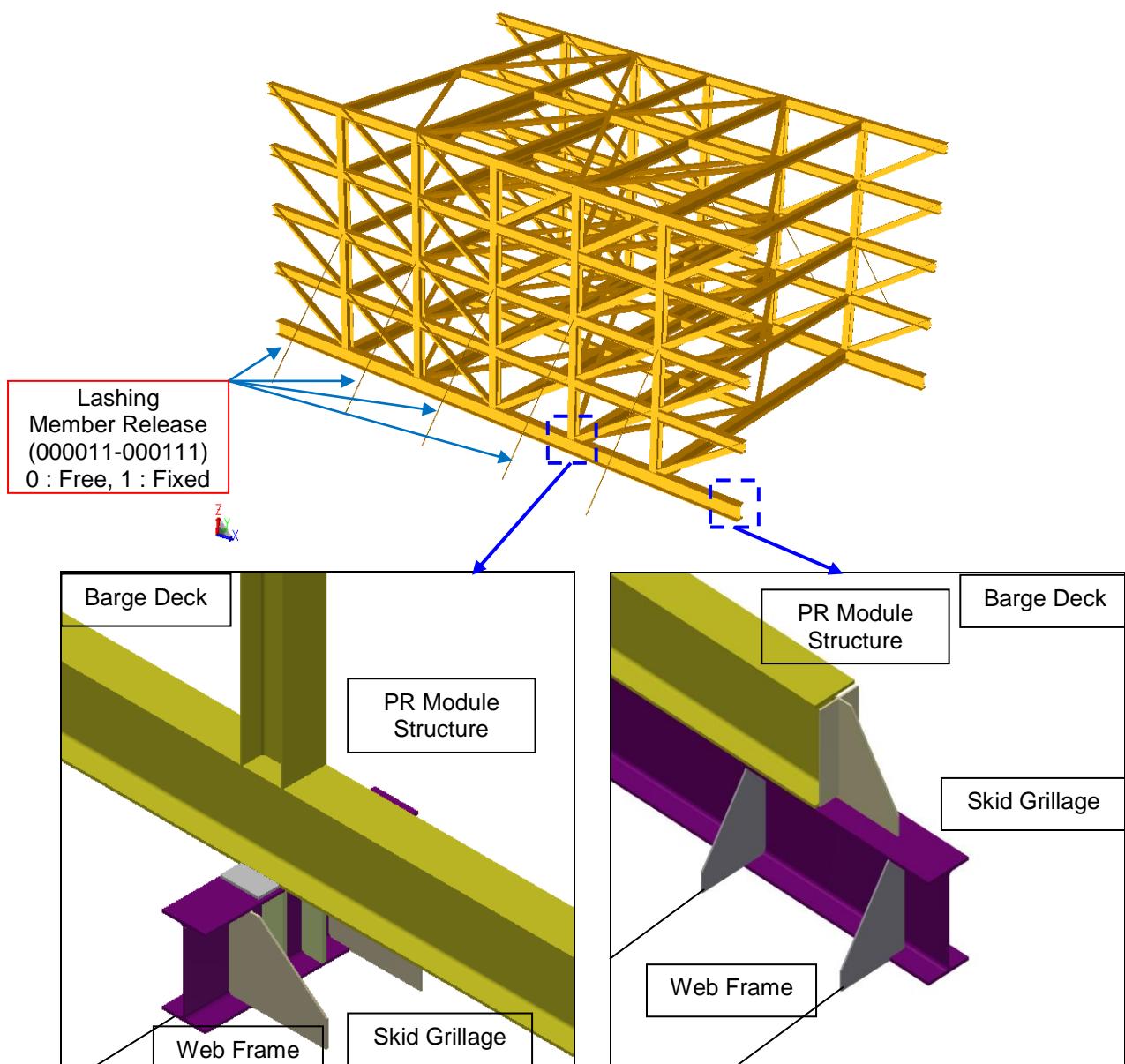
REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
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4.1.2 BOUNDARY CONDITIONS

The column of pipe rack structure is hinged on the barge by partially welding and lashings will be used to make the pipe rack structure fastened against roll, pitch or heave motions.

The typical configurations are shown below.



The boundary conditions for sea-transportation were used as shown in table below.

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT SUBPROJECT: OFFSITES UNIT: INTERCONNECTIONS AREA: MACOTAL AREA PHASE: DETAILED ENGINEERING DISCIPLINE: CIVIL TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE) PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	PDVSA DOC. No. 3006-466C-DC406121		
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Table 4.1.2.1:Column of Module Joint Boundary

JOINT NO.	TRANSLATION (Δ)			ROTATION (Θ)			REMARK
	X	Y	Z	X	Y	Z	
1XY	1	0	0	0	0	0	Vertical Column of Pipe Rack Structure
2XY	1	0	0	0	0	0	
3XY	1	0	0	0	0	0	
4XY	1	0	0	0	0	0	
113	0	1	1	0	0	0	
115	0	1	1	0	0	0	
116	0	1	1	0	0	0	
118	0	1	1	0	0	0	
119	0	1	1	0	0	0	
121	0	1	1	0	0	0	
122	0	1	1	0	0	0	
124	0	1	1	0	0	0	
125	0	1	1	0	0	0	
127	0	1	1	0	0	0	

(Fixed Condition : 1, Free Condition : 0)

Table 4.1.2.2:Lashing Joint Boundary

JOINT NO.	TRANSLATION (Δ)			ROTATION (Θ)			REMARK
	X	Y	Z	X	Y	Z	
0000	1	1	1	1	1	1	Lashing Foundation Connected on Barge / Vessel Deck
0001	1	1	1	1	1	1	
0002	1	1	1	1	1	1	
0003	1	1	1	1	1	1	
0004	1	1	1	1	1	1	
0005	1	1	1	1	1	1	
0006	1	1	1	1	1	1	
0007	1	1	1	1	1	1	
0008	1	1	1	1	1	1	
0009	1	1	1	1	1	1	

(Fixed Condition : 1, Free Condition : 0)

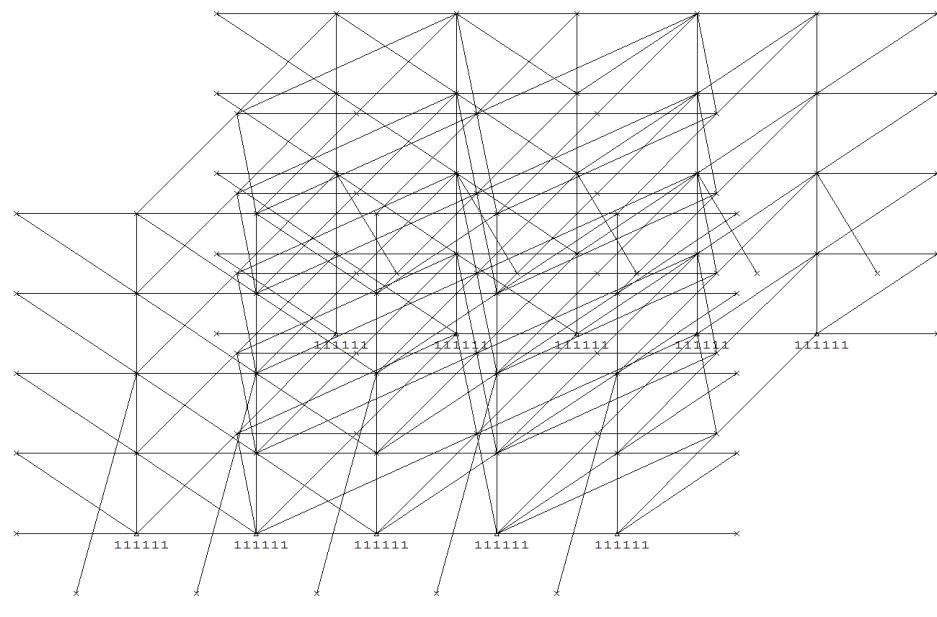
REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
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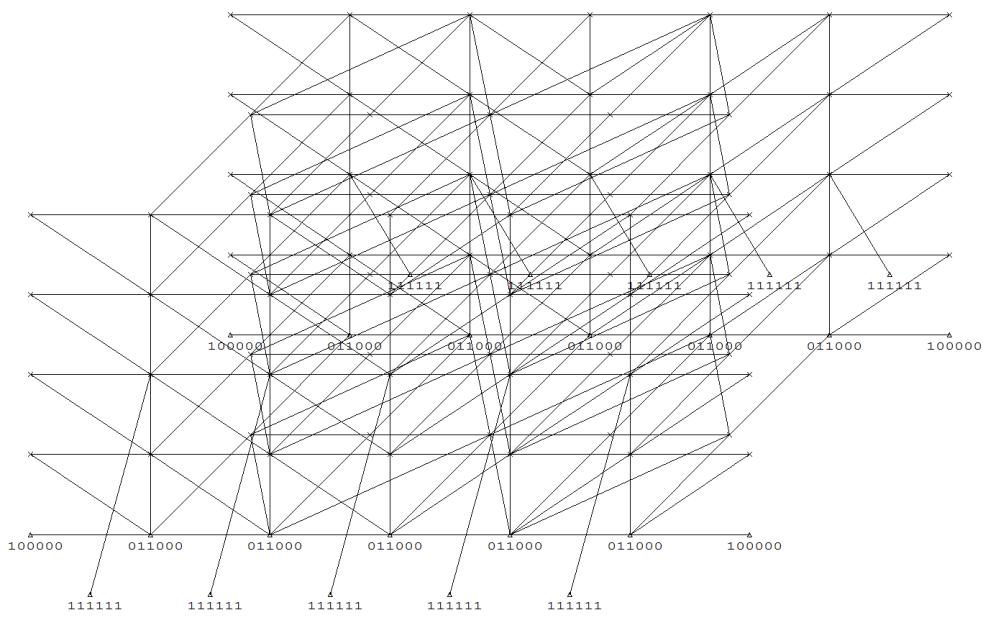
Note : Lashing members are free of moment constraint using member release option as well as 'tension only member' using 'gap element option in the SACS software tool.

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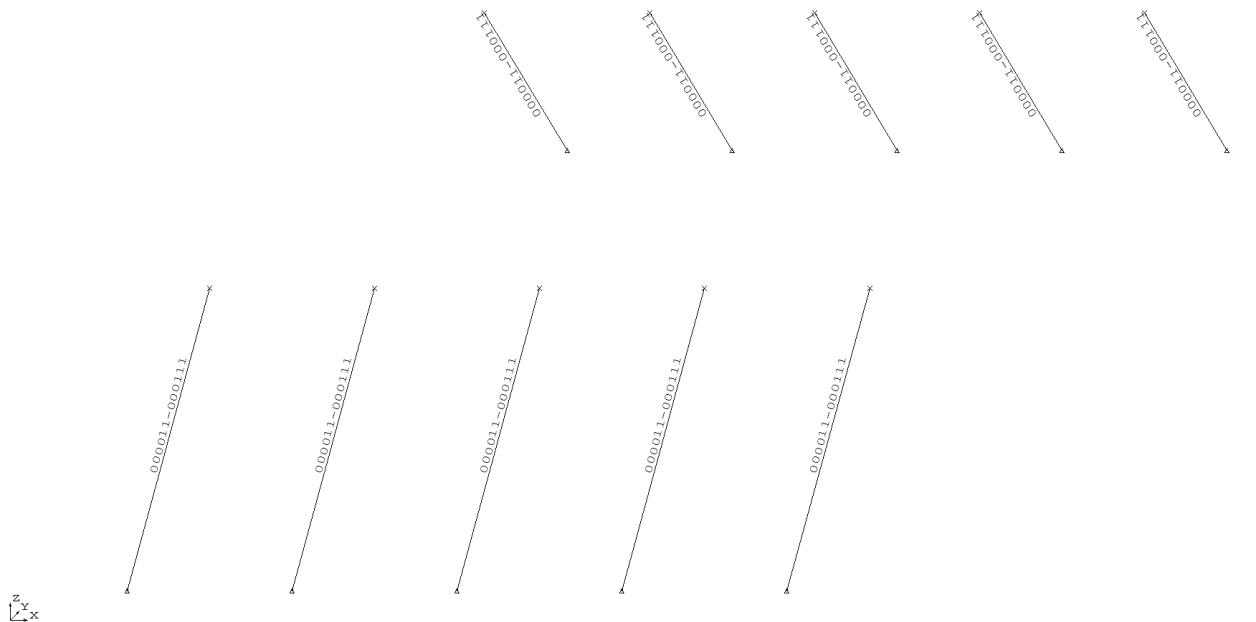
Boundary Condition of Module C30PR03 in Set-down (Static)



Boundary Condition of Module C30PR03 in Sea Transportation (Motion)

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121	
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A	
UNIT: INTERCONNECTIONS	REV.A	
AREA: MACOTAL AREA	DATE : 08-08-13	
PHASE: DETAILED ENGINEERING	TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
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UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	REV.A DATE : 08-08-13
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4.2 DESIGN LOAD CONDITIONS
4.2.1 BASIC LOAD CONDITIONS (STATIC)
Load case 1 : Self-Weight

The self-weight including dead weight for structural steel is generated automatically by the SACS computer program.

Load case 2 : Cable Tray Load

Cable Tray Load, the structural element of the cable tray not included in the model, is input as department is applied as distributed load on members or concentrated load on members or joints.

Load case 4 : Piping & Equipment Empty Load

Piping & Equipment Empty Load, the structural element of the secondary steel not included in the model, is input department is applied as distributed load on members or concentrated load on members or joints.

No.	Description	FX (kN)	FY (kN)	FZ (kN)
1	Self-Weight	0.000	0.000	-515.500
2	Cable Tray Load	0.000	0.000	-10.950
4	Piping & Equipment Empty Load	0.000	0.000	-308.700

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

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4.2.2 CALCULATION OF BASIC LOAD FOR ACCELERATION (TOW)
MOTION CHARACTERISTICS USING NDA CRITERIA

ROLL ANGEL =	20 DEG	PERIOD =	10 SEC
PITCH ANGLE =	12.5 DEG	PERIOD =	10 SEC
HEAVE ACCL =	0.2 G		

SLIDING COMPONENT FOR STATIC

TRANSVERSE COMPONENT = $\sin(\theta)$
 VERTICAL COMPONENT = $\cos(\theta)$

ROLL MOTION

ANGULAR ACCL. =	7.896	deg/sec ²
TRANSVERSE COMPONENT =	0.342	
VERTICAL COMPONENT =	0.940	

STATIC COMPONENT FOR ROLL ANGLE

GRAVITY	Hori. Accl	Heave Accl
1.2g	0.410424g	1.127631g
0.8g	0.273616g	0.751754g

PITCH MOTION

ANGULAR ACCL. =	4.935	deg/sec ²
TRANSVERSE COMPONENT =	0.216	
VERTICAL COMPONENT =	0.976	

STATIC COMPONENT FOR PITCH ANGLE

GRAVITY	Hori. Accl	Heave Accl
1.2g	0.259728g	1.171555g
0.8g	0.173152g	0.781037g

LOADCASE	MOTION ACCL		STATIC COMPONENT		Z-HEAVE	HEAVE-REMARKS
	Y-PITCH	X-ROLL	Y-SWAY	X-SURGE		
#1:-P +H	-4.935			0.260g	0.172g	(-1g-0.2g)*COS(θp)
#2:+P -H	-4.935			0.173g	-0.219g	(-1g+0.2g)*COS(θp)
#3:+P +H	4.935			-0.260g	0.172g	(-1g-0.2g)*COS(θp)
#4:+P -H	4.935			-0.173g	-0.219g	(-1g+0.2g)*COS(θp)
#5:-R +H		-7.896	0.410g		0.128g	(-1g-0.2g)*COS(θr)
#6:-R -H		-7.896	0.274g		-0.248g	(-1g+0.2g)*COS(θr)
#7:+R +H		7.896	-0.410g		0.128g	(-1g-0.2g)*COS(θr)
#8:+R -H		7.896	-0.274g		-0.248g	(-1g+0.2g)*COS(θr)

The relative distance from center of vessel to center of cargo is set "zero" because the stowage plan is not confirmed yet. This analysis will be revised after the plan is well arranged.

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

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UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	REV.A DATE : 08-08-13
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4.2.3 LOAD COMBINATIONS
4.2.3.1 Sea Motion Acceleration and Wind Load Combinations
1) Head Sea & Beam Sea

Load Case	Roll	Sway	Pitch	Surge	Heave	Wind
<i>Heave + Pitch</i>						
T101			-4.935	0.260	0.172	W1 (0)
T102			-4.935	0.173	-0.219	W1 (0)
T103			4.935	-0.260	0.172	W3 (180)
T104			4.935	-0.173	-0.219	W3 (180)
<i>Heave + Roll</i>						
T105	-7.896	-0.410			0.128	W4 (270)
T106	-7.896	-0.274			-0.248	W4 (270)
T107	7.896	0.410			0.128	W2 (90)
T108	7.896	0.274			-0.248	W2 (90)

2) Quartering Sea

Heave + Roll (80%) + Pitch (60%)						
T201	6.317	0.328	2.961	-0.156	0.188	W6 (135)
T202	6.317	0.219	2.961	-0.104	-0.188	W6 (135)
T203	6.317	0.328	-2.961	0.156	0.195	W5 (45)
T204	6.317	0.219	-2.961	0.104	-0.195	W5 (45)
T205	-6.317	-0.328	-2.961	0.156	0.188	W8 (315)
T206	-6.317	-0.219	-2.961	0.104	-0.188	W8 (315)
T207	-6.317	-0.328	2.961	-0.156	0.195	W7 (225)
T208	-6.317	-0.219	2.961	-0.104	-0.195	W7 (225)
Heave + Roll (60%) + Pitch (80%)						
T301	4.737	0.246	3.948	-0.208	0.153	W6 (135)
T302	4.737	0.164	3.948	-0.139	-0.232	W6 (135)
T303	4.737	0.246	-3.948	0.208	0.153	W5 (45)
T304	4.737	0.164	-3.948	0.139	-0.232	W5 (45)
T305	-4.737	-0.246	-3.948	0.208	0.153	W8 (315)
T306	-4.737	-0.164	-3.948	0.139	-0.232	W8 (315)
T307	-4.737	-0.246	3.948	-0.208	0.153	W7 (225)
T308	-4.737	-0.164	3.948	-0.139	-0.232	W7 (225)

Note: Based on the project Doc. No. S-000-1330-0301P Rev.A, 'Design Specification for Module Structure', it shows that "Wind loads shall be excluded in the voyage condition design. This is as stated on Chapter 6 of S-000-1450-0004P.".

Then, the wind speed of 10 m/s has been applied in the analysis for a conservative approach.

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

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4.2.3.2 Final Load Combinations

Following load combinations are considered in structural analysis for load-out/land transportation condition.

Load Case	Static	Dynamic (Motion)	Remarks
100	LC#1 (Dead) x 1.1+ LC#2(Tray) + LC#4 (Pipe)		
1100	LC#100 x 1.2	T101 x 1.2	Heave + Pitch
1200	LC#100 x 1.2	T102 x 1.2	
1300	LC#100 x 1.2	T103 x 1.2	
1400	LC#100 x 1.2	T104 x 1.2	
1500	LC#100 x 1.2	T105 x 1.2	
1600	LC#100 x 1.2	T106 x 1.2	Heave + Roll
1700	LC#100 x 1.2	T107 x 1.2	
1800	LC#100 x 1.2	T108 x 1.2	
2100	LC#100 x 1.2	T201 x 1.2	
2200	LC#100 x 1.2	T202 x 1.2	Heave + Roll (80%) + Pitch (60%)
2300	LC#100 x 1.2	T203 x 1.2	
2400	LC#100 x 1.2	T204 x 1.2	
2500	LC#100 x 1.2	T205 x 1.2	
2600	LC#100 x 1.2	T206 x 1.2	
2700	LC#100 x 1.2	T207 x 1.2	
2800	LC#100 x 1.2	T208 x 1.2	
3100	LC#100 x 1.2	T301 x 1.2	
3200	LC#100 x 1.2	T301 x 1.2	
3300	LC#100 x 1.2	T301 x 1.2	
3400	LC#100 x 1.2	T301 x 1.2	Heave + Roll (60%) + Pitch (80%)
3500	LC#100 x 1.2	T301 x 1.2	
3600	LC#100 x 1.2	T301 x 1.2	
3700	LC#100 x 1.2	T301 x 1.2	
3800	LC#100 x 1.2	T301 x 1.2	

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT SUBPROJECT: OFFSITES UNIT: INTERCONNECTIONS AREA: MACOTAL AREA PHASE: DETAILED ENGINEERING DISCIPLINE: CIVIL TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE) PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	PDVSA DOC. No. 3006-466C-DC406121	
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Table 4.2.3.2.1:Reaction Force & Moments Summary

LDCN	FX (kN)	FY (kN)	FZ (kN)	Mx (kN-m)	My (kN-m)	Mz (kN-m)	Remark
100	0.000	0.000	-886.702	-0.340	0.001	0.000	
1100	-340.734	0.000	1120.262	1.450	-1305.703	-1.240	Heave + Pitch
1200	-249.710	0.000	1529.349	3.397	-1028.574	-1.673	
1300	340.733	0.000	293.226	-2.484	1305.705	1.240	
1400	249.709	0.000	702.313	-0.536	1028.571	1.670	
1500	0.000	532.313	973.252	-1937.089	-0.002	0.001	Heave + Roll
1600	0.000	390.025	1366.644	-1502.011	-0.003	0.000	
1700	0.000	-532.312	532.305	1936.480	-0.001	-0.001	
1800	0.000	-390.021	925.697	1505.137	-0.002	-0.001	
2100	205.793	-424.589	265.509	1542.869	789.318	1.092	Heave + Roll (80%) + Pitch (60%)
2200	151.385	-310.547	658.900	1197.533	623.665	1.349	
2300	-205.790	-424.589	754.406	1545.197	-789.304	-1.091	
2400	-151.385	-310.547	1162.447	1199.929	-623.664	-1.350	
2500	-205.790	424.593	1114.499	-1544.074	-789.304	-1.090	
2600	-151.385	310.548	1507.890	-1194.987	-623.665	-1.349	
2700	205.793	424.593	610.953	-1546.470	789.317	1.094	
2800	151.385	310.548	1018.993	-1197.314	623.665	1.350	
3100	271.418	-320.836	263.541	1165.549	1039.469	0.690	Heave + Roll (60%) + Pitch (80%)
3200	199.225	-235.043	666.347	906.265	819.673	1.034	
3300	-271.416	-320.836	925.169	1168.697	-1039.463	-0.691	
3400	-199.224	-235.043	1327.976	909.413	-819.671	-1.034	
3500	-271.416	320.835	1189.704	-1166.386	-1039.463	-0.690	
3600	-199.224	235.042	1592.510	-903.266	-819.672	-1.034	
3700	271.418	320.835	528.075	-1169.535	1039.468	0.691	
3800	199.226	235.042	930.882	-906.414	819.673	1.034	

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

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SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	REV.A DATE : 08-08-13
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4.3 SUMMARY OF ANALYSIS RESULT
4.3.1 SUMMARY FOR LOAD

The applied weights are summarized as below.

Structural Weight	Structural Weight From STAAD (kN)	Structural Weight From SACS(kN)	Difference (kN)
Dead Load (Steel Self Weight)	515.191	515.500	0.309
Cable Tray	11.030	10.950	-0.080
Piping & Equipment Load - Empty	308.870	308.700	-0.170
TOTAL	835.091	835.150	0.059

4.3.2 LASHING MEMBER FORCE SUMMARY

The maximum member forces of lashing are summarized and shown below.

Location	Member	Load Case	Fx (kN)	Fy (kN)	Fz (kZ)
Lashing Member	0000- 336	1500	95.282	0.000	0.005
	0001- 339	1500	92.060	0.000	0.005
	0002- 342	1500	94.525	0.000	0.005
	0003- 345	1500	92.060	0.000	0.005
	0004- 348	1500	95.282	0.000	0.005
	0005- 338	1700	96.466	0.000	0.005
	0006- 341	1700	93.239	0.000	0.005
	0007- 344	1700	95.775	0.000	0.005
	0008- 347	1700	93.239	0.000	0.005
	0009- 350	1700	96.466	0.000	0.005

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
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4.3.3 MEMBER UNITY CHECK RESULT

The maximum unity check ratio of each member group is shown below and limited not to exceed 1.0.

GROUP LABEL	SECTION	MEMBER	LOAD CASE	MAXIMUM UNITY CHECK	REMARK
G1	H488x300x11x18	3XY- 113	3500	0.040	O.K
G2	H340x250x9x14	222- 225	1100	0.060	O.K
G3	H390x300x10x16	120- 121	3600	0.210	O.K
G4	H294x200x8x12	219- 220	1200	0.350	O.K
G5	T175x175x7x11	220- 222	1100	0.060	O.K
G6	H250x250x9x14	225- 125	3400	0.130	O.K
G7	T200x200x8x13	216- 119	1100	0.040	O.K

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT
 SUBPROJECT: OFFSITES
 UNIT: INTERCONNECTIONS
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 PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE

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 HYUNDAI-WISON DOC. No.
 N/A

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5 LIFTING

5.1 STRUCTURAL SIMULATION

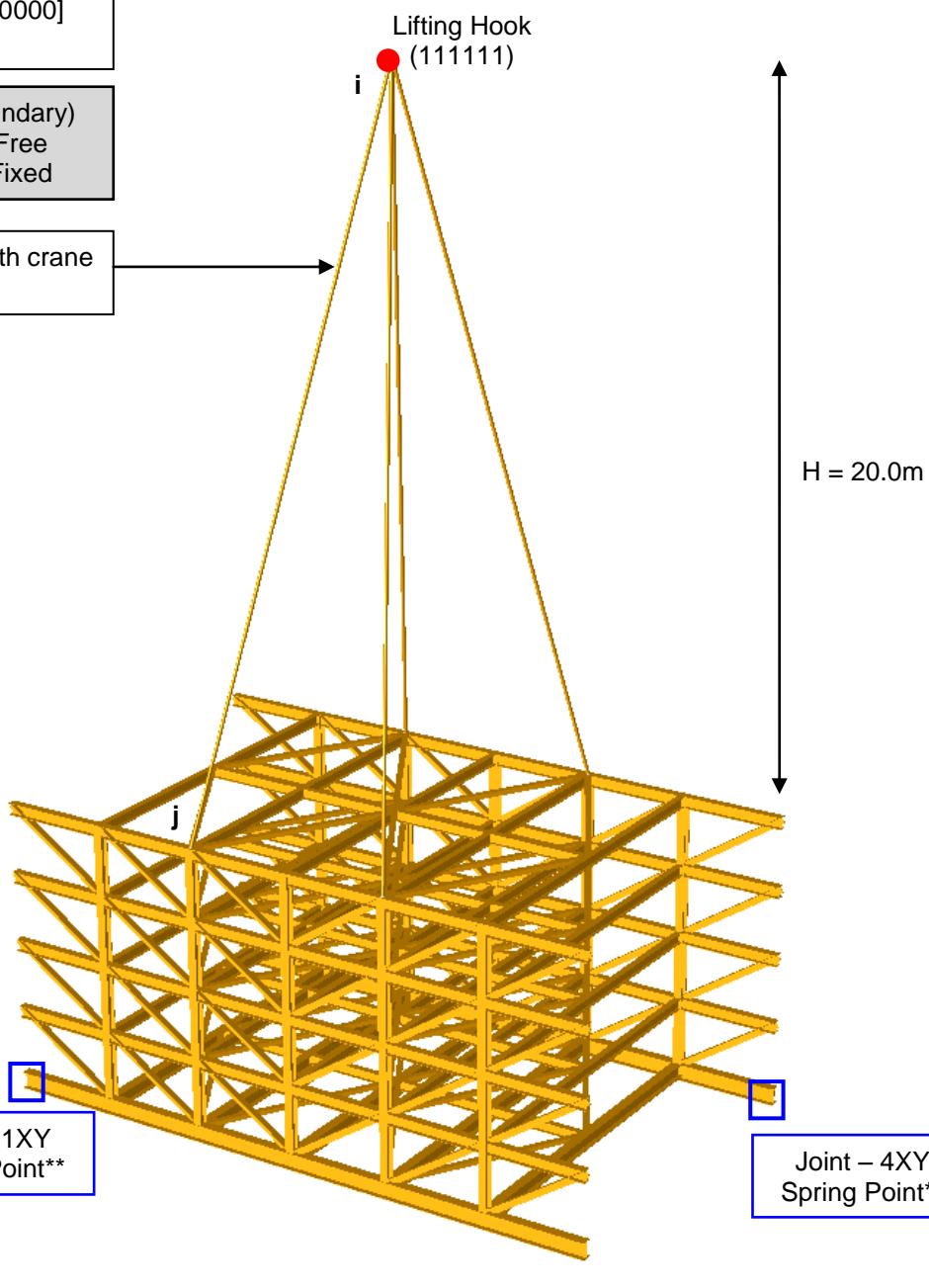
5.1.1 STRUCTURAL MODEL AND BOUNDARY CONDITION

*Release [i=000111, j=000000]
(Fixed : 0, Free : 1)

** (Spring)
X : 10 kN/m
Y : 10 kN/m

* (Boundary)
0 : Free
1 : Fixed

Sling Member: connected with crane hook and module.



REFINING MAJOR PROJECTS GENERAL MANAGEMENT

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5.1.1.1 Against Translation

In the vertical direction (Z-dir.) and the horizontal direction (X or Y dir.), the boundary conditions are fixed because the crane hook point is set at a certain location during a lifting work.

5.1.1.2 Against Rotation

In all the direction, the rotational boundary conditions are free.

5.1.1.3 Light Spring Constant

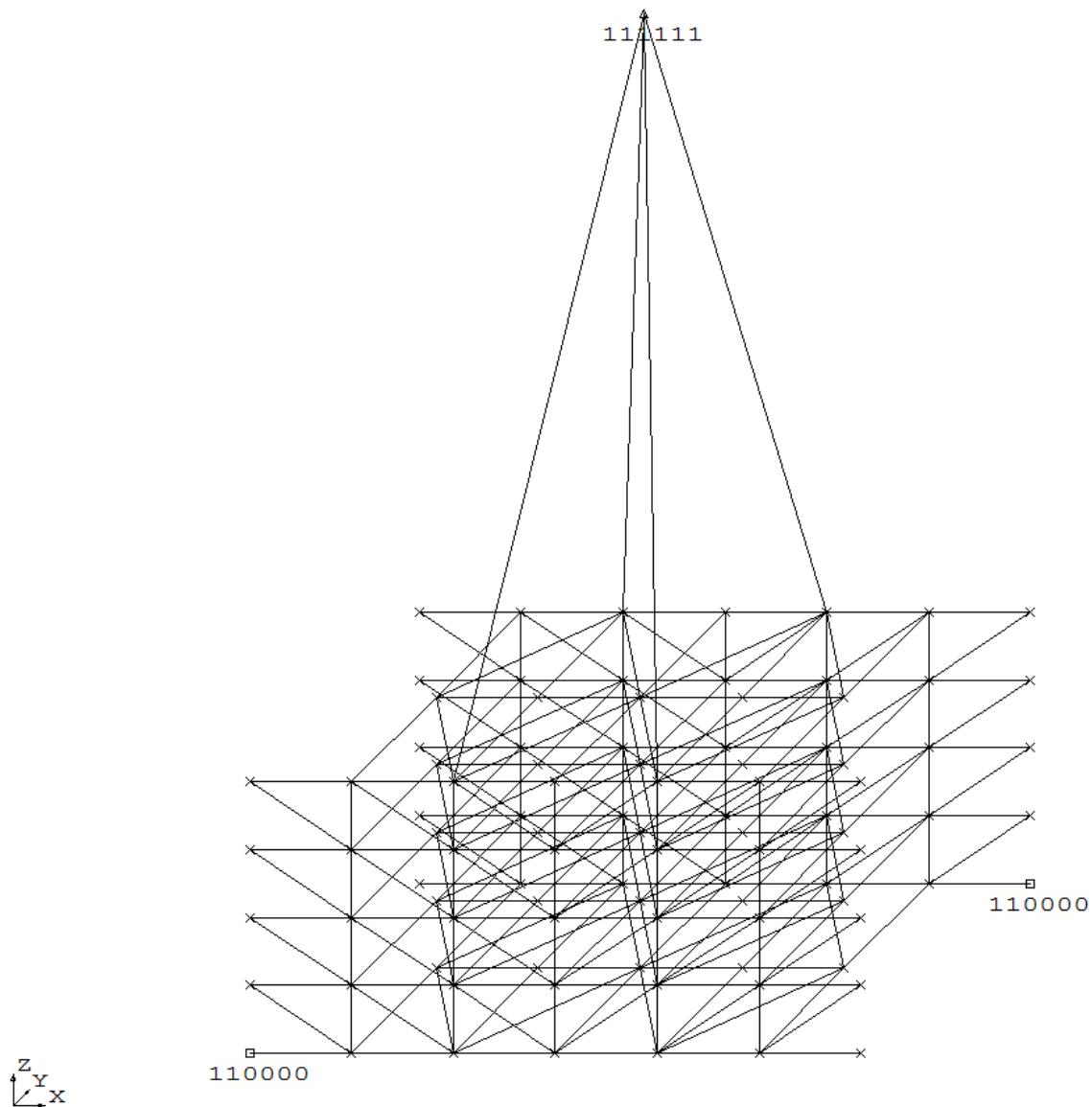
The spring constant shall be provided to prevent the rigid body motion because the structure subjected loading upward requires some lateral and rotational resistance for structural stability. In general, the diagonally opposite points are coupled in the same directions. Light spring constant is applied as the following values (10 kN/m)

Joint No.	SPRING CONSTANT			TRANSLATION			ROTATION		
	X(kN/m)	Y(kN/m)	Z(kN/m)	X	Y	Z	X	Y	Z
1XY	10	10	-	0	0	0	0	0	0
2XY	10	10	-	0	0	0	0	0	0

Noted. 1 (Fixed), 0 (Free)

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

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Boundary Condition of Module C30PR03

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

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5.2 DESIGN LOAD CONDITIONS
5.2.1 LOAD COMBINATION
Load case 1 : Self-Weight

The self-weight including dead weight for structural steel is generated automatically by the SACS computer program.

Load case 2 : Cable Tray Load

Cable Tray Load, the structural element of the cable tray not included in the model, is input as department is applied as distributed load on members or concentrated load on members or joints.

Load case 4 : Piping & Equipment Empty Load

Piping & Equipment Empty Load, the structural element of the secondary steel not included in the model, is input department is applied as distributed load on members or concentrated load on members or joints.

No.	Description	FX (kN)	FY (kN)	FZ (kN)
1	Self-Weight	0.000	0.000	-515.500
2	Cable Tray Load	0.000	0.000	-10.950
4	Piping & Equipment Empty Load	0.000	0.000	-308.700

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

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5.2.2 LOAD COMBINATIONS

Following load combinations are considered in structural analysis for lift condition.

Table 5.2.2.1:Load Combinations

Combined Load Case	Description
100(Base)	Basic load combination (permanent structural loadings without contingency) LC#1 x 1.10 + LC#2 x 1.00 + LC#4 x 1.00
101	Factored load combination (CoG shift factor of 1.10 and Skew factor of 1.10) LC#100 x 1.21
121	Factored load combination (DAF) LC#101 x 1.00
210	Factored load combination for checking no padeye attached members LC#121x 1.15
220	Factored load combination for members directly supporting or framing in to lift points (Columns with lifting lug) LC#121 x 1.00
211	Factored load combination (LRFD factor for lift design of 1.60) LC#210 x 1.60
221	Factored load combination (LRFD factor for lift design of 1.60) LC#220 x 1.60
LLUG	Factored load combination for Lifting Lug(Padeye) Design check LC#121 x 1.3

Table 5.2.2.2:Load Combinations Summary

LDCN	FX (kN)	FY (kN)	FZ (kN)	Mx (kN-m)	My (kN-m)	Mz (kN-m)	Remark
100	0.000	0.000	-886.700	-0.300	0.000	0.000	
101	0.000	0.000	-1072.910	-0.400	0.000	0.000	
121	0.000	0.000	-1072.910	-0.400	0.000	0.000	
210	0.000	0.000	-1233.850	-0.500	0.000	0.000	
211	0.000	0.000	-1974.150	-0.800	0.000	0.000	
220	0.000	0.000	-1072.910	-0.400	0.000	0.000	
221	0.000	0.000	-1716.660	-0.700	0.000	0.000	
LLUG	0.000	0.000	-1394.780	-0.500	0.000	0.000	

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5.3 SUMMARY OF ANALYSIS RESULT

5.3.1 SUMMARY FOR LOAD

The applied weights are summarized as below.

Structural Weight	Structural Weight From STAAD (kN)	Structural Weight From SACS(kN)	Difference (kN)
Dead Load (Steel Self Weight)	515.191	515.500	0.309
Cable Tray	11.030	10.950	-0.080
Piping & Equipment Load - Empty	308.870	308.700	-0.170
TOTAL	835.091	835.150	0.059

5.3.2 Hook Results Summary

The reactions of lifting hook point are shown below.

Joint No.	Load Case No.	FX (kN)	FY (kN)	FZ (kN)	Mx (kN-m)	My (kN-m)	Mz (kN-m)	Remark
0000	100(Base)	0.000	-0.012	886.700	0.000	0.000	0.000	
	101	0.000	-0.015	1072.913	0.000	0.000	0.000	
	211	0.000	-0.028	1974.138	0.000	0.000	0.000	
	221	0.000	-0.024	1716.641	0.000	0.000	0.000	
	LLUG	0.000	-0.019	1394.768	0.000	0.000	0.000	

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

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5.3.3 Sling Member Force Summary

The maximum sling member forces are shown below.

Member	Load Case	FX	FY	FZ	MX	MY	MZ	REMARK
509-0000	LLUG	380.795	0.000	0.000	0.000	0.000	0.000	Crane Sling Wire
511-0000	LLUG	345.565	0.000	0.000	0.000	0.000	0.000	
515-0000	LLUG	380.795	0.000	0.000	0.000	0.000	0.000	
517-0000	LLUG	345.566	0.000	0.000	0.000	0.000	0.000	

5.3.4 MEMBER UNITY CHECK RESULT

The maximum unity check ratio of each member group is shown below and limited not to exceed 1.0.

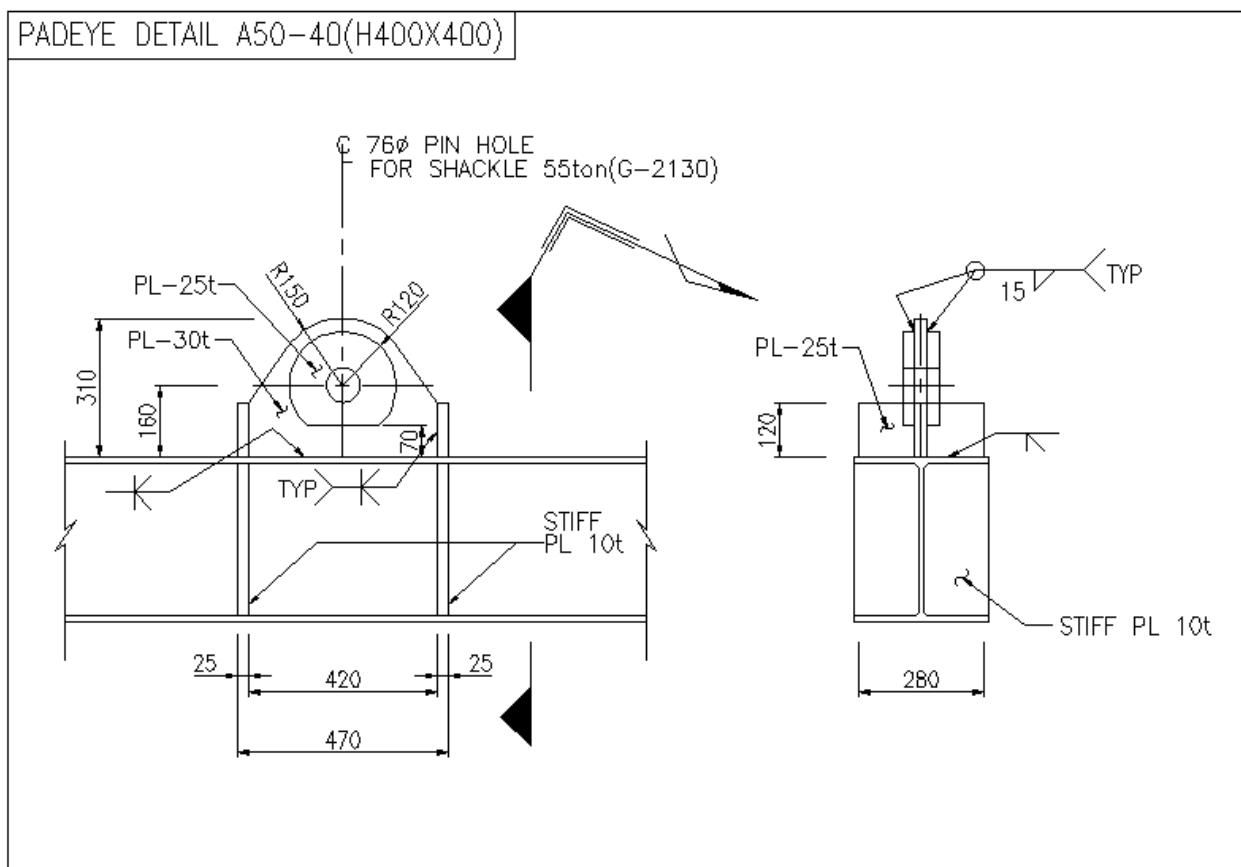
GROUP LABEL	SECTION	MEMBER	LOAD CASE	MAXIMUM UNITY CHECK	REMARK
G1	H488x300x11x18	122- 125	211	0.030	O.K
G2	H340x250x9x14	506- 509	211	0.110	O.K
G3	H390x300x10x16	120- 121	211	0.220	O.K
G4	H294x200x8x12	219- 220	211	0.320	O.K
G5	T175x175x7x11	513- 517	211	0.230	O.K
G6	H250x250x9x14	517- 437	211	0.220	O.K
G7	T200x200x8x13	435- 518	211	0.080	O.K

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121	
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5.3.5 LIFTING PADEYE CALCULATION
5.3.5.1 Lifting padeye Design

Typical Lifting Hole & Padeye Design is shown below.

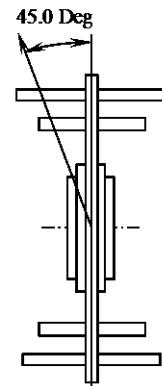
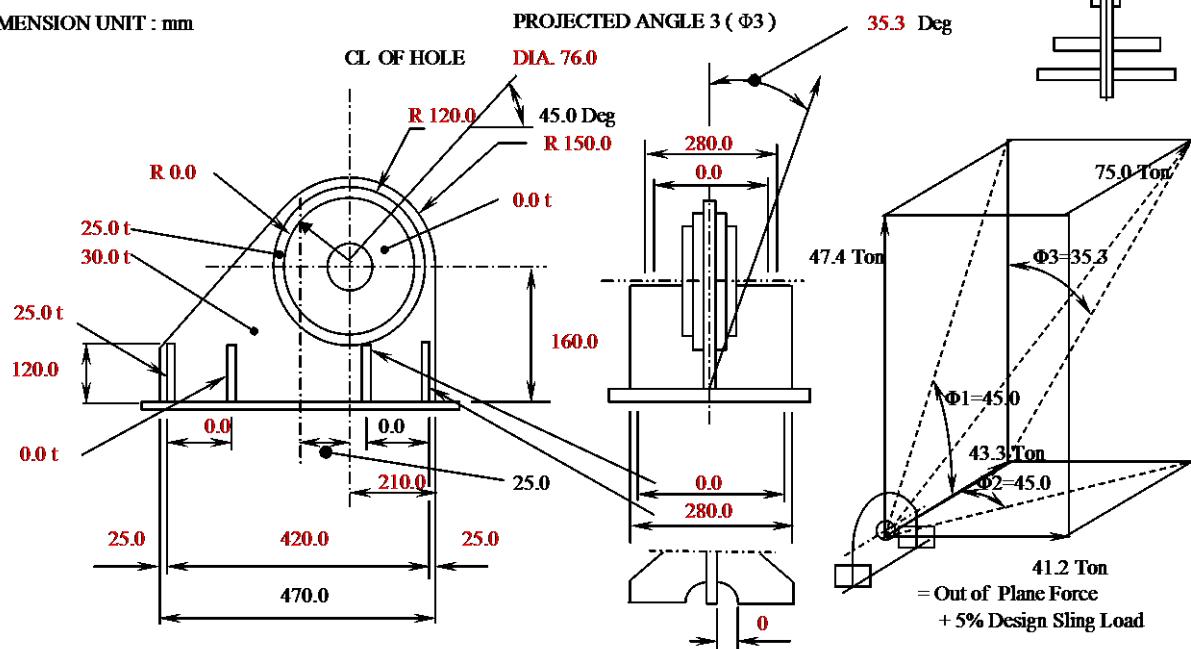


REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
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5.3.5.2 Lifting padeye Calculation — A50
LIFTING PADEYE 50TON 13/Mar/2013
LOCATION OF PADEYE : PADEYE STANDARD
PART 1. DESIGN DATA

1) SLING LOAD , SL	=	50.0 Ton
2) PROJECTED ANGLE 1 (Φ1)	=	45.0 Deg
3) PROJECTED ANGLE 2 (Φ2)	=	45.0 Deg
4) DESIGN DYNAMIC FACTOR, DF	=	1.500
5) OUT OF PLANE FACTOR, OF	=	5%
6) BEAM or PLATE MATERIAL, Fy	=	50 ksi = 3.515 Ton/cm ²
7) DESIGN SLING LOAD, DSL	=	75.0 Ton


PART 2. PADEYE CONFIGURATION
DIMENSION UNIT : mm

PART 3. DESIGN AT PIN POINT

1) PADEYE SECTION PROPERTIES	=	
- PADEYE MAIN PLATE THICKNESS	=	3.0 cm
- PADEYE MAIN PLATE DIAMETER	=	30.0 cm
- PADEYE MAIN PLATE GRADE	=	50 ksi = 3.515 Ton/cm ²
- FIRST CHEEK PLATE THICKNESS	=	2.5 cm
- FIRST CHEEK PLATE DIAMETER	=	24.0 cm
- FIRST CHEEK PLATE GRADE	=	50 ksi = 3.515 Ton/cm ²
- SECOND CHEEK PLATE THICKNESS	=	0.0 cm
- SECOND CHEEK PLATE DIAMETER	=	0.0 cm
- SECOND CHEEK PLATE GRADE	=	50 ksi = 3.515 Ton/cm ²
- PADEYE HOLE SIZE	=	7.6 cm

2) BEARING STRESS AT PIN

- BEARING AREA	=	56.0 cm ²
- MAXIMUM SLING LOAD	=	75.0 Ton
- BEARING STRESS, f _{bp}	=	1.339 Ton/cm ²

< 3.164 Ton/cm² ==> ACCEPT

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3) TENSILE STRESS AT PIN

- TENSILE AREA = 149.2 cm²
- MAXIMUM SLING LOAD = 75.0 Ton
- TENSILE STRESS, f_{tp} = 0.503 Ton/cm² < 2.109 Ton/cm² ==> ACCEPT

4) SHEAR STRESS AT PIN

- SHEAR AREA = 149.2 cm²
- MAXIMUM SLING LOAD = 75.0 Ton
- SHEAR STRESS, f_{sp} = 0.503 Ton/cm² < 1.406 Ton/cm² ==> ACCEPT

5) TEARING CAPACITY AT PIN

- MAXIMUM SLING LOAD = 75.0 Ton
- TENSILE AREA = 72.0 cm²
- SHEAR AREA = 90.0 cm²
- TEARING CAPACITY = 278.4 Ton
THEREFORE, THE TEARING CAPACITY IS GREATER THAN MAXIMUM SLING LOAD ==> ACCEPT

6) WELDING CHECK AT CHEEK PLATE

- USE ELECTROD XXX70
- ELECTROD ULTIMATE STRENGTH = 70 ksi = 4.922 Ton/cm²
- WELDING LEG SIZE = 0.30 cm = 3 mm
Used = 15 mm ==> ACCEPT

PART 4. DESIGN AT BASE
SECTION PROPERTIES

X-X DIR

NO	B	H	AREA	Y	AREA*Y	AY2	IO	UNIT: mm
1	30.0	470.0	14100.0	235.0	3313500	778672500	259557500	
2	125.0	25.0	3125.0	37.5	117187.5	4394531.25	162760	
3	125.0	25.0	3125.0	37.5	117187.5	4394531.25	162760	
4	125.0	25.0	3125.0	432.5	1351562.5	584550781.3	162760	
5	125.0	25.0	3125.0	432.5	1351562.5	584550781.3	162760	
6	0.0	0.0	0.0	0.0	0	0	0	
7	0.0	0.0	0.0	0.0	0	0	0	
8	0.0	0.0	0.0	0.0	0	0	0	
9	0.0	0.0	0.0	0.0	0	0	0	
SUMMATION			26600.0	235.0	6251000	2216771667		

IX-X = 74778.7 cm⁴ DY = 47.0 cm
SX-X = 3182.1 cm³ A = 266.0 cm²

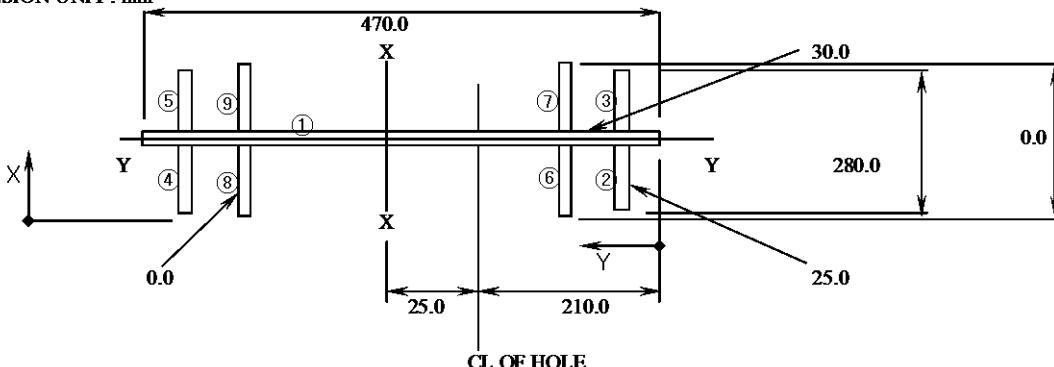
Y-Y DIR

NO	B	H	AREA	X	AREA*X	AX2	IO	UNIT: mm
1	470.0	30.0	14100.0	140.0	1974000	276360000	1057500	
2	25.0	125.0	3125.0	62.5	195312.5	12207031	4069010	
3	25.0	125.0	3125.0	217.5	679687.5	147832031	4069010	
4	25.0	125.0	3125.0	62.5	195312.5	12207031	4069010	
5	25.0	125.0	3125.0	217.5	679687.5	147832031	4069010	
6	0.0	0.0	0.0	0.0	0	0	0	
7	0.0	0.0	0.0	0.0	0	0	0	
8	0.0	0.0	0.0	0.0	0	0	0	
9	0.0	0.0	0.0	0.0	0	0	0	
SUMMATION			26600.0	140.0	3724000	613771667		

IY-Y = 9241.2 cm⁴ DX = 28.0 cm
SY-Y = 660.1 cm³ A = 266.0 cm²

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DIMENSION UNIT : mm

1) TENSILE STRESS

- TENSION AREA, At = 266.0 cm²
- TENSION LOAD = 47.4 Ton
- TENSILE STRESS, ft = 0.178 Ton/cm² < 2.109 Ton/cm² ==> ACCEPT

2) IN-PLANE-BENDING STRESS

- BENDING MOMENT = 574.2 Ton-cm
- SECTION MODULUS, SX-X = 3182.1 cm³
- INPLANE BENDING STRESS, fbi = 0.180 Ton/cm² < 2.320 Ton/cm² ==> ACCEPT

3) OUT OF PLANE BENDING

- MAXIMUM OUT OF PLANE LOAD = 41.2 Ton
- BENDING MOMENT = 660.0 Ton-cm
- SECTION MODULUS, SY-Y = 660.1 cm³
- OUT OF PL. BEND'G STRESS, fbo = 1.000 Ton/cm² < 2.637 Ton/cm² ==> ACCEPT

4) MAX. SHEAR STRESS & MAX. PRINCIPAL STRESS

- SHEAR STRESS, $f_v = \text{Shear Force} / \text{Area}$ = 0.225 Ton/cm²
- AXIAL STRESS, $\sigma_a = \text{Axial Force} / \text{Area} + fbi + fbo$ = 1.359 Ton/cm²

FROM MOHR'S CIRCLE

- MAX. SHEAR STRESS, $f_{v1} = \sqrt{(\sigma_a/2)^2 + (f_v)^2}$ = 0.716 Ton/cm²
- MAX. PRINCIPAL STRESS, $\sigma_{max} = \sigma_a/2 + f_{v1}$ = 1.395 Ton/cm²
 $f_{v1} = 0.716 < 0.4*Fy = 1.406$ Ton/cm² ==> ACCEPT
 $\sigma_{max} = 1.395 < 0.6*Fy = 2.109$ Ton/cm² ==> ACCEPT

5) UNITY CHECK

U.C. = 0.542 < 1.000 ==> ACCEPT

PART 5. WELDING CHECK AT BASE
SECTION PROPERTIES
X-X DIR

NO	B	H	AREA	Y	AREA*Y	AY2	IO	UNIT: mm
1	1.0	470.0	470.0	235.0	110450	25955750	8651917	
2	125.0	1.0	125.0	37.5	4688	175781	10	
3	125.0	1.0	125.0	37.5	4688	175781	10	
4	125.0	1.0	125.0	432.5	54063	23382031	10	
5	125.0	1.0	125.0	432.5	54063	23382031	10	
6	0.0	0.0	0.0	0.0	0	0	0	
7	0.0	0.0	0.0	0.0	0	0	0	
8	0.0	0.0	0.0	0.0	0	0	0	
9	0.0	0.0	0.0	0.0	0	0	0	
SUMMATION			970.0	235.0	227950	81723333		

IX-X = 28155.1 cm⁴/cm

DY = 47.0 cm

SX-X = 1198.1 cm³/cm

A = 47.0 cm²/cm

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	
PHASE: DETAILED ENGINEERING	
DISCIPLINE: CIVIL	REV.A DATE : 08-08-13
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	
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Y-Y DIR

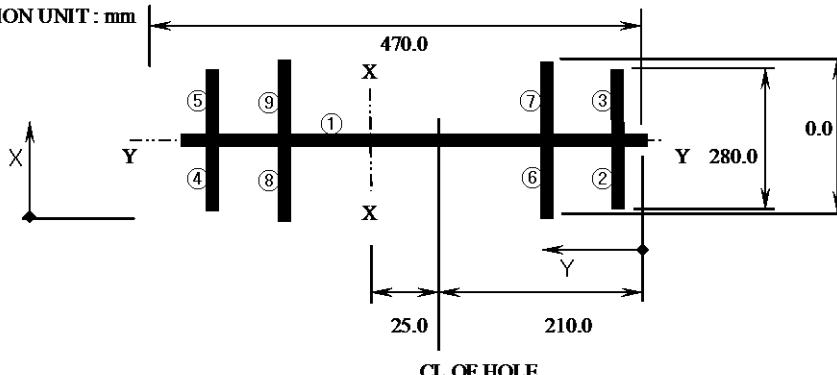
NO	B	H	AREA	X	AREA*X	AX2	IO
1	470.0	1.0	470.0	140.0	65800	9212000	39
2	1.0	125.0	125.0	62.5	7813	488281	162760
3	1.0	125.0	125.0	217.5	27188	5913281	162760
4	1.0	125.0	125.0	62.5	7813	488281	162760
5	1.0	125.0	125.0	217.5	27188	5913281	162760
6	0.0	0.0	0.0	0.0	0	0	0
7	0.0	0.0	0.0	0.0	0	0	0
8	0.0	0.0	0.0	0.0	0	0	0
9	0.0	0.0	0.0	0.0	0	0	0
SUMMATION		970.0	140.0	135800	22666206		

$$\text{IY-Y} = 3654.2 \text{ cm}^4/\text{cm}$$

$$\text{SY-Y} = 261.0 \text{ cm}^3/\text{cm}$$

$$\text{DX} = 28.0 \text{ cm}$$

$$\text{A} = 97.0 \text{ cm}^2/\text{cm}$$

DIMENSION UNIT : mm

1) TENSILE STRESS

- TENSION AREA, At = $97.0 \text{ cm}^2/\text{cm}$
- TENSION LOAD = 47.4 Ton
- TENSILE STRESS, ft = 0.489 Ton/cm

2) IN-PLANE-BENDING STRESS

- BENDING MOMENT = 574.2 Ton-cm
- SECTION MODULUS, SX-X = $1198.1 \text{ cm}^3/\text{cm}$
- INPLANE BENDING STRESS, fbi = 0.479 Ton/cm

3) OUT OF PLANE BENDING

- BENDING MOMENT = 660.0 Ton-cm
- SECTION MODULUS, SY-Y = $261.0 \text{ cm}^3/\text{cm}$
- OUT OF PL. BENDG STRESS, fbo= 2.528 Ton/cm

4) IN PLANE SHEAR STRESS

- SHEAR LOAD = 43.3 Ton
- SHEAR AREA, Asi = $47.0 \text{ cm}^2/\text{cm}$
- SHEAR STRESS, fsi = 0.921 Ton/cm

5) OUT OF PLANE SHEAR STRESS

- SHEAR LOAD = 41.2 Ton
- SHEAR AREA, Aso = $97.0 \text{ cm}^2/\text{cm}$
- SHEAR STRESS, fso = 0.425 Ton/cm

6) RESULTANT STRESS UNITY CHECK

$$\text{-Fr} = \text{SQRT}((\text{fbi} + \text{fbo} + \text{ft})^2 + (\text{fsi})^2 + (\text{fso})^2 + (\text{fnt})^2)$$

$$\text{- WELDMENT ftw / (0.6 x Fybasemetal)} = 17 \text{ mm}$$

$$\text{USE} = \text{FULL-PEN}$$

$$\text{- ftw} = \text{fbi} + \text{fbo} + \text{ft} = 3.497 \text{ Ton/cm}$$

$$\implies \text{ACCEPT}$$

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121	
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A	
UNIT: INTERCONNECTIONS	REV.A	
AREA: MACOTAL AREA	DATE : 08-08-13	
PHASE: DETAILED ENGINEERING	PAGE 76 OF 140	
DISCIPLINE: CIVIL		
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PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE		

5.3.6 LIFTING SLING & SHACKLE CALCULATION

1. Sling

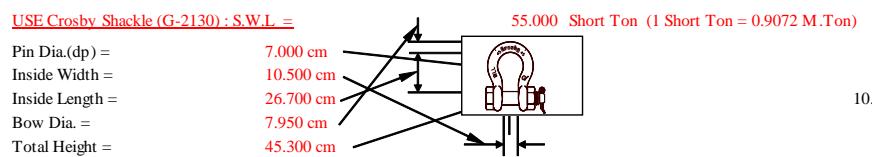
Factor of Safety = **4**
Sling Force, SL = **50.0 Ton**

F.S x DSL = **200.0 Ton**
Choose Sling Dia.= **90 mm** = **3.543 inch**
SWL = ROPE DIAMETER * ROPE DIAMETER * 8 (Refer CSA Standard G4-1967, Steel Wire Rope - General Purpose, and are provided for the most commonly used wire rope classifiTon) = **100.4 Ton**
Calculated Breaking Load = **401.8 Ton** > **200.0 Ton** = F.S * DSL
====> **ACCEPT**

* You should check actual Catalogue Breaking Strength

2. Shackle

Sling Force, SL = **50.0 Ton**



3. Sling / Shackle & Padeye Clearance Check

- Padeye to Sling Clearance = Inside Length - (rm - 0.5dh) - Sling Dia. = **8.50 cm** ==> **ACCEPT**
- Jaw Opening to Padeye Width = Inside Width - (tm + 2tc1 + 2tc2) = **4.50 cm** ==> **ACCEPT**
- Clearance between Base and End of Shackle = **5.85 cm** ==> **ACCEPT**
- Shackle Capacity Reduction = Padeye Width / Jaw Opening Width = **57.1%**
- Crosby recommended the reduction factor of working load limit :

Padeye Width / Jaw Opening	80%	60%	40%	0%
Reduction Factor	1.00	0.87	0.80	0.70
	⇒	57.1%	S.W.L.	
		0.89	49 Ton	

====> **ACCEPT**

* Check Min. Weldment **max(main,Ch1,Ch2)= 2mm** **Min. Weld = 7.9mm**

4. Padeye Dimension

- Hole Dia.(dp+(6.35-12.7mm)) = **7.64 cm** < **8.27 cm** Use (dh) = **7.60 cm**
- Radius of Main Plate (1.75dh) = **13.30 cm** < **20.87 cm** Use (rm) = **13.00 cm** (Refer to ASD 9th Edition, J3.9, Page 5-75)
- Radius of 1ST Check Plate (1.5dh) = **11.40 cm** Use (rc1) = **11.00 cm**
- Radius of 2ND Check Plate (1.3dh) = **0.00 cm** Use (rc2) = **0.00 cm**
- Main Plate Thickness = **2.00 cm** Use (tm) = **2.00 cm**
- 1ST Check Plate Thickness = **2.00 cm** Use (tc1) = **2.00 cm**
- 2ND Check Plate Thickness = **0.00 cm** Use (tc2) = **0.00 cm**

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	REV.A DATE : 08-08-13
PHASE: DETAILED ENGINEERING	
DISCIPLINE: CIVIL	
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	PAGE 77 OF 140
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	

APPENDIX A LOAD-OUT/LAND TRANSPORTATION

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

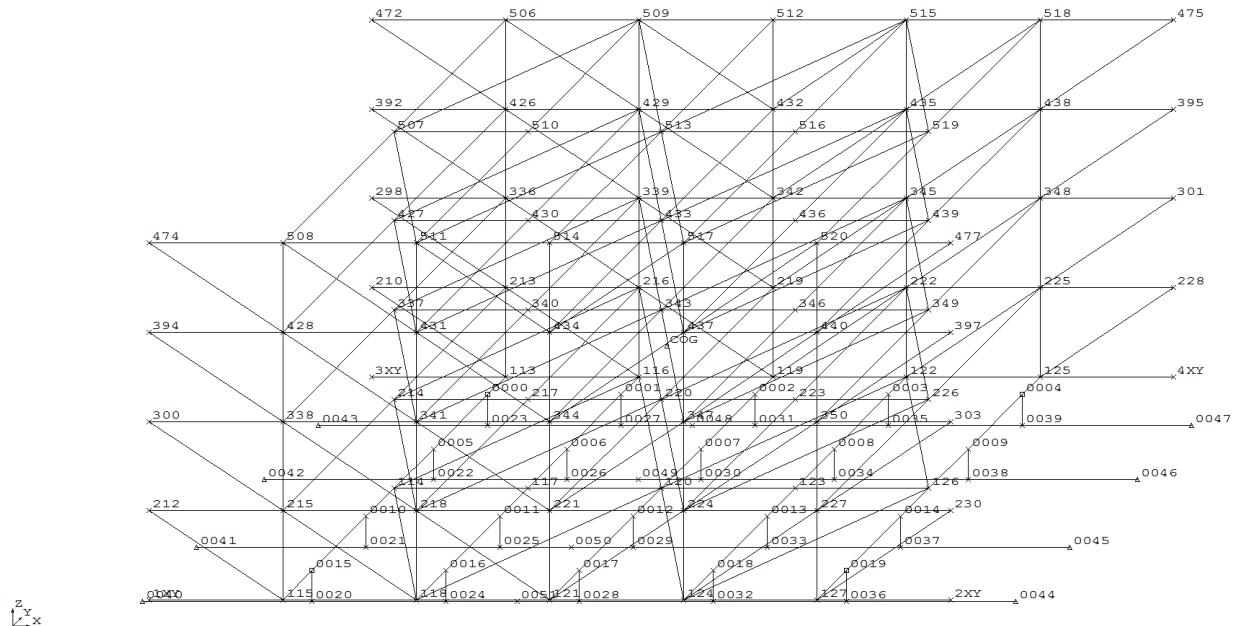
PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	REV.A DATE : 08-08-13
PHASE: DETAILED ENGINEERING	
DISCIPLINE: CIVIL	
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	PAGE 78 OF 140
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	

APPENDIX A.1 STRUCTURAL MODEL PLOT

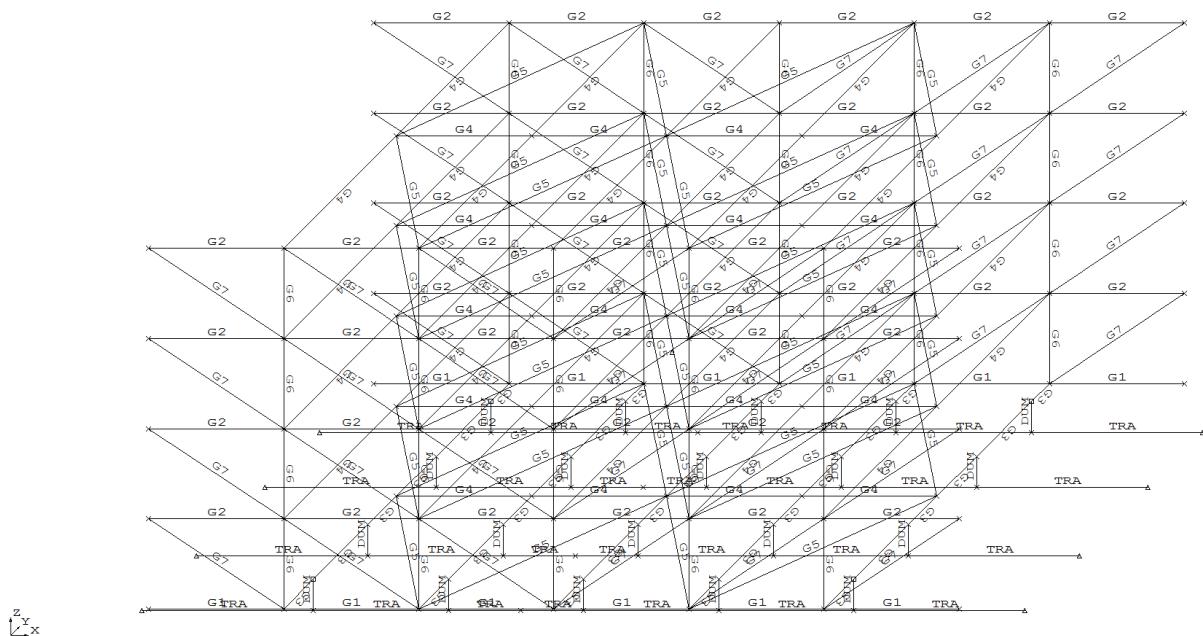
REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	
UNIT: INTERCONNECTIONS	HYUNDAI-WISON DOC. No. N/A
AREA: MACOTAL AREA	
PHASE: DETAILED ENGINEERING	
DISCIPLINE: CIVIL	REV.A DATE : 08-08-13
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	PAGE 79 OF 140
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	

A.1.1 Joint

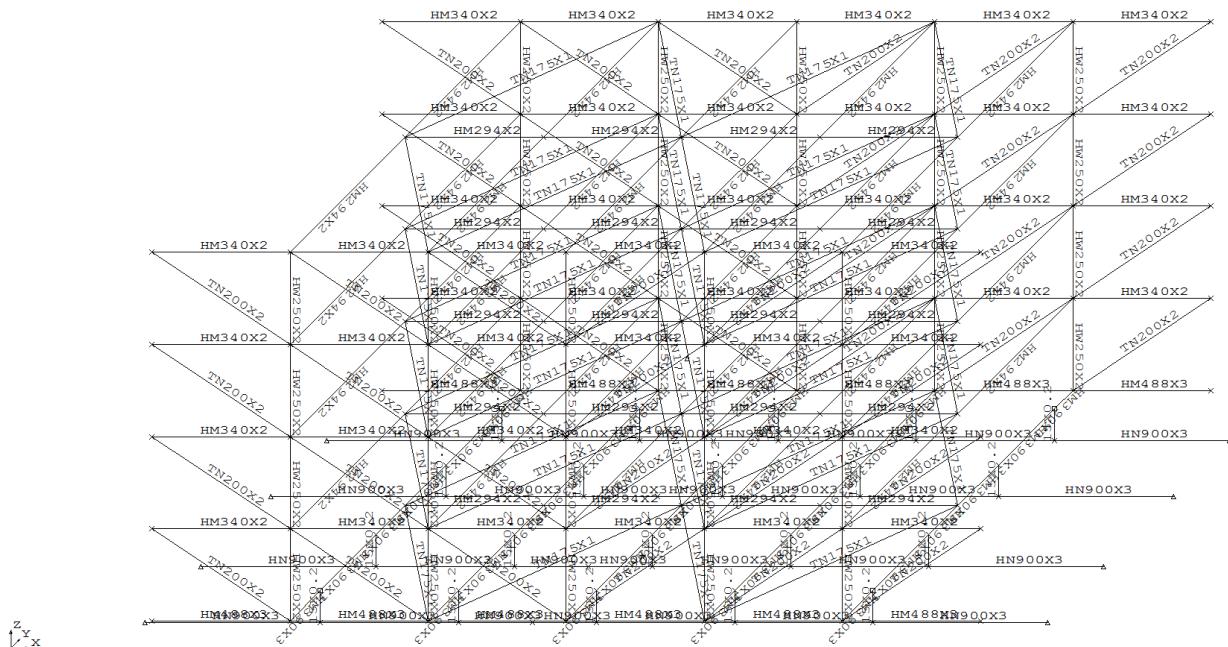
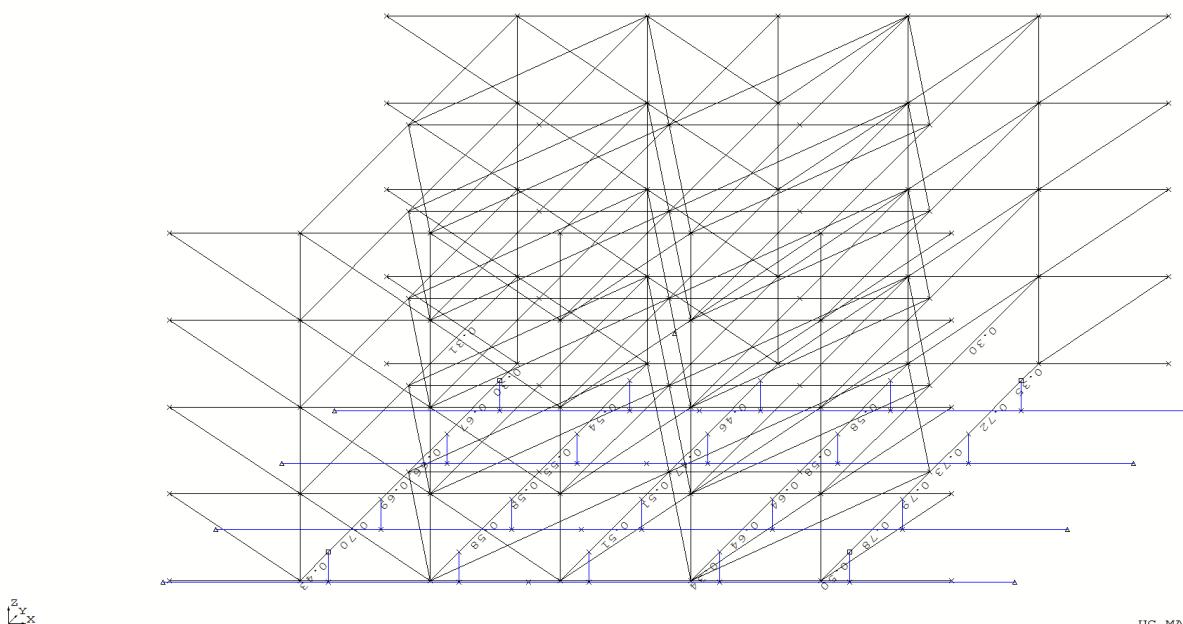


A.1.2 Group



REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	
PHASE: DETAILED ENGINEERING	
DISCIPLINE: CIVIL	
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
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A.1.3 Member Section

A.1.4 Member Unit Check(UC>0.3)


REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	REV.A DATE : 08-08-13
PHASE: DETAILED ENGINEERING	
DISCIPLINE: CIVIL	
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	PAGE 81 OF 140
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	

APPENDIX A.2 SACS INPUT FILE LIST

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121	
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A	
UNIT: INTERCONNECTIONS	REV.A DATE : 08-08-13	
AREA: MACOTAL AREA	PAGE 82 OF 140	
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PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE		

A.2.1 SACS Input Data

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LCSEL ST    110  111  112  113  114
UCPART     0.8500. 8501. 0001. 000
SECT
SECT HM294X2  WFC           20.0001. 20029. 4000. 800
SECT HM340X2  WFC           25.0001. 40034. 0000. 900
SECT HM390X3  WFC           30.0001. 60039. 0001. 000
SECT HM488X3  WFC           30.0001. 80048. 8001. 100
SECT HN900X3  WF            30.0002. 80090. 0001. 600
SECT HW250X2  WFC           25.0001. 40025. 0000. 900
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SECT TN200X2  TEE           20.00020. 000. 800  1. 30015. 700. 00
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REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121	
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A	
UNIT: INTERCONNECTIONS	REV.A	
AREA: MACOTAL AREA	DATE : 08-08-13	
PHASE: DETAILED ENGINEERING	TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
DISCIPLINE: CIVIL	PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	
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MEMBER OFFSETS
MEMBER1113 116 G1 L 3.003.003.000 -24.40 -24.40
MEMBER OFFSETS L 3.003.003.000 -24.40 -24.40
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DISCIPLINE: CIVIL	PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	
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MEMBER1113 0000	G3	000011	L	5.005.005.000
MEMBER OFFSETS		-19.50	-19.50	
MEMBER1114 0010	G3		L	5.005.005.000
MEMBER OFFSETS		-19.50	-19.50	
MEMBER1116 0001	G3	000011	L	5.005.005.000
MEMBER OFFSETS		-19.50	-19.50	
MEMBER1117 0011	G3		L	5.005.005.000
MEMBER OFFSETS		-19.50	-19.50	
MEMBER1119 0002	G3	000011	L	5.005.005.000
MEMBER OFFSETS		-19.50	-19.50	
MEMBER1120 0012	G3		L	5.005.005.000
MEMBER OFFSETS		-19.50	-19.50	
MEMBER1122 0003	G3	000011	L	5.005.005.000
MEMBER OFFSETS		-19.50	-19.50	

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121	
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A	
UNIT: INTERCONNECTIONS	REV.A	
AREA: MACOTAL AREA	DATE : 08-08-13	
PHASE: DETAILED ENGINEERING	TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
DISCIPLINE: CIVIL	PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	
PAGE 85 OF 140		

MEMBER1123 0013 G3		L 5.005.005.000	
MEMBER OFFSETS		-19.50	-19.50
MEMBER1125 0004 G3	000011	L 5.005.005.000	
MEMBER OFFSETS		-19.50	-19.50
MEMBER1126 0014 G3		L 5.005.005.000	
MEMBER OFFSETS		-19.50	-19.50
MEMBER10000005 G3		L 5.005.005.000	
MEMBER OFFSETS		-19.50	-19.50
MEMBER100010006 G3		L 5.005.005.000	
MEMBER OFFSETS		-19.50	-19.50
MEMBER100020007 G3		L 5.005.005.000	
MEMBER OFFSETS		-19.50	-19.50
MEMBER100030008 G3		L 5.005.005.000	
MEMBER OFFSETS		-19.50	-19.50
MEMBER100040009 G3		L 5.005.005.000	
MEMBER OFFSETS		-19.50	-19.50
MEMBER10005114 G3		L 5.005.005.000	
MEMBER OFFSETS		-19.50	-19.50
MEMBER10006117 G3		L 5.005.005.000	
MEMBER OFFSETS		-19.50	-19.50
MEMBER10007120 G3		L 5.005.005.000	
MEMBER OFFSETS		-19.50	-19.50
MEMBER10008123 G3		L 5.005.005.000	
MEMBER OFFSETS		-19.50	-19.50
MEMBER10009126 G3		L 5.005.005.000	
MEMBER OFFSETS		-19.50	-19.50
MEMBER100100015 G3		L 5.005.005.000	
MEMBER OFFSETS		-19.50	-19.50
MEMBER100110016 G3		L 5.005.005.000	
MEMBER OFFSETS		-19.50	-19.50
MEMBER100120017 G3		L 5.005.005.000	
MEMBER OFFSETS		-19.50	-19.50
MEMBER100130018 G3		L 5.005.005.000	
MEMBER OFFSETS		-19.50	-19.50
MEMBER100140019 G3		L 5.005.005.000	
MEMBER OFFSETS		-19.50	-19.50
MEMBER10015115 G3	000011	L 5.005.005.000	
MEMBER OFFSETS		-19.50	-19.50
MEMBER10016118 G3	000011	L 5.005.005.000	
MEMBER OFFSETS		-19.50	-19.50
MEMBER10017121 G3	000011	L 5.005.005.000	
MEMBER OFFSETS		-19.50	-19.50
MEMBER10018124 G3	000011	L 5.005.005.000	
MEMBER OFFSETS		-19.50	-19.50
MEMBER10019127 G3	000011	L 5.005.005.000	
MEMBER OFFSETS		-19.50	-19.50
MEMBER1114 117 G4	000011000011	L 3.003.003.000	
MEMBER OFFSETS		-14.70	-14.70
MEMBER1117 120 G4	000011000011	L 3.003.003.000	
MEMBER OFFSETS		-14.70	-14.70
MEMBER1120 123 G4	000011000011	L 3.003.003.000	
MEMBER OFFSETS		-14.70	-14.70
MEMBER1123 126 G4	000011000011	L 3.003.003.000	
MEMBER OFFSETS		-14.70	-14.70
MEMBER1213 214 G4		L 5.005.005.000	
MEMBER OFFSETS		-14.70	-14.70
MEMBER1214 215 G4		L 5.005.005.000	
MEMBER OFFSETS		-14.70	-14.70
MEMBER1214 217 G4	000011000011	L 3.003.003.000	
MEMBER OFFSETS		-14.70	-14.70
MEMBER1216 217 G4		L 5.005.005.000	
MEMBER OFFSETS		-14.70	-14.70
MEMBER1217 218 G4		L 5.005.005.000	
MEMBER OFFSETS		-14.70	-14.70
MEMBER1217 220 G4	000011000011	L 3.003.003.000	
MEMBER OFFSETS		-14.70	-14.70
MEMBER1219 220 G4		L 5.005.005.000	
MEMBER OFFSETS		-14.70	-14.70

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121	
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A	
UNIT: INTERCONNECTIONS	REV.A	
AREA: MACOTAL AREA	DATE : 08-08-13	
PHASE: DETAILED ENGINEERING	TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
DISCIPLINE: CIVIL	PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	
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MEMBER1220 221	64	L	5.005.005.000	
MEMBER OFFSETS			-14.70	-14.70
MEMBER1220 223	64	000011000011	L	3.003.003.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1222 223	64	L	5.005.005.000	
MEMBER OFFSETS			-14.70	-14.70
MEMBER1223 224	64	L	5.005.005.000	
MEMBER OFFSETS			-14.70	-14.70
MEMBER1223 226	64	000011000011	L	3.003.003.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1225 226	64	L	5.005.005.000	
MEMBER OFFSETS			-14.70	-14.70
MEMBER1226 227	64	L	5.005.005.000	
MEMBER OFFSETS			-14.70	-14.70
MEMBER1336 337	64	L	5.005.005.000	
MEMBER OFFSETS			-14.70	-14.70
MEMBER1337 338	64	L	5.005.005.000	
MEMBER OFFSETS			-14.70	-14.70
MEMBER1337 340	64	000011000011	L	3.003.003.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1339 340	64	L	5.005.005.000	
MEMBER OFFSETS			-14.70	-14.70
MEMBER1340 341	64	L	5.005.005.000	
MEMBER OFFSETS			-14.70	-14.70
MEMBER1340 343	64	000011000011	L	3.003.003.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1342 343	64	L	5.005.005.000	
MEMBER OFFSETS			-14.70	-14.70
MEMBER1343 344	64	L	5.005.005.000	
MEMBER OFFSETS			-14.70	-14.70
MEMBER1343 346	64	000011000011	L	3.003.003.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1345 346	64	L	5.005.005.000	
MEMBER OFFSETS			-14.70	-14.70
MEMBER1346 347	64	L	5.005.005.000	
MEMBER OFFSETS			-14.70	-14.70
MEMBER1346 349	64	000011000011	L	3.003.003.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1348 349	64	L	5.005.005.000	
MEMBER OFFSETS			-14.70	-14.70
MEMBER1349 350	64	L	5.005.005.000	
MEMBER OFFSETS			-14.70	-14.70
MEMBER1349 350	64	L	5.005.005.000	
MEMBER OFFSETS			-14.70	-14.70
MEMBER1426 427	64	L	5.005.005.000	
MEMBER OFFSETS			-14.70	-14.70
MEMBER1427 428	64	L	5.005.005.000	
MEMBER OFFSETS			-14.70	-14.70
MEMBER1427 430	64	000011000011	L	3.003.003.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1429 430	64	L	5.005.005.000	
MEMBER OFFSETS			-14.70	-14.70
MEMBER1430 431	64	L	5.005.005.000	
MEMBER OFFSETS			-14.70	-14.70
MEMBER1430 431	64	000011000011	L	3.003.003.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1432 433	64	L	5.005.005.000	
MEMBER OFFSETS			-14.70	-14.70
MEMBER1433 434	64	000011000011	L	5.005.005.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1433 436	64	L	5.005.005.000	
MEMBER OFFSETS			-14.70	-14.70
MEMBER1435 436	64	L	5.005.005.000	
MEMBER OFFSETS			-14.70	-14.70
MEMBER1436 437	64	L	5.005.005.000	
MEMBER OFFSETS			-14.70	-14.70
MEMBER1436 439	64	000011000011	L	3.003.003.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1438 439	64	L	5.005.005.000	
MEMBER OFFSETS			-14.70	-14.70

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121	
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A	
UNIT: INTERCONNECTIONS	REV.A	
AREA: MACOTAL AREA	DATE : 08-08-13	
PHASE: DETAILED ENGINEERING	TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
DISCIPLINE: CIVIL	PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	
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MEMBER1439 440 G4	L 5.005.005.000
MEMBER OFFSETS	-14.70 -14.70
MEMBER1506 507 G4	L 5.005.005.000
MEMBER OFFSETS	-14.70 -14.70
MEMBER1507 508 G4	L 5.005.005.000
MEMBER OFFSETS	-14.70 -14.70
MEMBER1507 510 G4 000011000011	L 3.003.003.000
MEMBER OFFSETS	-14.70 -14.70
MEMBER1509 510 G4	L 5.005.005.000
MEMBER OFFSETS	-14.70 -14.70
MEMBER1510 511 G4	L 5.005.005.000
MEMBER OFFSETS	-14.70 -14.70
MEMBER1510 513 G4 000011000011	L 3.003.003.000
MEMBER OFFSETS	-14.70 -14.70
MEMBER1512 513 G4	L 5.005.005.000
MEMBER OFFSETS	-14.70 -14.70
MEMBER1513 514 G4	L 5.005.005.000
MEMBER OFFSETS	-14.70 -14.70
MEMBER1513 516 G4 000011000011	L 3.003.003.000
MEMBER OFFSETS	-14.70 -14.70
MEMBER1515 516 G4	L 5.005.005.000
MEMBER OFFSETS	-14.70 -14.70
MEMBER1516 517 G4	L 5.005.005.000
MEMBER OFFSETS	-14.70 -14.70
MEMBER1516 519 G4 000011000011	L 3.003.003.000
MEMBER OFFSETS	-14.70 -14.70
MEMBER1518 519 G4	L 5.005.005.000
MEMBER OFFSETS	-14.70 -14.70
MEMBER1519 520 G4	L 5.005.005.000
MEMBER OFFSETS	-14.70 -14.70
MEMBER1114 116 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1114 118 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1116 120 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1118 120 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1120 122 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1120 124 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1122 126 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1124 126 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1214 216 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1214 218 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1216 220 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1218 220 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1220 222 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1220 224 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1222 226 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1224 226 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1337 339 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1337 341 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1339 343 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	
PHASE: DETAILED ENGINEERING	
DISCIPLINE: CIVIL	REV.A DATE : 08-08-13
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	
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MEMBER1341 343 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1343 345 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1343 347 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1345 349 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1347 349 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1427 429 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1427 431 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1429 433 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1431 433 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1433 435 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1433 437 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1435 439 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1437 439 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1507 509 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1507 511 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1509 513 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1511 513 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1513 515 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1513 517 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1515 519 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1517 519 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER 213 113 G6	L 2.002.00
MEMBER 215 115 G6	L 2.002.00
MEMBER 216 116 G6	L 2.002.00
MEMBER 218 118 G6	L 2.002.00
MEMBER 219 119 G6	L 2.002.00
MEMBER 221 121 G6	L 2.002.00
MEMBER 222 122 G6	L 2.002.00
MEMBER 224 124 G6	L 2.002.00
MEMBER 225 125 G6	L 2.002.00
MEMBER 227 127 G6	L 2.002.00
MEMBER 336 213 G6	L 2.002.00
MEMBER 338 215 G6	L 2.002.00
MEMBER 339 216 G6	L 2.002.00
MEMBER 341 218 G6	L 2.002.00
MEMBER 342 219 G6	L 2.002.00
MEMBER 344 221 G6	L 2.002.00
MEMBER 345 222 G6	L 2.002.00
MEMBER 347 224 G6	L 2.002.00
MEMBER 348 225 G6	L 2.002.00
MEMBER 350 227 G6	L 2.002.00
MEMBER 426 336 G6	L 2.002.00
MEMBER 428 338 G6	L 2.002.00
MEMBER 429 339 G6	L 2.002.00
MEMBER 431 341 G6	L 2.002.00
MEMBER 432 342 G6	L 2.002.00
MEMBER 434 344 G6	L 2.002.00

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121	
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A	
UNIT: INTERCONNECTIONS	REV.A	
AREA: MACOTAL AREA	DATE : 08-08-13	
PHASE: DETAILED ENGINEERING	TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
DISCIPLINE: CIVIL	PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	
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MEMBER 435 345 G6	L	2.002.00
MEMBER 437 347 G6	L	2.002.00
MEMBER 438 348 G6	L	2.002.00
MEMBER 440 350 G6	L	2.002.00
MEMBER 506 426 G6	L	2.002.00
MEMBER 508 428 G6	L	2.002.00
MEMBER 509 429 G6	L	2.002.00
MEMBER 511 431 G6	L	2.002.00
MEMBER 512 432 G6	L	2.002.00
MEMBER 514 434 G6	L	2.002.00
MEMBER 515 435 G6	L	2.002.00
MEMBER 517 437 G6	L	2.002.00
MEMBER 518 438 G6	L	2.002.00
MEMBER 520 440 G6	L	2.002.00
MEMBER1119 222 G7	000011000011	L 3.603.603.600 5.00 -3.580 -3.580
MEMBER OFFSETS		L 3.603.603.600 5.00 -3.580 -3.580
MEMBER1121 224 G7	000011000011	L 3.603.603.600 5.00 -3.580 -3.580
MEMBER OFFSETS		L 3.603.603.600 5.00 -3.580 -3.580
MEMBER1122 225 G7	000011000011	L 3.603.603.600 5.00 -3.580 -3.580
MEMBER OFFSETS		L 3.603.603.600 5.00 -3.580 -3.580
MEMBER1124 227 G7	000011000011	L 3.603.603.600 5.00 -3.580 -3.580
MEMBER OFFSETS		L 3.603.603.600 5.00 -3.580 -3.580
MEMBER1125 228 G7	000011000011	L 3.603.603.600 5.00 -3.580 -3.580
MEMBER OFFSETS		L 3.603.603.600 5.00 -3.580 -3.580
MEMBER1127 230 G7	000011000011	L 3.603.603.600 5.00 -3.580 -3.580
MEMBER OFFSETS		L 3.603.603.600 5.00 -3.580 -3.580
MEMBER1210 113 G7	000011000011	L 3.603.603.600 5.00 -3.580 -3.580
MEMBER OFFSETS		L 3.603.603.600 5.00 -3.580 -3.580
MEMBER1212 115 G7	000011000011	L 3.603.603.600 5.00 -3.580 -3.580
MEMBER OFFSETS		L 3.603.603.600 5.00 -3.580 -3.580
MEMBER1213 116 G7	000011000011	L 3.603.603.600 5.00 -3.580 -3.580
MEMBER OFFSETS		L 3.603.603.600 5.00 -3.580 -3.580
MEMBER1215 118 G7	000011000011	L 3.603.603.600 5.00 -3.580 -3.580
MEMBER OFFSETS		L 3.603.603.600 5.00 -3.580 -3.580
MEMBER1216 119 G7	000011000011	L 3.603.603.600 5.00 -3.580 -3.580
MEMBER OFFSETS		L 3.603.603.600 5.00 -3.580 -3.580
MEMBER1218 121 G7	000011000011	L 3.603.603.600 5.00 -3.580 -3.580
MEMBER OFFSETS		L 3.603.603.600 5.00 -3.580 -3.580
MEMBER1219 345 G7	000011000011	L 3.603.603.600 5.00 -3.580 -3.580
MEMBER OFFSETS		L 3.603.603.600 5.00 -3.580 -3.580
MEMBER1221 347 G7	000011000011	L 3.603.603.600 5.00 -3.580 -3.580
MEMBER OFFSETS		L 3.603.603.600 5.00 -3.580 -3.580
MEMBER1222 348 G7	000011000011	L 3.603.603.600 5.00 -3.580 -3.580
MEMBER OFFSETS		L 3.603.603.600 5.00 -3.580 -3.580
MEMBER1224 350 G7	000011000011	L 3.603.603.600 5.00 -3.580 -3.580
MEMBER OFFSETS		L 3.603.603.600 5.00 -3.580 -3.580
MEMBER1225 301 G7	000011000011	L 3.603.603.600 5.00 -3.580 -3.580
MEMBER OFFSETS		L 3.603.603.600 5.00 -3.580 -3.580
MEMBER1227 303 G7	000011000011	L 3.603.603.600 5.00 -3.580 -3.580
MEMBER OFFSETS		L 3.603.603.600 5.00 -3.580 -3.580
MEMBER1298 213 G7	000011000011	L 3.603.603.600 5.00 -3.580 -3.580
MEMBER OFFSETS		L 3.603.603.600 5.00 -3.580 -3.580
MEMBER1300 215 G7	000011000011	L 3.603.603.600 5.00 -3.580 -3.580
MEMBER OFFSETS		L 3.603.603.600 5.00 -3.580 -3.580
MEMBER1336 216 G7	000011000011	L 3.603.603.600 5.00 -3.580 -3.580
MEMBER OFFSETS		L 3.603.603.600 5.00 -3.580 -3.580
MEMBER1338 218 G7	000011000011	L 3.603.603.600 5.00 -3.580 -3.580
MEMBER OFFSETS		L 3.603.603.600 5.00 -3.580 -3.580
MEMBER1339 219 G7	000011000011	L 3.603.603.600 5.00 -3.580 -3.580
MEMBER OFFSETS		L 3.603.603.600 5.00 -3.580 -3.580
MEMBER1341 221 G7	000011000011	L 3.603.603.600 5.00 -3.580 -3.580
MEMBER OFFSETS		L 3.603.603.600 5.00 -3.580 -3.580
MEMBER1342 435 G7	000011000011	L 3.603.603.600 5.00 -3.580 -3.580
MEMBER OFFSETS		L 3.603.603.600 5.00 -3.580 -3.580
MEMBER1344 437 G7	000011000011	L 3.603.603.600 5.00 -3.580 -3.580
MEMBER OFFSETS		L 3.603.603.600 5.00 -3.580 -3.580
MEMBER1345 438 G7	000011000011	L 3.603.603.600 5.00 -3.580 -3.580
MEMBER OFFSETS		L 3.603.603.600 5.00 -3.580 -3.580

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT SUBPROJECT: OFFSITES UNIT: INTERCONNECTIONS AREA: MACOTAL AREA PHASE: DETAILED ENGINEERING DISCIPLINE: CIVIL TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE) PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	PDVSA DOC. No. 3006-466C-DC406121	
	HYUNDAI-WISON DOC. No. N/A	
	REV.A	DATE : 08-08-13
	PAGE 90 OF 140	

MEMBER1347 440 G7 000011000011	L 3.603.603.600	5.00
MEMBER OFFSETS	-3.580	-3.580
MEMBER1348 395 G7 000011000011	L 3.603.603.600	5.00
MEMBER OFFSETS	-3.580	-3.580
MEMBER1350 397 G7 000011000011	L 3.603.603.600	5.00
MEMBER OFFSETS	-3.580	-3.580
MEMBER1392 336 G7 000011000011	L 3.603.603.600	5.00
MEMBER OFFSETS	-3.580	-3.580
MEMBER1394 338 G7 000011000011	L 3.603.603.600	5.00
MEMBER OFFSETS	-3.580	-3.580
MEMBER1426 339 G7 000011000011	L 3.603.603.600	5.00
MEMBER OFFSETS	-3.580	-3.580
MEMBER1428 341 G7 000011000011	L 3.603.603.600	5.00
MEMBER OFFSETS	-3.580	-3.580
MEMBER1429 342 G7 000011000011	L 3.603.603.600	5.00
MEMBER OFFSETS	-3.580	-3.580
MEMBER1431 344 G7 000011000011	L 3.603.603.600	5.00
MEMBER OFFSETS	-3.580	-3.580
MEMBER1432 515 G7 000011000011	L 3.603.603.600	5.00
MEMBER OFFSETS	-3.580	-3.580
MEMBER1434 517 G7 000011000011	L 3.603.603.600	5.00
MEMBER OFFSETS	-3.580	-3.580
MEMBER1435 518 G7 000011000011	L 3.603.603.600	5.00
MEMBER OFFSETS	-3.580	-3.580
MEMBER1437 520 G7 000011000011	L 3.603.603.600	5.00
MEMBER OFFSETS	-3.580	-3.580
MEMBER1438 475 G7 000011000011	L 3.603.603.600	5.00
MEMBER OFFSETS	-3.580	-3.580
MEMBER1440 477 G7 000011000011	L 3.603.603.600	5.00
MEMBER OFFSETS	-3.580	-3.580
MEMBER1472 426 G7 000011000011	L 3.603.603.600	5.00
MEMBER OFFSETS	-3.580	-3.580
MEMBER1474 428 G7 000011000011	L 3.603.603.600	5.00
MEMBER OFFSETS	-3.580	-3.580
MEMBER1506 429 G7 000011000011	L 3.603.603.600	5.00
MEMBER OFFSETS	-3.580	-3.580
MEMBER1508 431 G7 000011000011	L 3.603.603.600	5.00
MEMBER OFFSETS	-3.580	-3.580
MEMBER1509 432 G7 000011000011	L 3.603.603.600	5.00
MEMBER OFFSETS	-3.580	-3.580
MEMBER1511 434 G7 000011000011	L 3.603.603.600	5.00
MEMBER OFFSETS	-3.580	-3.580
MEMBER100200024 TRA	-45.00	-45.00
MEMBER OFFSETS	-45.00	-45.00
MEMBER100210025 TRA	-45.00	-45.00
MEMBER OFFSETS	-45.00	-45.00
MEMBER100220026 TRA	-45.00	-45.00
MEMBER OFFSETS	-45.00	-45.00
MEMBER100230027 TRA	-45.00	-45.00
MEMBER OFFSETS	-45.00	-45.00
MEMBER100240051 TRA	-45.00	-45.00
MEMBER OFFSETS	-45.00	-45.00
MEMBER100250050 TRA	-45.00	-45.00
MEMBER OFFSETS	-45.00	-45.00
MEMBER100260049 TRA	-45.00	-45.00
MEMBER OFFSETS	-45.00	-45.00
MEMBER100270048 TRA	-45.00	-45.00
MEMBER OFFSETS	-45.00	-45.00
MEMBER100280032 TRA	-45.00	-45.00
MEMBER OFFSETS	-45.00	-45.00
MEMBER100290033 TRA	-45.00	-45.00
MEMBER OFFSETS	-45.00	-45.00
MEMBER100300034 TRA	-45.00	-45.00
MEMBER OFFSETS	-45.00	-45.00
MEMBER100310035 TRA	-45.00	-45.00
MEMBER OFFSETS	-45.00	-45.00
MEMBER100320036 TRA	-45.00	-45.00
MEMBER OFFSETS	-45.00	-45.00

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121	
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A	
UNIT: INTERCONNECTIONS	REV.A	
AREA: MACOTAL AREA	DATE : 08-08-13	
PHASE: DETAILED ENGINEERING	TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
DISCIPLINE: CIVIL	PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	
PAGE 91 OF 140		

MEMBER100330037 TRA			
MEMBER OFFSETS	-45.00	-45.00	
MEMBER100340038 TRA			
MEMBER OFFSETS	-45.00	-45.00	
MEMBER100350039 TRA			
MEMBER OFFSETS	-45.00	-45.00	
MEMBER100360044 TRA			
MEMBER OFFSETS	-45.00	-45.00	
MEMBER100370045 TRA			
MEMBER OFFSETS	-45.00	-45.00	
MEMBER100380046 TRA			
MEMBER OFFSETS	-45.00	-45.00	
MEMBER100390047 TRA			
MEMBER OFFSETS	-45.00	-45.00	
MEMBER100400020 TRA			
MEMBER OFFSETS	-45.00	-45.00	
MEMBER100410021 TRA			
MEMBER OFFSETS	-45.00	-45.00	
MEMBER100420022 TRA			
MEMBER OFFSETS	-45.00	-45.00	
MEMBER100430023 TRA			
MEMBER OFFSETS	-45.00	-45.00	
MEMBER100480031 TRA			
MEMBER OFFSETS	-45.00	-45.00	
MEMBER100490030 TRA			
MEMBER OFFSETS	-45.00	-45.00	
MEMBER100500029 TRA			
MEMBER OFFSETS	-45.00	-45.00	
MEMBER100510028 TRA			
MEMBER OFFSETS	-45.00	-45.00	
JOINT			
JOINT 113 -6. 4. 0. 74.300			
JOINT 114 -6. 0. 0. -25.700			
JOINT 115 -6. -5. 0. -25.700			
JOINT 116 -3. 4. 0. 74.300			
JOINT 117 -3. 0. 0. -25.700			
JOINT 118 -3. -5. 0. -25.700			
JOINT 119 0. 4. 0. 0.001 74.300			
JOINT 120 0. 0. 0. 0.001-25.700			
JOINT 121 0. -5. 0. 0.001-25.700			
JOINT 122 3. 4. 0. 74.300			
JOINT 123 3. 0. 0. -25.700			
JOINT 124 3. -5. 0. -25.700			
JOINT 125 6. 4. 0. 74.300			
JOINT 126 6. 0. 0. -25.700			
JOINT 127 6. -5. 0. -25.700			
JOINT 1XY -9. -5. 0. -25.700			
JOINT 210 -9. 4. 2. 74.300			
JOINT 212 -9. -5. 2. -25.700			
JOINT 213 -6. 4. 2. 74.300			
JOINT 214 -6. 0. 2. -25.700			
JOINT 215 -6. -5. 2. -25.700			
JOINT 216 -3. 4. 2. 74.300			
JOINT 217 -3. 0. 2. -25.700			
JOINT 218 -3. -5. 2. -25.700			
JOINT 219 0. 4. 2. 0.001 74.300			
JOINT 220 0. 0. 2. 0.001-25.700			
JOINT 221 0. -5. 2. 0.001-25.700			
JOINT 222 3. 4. 2. 74.300			
JOINT 223 3. 0. 2. -25.700			
JOINT 224 3. -5. 2. -25.700			
JOINT 225 6. 4. 2. 74.300			
JOINT 226 6. 0. 2. -25.700			
JOINT 227 6. -5. 2. -25.700			
JOINT 228 9. 4. 2. 74.300			
JOINT 230 9. -5. 2. -25.700			
JOINT 298 -9. 4. 4. 74.300			
JOINT 2XY 9. -5. 0. -25.700			

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121	
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A	
UNIT: INTERCONNECTIONS	REV.A	
AREA: MACOTAL AREA	DATE : 08-08-13	
PHASE: DETAILED ENGINEERING	TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
DISCIPLINE: CIVIL	PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	
PAGE 92 OF 140		

JOINT 300	-9.	-5.	4.	-25.700
JOINT 301	9.	4.	4.	74.300
JOINT 303	9.	-5.	4.	-25.700
JOINT 336	-6.	4.	4.	74.300
JOINT 337	-6.	0.	4.	-25.700
JOINT 338	-6.	-5.	4.	-25.700
JOINT 339	-3.	4.	4.	74.300
JOINT 340	-3.	0.	4.	-25.700
JOINT 341	-3.	-5.	4.	-25.700
JOINT 342	0.	4.	4.	0.001 74.300
JOINT 343	0.	0.	4.	0.001-25.700
JOINT 344	0.	-5.	4.	0.001-25.700
JOINT 345	3.	4.	4.	74.300
JOINT 346	3.	0.	4.	-25.700
JOINT 347	3.	-5.	4.	-25.700
JOINT 348	6.	4.	4.	74.300
JOINT 349	6.	0.	4.	-25.700
JOINT 350	6.	-5.	4.	-25.700
JOINT 392	-9.	4.	6.	74.300
JOINT 394	-9.	-5.	6.	-25.700
JOINT 395	9.	4.	6.	74.300
JOINT 397	9.	-5.	6.	-25.700
JOINT 3XY	-9.	4.	0.	74.300
JOINT 426	-6.	4.	6.	74.300
JOINT 427	-6.	0.	6.	-25.700
JOINT 428	-6.	-5.	6.	-25.700
JOINT 429	-3.	4.	6.	74.300
JOINT 430	-3.	0.	6.	-25.700
JOINT 431	-3.	-5.	6.	-25.700
JOINT 432	0.	4.	6.	0.001 74.300
JOINT 433	0.	0.	6.	0.001-25.700
JOINT 434	0.	-5.	6.	0.001-25.700
JOINT 435	3.	4.	6.	74.300
JOINT 436	3.	0.	6.	-25.700
JOINT 437	3.	-5.	6.	-25.700
JOINT 438	6.	4.	6.	74.300
JOINT 439	6.	0.	6.	-25.700
JOINT 440	6.	-5.	6.	-25.700
JOINT 472	-9.	4.	8.	74.300
JOINT 474	-9.	-5.	8.	-25.700
JOINT 475	9.	4.	8.	74.300
JOINT 477	9.	-5.	8.	-25.700
JOINT 4XY	9.	4.	0.	74.300
JOINT 506	-6.	4.	8.	74.300
JOINT 507	-6.	0.	8.	-25.700
JOINT 508	-6.	-5.	8.	-25.700
JOINT 509	-3.	4.	8.	74.300
JOINT 510	-3.	0.	8.	-25.700
JOINT 511	-3.	-5.	8.	-25.700
JOINT 512	0.	4.	8.	0.001 74.300
JOINT 513	0.	0.	8.	0.001-25.700
JOINT 514	0.	-5.	8.	0.001-25.700
JOINT 515	3.	4.	8.	74.300
JOINT 516	3.	0.	8.	-25.700
JOINT 517	3.	-5.	8.	-25.700
JOINT 518	6.	4.	8.	74.300
JOINT 519	6.	0.	8.	-25.700
JOINT 520	6.	-5.	8.	-25.700
JOINT COG	0.	0.	3.	6.000 111000
JOINT 0000	-6.	3.	0.	94.300 011000
JOINT 0000	10.000	10.000		ELASTI
JOINT 0001	-3.	3.	0.	94.300
JOINT 0002	0.	3.	0.	0.001 94.300
JOINT 0003	3.	3.	0.	94.300
JOINT 0004	6.	3.	0.	94.300 101000
JOINT 0004	10.000	10.000		ELASTI
JOINT 0005	-6.	1.	0.	51.300
JOINT 0006	-3.	1.	0.	51.300

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121	
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A	
UNIT: INTERCONNECTIONS	REV.A	
AREA: MACOTAL AREA	DATE : 08-08-13	
PHASE: DETAILED ENGINEERING	TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
DISCIPLINE: CIVIL	PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	
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JOINT 0007 0. 1. 0. 0.001 51.300
JOINT 0008 3. 1. 0. 51.300
JOINT 0009 6. 1. 0. 51.300
JOINT 0010 -6. -1. 0. -51.300
JOINT 0011 -3. -1. 0. -51.300
JOINT 0012 0. -1. 0. 0.001-51.300
JOINT 0013 3. -1. 0. -51.300
JOINT 0014 6. -1. 0. -51.300
JOINT 0015 -6. -3. 0. -94.300 101000
JOINT 0015 10.000 10.000 ELASTI
JOINT 0016 -3. -3. 0. -94.300
JOINT 0017 0. -3. 0. 0.001-94.300
JOINT 0018 3. -3. 0. -94.300
JOINT 0019 6. -3. 0. -94.300 011000
JOINT 0019 10.000 10.000 ELASTI
JOINT 0020 -6. -3. 0. -94.300-69.000
JOINT 0021 -6. -1. 0. -51.300-69.000
JOINT 0022 -6. 1. 0. 51.300-69.000
JOINT 0023 -6. 3. 0. 94.300-69.000
JOINT 0024 -3. -3. 0. -94.300-69.000
JOINT 0025 -3. -1. 0. -51.300-69.000
JOINT 0026 -3. 1. 0. 51.300-69.000
JOINT 0027 -3. 3. 0. 94.300-69.000
JOINT 0028 0. -3. 0. 0.001-94.300-69.000
JOINT 0029 0. -1. 0. 0.001-51.300-69.000
JOINT 0030 0. 1. 0. 0.001 51.300-69.000
JOINT 0031 0. 3. 0. 0.001 94.300-69.000
JOINT 0032 3. -3. 0. -94.300-69.000
JOINT 0033 3. -1. 0. -51.300-69.000
JOINT 0034 3. 1. 0. 51.300-69.000
JOINT 0035 3. 3. 0. 94.300-69.000
JOINT 0036 6. -3. 0. -94.300-69.000
JOINT 0037 6. -1. 0. -51.300-69.000
JOINT 0038 6. 1. 0. 51.300-69.000
JOINT 0039 6. 3. 0. 94.300-69.000
JOINT 0040 -9. -3. 0. -80.000-94.300-69.000 110000
JOINT 0041 -9. -1. 0. -80.000-51.300-69.000 110000
JOINT 0042 -9. 1. 0. -80.000 51.300-69.000 110000
JOINT 0043 -9. 3. 0. -80.000 94.300-69.000 110000
JOINT 0044 9. -3. 0. 80.000-94.300-69.000 110000
JOINT 0045 9. -1. 0. 80.000-51.300-69.000 110000
JOINT 0046 9. 1. 0. 80.000 51.300-69.000 110000
JOINT 0047 9. 3. 0. 80.000 94.300-69.000 110000
JOINT 0048 -1. 3. 0. -40.000 94.300-69.000
JOINT 0049 -1. 1. 0. -40.000 51.300-69.000
JOINT 0050 -1. -1. 0. -40.000-51.300-69.000
JOINT 0051 -1. -3. 0. -40.000-94.300-69.000
LOAD
LOADCN 1 1.102
LOADLB1 DEAD LOAD: D
DEAD
DEAD -Z
LOADCN 2
LOADLB2 EL CABLE TRY LOAD
LOAD Z 506 507 3.75000-0.35001.25000-0.3500 GLOB UNIF
LOAD Z 509 510 3.75000-0.35001.25000-0.3500 GLOB UNIF
LOAD Z 512 513 3.75000-0.35001.25000-0.3500 GLOB UNIF
LOAD Z 515 516 3.75000-0.35001.25000-0.3500 GLOB UNIF
LOAD Z 518 519 3.75000-0.35001.25000-0.3500 GLOB UNIF
LOAD Z 507 508 -0.35004.50000-0.3500 GLOB UNIF
LOAD Z 510 511 -0.35004.50000-0.3500 GLOB UNIF
LOAD Z 513 514 -0.35004.50000-0.3500 GLOB UNIF
LOAD Z 516 517 -0.35004.50000-0.3500 GLOB UNIF
LOAD Z 519 520 -0.35004.50000-0.3500 GLOB UNIF
LOAD Z 506 507 2.58000-0.59000.30000-0.5900 GLOB UNIF
LOAD Z 509 510 2.58000-0.59000.30000-0.5900 GLOB UNIF
LOAD Z 512 513 2.58000-0.59000.30000-0.5900 GLOB UNIF
LOAD Z 515 516 2.58000-0.59000.30000-0.5900 GLOB UNIF

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121	
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A	
UNIT: INTERCONNECTIONS	REV.A	
AREA: MACOTAL AREA	DATE : 08-08-13	
PHASE: DETAILED ENGINEERING	TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE) PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	
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LOAD Z 518 519 2. 58000-0. 59000. 30000-0. 5900	GLOB UNIF
LOADCN 4	
LOADLB4 PIPING&EQUIPMENT LOAD-EMPTY: DE	
LOAD Z 213 214 1. 80000-5. 5200	GLOB CONC
LOAD Z 216 217 1. 80000-5. 5200	GLOB CONC
LOAD Z 219 220 1. 80000-5. 5200	GLOB CONC
LOAD Z 222 223 1. 80000-5. 5200	GLOB CONC
LOAD Z 225 226 1. 80000-5. 5200	GLOB CONC
LOAD Z 213 214 2. 71000-5. 5200	GLOB CONC
LOAD Z 216 217 2. 71000-5. 5200	GLOB CONC
LOAD Z 219 220 2. 71000-5. 5200	GLOB CONC
LOAD Z 222 223 2. 71000-5. 5200	GLOB CONC
LOAD Z 225 226 2. 71000-5. 5200	GLOB CONC
LOAD Z 213 214 3. 70000-2. 10001. 30000-2. 1000	GLOB UNIF
LOAD Z 216 217 3. 70000-2. 10001. 30000-2. 1000	GLOB UNIF
LOAD Z 219 220 3. 70000-2. 10001. 30000-2. 1000	GLOB UNIF
LOAD Z 222 223 3. 70000-2. 10001. 30000-2. 1000	GLOB UNIF
LOAD Z 225 226 3. 70000-2. 10001. 30000-2. 1000	GLOB UNIF
LOAD Z 214 215 -2. 10001. 17000-2. 1000	GLOB UNIF
LOAD Z 217 218 -2. 10001. 17000-2. 1000	GLOB UNIF
LOAD Z 220 221 -2. 10001. 17000-2. 1000	GLOB UNIF
LOAD Z 223 224 -2. 10001. 17000-2. 1000	GLOB UNIF
LOAD Z 226 227 -2. 10001. 17000-2. 1000	GLOB UNIF
LOAD Z 337 338 3. 90000-6. 9000	GLOB CONC
LOAD Z 340 341 3. 90000-6. 9000	GLOB CONC
LOAD Z 343 344 3. 90000-6. 9000	GLOB CONC
LOAD Z 346 347 3. 90000-6. 9000	GLOB CONC
LOAD Z 349 350 3. 90000-6. 9000	GLOB CONC
LOAD Z 336 337 2. 03000-4. 50000. 80000-4. 5000	GLOB UNIF
LOAD Z 339 340 2. 03000-4. 50000. 80000-4. 5000	GLOB UNIF
LOAD Z 342 343 2. 03000-4. 50000. 80000-4. 5000	GLOB UNIF
LOAD Z 345 346 2. 03000-4. 50000. 80000-4. 5000	GLOB UNIF
LOAD Z 348 349 2. 03000-4. 50000. 80000-4. 5000	GLOB UNIF
LOAD Z 336 337 3. 43000-3. 30000. 72000-3. 3000	GLOB UNIF
LOAD Z 339 340 3. 43000-3. 30000. 72000-3. 3000	GLOB UNIF
LOAD Z 342 343 3. 43000-3. 30000. 72000-3. 3000	GLOB UNIF
LOAD Z 345 346 3. 43000-3. 30000. 72000-3. 3000	GLOB UNIF
LOAD Z 348 349 3. 43000-3. 30000. 72000-3. 3000	GLOB UNIF
LOAD Z 426 427 0. 95000-0. 4800	GLOB CONC
LOAD Z 429 430 0. 95000-0. 4800	GLOB CONC
LOAD Z 432 433 0. 95000-0. 4800	GLOB CONC
LOAD Z 435 436 0. 95000-0. 4800	GLOB CONC
LOAD Z 438 439 0. 95000-0. 4800	GLOB CONC
LOAD Z 426 427 1. 70000-8. 2500	GLOB CONC
LOAD Z 429 430 1. 70000-8. 2500	GLOB CONC
LOAD Z 432 433 1. 70000-8. 2500	GLOB CONC
LOAD Z 435 436 1. 70000-8. 2500	GLOB CONC
LOAD Z 438 439 1. 70000-8. 2500	GLOB CONC
LOAD Z 00000005 0. 02000-3. 6900	GLOB CONC
LOAD Z 00000005 0. 70000-3. 3000 -3. 3000	GLOB UNIF
LOAD Z 0005114 -3. 30000. 12000-3. 3000	GLOB UNIF
LOAD Z 00010006 0. 02000-3. 6900	GLOB CONC
LOAD Z 00010006 0. 70000-3. 3000 -3. 3000	GLOB UNIF
LOAD Z 0006117 -3. 30000. 12000-3. 3000	GLOB UNIF
LOAD Z 00020007 0. 02000-3. 6900	GLOB CONC
LOAD Z 00020007 0. 70000-3. 3000 -3. 3000	GLOB UNIF
LOAD Z 0007120 -3. 30000. 12000-3. 3000	GLOB UNIF
LOAD Z 00030008 0. 02000-3. 6900	GLOB CONC
LOAD Z 00030008 0. 70000-3. 3000 -3. 3000	GLOB UNIF
LOAD Z 0008123 -3. 30000. 12000-3. 3000	GLOB UNIF
LOAD Z 00040009 0. 02000-3. 6900	GLOB CONC
LOAD Z 00040009 0. 70000-3. 3000 -3. 3000	GLOB UNIF
LOAD Z 0009126 -3. 30000. 12000-3. 3000	GLOB UNIF
LOAD Z 114 0010 -3. 6000 -3. 6000	GLOB UNIF
LOAD Z 117 0011 -3. 6000 -3. 6000	GLOB UNIF
LOAD Z 120 0012 -3. 6000 -3. 6000	GLOB UNIF
LOAD Z 123 0013 -3. 6000 -3. 6000	GLOB UNIF
LOAD Z 126 0014 -3. 6000 -3. 6000	GLOB UNIF

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121	
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A	
UNIT: INTERCONNECTIONS	REV.A	
AREA: MACOTAL AREA	DATE : 08-08-13	
PHASE: DETAILED ENGINEERING	TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE) PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	
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LOAD Z 00100015	-3. 6000	-3. 6000	GLOB UNIF	
LOAD Z 0015115	-3. 60000.	23400-3. 6000	GLOB UNIF	
LOAD Z 00110016	-3. 6000	-3. 6000	GLOB UNIF	
LOAD Z 0016118	-3. 60000.	23400-3. 6000	GLOB UNIF	
LOAD Z 00120017	-3. 6000	-3. 6000	GLOB UNIF	
LOAD Z 0017121	-3. 60000.	23400-3. 6000	GLOB UNIF	
LOAD Z 00130018	-3. 6000	-3. 6000	GLOB UNIF	
LOAD Z 0018124	-3. 60000.	23400-3. 6000	GLOB UNIF	
LOAD Z 00140019	-3. 6000	-3. 6000	GLOB UNIF	
LOAD Z 0019127	-3. 60000.	23400-3. 6000	GLOB UNIF	
LOADCN 9A				
LOAD 3XY	-23. 276		GLOB JOIN	91
LOAD 1XY	-23. 276		GLOB JOIN	91
LOAD 4XY	23. 2760		GLOB JOIN	91
LOAD 2XY	23. 2760		GLOB JOIN	91
LOAD 3XY	-23. 276		GLOB JOIN	92
LOAD 4XY	-23. 276		GLOB JOIN	92
LOAD 1XY	23. 2760		GLOB JOIN	92
LOAD 2XY	23. 2760		GLOB JOIN	92
LOADCN 9B				
LOAD 3XY	-23. 276		GLOB JOIN	91
LOAD 1XY	-23. 276		GLOB JOIN	91
LOAD 4XY	23. 2760		GLOB JOIN	91
LOAD 2XY	23. 2760		GLOB JOIN	91
LOAD 3XY	23. 2760		GLOB JOIN	92
LOAD 4XY	23. 2760		GLOB JOIN	92
LOAD 1XY	-23. 276		GLOB JOIN	92
LOAD 2XY	-23. 276		GLOB JOIN	92
LOADCN 9C				
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LOAD 1XY	23. 2760		GLOB JOIN	91
LOAD 4XY	-23. 276		GLOB JOIN	91
LOAD 2XY	-23. 276		GLOB JOIN	91
LOAD 3XY	-23. 276		GLOB JOIN	92
LOAD 4XY	-23. 276		GLOB JOIN	92
LOAD 1XY	23. 2760		GLOB JOIN	92
LOAD 2XY	23. 2760		GLOB JOIN	92
LOADCN 9D				
LOAD 3XY	23. 2760		GLOB JOIN	91
LOAD 1XY	23. 2760		GLOB JOIN	91
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LOAD 2XY	-23. 276		GLOB JOIN	91
LOAD 3XY	23. 2760		GLOB JOIN	92
LOAD 4XY	23. 2760		GLOB JOIN	92
LOAD 1XY	-23. 276		GLOB JOIN	92
LOAD 2XY	-23. 276		GLOB JOIN	92
LOADCN 60				
LOAD Z 00200024	11. 8755	11. 8755	GLOB UNIF	GA
LOAD Z 00210025	11. 8755	11. 8755	GLOB UNIF	GA
LOAD Z 00220026	11. 8755	11. 8755	GLOB UNIF	GA
LOAD Z 00230027	11. 8755	11. 8755	GLOB UNIF	GA
LOAD Z 00240051	11. 8755	11. 8755	GLOB UNIF	GA
LOAD Z 00250050	11. 8755	11. 8755	GLOB UNIF	GA
LOAD Z 00260049	11. 8755	11. 8755	GLOB UNIF	GA
LOAD Z 00270048	11. 8755	11. 8755	GLOB UNIF	GA
LOAD Z 00400020	11. 8755	11. 8755	GLOB UNIF	GA
LOAD Z 00410021	11. 8755	11. 8755	GLOB UNIF	GA
LOAD Z 00420022	11. 8755	11. 8755	GLOB UNIF	GA
LOAD Z 00430023	11. 8755	11. 8755	GLOB UNIF	GA
LOAD Z 00300034	11. 8784	11. 8784	GLOB UNIF	GB
LOAD Z 00310035	11. 8784	11. 8784	GLOB UNIF	GB
LOAD Z 00340038	11. 8784	11. 8784	GLOB UNIF	GB
LOAD Z 00350039	11. 8784	11. 8784	GLOB UNIF	GB
LOAD Z 00380046	11. 8784	11. 8784	GLOB UNIF	GB
LOAD Z 00390047	11. 8784	11. 8784	GLOB UNIF	GB
LOAD Z 00480031	11. 8784	11. 8784	GLOB UNIF	GB
LOAD Z 00490030	11. 8784	11. 8784	GLOB UNIF	GB
LOAD Z 00280032	11. 8726	11. 8726	GLOB UNIF	GC

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121	
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A	
UNIT: INTERCONNECTIONS	REV.A	
AREA: MACOTAL AREA	DATE : 08-08-13	
PHASE: DETAILED ENGINEERING	TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
DISCIPLINE: CIVIL	PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	
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LOAD Z 00290033	11.8726	11.8726	GLOB UNIF	GC
LOAD Z 00320036	11.8726	11.8726	GLOB UNIF	GC
LOAD Z 00330037	11.8726	11.8726	GLOB UNIF	GC
LOAD Z 00360044	11.8726	11.8726	GLOB UNIF	GC
LOAD Z 00370045	11.8726	11.8726	GLOB UNIF	GC
LOAD Z 00500029	11.8726	11.8726	GLOB UNIF	GC
LOAD Z 00510028	11.8726	11.8726	GLOB UNIF	GC
LOADCN 61				
LOAD Z 00200024	14.4202	14.4202	GLOB UNIF	GA
LOAD Z 00210025	14.4202	14.4202	GLOB UNIF	GA
LOAD Z 00220026	14.4202	14.4202	GLOB UNIF	GA
LOAD Z 00230027	14.4202	14.4202	GLOB UNIF	GA
LOAD Z 00240051	14.4202	14.4202	GLOB UNIF	GA
LOAD Z 00250050	14.4202	14.4202	GLOB UNIF	GA
LOAD Z 00260049	14.4202	14.4202	GLOB UNIF	GA
LOAD Z 00270048	14.4202	14.4202	GLOB UNIF	GA
LOAD Z 00400020	14.4202	14.4202	GLOB UNIF	GA
LOAD Z 00410021	14.4202	14.4202	GLOB UNIF	GA
LOAD Z 00420022	14.4202	14.4202	GLOB UNIF	GA
LOAD Z 00430023	14.4202	14.4202	GLOB UNIF	GA
LOAD Z 00300034	13.7789	13.7789	GLOB UNIF	GB
LOAD Z 00310035	13.7789	13.7789	GLOB UNIF	GB
LOAD Z 00340038	13.7789	13.7789	GLOB UNIF	GB
LOAD Z 00350039	13.7789	13.7789	GLOB UNIF	GB
LOAD Z 00380046	13.7789	13.7789	GLOB UNIF	GB
LOAD Z 00390047	13.7789	13.7789	GLOB UNIF	GB
LOAD Z 00480031	13.7789	13.7789	GLOB UNIF	GB
LOAD Z 00490030	13.7789	13.7789	GLOB UNIF	GB
LOAD Z 00280032	6.15496	6.15496	GLOB UNIF	GC
LOAD Z 00290033	6.15496	6.15496	GLOB UNIF	GC
LOAD Z 00320036	6.15496	6.15496	GLOB UNIF	GC
LOAD Z 00330037	6.15496	6.15496	GLOB UNIF	GC
LOAD Z 00360044	6.15496	6.15496	GLOB UNIF	GC
LOAD Z 00370045	6.15496	6.15496	GLOB UNIF	GC
LOAD Z 00500029	6.15496	6.15496	GLOB UNIF	GC
LOAD Z 00510028	6.15496	6.15496	GLOB UNIF	GC
LOADCN 62				
LOAD Z 00200024	14.4202	14.4202	GLOB UNIF	GA
LOAD Z 00210025	14.4202	14.4202	GLOB UNIF	GA
LOAD Z 00220026	14.4202	14.4202	GLOB UNIF	GA
LOAD Z 00230027	14.4202	14.4202	GLOB UNIF	GA
LOAD Z 00240051	14.4202	14.4202	GLOB UNIF	GA
LOAD Z 00250050	14.4202	14.4202	GLOB UNIF	GA
LOAD Z 00260049	14.4202	14.4202	GLOB UNIF	GA
LOAD Z 00270048	14.4202	14.4202	GLOB UNIF	GA
LOAD Z 00400020	14.4202	14.4202	GLOB UNIF	GA
LOAD Z 00410021	14.4202	14.4202	GLOB UNIF	GA
LOAD Z 00420022	14.4202	14.4202	GLOB UNIF	GA
LOAD Z 00430023	14.4202	14.4202	GLOB UNIF	GA
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LOAD Z 00310035	6.16080	6.16080	GLOB UNIF	GB
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LOAD Z 00350039	6.16080	6.16080	GLOB UNIF	GB
LOAD Z 00380046	6.16080	6.16080	GLOB UNIF	GB
LOAD Z 00390047	6.16080	6.16080	GLOB UNIF	GB
LOAD Z 00480031	6.16080	6.16080	GLOB UNIF	GB
LOAD Z 00490030	6.16080	6.16080	GLOB UNIF	GB
LOAD Z 00280032	13.7730	13.7730	GLOB UNIF	GC
LOAD Z 00290033	13.7730	13.7730	GLOB UNIF	GC
LOAD Z 00320036	13.7730	13.7730	GLOB UNIF	GC
LOAD Z 00330037	13.7730	13.7730	GLOB UNIF	GC
LOAD Z 00360044	13.7730	13.7730	GLOB UNIF	GC
LOAD Z 00370045	13.7730	13.7730	GLOB UNIF	GC
LOAD Z 00500029	13.7730	13.7730	GLOB UNIF	GC
LOAD Z 00510028	13.7730	13.7730	GLOB UNIF	GC
LOADCN 63				
LOAD Z 00200024	9.33071	9.33071	GLOB UNIF	GA
LOAD Z 00210025	9.33071	9.33071	GLOB UNIF	GA

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121	
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A	
UNIT: INTERCONNECTIONS	REV.A	
AREA: MACOTAL AREA	DATE : 08-08-13	
PHASE: DETAILED ENGINEERING	TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE) PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	
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LOAD Z 00220026	9.33071	9.33071	GLOB UNIF	GA
LOAD Z 00230027	9.33071	9.33071	GLOB UNIF	GA
LOAD Z 00240051	9.33071	9.33071	GLOB UNIF	GA
LOAD Z 00250050	9.33071	9.33071	GLOB UNIF	GA
LOAD Z 00260049	9.33071	9.33071	GLOB UNIF	GA
LOAD Z 00270048	9.33071	9.33071	GLOB UNIF	GA
LOAD Z 00400020	9.33071	9.33071	GLOB UNIF	GA
LOAD Z 00410021	9.33071	9.33071	GLOB UNIF	GA
LOAD Z 00420022	9.33071	9.33071	GLOB UNIF	GA
LOAD Z 00430023	9.33071	9.33071	GLOB UNIF	GA
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LOAD Z 00310035	17.5960	17.5960	GLOB UNIF	GB
LOAD Z 00340038	17.5960	17.5960	GLOB UNIF	GB
LOAD Z 00350039	17.5960	17.5960	GLOB UNIF	GB
LOAD Z 00380046	17.5960	17.5960	GLOB UNIF	GB
LOAD Z 00390047	17.5960	17.5960	GLOB UNIF	GB
LOAD Z 00480031	17.5960	17.5960	GLOB UNIF	GB
LOAD Z 00490030	17.5960	17.5960	GLOB UNIF	GB
LOAD Z 00280032	9.97205	9.97205	GLOB UNIF	GC
LOAD Z 00290033	9.97205	9.97205	GLOB UNIF	GC
LOAD Z 00320036	9.97205	9.97205	GLOB UNIF	GC
LOAD Z 00330037	9.97205	9.97205	GLOB UNIF	GC
LOAD Z 00360044	9.97205	9.97205	GLOB UNIF	GC
LOAD Z 00370045	9.97205	9.97205	GLOB UNIF	GC
LOAD Z 00500029	9.97205	9.97205	GLOB UNIF	GC
LOAD Z 00510028	9.97205	9.97205	GLOB UNIF	GC
LOADCN 64				
LOAD Z 00200024	9.33071	9.33071	GLOB UNIF	GA
LOAD Z 00210025	9.33071	9.33071	GLOB UNIF	GA
LOAD Z 00220026	9.33071	9.33071	GLOB UNIF	GA
LOAD Z 00230027	9.33071	9.33071	GLOB UNIF	GA
LOAD Z 00240051	9.33071	9.33071	GLOB UNIF	GA
LOAD Z 00250050	9.33071	9.33071	GLOB UNIF	GA
LOAD Z 00260049	9.33071	9.33071	GLOB UNIF	GA
LOAD Z 00270048	9.33071	9.33071	GLOB UNIF	GA
LOAD Z 00400020	9.33071	9.33071	GLOB UNIF	GA
LOAD Z 00410021	9.33071	9.33071	GLOB UNIF	GA
LOAD Z 00420022	9.33071	9.33071	GLOB UNIF	GA
LOAD Z 00430023	9.33071	9.33071	GLOB UNIF	GA
LOAD Z 00300034	9.97790	9.97790	GLOB UNIF	GB
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LOAD Z 00290033	17.5902	17.5902	GLOB UNIF	GC
LOAD Z 00320036	17.5902	17.5902	GLOB UNIF	GC
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LOAD Z 00360044	17.5902	17.5902	GLOB UNIF	GC
LOAD Z 00370045	17.5902	17.5902	GLOB UNIF	GC
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LOAD Z 00510028	17.5902	17.5902	GLOB UNIF	GC
LOADCN 70				
LOAD X 113 0000	0.93104	0.93104	GLOB UNIF	LOG
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LOAD X 00010006	0.93104	0.93104	GLOB UNIF	LOG
LOAD X 0006117	0.93104	0.93104	GLOB UNIF	LOG
LOAD X 00110016	0.93104	0.93104	GLOB UNIF	LOG
LOAD X 0016118	0.93104	0.93104	GLOB UNIF	LOG

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121	
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A	
UNIT: INTERCONNECTIONS	REV.A	
AREA: MACOTAL AREA	DATE : 08-08-13	
PHASE: DETAILED ENGINEERING	TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
DISCIPLINE: CIVIL	PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	
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LOAD X 119 0002 0.93104 0.93104 GLOB UNIF LOG
LOAD X 120 0012 0.93104 0.93104 GLOB UNIF LOG
LOAD X 00020007 0.93104 0.93104 GLOB UNIF LOG
LOAD X 0007120 0.93104 0.93104 GLOB UNIF LOG
LOAD X 00120017 0.93104 0.93104 GLOB UNIF LOG
LOAD X 0017121 0.93104 0.93104 GLOB UNIF LOG
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LOAD X 00130018 0.93104 0.93104 GLOB UNIF LOG
LOAD X 0018124 0.93104 0.93104 GLOB UNIF LOG
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LOAD Y 00000005 0.37241 0.37241 GLOB UNIF TRA
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LOAD Y 123 0013 0.37241 0.37241 GLOB UNIF TRA
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LOAD Y 00130018 0.37241 0.37241 GLOB UNIF TRA
LOAD Y 0018124 0.37241 0.37241 GLOB UNIF TRA
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LOAD Y 126 0014 0.37241 0.37241 GLOB UNIF TRA
LOAD Y 00040009 0.37241 0.37241 GLOB UNIF TRA
LOAD Y 0009126 0.37241 0.37241 GLOB UNIF TRA
LOAD Y 00140019 0.37241 0.37241 GLOB UNIF TRA
LOAD Y 0019127 0.37241 0.37241 GLOB UNIF TRA
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LCOMB 15 10 1.0500
LCOMB 100 15 1.000060 1.0000
LCOMB 101 15 1.00009A 1.000061 1.000070 -1.000071 1.0000
LCOMB 102 15 1.00009B 1.000062 1.000070 -1.000071 -1.0000
LCOMB 103 15 1.00009C 1.000063 1.000070 1.000071 1.0000
LCOMB 104 15 1.00009D 1.000064 1.000070 1.000071 -1.0000
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LCOMB 111 101 1.6000
LCOMB 112 102 1.6000
LCOMB 113 103 1.6000
LCOMB 114 104 1.6000
END

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	REV.A DATE : 08-08-13
PHASE: DETAILED ENGINEERING	
DISCIPLINE: CIVIL	
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	PAGE 99 OF 140
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	

APPENDIX B SEA-TRANSPORTATION/FASTENING

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

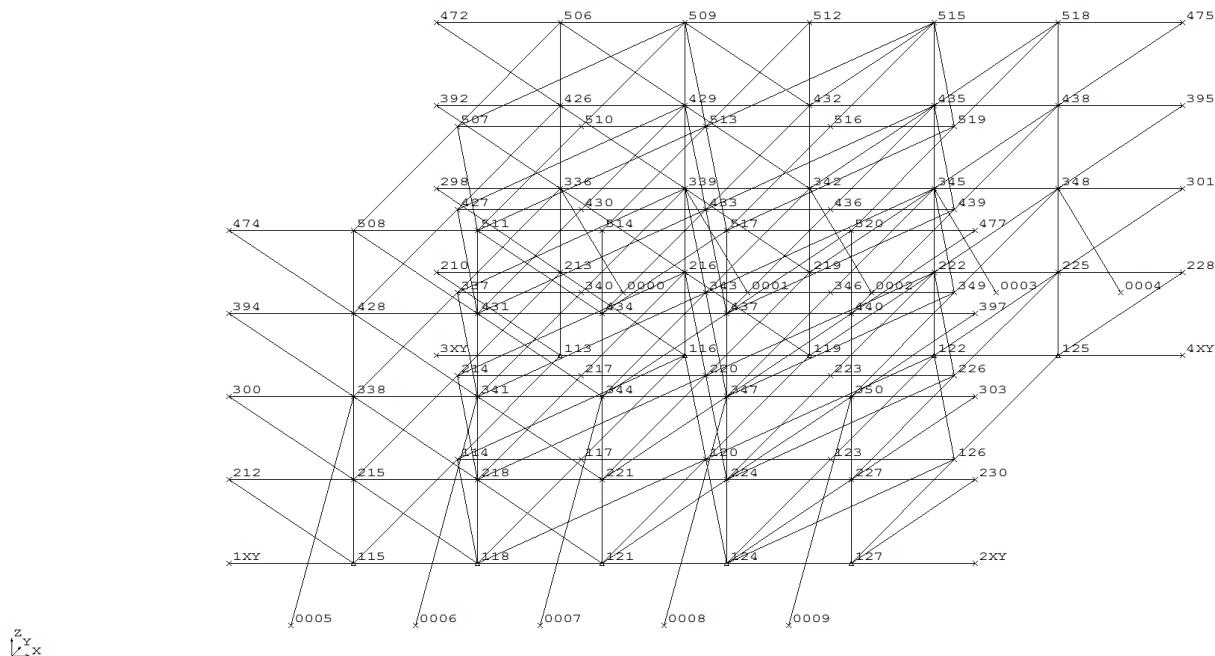
PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	
PHASE: DETAILED ENGINEERING	REV.A DATE : 08-08-13
DISCIPLINE: CIVIL	
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	PAGE 100 OF 140
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	

APPENDIX B.1 STRUCTURAL MODEL PLOT

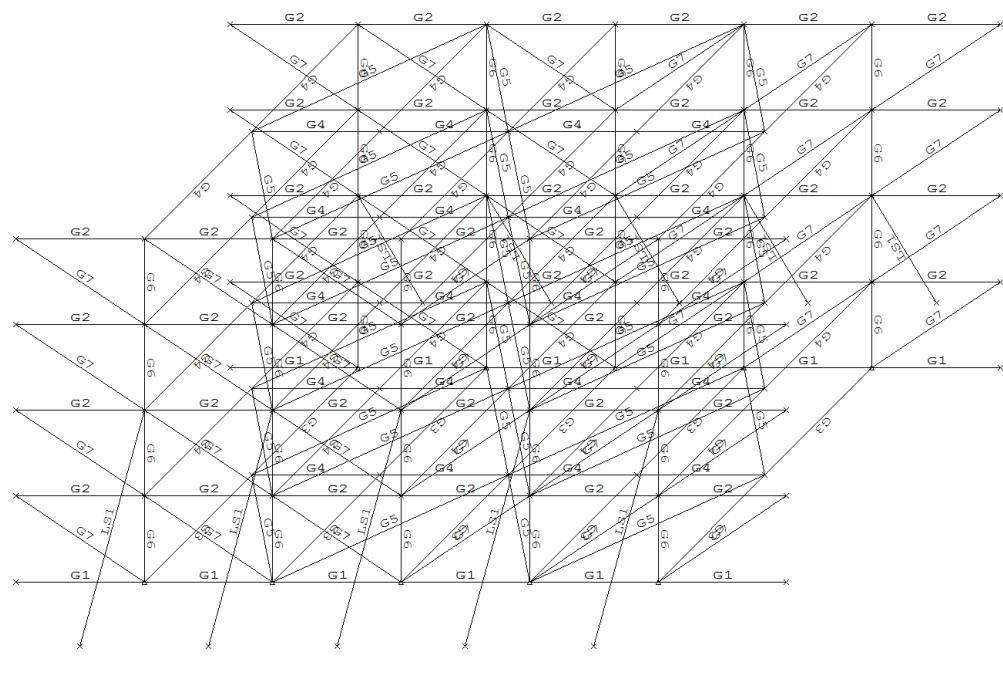
REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	
PHASE: DETAILED ENGINEERING	REV.A
DISCIPLINE: CIVIL	DATE : 08-08-13
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	PAGE 101 OF 140
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	

B.1.1 Joint

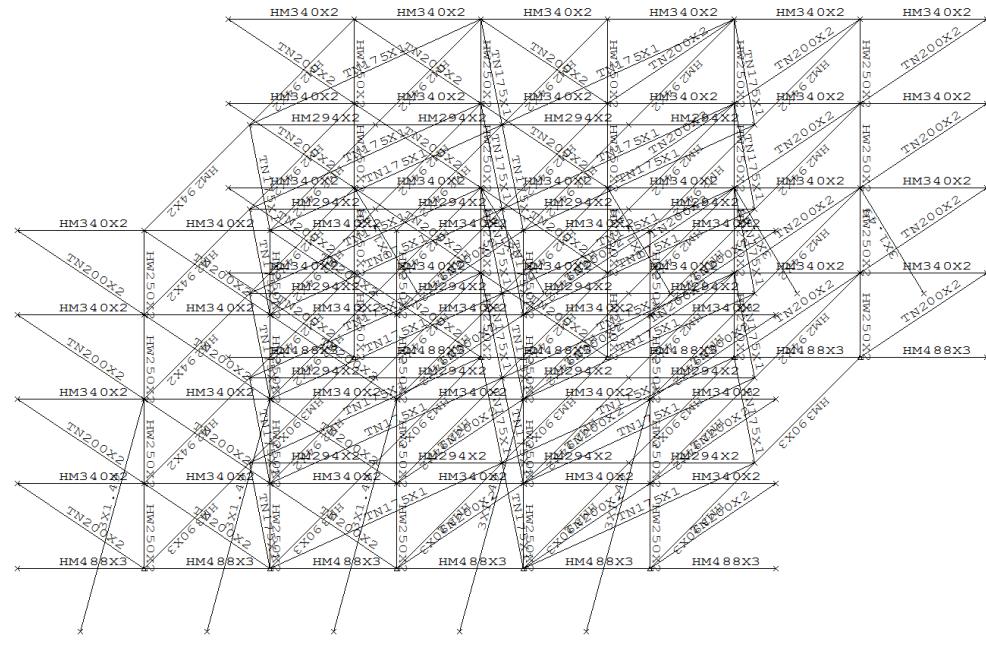
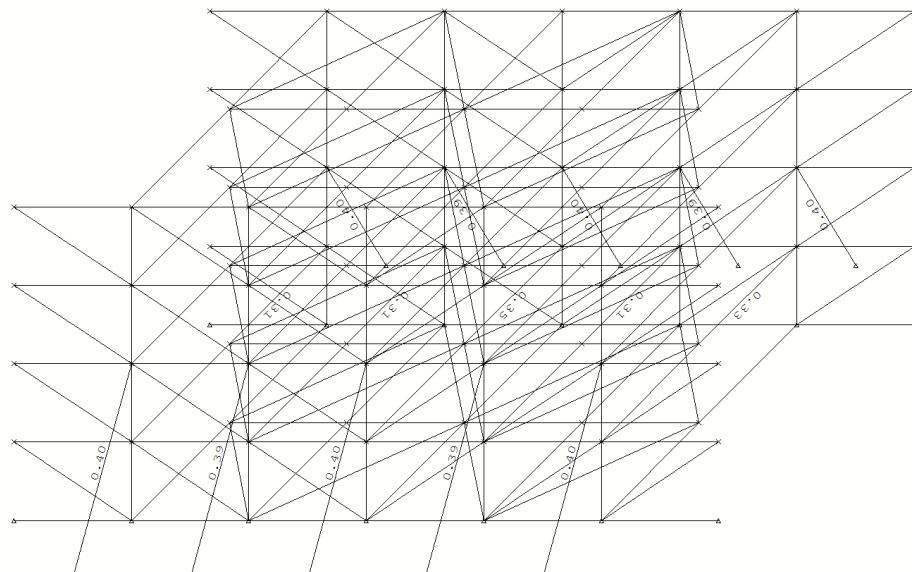


B.1.2 Group



REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	
PHASE: DETAILED ENGINEERING	
DISCIPLINE: CIVIL	REV.A DATE : 08-08-13
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	
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B.1.6 Member Section

B.1.7 Member Unit Check(UC>0.3)


UC MAX COMB

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	
PHASE: DETAILED ENGINEERING	REV.A DATE : 08-08-13
DISCIPLINE: CIVIL	
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	
PAGE 103 OF 140	

APPENDIX B.2 SACS INPUT FILE LIST

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	REV.A
AREA: MACOTAL AREA	DATE : 08-08-13
PHASE: DETAILED ENGINEERING	PAGE 104 OF 140
DISCIPLINE: CIVIL	
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	

B.2.1 SACS Input Data-STATIC INPUT

```

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LCSEL ST      100
UCPART        0.8500.8501.0001.000
SECT
SECT HM294X2  WFC                  20.0001.20029.4000.800
SECT HM340X2  WFC                  25.0001.40034.0000.900
SECT HM390X3  WFC                  30.0001.60039.0001.000
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SECT HW250X2  WFC                  25.0001.40025.0000.900
SECT TN175X1  TEE                 17.50017.500.700 1.10013.70
SECT TN200X2  TEE                 20.00020.000.800 1.30015.70
GRUP
GRUP G1  HM488X3  20.008.00034.50 1  1.001.00  N7.8500
GRUP G2  HM340X2  20.008.00034.50 1  1.001.00  N7.8500
GRUP G3  HM390X3  20.008.00034.50 1  1.001.00  N7.8500
GRUP G4  HM294X2  20.008.00034.50 1  1.001.00  N7.8500
GRUP G5  TN175X1  20.008.00034.50 1  1.001.00  N7.8500
GRUP G6  HW250X2  20.008.00034.50 1  1.001.00  N7.8500
GRUP G7  TN200X2  20.008.00034.50 1  1.001.00  N7.8500
GRUP LS1   3.000 1.490720.008.00035.50 1  1.001.00  0.500N1.00-6
MEMBER
MEMBER1113 116 G1  L  3.003.003.000
MEMBER OFFSETS -24.40  -24.40
MEMBER1115 118 G1  L  3.003.003.000
MEMBER OFFSETS -24.40  -24.40
MEMBER1116 119 G1  L  3.003.003.000
MEMBER OFFSETS -24.40  -24.40
MEMBER1118 121 G1  L  3.003.003.000
MEMBER OFFSETS -24.40  -24.40
MEMBER1119 122 G1  L  3.003.003.000
MEMBER OFFSETS -24.40  -24.40
MEMBER1121 124 G1  L  3.003.003.000
MEMBER OFFSETS -24.40  -24.40
MEMBER1122 125 G1  L  3.003.003.000
MEMBER OFFSETS -24.40  -24.40
MEMBER1124 127 G1  L  3.003.003.000
MEMBER OFFSETS -24.40  -24.40
MEMBER1125 4XY G1  L  3.003.003.000
MEMBER OFFSETS -24.40  -24.40
MEMBER1127 2XY G1  L  3.003.003.000
MEMBER OFFSETS -24.40  -24.40
MEMBER11XY 115 G1  L  3.003.003.000
MEMBER OFFSETS -24.40  -24.40
MEMBER13XY 113 G1  L  3.003.003.000
MEMBER OFFSETS -24.40  -24.40
MEMBER1210 213 G2  L  3.003.003.000
MEMBER OFFSETS -17.00  -17.00
MEMBER1212 215 G2  L  3.003.003.000
MEMBER OFFSETS -17.00  -17.00
MEMBER1213 216 G2  L  3.003.003.000
MEMBER OFFSETS -17.00  -17.00
MEMBER1215 218 G2  L  3.003.003.000
MEMBER OFFSETS -17.00  -17.00
MEMBER1216 219 G2  L  3.003.003.000
MEMBER OFFSETS -17.00  -17.00
MEMBER1218 221 G2  L  3.003.003.000
MEMBER OFFSETS -17.00  -17.00
MEMBER1219 222 G2  L  3.003.003.000
MEMBER OFFSETS -17.00  -17.00
MEMBER1221 224 G2  L  3.003.003.000
MEMBER OFFSETS -17.00  -17.00
MEMBER1222 225 G2  L  3.003.003.000
MEMBER OFFSETS -17.00  -17.00
MEMBER1222 225 G2  L  3.003.003.000
MEMBER OFFSETS -17.00  -17.00

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REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	REV.A
AREA: MACOTAL AREA	DATE : 08-08-13
PHASE: DETAILED ENGINEERING	PAGE 105 OF 140
DISCIPLINE: CIVIL	
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	

MEMBER1224 227 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1225 228 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1227 230 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1298 336 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1300 338 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1336 339 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1338 341 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1339 342 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1341 344 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1342 345 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1344 347 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1345 348 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1347 350 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1348 301 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1350 303 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1392 426 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1394 428 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1426 429 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1428 431 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1429 432 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1431 434 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1432 435 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1434 437 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1435 438 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1437 440 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1438 395 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1440 397 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1472 506 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1474 508 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1506 509 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1508 511 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1509 512 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1511 514 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1512 515 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	REV.A
AREA: MACOTAL AREA	DATE : 08-08-13
PHASE: DETAILED ENGINEERING	PAGE 106 OF 140
DISCIPLINE: CIVIL	
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	

MEMBER1514 517	G2	L 3.003.003.000	
MEMBER OFFSETS		-17.00	-17.00
MEMBER1515 518	G2	L 3.003.003.000	
MEMBER OFFSETS		-17.00	-17.00
MEMBER1517 520	G2	L 3.003.003.000	
MEMBER OFFSETS		-17.00	-17.00
MEMBER1518 475	G2	L 3.003.003.000	
MEMBER OFFSETS		-17.00	-17.00
MEMBER1520 477	G2	L 3.003.003.000	
MEMBER OFFSETS		-17.00	-17.00
MEMBER1113 114	G3	000011000000	L 5.005.005.000
MEMBER OFFSETS		-19.50	-19.50
MEMBER1114 115	G3	000000000011	L 5.005.005.000
MEMBER OFFSETS		-19.50	-19.50
MEMBER1116 117	G3	000011000000	L 5.005.005.000
MEMBER OFFSETS		-19.50	-19.50
MEMBER1117 118	G3	000000000011	L 5.005.005.000
MEMBER OFFSETS		-19.50	-19.50
MEMBER1119 120	G3	000011000000	L 5.005.005.000
MEMBER OFFSETS		-19.50	-19.50
MEMBER1120 121	G3	000000000011	L 5.005.005.000
MEMBER OFFSETS		-19.50	-19.50
MEMBER1122 123	G3	000011000000	L 5.005.005.000
MEMBER OFFSETS		-19.50	-19.50
MEMBER1123 124	G3	000000000011	L 5.005.005.000
MEMBER OFFSETS		-19.50	-19.50
MEMBER1125 126	G3	000011000000	L 5.005.005.000
MEMBER OFFSETS		-19.50	-19.50
MEMBER1126 127	G3	000000000011	L 5.005.005.000
MEMBER OFFSETS		-19.50	-19.50
MEMBER1114 117	G4	000011000011	L 3.003.003.000
MEMBER OFFSETS		-14.70	-14.70
MEMBER1117 120	G4	000011000011	L 3.003.003.000
MEMBER OFFSETS		-14.70	-14.70
MEMBER1120 123	G4	000011000011	L 3.003.003.000
MEMBER OFFSETS		-14.70	-14.70
MEMBER123 126	G4	000011000011	L 3.003.003.000
MEMBER OFFSETS		-14.70	-14.70
MEMBER123 214	G4		L 5.005.005.000
MEMBER OFFSETS		-14.70	-14.70
MEMBER1214 215	G4		L 5.005.005.000
MEMBER OFFSETS		-14.70	-14.70
MEMBER1214 217	G4	000011000011	L 3.003.003.000
MEMBER OFFSETS		-14.70	-14.70
MEMBER1216 217	G4		L 5.005.005.000
MEMBER OFFSETS		-14.70	-14.70
MEMBER1217 218	G4		L 5.005.005.000
MEMBER OFFSETS		-14.70	-14.70
MEMBER1217 220	G4	000011000011	L 3.003.003.000
MEMBER OFFSETS		-14.70	-14.70
MEMBER1219 220	G4		L 5.005.005.000
MEMBER OFFSETS		-14.70	-14.70
MEMBER1220 221	G4		L 5.005.005.000
MEMBER OFFSETS		-14.70	-14.70
MEMBER1220 223	G4	000011000011	L 3.003.003.000
MEMBER OFFSETS		-14.70	-14.70
MEMBER1222 223	G4		L 5.005.005.000
MEMBER OFFSETS		-14.70	-14.70
MEMBER1223 224	G4		L 5.005.005.000
MEMBER OFFSETS		-14.70	-14.70
MEMBER1223 226	G4	000011000011	L 3.003.003.000
MEMBER OFFSETS		-14.70	-14.70
MEMBER1225 226	G4		L 5.005.005.000
MEMBER OFFSETS		-14.70	-14.70
MEMBER1226 227	G4		L 5.005.005.000
MEMBER OFFSETS		-14.70	-14.70
MEMBER1336 337	G4		L 5.005.005.000
MEMBER OFFSETS		-14.70	-14.70

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	REV.A
AREA: MACOTAL AREA	DATE : 08-08-13
PHASE: DETAILED ENGINEERING	PAGE 107 OF 140
DISCIPLINE: CIVIL	
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	

MEMBER1337 338	G4	L	5.005.005.000	
MEMBER OFFSETS			-14.70	-14.70
MEMBER1337 340	G4	000011000011	L	3.003.003.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1339 340	G4		L	5.005.005.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1340 341	G4		L	5.005.005.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1340 343	G4	000011000011	L	3.003.003.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1342 343	G4		L	5.005.005.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1343 344	G4		L	5.005.005.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1343 346	G4	000011000011	L	3.003.003.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1345 346	G4		L	5.005.005.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1346 347	G4		L	5.005.005.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1346 349	G4	000011000011	L	3.003.003.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1348 349	G4		L	5.005.005.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1349 350	G4		L	5.005.005.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1426 427	G4		L	5.005.005.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1427 428	G4		L	5.005.005.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1427 430	G4	000011000011	L	3.003.003.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1429 430	G4		L	5.005.005.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1430 431	G4		L	5.005.005.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1430 433	G4	000011000011	L	3.003.003.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1432 433	G4		L	5.005.005.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1433 434	G4		L	5.005.005.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1433 436	G4	000011000011	L	3.003.003.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1435 436	G4		L	5.005.005.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1436 437	G4		L	5.005.005.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1436 439	G4	000011000011	L	3.003.003.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1438 439	G4		L	5.005.005.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1439 440	G4		L	5.005.005.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1506 507	G4		L	5.005.005.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1507 508	G4		L	5.005.005.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1507 510	G4	000011000011	L	3.003.003.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1509 510	G4		L	5.005.005.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1510 511	G4		L	5.005.005.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1510 513	G4	000011000011	L	3.003.003.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1512 513	G4		L	5.005.005.000
MEMBER OFFSETS			-14.70	-14.70

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	REV.A
AREA: MACOTAL AREA	DATE : 08-08-13
PHASE: DETAILED ENGINEERING	PAGE 108 OF 140
DISCIPLINE: CIVIL	
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	

MEMBER1513 514 G4	L 5.005.005.000
MEMBER OFFSETS	-14.70 -14.70
MEMBER1513 516 G4 000011000011	L 3.003.003.000
MEMBER OFFSETS	-14.70 -14.70
MEMBER1515 516 G4	L 5.005.005.000
MEMBER OFFSETS	-14.70 -14.70
MEMBER1516 517 G4	L 5.005.005.000
MEMBER OFFSETS	-14.70 -14.70
MEMBER1516 519 G4 000011000011	L 3.003.003.000
MEMBER OFFSETS	-14.70 -14.70
MEMBER1518 519 G4	L 5.005.005.000
MEMBER OFFSETS	-14.70 -14.70
MEMBER1519 520 G4	L 5.005.005.000
MEMBER OFFSETS	-14.70 -14.70
MEMBER1114 116 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.820 -3.820
MEMBER1114 118 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.820 -3.820
MEMBER1116 120 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.820 -3.820
MEMBER1118 120 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.820 -3.820
MEMBER1120 122 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.820 -3.820
MEMBER1120 124 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.820 -3.820
MEMBER1122 126 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.820 -3.820
MEMBER1124 126 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.820 -3.820
MEMBER1214 216 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.820 -3.820
MEMBER1214 218 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.820 -3.820
MEMBER1216 220 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.820 -3.820
MEMBER1218 220 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.820 -3.820
MEMBER1220 222 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.820 -3.820
MEMBER1220 224 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.820 -3.820
MEMBER1222 226 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.820 -3.820
MEMBER1224 226 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.820 -3.820
MEMBER1337 339 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.820 -3.820
MEMBER1337 341 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.820 -3.820
MEMBER1339 343 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.820 -3.820
MEMBER1341 343 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.820 -3.820
MEMBER1343 345 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.820 -3.820
MEMBER1343 347 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.820 -3.820
MEMBER1345 349 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.820 -3.820
MEMBER1347 349 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.820 -3.820
MEMBER1427 429 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.820 -3.820
MEMBER1427 431 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.820 -3.820
MEMBER1429 433 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.820 -3.820

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	
PHASE: DETAILED ENGINEERING	
DISCIPLINE: CIVIL	REV.A DATE : 08-08-13
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	
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MEMBER1431 433 G5	000011000011	L	5.835.835.830	5.00
MEMBER OFFSETS			-3.820	-3.820
MEMBER1433 435 G5	000011000011	L	5.835.835.830	5.00
MEMBER OFFSETS			-3.820	-3.820
MEMBER1433 437 G5	000011000011	L	5.835.835.830	5.00
MEMBER OFFSETS			-3.820	-3.820
MEMBER1435 439 G5	000011000011	L	5.835.835.830	5.00
MEMBER OFFSETS			-3.820	-3.820
MEMBER1437 439 G5	000011000011	L	5.835.835.830	5.00
MEMBER OFFSETS			-3.820	-3.820
MEMBER1507 509 G5	000011000011	L	5.835.835.830	5.00
MEMBER OFFSETS			-3.820	-3.820
MEMBER1507 511 G5	000011000011	L	5.835.835.830	5.00
MEMBER OFFSETS			-3.820	-3.820
MEMBER1509 513 G5	000011000011	L	5.835.835.830	5.00
MEMBER OFFSETS			-3.820	-3.820
MEMBER1511 513 G5	000011000011	L	5.835.835.830	5.00
MEMBER OFFSETS			-3.820	-3.820
MEMBER1513 515 G5	000011000011	L	5.835.835.830	5.00
MEMBER OFFSETS			-3.820	-3.820
MEMBER1513 517 G5	000011000011	L	5.835.835.830	5.00
MEMBER OFFSETS			-3.820	-3.820
MEMBER1515 519 G5	000011000011	L	5.835.835.830	5.00
MEMBER OFFSETS			-3.820	-3.820
MEMBER1517 519 G5	000011000011	L	5.835.835.830	5.00
MEMBER OFFSETS			-3.820	-3.820
MEMBER 213 113 G6		L	2.002.00	
MEMBER 215 115 G6		L	2.002.00	
MEMBER 216 116 G6		L	2.002.00	
MEMBER 218 118 G6		L	2.002.00	
MEMBER 219 119 G6		L	2.002.00	
MEMBER 221 121 G6		L	2.002.00	
MEMBER 222 122 G6		L	2.002.00	
MEMBER 224 124 G6		L	2.002.00	
MEMBER 225 125 G6		L	2.002.00	
MEMBER 227 127 G6		L	2.002.00	
MEMBER 336 213 G6		L	2.002.00	
MEMBER 338 215 G6		L	2.002.00	
MEMBER 339 216 G6		L	2.002.00	
MEMBER 341 218 G6		L	2.002.00	
MEMBER 342 219 G6		L	2.002.00	
MEMBER 344 221 G6		L	2.002.00	
MEMBER 345 222 G6		L	2.002.00	
MEMBER 347 224 G6		L	2.002.00	
MEMBER 348 225 G6		L	2.002.00	
MEMBER 350 227 G6		L	2.002.00	
MEMBER 426 336 G6		L	2.002.00	
MEMBER 428 338 G6		L	2.002.00	
MEMBER 429 339 G6		L	2.002.00	
MEMBER 431 341 G6		L	2.002.00	
MEMBER 432 342 G6		L	2.002.00	
MEMBER 434 344 G6		L	2.002.00	
MEMBER 435 345 G6		L	2.002.00	
MEMBER 437 347 G6		L	2.002.00	
MEMBER 438 348 G6		L	2.002.00	
MEMBER 440 350 G6		L	2.002.00	
MEMBER 506 426 G6		L	2.002.00	
MEMBER 508 428 G6		L	2.002.00	
MEMBER 509 429 G6		L	2.002.00	
MEMBER 511 431 G6		L	2.002.00	
MEMBER 512 432 G6		L	2.002.00	
MEMBER 514 434 G6		L	2.002.00	
MEMBER 515 435 G6		L	2.002.00	
MEMBER 517 437 G6		L	2.002.00	
MEMBER 518 438 G6		L	2.002.00	
MEMBER 520 440 G6		L	2.002.00	
MEMBER1119 222 G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	
PHASE: DETAILED ENGINEERING	
DISCIPLINE: CIVIL	REV.A DATE : 08-08-13
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	
PAGE 110 OF 140	

MEMBER1121 224	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1122 225	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1124 227	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1125 228	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1127 230	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1210 113	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1212 115	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1213 116	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1215 118	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1216 119	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1218 121	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1219 345	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1221 347	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1222 348	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1224 350	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1225 301	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1227 303	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1298 213	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1300 215	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1336 216	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1338 218	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1339 219	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1341 221	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1342 435	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1344 437	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1345 438	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1347 440	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1348 395	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1350 397	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1392 336	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1394 338	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1426 339	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1428 341	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1429 342	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	REV.A
AREA: MACOTAL AREA	DATE : 08-08-13
PHASE: DETAILED ENGINEERING	PAGE 111 OF 140
DISCIPLINE: CIVIL	
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	

MEMBER1431 344	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1432 515	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1434 517	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1435 518	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1437 520	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1438 475	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1440 477	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1472 426	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1474 428	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1506 429	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1508 431	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1509 432	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1511 434	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER 0000336	LS1				
MEMBER 0001339	LS1				
MEMBER 0002342	LS1				
MEMBER 0003345	LS1				
MEMBER 0004348	LS1				
MEMBER 0005338	LS1				
MEMBER 0006341	LS1				
MEMBER 0007344	LS1				
MEMBER 0008347	LS1				
MEMBER 0009350	LS1				
JOINT					
JOINT 113	-6.	4.	0.	74.300	111111
JOINT 114	-6.	0.	0.	-25.700	
JOINT 115	-6.	-5.	0.	-25.700	111111
JOINT 116	-3.	4.	0.	74.300	111111
JOINT 117	-3.	0.	0.	-25.700	
JOINT 118	-3.	-5.	0.	-25.700	111111
JOINT 119	0.	4.	0.	0.001 74.300	111111
JOINT 120	0.	0.	0.	0.001-25.700	
JOINT 121	0.	-5.	0.	0.001-25.700	111111
JOINT 122	3.	4.	0.	74.300	111111
JOINT 123	3.	0.	0.	-25.700	
JOINT 124	3.	-5.	0.	-25.700	111111
JOINT 125	6.	4.	0.	74.300	111111
JOINT 126	6.	0.	0.	-25.700	
JOINT 127	6.	-5.	0.	-25.700	111111
JOINT 1XY	-9.	-5.	0.	-25.700	
JOINT 210	-9.	4.	2.	74.300	
JOINT 212	-9.	-5.	2.	-25.700	
JOINT 213	-6.	4.	2.	74.300	
JOINT 214	-6.	0.	2.	-25.700	
JOINT 215	-6.	-5.	2.	-25.700	
JOINT 216	-3.	4.	2.	74.300	
JOINT 217	-3.	0.	2.	-25.700	
JOINT 218	-3.	-5.	2.	-25.700	
JOINT 219	0.	4.	2.	0.001 74.300	
JOINT 220	0.	0.	2.	0.001-25.700	
JOINT 221	0.	-5.	2.	0.001-25.700	
JOINT 222	3.	4.	2.	74.300	
JOINT 223	3.	0.	2.	-25.700	
JOINT 224	3.	-5.	2.	-25.700	
JOINT 225	6.	4.	2.	74.300	

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	REV.A
AREA: MACOTAL AREA	DATE : 08-08-13
PHASE: DETAILED ENGINEERING	PAGE 112 OF 140
DISCIPLINE: CIVIL	
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	

JOINT 226	6.	0.	2.	-25.700
JOINT 227	6.	-5.	2.	-25.700
JOINT 228	9.	4.	2.	74.300
JOINT 230	9.	-5.	2.	-25.700
JOINT 298	-9.	4.	4.	74.300
JOINT 2XY	9.	-5.	0.	-25.700
JOINT 300	-9.	-5.	4.	-25.700
JOINT 301	9.	4.	4.	74.300
JOINT 303	9.	-5.	4.	-25.700
JOINT 336	-6.	4.	4.	74.300
JOINT 337	-6.	0.	4.	-25.700
JOINT 338	-6.	-5.	4.	-25.700
JOINT 339	-3.	4.	4.	74.300
JOINT 340	-3.	0.	4.	-25.700
JOINT 341	-3.	-5.	4.	-25.700
JOINT 342	0.	4.	4.	0.001 74.300
JOINT 343	0.	0.	4.	0.001-25.700
JOINT 344	0.	-5.	4.	0.001-25.700
JOINT 345	3.	4.	4.	74.300
JOINT 346	3.	0.	4.	-25.700
JOINT 347	3.	-5.	4.	-25.700
JOINT 348	6.	4.	4.	74.300
JOINT 349	6.	0.	4.	-25.700
JOINT 350	6.	-5.	4.	-25.700
JOINT 392	-9.	4.	6.	74.300
JOINT 394	-9.	-5.	6.	-25.700
JOINT 395	9.	4.	6.	74.300
JOINT 397	9.	-5.	6.	-25.700
JOINT 3XY	-9.	4.	0.	74.300
JOINT 426	-6.	4.	6.	74.300
JOINT 427	-6.	0.	6.	-25.700
JOINT 428	-6.	-5.	6.	-25.700
JOINT 429	-3.	4.	6.	74.300
JOINT 430	-3.	0.	6.	-25.700
JOINT 431	-3.	-5.	6.	-25.700
JOINT 432	0.	4.	6.	0.001 74.300
JOINT 433	0.	0.	6.	0.001-25.700
JOINT 434	0.	-5.	6.	0.001-25.700
JOINT 435	3.	4.	6.	74.300
JOINT 436	3.	0.	6.	-25.700
JOINT 437	3.	-5.	6.	-25.700
JOINT 438	6.	4.	6.	74.300
JOINT 439	6.	0.	6.	-25.700
JOINT 440	6.	-5.	6.	-25.700
JOINT 472	-9.	4.	8.	74.300
JOINT 474	-9.	-5.	8.	-25.700
JOINT 475	9.	4.	8.	74.300
JOINT 477	9.	-5.	8.	-25.700
JOINT 4XY	9.	4.	0.	74.300
JOINT 506	-6.	4.	8.	74.300
JOINT 507	-6.	0.	8.	-25.700
JOINT 508	-6.	-5.	8.	-25.700
JOINT 509	-3.	4.	8.	74.300
JOINT 510	-3.	0.	8.	-25.700
JOINT 511	-3.	-5.	8.	-25.700
JOINT 512	0.	4.	8.	0.001 74.300
JOINT 513	0.	0.	8.	0.001-25.700
JOINT 514	0.	-5.	8.	0.001-25.700
JOINT 515	3.	4.	8.	74.300
JOINT 516	3.	0.	8.	-25.700
JOINT 517	3.	-5.	8.	-25.700
JOINT 518	6.	4.	8.	74.300
JOINT 519	6.	0.	8.	-25.700
JOINT 520	6.	-5.	8.	-25.700
JOINT 0000	-6.	7.	0.	74.300
JOINT 0001	-3.	7.	0.	74.300
JOINT 0002	0.	7.	0.	0.001 74.300
JOINT 0003	3.	7.	0.	74.300

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121	
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A	
UNIT: INTERCONNECTIONS	REV.A	
AREA: MACOTAL AREA	DATE : 08-08-13	
PHASE: DETAILED ENGINEERING	TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
DISCIPLINE: CIVIL	PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	
PAGE 113 OF 140		

JOINT 0004 6. 7. 0. 74.300
 JOINT 0005 -6. -8. 0. -25.700
 JOINT 0006 -3. -8. 0. -25.700
 JOINT 0007 0. -8. 0. 0.001-25.700
 JOINT 0008 3. -8. 0. -25.700
 JOINT 0009 6. -8. 0. -25.700
 LOAD
 LOADCN 1 1.102
 LOADLB1 DEAD LOAD: D
 DEAD
 DEAD -Z M
 LOADCN 2
 LOADLB2 EL CABLE TRY LOAD
 LOAD Z 506 507 3.75000-0.35001.25000-0.3500 GLOB UNIF
 LOAD Z 509 510 3.75000-0.35001.25000-0.3500 GLOB UNIF
 LOAD Z 512 513 3.75000-0.35001.25000-0.3500 GLOB UNIF
 LOAD Z 515 516 3.75000-0.35001.25000-0.3500 GLOB UNIF
 LOAD Z 518 519 3.75000-0.35001.25000-0.3500 GLOB UNIF
 LOAD Z 507 508 -0.35004.50000-0.3500 GLOB UNIF
 LOAD Z 510 511 -0.35004.50000-0.3500 GLOB UNIF
 LOAD Z 513 514 -0.35004.50000-0.3500 GLOB UNIF
 LOAD Z 516 517 -0.35004.50000-0.3500 GLOB UNIF
 LOAD Z 519 520 -0.35004.50000-0.3500 GLOB UNIF
 LOAD Z 506 507 2.58000-0.59000.30000-0.5900 GLOB UNIF
 LOAD Z 509 510 2.58000-0.59000.30000-0.5900 GLOB UNIF
 LOAD Z 512 513 2.58000-0.59000.30000-0.5900 GLOB UNIF
 LOAD Z 515 516 2.58000-0.59000.30000-0.5900 GLOB UNIF
 LOAD Z 518 519 2.58000-0.59000.30000-0.5900 GLOB UNIF
 LOADCN 4
 LOADLB4 PIPING&EQUIPMENT LOAD-EMPTY: DE
 LOAD Z 113 114 0.82000-3.6900 GLOB CONC
 LOAD Z 116 117 0.82000-3.6900 GLOB CONC
 LOAD Z 119 120 0.82000-3.6900 GLOB CONC
 LOAD Z 122 123 0.82000-3.6900 GLOB CONC
 LOAD Z 125 126 0.82000-3.6900 GLOB CONC
 LOAD Z 113 114 1.50000-3.30001.85000-3.3000 GLOB UNIF
 LOAD Z 116 117 1.50000-3.30001.85000-3.3000 GLOB UNIF
 LOAD Z 119 120 1.50000-3.30001.85000-3.3000 GLOB UNIF
 LOAD Z 122 123 1.50000-3.30001.85000-3.3000 GLOB UNIF
 LOAD Z 125 126 1.50000-3.30001.85000-3.3000 GLOB UNIF
 LOAD Z 114 115 -3.60003.92000-3.6000 GLOB UNIF
 LOAD Z 117 118 -3.60003.92000-3.6000 GLOB UNIF
 LOAD Z 120 121 -3.60003.92000-3.6000 GLOB UNIF
 LOAD Z 123 124 -3.60003.92000-3.6000 GLOB UNIF
 LOAD Z 126 127 -3.60003.92000-3.6000 GLOB UNIF
 LOAD Z 213 214 1.80000-5.5200 GLOB CONC
 LOAD Z 216 217 1.80000-5.5200 GLOB CONC
 LOAD Z 219 220 1.80000-5.5200 GLOB CONC
 LOAD Z 222 223 1.80000-5.5200 GLOB CONC
 LOAD Z 225 226 1.80000-5.5200 GLOB CONC
 LOAD Z 213 214 2.71000-5.5200 GLOB CONC
 LOAD Z 216 217 2.71000-5.5200 GLOB CONC
 LOAD Z 219 220 2.71000-5.5200 GLOB CONC
 LOAD Z 222 223 2.71000-5.5200 GLOB CONC
 LOAD Z 225 226 2.71000-5.5200 GLOB CONC
 LOAD Z 213 214 3.70000-2.10001.30000-2.1000 GLOB UNIF
 LOAD Z 216 217 3.70000-2.10001.30000-2.1000 GLOB UNIF
 LOAD Z 219 220 3.70000-2.10001.30000-2.1000 GLOB UNIF
 LOAD Z 222 223 3.70000-2.10001.30000-2.1000 GLOB UNIF
 LOAD Z 225 226 3.70000-2.10001.30000-2.1000 GLOB UNIF
 LOAD Z 214 215 -2.10001.17000-2.1000 GLOB UNIF
 LOAD Z 217 218 -2.10001.17000-2.1000 GLOB UNIF
 LOAD Z 220 221 -2.10001.17000-2.1000 GLOB UNIF
 LOAD Z 223 224 -2.10001.17000-2.1000 GLOB UNIF
 LOAD Z 226 227 -2.10001.17000-2.1000 GLOB UNIF
 LOAD Z 337 338 3.90000-6.9000 GLOB CONC
 LOAD Z 340 341 3.90000-6.9000 GLOB CONC
 LOAD Z 343 344 3.90000-6.9000 GLOB CONC

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	REV.A
AREA: MACOTAL AREA	DATE : 08-08-13
PHASE: DETAILED ENGINEERING	PAGE 114 OF 140
DISCIPLINE: CIVIL	
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	

LOAD Z 346 347 3.90000-6.9000 GLOB CONC
 LOAD Z 349 350 3.90000-6.9000 GLOB CONC
 LOAD Z 336 337 2.03000-4.50000.80000-4.5000 GLOB UNIF
 LOAD Z 339 340 2.03000-4.50000.80000-4.5000 GLOB UNIF
 LOAD Z 342 343 2.03000-4.50000.80000-4.5000 GLOB UNIF
 LOAD Z 345 346 2.03000-4.50000.80000-4.5000 GLOB UNIF
 LOAD Z 348 349 2.03000-4.50000.80000-4.5000 GLOB UNIF
 LOAD Z 336 337 3.43000-3.30000.72000-3.3000 GLOB UNIF
 LOAD Z 339 340 3.43000-3.30000.72000-3.3000 GLOB UNIF
 LOAD Z 342 343 3.43000-3.30000.72000-3.3000 GLOB UNIF
 LOAD Z 345 346 3.43000-3.30000.72000-3.3000 GLOB UNIF
 LOAD Z 348 349 3.43000-3.30000.72000-3.3000 GLOB UNIF
 LOAD Z 426 427 0.95000-0.4800 GLOB CONC
 LOAD Z 429 430 0.95000-0.4800 GLOB CONC
 LOAD Z 432 433 0.95000-0.4800 GLOB CONC
 LOAD Z 435 436 0.95000-0.4800 GLOB CONC
 LOAD Z 438 439 0.95000-0.4800 GLOB CONC
 LOAD Z 426 427 1.70000-8.2500 GLOB CONC
 LOAD Z 429 430 1.70000-8.2500 GLOB CONC
 LOAD Z 432 433 1.70000-8.2500 GLOB CONC
 LOAD Z 435 436 1.70000-8.2500 GLOB CONC
 LOAD Z 438 439 1.70000-8.2500 GLOB CONC
 LCOMB
 LCOMB 100 1 1.10002 1.00004 1.0000
 END

B.2.2 SACS Input Data-TOW INPUT

```

TOWOPT MNEC      WPCG      -45.    15.   -3.06XYZ
*
RBMASS
LCFAC      1.0    2     4
RBMASS
ACCL ROL      1.2
ACCL PIT      1.2
ACCL SUR      -1.2
ACCL SWA      -1.2
ACCL HEA      -1.2
END
  
```

B.2.3 SACS Input Data-SEA INPUT

```

LDOPT SF          MN          CMB
*****
FILE B
*
LOAD
LOADCN W1
WIND
WIND SW      15.      1.        10.021AP
*
LOADCN W2
WIND
WIND SW      15.      1.     90.0    10.021AP
*
LOADCN W3
WIND
WIND SW      15.      1.    180.0   10.021AP
*
LOADCN W4
WIND
WIND SW      15.      1.   270.0   10.021AP
  
```

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	REV.A
AREA: MACOTAL AREA	DATE : 08-08-13
PHASE: DETAILED ENGINEERING	PAGE 115 OF 140
DISCIPLINE: CIVIL	
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	

*
 LOADCN W5
 WIND
 WIND SW 15. 1. 45.0 10.021AP
 *
 LOADCN W6
 WIND
 WIND SW 15. 1. 135.0 10.021AP
 *
 LOADCN W7
 WIND
 WIND SW 15. 1. 225.0 10.021AP
 *
 LOADCN W8
 WIND
 WIND SW 15. 1. 315.0 10.021AP
 *
 LCOMB
 *****/- PITCH +/-HEAVE, X DIR WIND
 *****/- ROLL +/-HEAVE, Y DIR WIND
 *****/- 80% ROLL +/- 60% PITCH +/-HEAVE, XY DIR WIND
 LCOMB T101 PIT-4.935 SUR 0.260 HEA 0.172 W1 1.0
 LCOMB T102 PIT-4.935 SUR 0.173 HEA-0.219 W1 1.0
 LCOMB T103 PIT 4.935 SUR-0.260 HEA 0.172 W3 1.0
 LCOMB T104 PIT 4.935 SUR-0.173 HEA-0.219 W3 1.0
 *
 *****/- 60% ROLL +/- 80% PITCH +/-HEAVE, XY DIR WIND
 LCOMB T105 ROL-7.896 SWA-0.410 HEA 0.128 W4 1.0
 LCOMB T106 ROL-7.896 SWA-0.274 HEA-0.248 W4 1.0
 LCOMB T107 ROL 7.896 SWA 0.410 HEA 0.128 W2 1.0
 LCOMB T108 ROL 7.896 SWA 0.274 HEA-0.248 W2 1.0
 *
 *****/- 60% ROLL +/- 80% PITCH +/-HEAVE, XY DIR WIND
 LCOMB T201 ROL 6.317 SWA 0.328 PIT 2.961 SUR-0.156 HEA 0.188 W6 1.0
 LCOMB T202 ROL 6.317 SWA 0.219 PIT 2.961 SUR-0.104 HEA-0.188 W6 1.0
 LCOMB T203 ROL 6.317 SWA 0.328 PIT-2.961 SUR 0.156 HEA 0.195 W5 1.0
 LCOMB T204 ROL 6.317 SWA 0.219 PIT-2.961 SUR 0.104 HEA-0.195 W5 1.0
 *
 LCOMB T205 ROL-6.317 SWA-0.328 PIT-2.961 SUR 0.156 HEA 0.188 W8 1.0
 LCOMB T206 ROL-6.317 SWA-0.219 PIT-2.961 SUR 0.104 HEA-0.188 W8 1.0
 LCOMB T207 ROL-6.317 SWA-0.328 PIT 2.961 SUR-0.156 HEA 0.195 W7 1.0
 LCOMB T208 ROL-6.317 SWA-0.219 PIT 2.961 SUR-0.104 HEA-0.195 W7 1.0
 *
 *****/- 60% ROLL +/- 80% PITCH +/-HEAVE, XY DIR WIND
 LCOMB T301 ROL 4.737 SWA 0.246 PIT 3.948 SUR-0.208 HEA 0.153 W6 1.0
 LCOMB T302 ROL 4.737 SWA 0.164 PIT 3.948 SUR-0.139 HEA-0.232 W6 1.0
 LCOMB T303 ROL 4.737 SWA 0.246 PIT-3.948 SUR 0.208 HEA 0.153 W5 1.0
 LCOMB T304 ROL 4.737 SWA 0.164 PIT-3.948 SUR 0.139 HEA-0.232 W5 1.0
 *
 LCOMB T305 ROL-4.737 SWA-0.246 PIT-3.948 SUR 0.208 HEA 0.153 W8 1.0
 LCOMB T306 ROL-4.737 SWA-0.164 PIT-3.948 SUR 0.139 HEA-0.232 W8 1.0
 LCOMB T307 ROL-4.737 SWA-0.246 PIT 3.948 SUR-0.208 HEA 0.153 W7 1.0
 LCOMB T308 ROL-4.737 SWA-0.164 PIT 3.948 SUR-0.139 HEA-0.232 W7 1.0
 *
 END

B.2.4 SACS Input Data-COMBINE INPUT

CMBOPT
 *
 *****/- Orthogonal Directions *****/-

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121	
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A	
UNIT: INTERCONNECTIONS	REV.A	
AREA: MACOTAL AREA	DATE : 08-08-13	
PHASE: DETAILED ENGINEERING	TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
DISCIPLINE: CIVIL	PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	
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LCOND 1100 LIN 1.0
 COMP PT101 1.0
 COMP S 100 1.0
 LCOND 1200 LIN 1.0
 COMP PT102 1.0
 COMP S 100 1.0
 LCOND 1300 LIN 1.0
 COMP PT103 1.0
 COMP S 100 1.0
 LCOND 1400 LIN 1.0
 COMP PT104 1.0
 COMP S 100 1.0
 LCOND 1500 LIN 1.0
 COMP PT105 1.0
 COMP S 100 1.0
 LCOND 1600 LIN 1.0
 COMP PT106 1.0
 COMP S 100 1.0
 LCOND 1700 LIN 1.0
 COMP PT107 1.0
 COMP S 100 1.0
 LCOND 1800 LIN 1.0
 COMP PT108 1.0
 COMP S 100 1.0
 **** Diagonal Directions ****
 LCOND 2100 LIN 1.0
 COMP PT201 1.0
 COMP S 100 1.0
 LCOND 2200 LIN 1.0
 COMP PT202 1.0
 COMP S 100 1.0
 LCOND 2300 LIN 1.0
 COMP PT203 1.0
 COMP S 100 1.0
 LCOND 2400 LIN 1.0
 COMP PT204 1.0
 COMP S 100 1.0
 LCOND 2500 LIN 1.0
 COMP PT205 1.0
 COMP S 100 1.0
 LCOND 2600 LIN 1.0
 COMP PT206 1.0
 COMP S 100 1.0
 LCOND 2700 LIN 1.0
 COMP PT207 1.0
 COMP S 100 1.0
 LCOND 2800 LIN 1.0
 COMP PT208 1.0
 COMP S 100 1.0
 LCOND 3100 LIN 1.0
 COMP PT301 1.0
 COMP S 100 1.0
 LCOND 3200 LIN 1.0
 COMP PT302 1.0
 COMP S 100 1.0
 LCOND 3300 LIN 1.0
 COMP PT303 1.0
 COMP S 100 1.0
 LCOND 3400 LIN 1.0
 COMP PT304 1.0
 COMP S 100 1.0
 LCOND 3500 LIN 1.0
 COMP PT305 1.0
 COMP S 100 1.0
 LCOND 3600 LIN 1.0
 COMP PT306 1.0
 COMP S 100 1.0
 LCOND 3700 LIN 1.0

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	REV.A DATE : 08-08-13
PHASE: DETAILED ENGINEERING	
DISCIPLINE: CIVIL	
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	PAGE 117 OF 140
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	

COMP PT307 1.0
 COMP S 100 1.0
 LCOND 3800 LIN 1.0
 COMP PT308 1.0
 COMP S 100 1.0

*

END

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	REV.A DATE : 08-08-13
PHASE: DETAILED ENGINEERING	
DISCIPLINE: CIVIL	
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	PAGE 118 OF 140
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	

APPENDIX C LIFTING

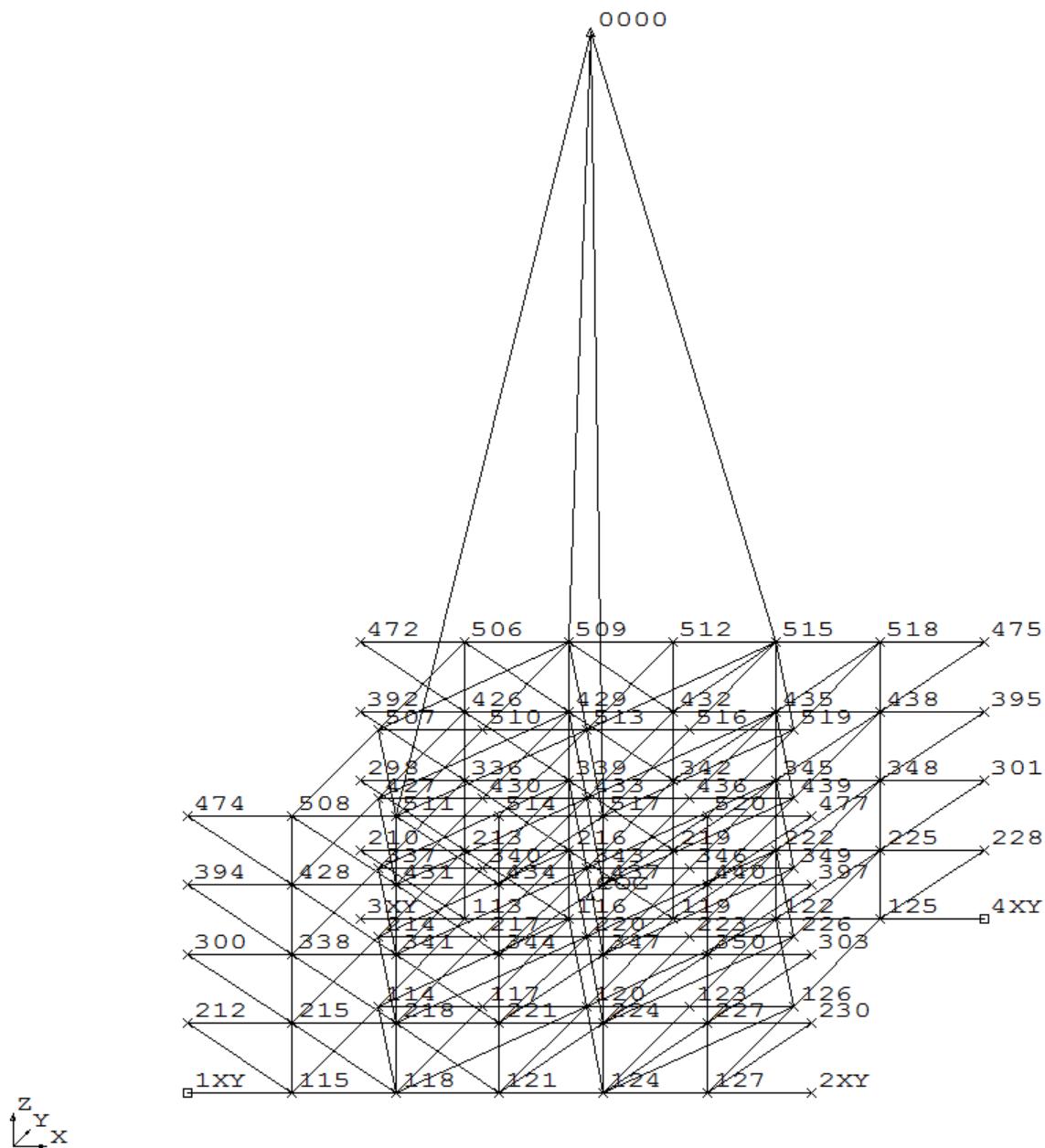
REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	
PHASE: DETAILED ENGINEERING	REV.A DATE : 08-08-13
DISCIPLINE: CIVIL	
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
PDVSA PROJECT NO.: 3006 ; HYUNDAI-WISON PROJECT NO.: VERE	
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APPENDIX C.1 STRUCTURAL MODEL PLOT

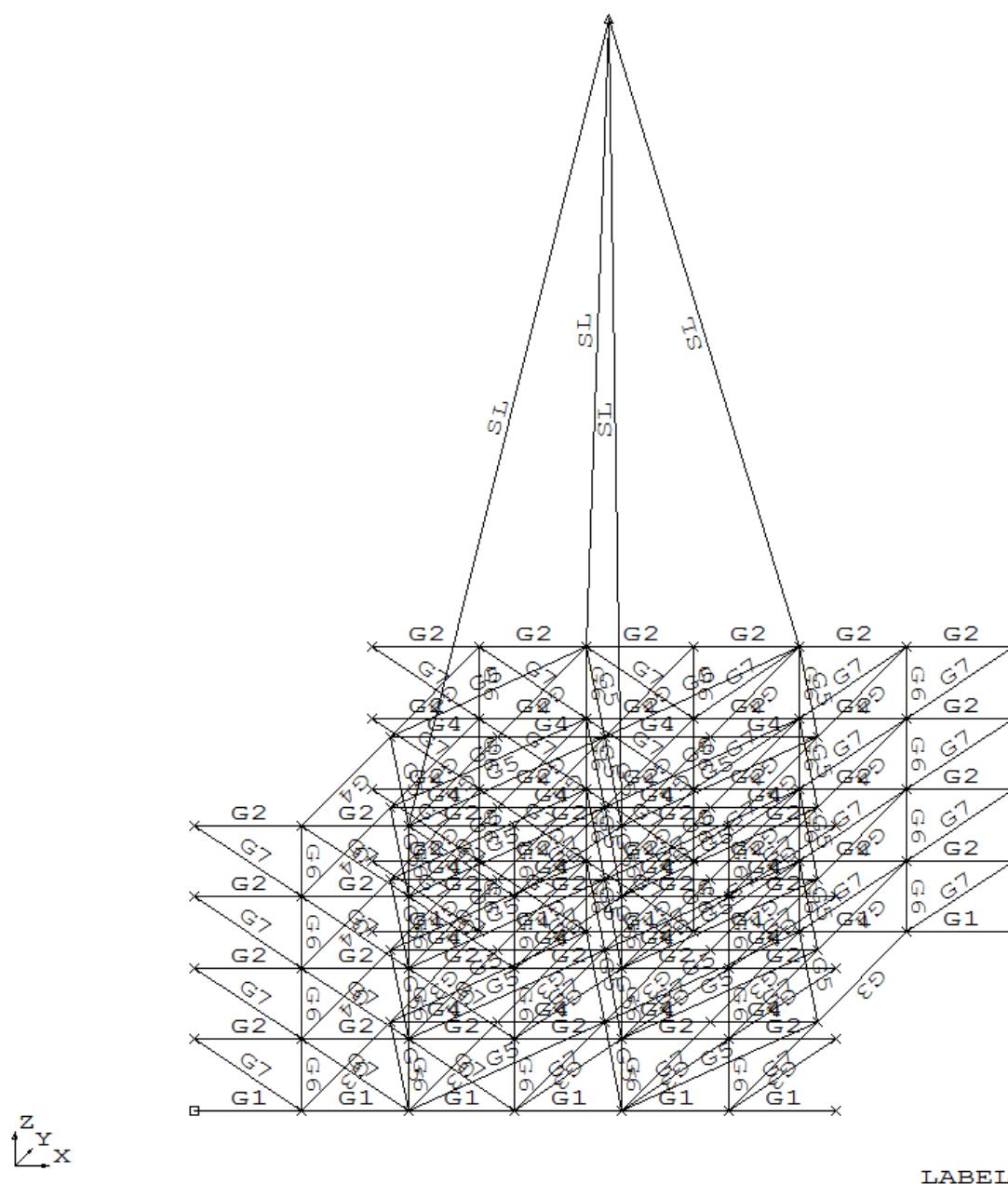
REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	
PHASE: DETAILED ENGINEERING	REV.A DATE : 08-08-13
DISCIPLINE: CIVIL	
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	
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C.1.1 Joint


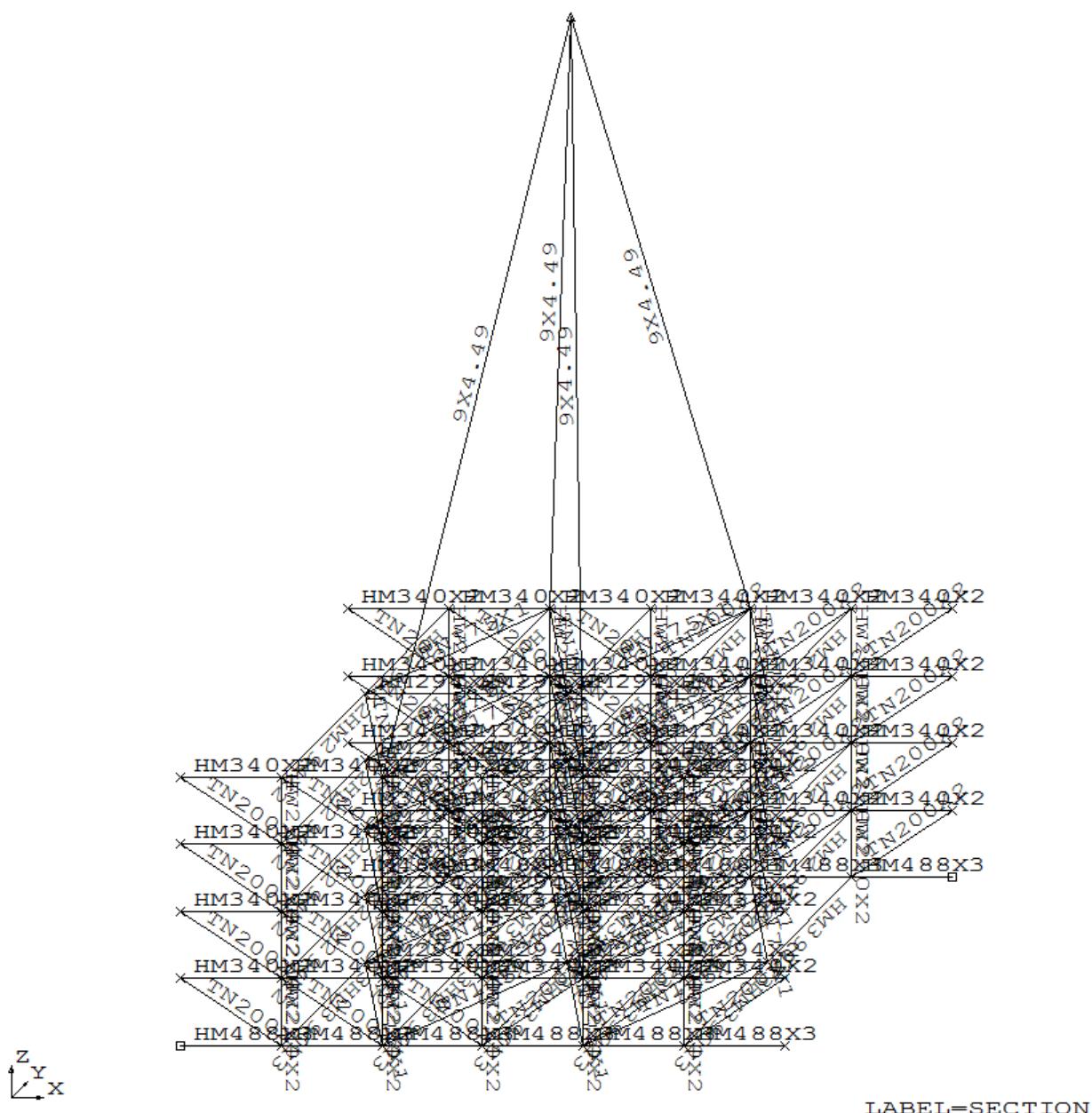
REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	
PHASE: DETAILED ENGINEERING	
DISCIPLINE: CIVIL	REV.A DATE : 08-08-13
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
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C.1.2 Group


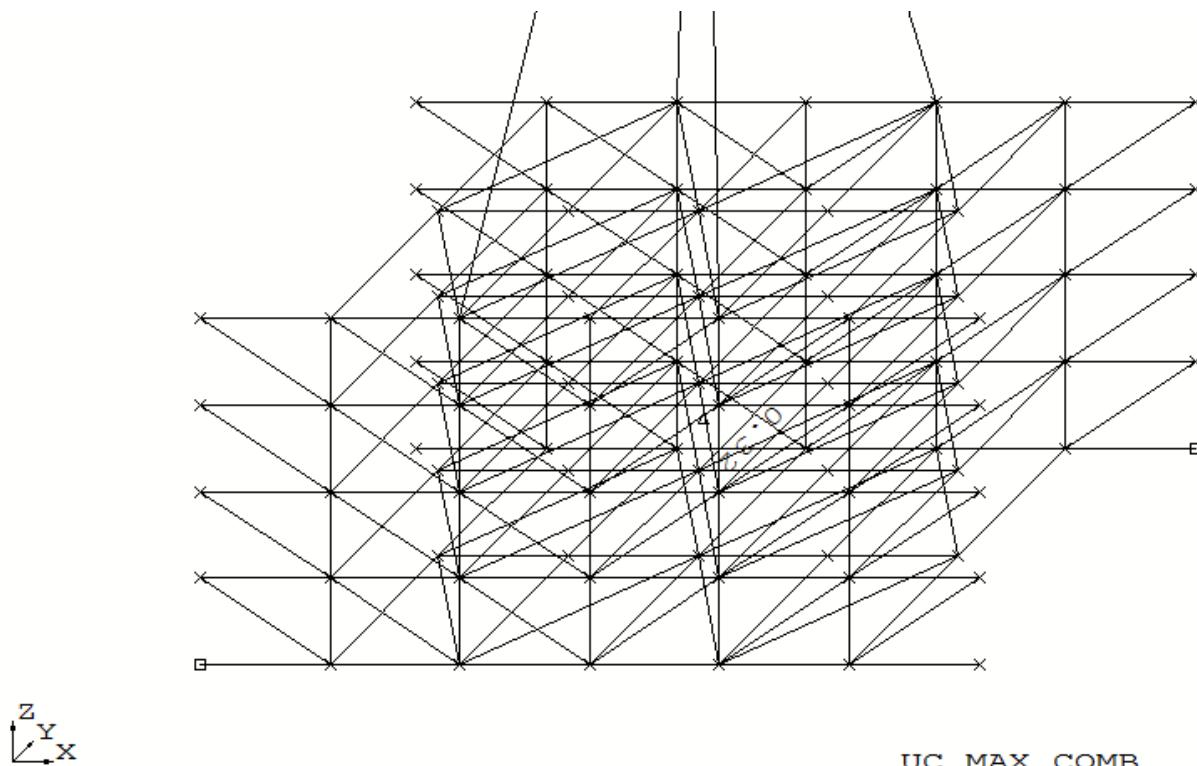
REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	
PHASE: DETAILED ENGINEERING	
DISCIPLINE: CIVIL	REV.A DATE : 08-08-13
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
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C.1.3 Member Section


REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	
PHASE: DETAILED ENGINEERING	
DISCIPLINE: CIVIL	REV.A DATE : 08-08-13
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
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C.1.4 Member Unit Check(UC>0.3)


REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	
PHASE: DETAILED ENGINEERING	REV.A DATE : 08-08-13
DISCIPLINE: CIVIL	
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
PDVSA PROJECT NO.: 3006 ; HYUNDAI-WISON PROJECT NO.: VERE	
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APPENDIX C.2 SACS INPUT FILE LIST

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	REV.A
AREA: MACOTAL AREA	DATE : 08-08-13
PHASE: DETAILED ENGINEERING	PAGE 125 OF 140
DISCIPLINE: CIVIL	
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	

C.2.1 SACS Input Data

LDOPT SF	NF+Z1.0320007.850000	GLOBMN	CMBMPT	NP
OPTIONS	MN	SDL3 1 1 DC CPT PTPTPTPTPT	PTPT	
RFLRFD	1.0000.9500.8500.9500.9500.8500	0.8500.8500.8500.900		
LCSEL ST	100 101 211 221 LLUG			
UCPART	0.8500.8501.0001.000			
SECT				
SECT HM294X2	WFC	20.0001.20029.4000.800		
SECT HM340X2	WFC	25.0001.40034.0000.900		
SECT HM390X3	WFC	30.0001.60039.0001.000		
SECT HM488X3	WFC	30.0001.80048.8001.100		
SECT HW250X2	WFC	25.0001.40025.0000.900		
SECT TN175X1	TEE	17.50017.500.700 1.10013.700.00		
SECT TN200X2	TEE	20.00020.000.800 1.30015.700.00		
GRUP				
GRUP G1	HM488X3	20.008.00034.50 1 1.001.00	N7.8500	
GRUP G2	HM340X2	20.008.00034.50 1 1.001.00	N7.8500	
GRUP G3	HM390X3	20.008.00034.50 1 1.001.00	N7.8500	
GRUP G4	HM294X2	20.008.00034.50 1 1.001.00	N7.8500	
GRUP G5	TN175X1	20.008.00034.50 1 1.001.00	N7.8500	
GRUP G6	HW250X2	20.008.00034.50 1 1.001.00	N7.8500	
GRUP G7	TN200X2	20.008.00034.50 1 1.001.00	N7.8500	
GRUP SL		9.000 4.490T20.008.00035.50 1 1.001.00	0.500 1.00-5	
MEMBER				
MEMBER1113 116	G1	L 3.003.003.000		
MEMBER OFFSETS		-24.40	-24.40	
MEMBER1115 118	G1	L 3.003.003.000		
MEMBER OFFSETS		-24.40	-24.40	
MEMBER1116 119	G1	L 3.003.003.000		
MEMBER OFFSETS		-24.40	-24.40	
MEMBER1118 121	G1	L 3.003.003.000		
MEMBER OFFSETS		-24.40	-24.40	
MEMBER1119 122	G1	L 3.003.003.000		
MEMBER OFFSETS		-24.40	-24.40	
MEMBER1121 124	G1	L 3.003.003.000		
MEMBER OFFSETS		-24.40	-24.40	
MEMBER1122 125	G1	L 3.003.003.000		
MEMBER OFFSETS		-24.40	-24.40	
MEMBER1124 127	G1	L 3.003.003.000		
MEMBER OFFSETS		-24.40	-24.40	
MEMBER1125 4XY	G1	L 3.003.003.000		
MEMBER OFFSETS		-24.40	-24.40	
MEMBER1127 2XY	G1	L 3.003.003.000		
MEMBER OFFSETS		-24.40	-24.40	
MEMBER11XY 115	G1	L 3.003.003.000		
MEMBER OFFSETS		-24.40	-24.40	
MEMBER13XY 113	G1	L 3.003.003.000		
MEMBER OFFSETS		-24.40	-24.40	
MEMBER1210 213	G2	L 3.003.003.000		
MEMBER OFFSETS		-17.00	-17.00	
MEMBER1212 215	G2	L 3.003.003.000		
MEMBER OFFSETS		-17.00	-17.00	
MEMBER1213 216	G2	L 3.003.003.000		
MEMBER OFFSETS		-17.00	-17.00	
MEMBER1215 218	G2	L 3.003.003.000		
MEMBER OFFSETS		-17.00	-17.00	
MEMBER1216 219	G2	L 3.003.003.000		
MEMBER OFFSETS		-17.00	-17.00	
MEMBER1218 221	G2	L 3.003.003.000		
MEMBER OFFSETS		-17.00	-17.00	
MEMBER1219 222	G2	L 3.003.003.000		
MEMBER OFFSETS		-17.00	-17.00	
MEMBER1221 224	G2	L 3.003.003.000		
MEMBER OFFSETS		-17.00	-17.00	
MEMBER1222 225	G2	L 3.003.003.000		
MEMBER OFFSETS		-17.00	-17.00	

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	REV.A
AREA: MACOTAL AREA	DATE : 08-08-13
PHASE: DETAILED ENGINEERING	PAGE 126 OF 140
DISCIPLINE: CIVIL	
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	

MEMBER1224 227 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1225 228 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1227 230 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1298 336 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1300 338 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1336 339 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1338 341 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1339 342 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1341 344 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1342 345 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1344 347 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1345 348 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1347 350 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1348 301 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1350 303 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1392 426 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1394 428 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1426 429 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1428 431 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1429 432 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1431 434 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1432 435 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1434 437 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1435 438 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1437 440 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1438 395 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1440 397 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1472 506 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1474 508 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1506 509 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1508 511 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1509 512 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1511 514 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00
MEMBER1512 515 G2	L 3.003.003.000	
MEMBER OFFSETS	-17.00	-17.00

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	REV.A
AREA: MACOTAL AREA	DATE : 08-08-13
PHASE: DETAILED ENGINEERING	PAGE 127 OF 140
DISCIPLINE: CIVIL	
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	

MEMBER1514 517	G2	L	3.003.003.000	
MEMBER OFFSETS			-17.00	-17.00
MEMBER1515 518	G2	L	3.003.003.000	
MEMBER OFFSETS			-17.00	-17.00
MEMBER1517 520	G2	L	3.003.003.000	
MEMBER OFFSETS			-17.00	-17.00
MEMBER1518 475	G2	L	3.003.003.000	
MEMBER OFFSETS			-17.00	-17.00
MEMBER1520 477	G2	L	3.003.003.000	
MEMBER OFFSETS			-17.00	-17.00
MEMBER1113 114	G3	000011	L	5.005.005.000
MEMBER OFFSETS			-19.50	-19.50
MEMBER1114 115	G3	000011	L	5.005.005.000
MEMBER OFFSETS			-19.50	-19.50
MEMBER1116 117	G3	000011	L	5.005.005.000
MEMBER OFFSETS			-19.50	-19.50
MEMBER1117 118	G3	000011	L	5.005.005.000
MEMBER OFFSETS			-19.50	-19.50
MEMBER1119 120	G3	000011	L	5.005.005.000
MEMBER OFFSETS			-19.50	-19.50
MEMBER1120 121	G3	000011	L	5.005.005.000
MEMBER OFFSETS			-19.50	-19.50
MEMBER1122 123	G3	000011	L	5.005.005.000
MEMBER OFFSETS			-19.50	-19.50
MEMBER1123 124	G3	000011	L	5.005.005.000
MEMBER OFFSETS			-19.50	-19.50
MEMBER1125 126	G3	000011	L	5.005.005.000
MEMBER OFFSETS			-19.50	-19.50
MEMBER1126 127	G3	000011	L	5.005.005.000
MEMBER OFFSETS			-19.50	-19.50
MEMBER1114 117	G4	000011000011	L	3.003.003.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1117 120	G4	000011000011	L	3.003.003.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1120 123	G4	000011000011	L	3.003.003.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER123 126	G4	000011000011	L	3.003.003.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER123 214	G4		L	5.005.005.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1214 215	G4		L	5.005.005.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1214 217	G4	000011000011	L	3.003.003.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1216 217	G4		L	5.005.005.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1217 218	G4		L	5.005.005.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1217 220	G4	000011000011	L	3.003.003.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1219 220	G4		L	5.005.005.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1220 221	G4		L	5.005.005.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1220 223	G4	000011000011	L	3.003.003.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1222 223	G4		L	5.005.005.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1223 224	G4		L	5.005.005.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1223 226	G4	000011000011	L	3.003.003.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1225 226	G4		L	5.005.005.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1226 227	G4		L	5.005.005.000
MEMBER OFFSETS			-14.70	-14.70
MEMBER1336 337	G4		L	5.005.005.000
MEMBER OFFSETS			-14.70	-14.70

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	REV.A
AREA: MACOTAL AREA	DATE : 08-08-13
PHASE: DETAILED ENGINEERING	PAGE 128 OF 140
DISCIPLINE: CIVIL	
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	

MEMBER1337 338	G4	L	5.005.005.000	
MEMBER OFFSETS		-14.70	-14.70	
MEMBER1337 340	G4	000011000011	L	3.003.003.000
MEMBER OFFSETS		-14.70	-14.70	
MEMBER1339 340	G4	L	5.005.005.000	
MEMBER OFFSETS		-14.70	-14.70	
MEMBER1340 341	G4	L	5.005.005.000	
MEMBER OFFSETS		-14.70	-14.70	
MEMBER1340 343	G4	000011000011	L	3.003.003.000
MEMBER OFFSETS		-14.70	-14.70	
MEMBER1342 343	G4	L	5.005.005.000	
MEMBER OFFSETS		-14.70	-14.70	
MEMBER1343 344	G4	L	5.005.005.000	
MEMBER OFFSETS		-14.70	-14.70	
MEMBER1343 346	G4	000011000011	L	3.003.003.000
MEMBER OFFSETS		-14.70	-14.70	
MEMBER1345 346	G4	L	5.005.005.000	
MEMBER OFFSETS		-14.70	-14.70	
MEMBER1346 347	G4	L	5.005.005.000	
MEMBER OFFSETS		-14.70	-14.70	
MEMBER1346 349	G4	000011000011	L	3.003.003.000
MEMBER OFFSETS		-14.70	-14.70	
MEMBER1348 349	G4	L	5.005.005.000	
MEMBER OFFSETS		-14.70	-14.70	
MEMBER1349 350	G4	L	5.005.005.000	
MEMBER OFFSETS		-14.70	-14.70	
MEMBER1426 427	G4	L	5.005.005.000	
MEMBER OFFSETS		-14.70	-14.70	
MEMBER1427 428	G4	L	5.005.005.000	
MEMBER OFFSETS		-14.70	-14.70	
MEMBER1427 430	G4	000011000011	L	3.003.003.000
MEMBER OFFSETS		-14.70	-14.70	
MEMBER1429 430	G4	L	5.005.005.000	
MEMBER OFFSETS		-14.70	-14.70	
MEMBER1430 431	G4	L	5.005.005.000	
MEMBER OFFSETS		-14.70	-14.70	
MEMBER1430 433	G4	000011000011	L	3.003.003.000
MEMBER OFFSETS		-14.70	-14.70	
MEMBER1432 433	G4	L	5.005.005.000	
MEMBER OFFSETS		-14.70	-14.70	
MEMBER1433 434	G4	L	5.005.005.000	
MEMBER OFFSETS		-14.70	-14.70	
MEMBER1433 436	G4	000011000011	L	3.003.003.000
MEMBER OFFSETS		-14.70	-14.70	
MEMBER1435 436	G4	L	5.005.005.000	
MEMBER OFFSETS		-14.70	-14.70	
MEMBER1436 437	G4	L	5.005.005.000	
MEMBER OFFSETS		-14.70	-14.70	
MEMBER1436 439	G4	000011000011	L	3.003.003.000
MEMBER OFFSETS		-14.70	-14.70	
MEMBER1438 439	G4	L	5.005.005.000	
MEMBER OFFSETS		-14.70	-14.70	
MEMBER1439 440	G4	L	5.005.005.000	
MEMBER OFFSETS		-14.70	-14.70	
MEMBER1506 507	G4	L	5.005.005.000	
MEMBER OFFSETS		-14.70	-14.70	
MEMBER1507 508	G4	L	5.005.005.000	
MEMBER OFFSETS		-14.70	-14.70	
MEMBER1507 510	G4	000011000011	L	3.003.003.000
MEMBER OFFSETS		-14.70	-14.70	
MEMBER1509 510	G4	L	5.005.005.000	
MEMBER OFFSETS		-14.70	-14.70	
MEMBER1510 511	G4	L	5.005.005.000	
MEMBER OFFSETS		-14.70	-14.70	
MEMBER1510 513	G4	000011000011	L	3.003.003.000
MEMBER OFFSETS		-14.70	-14.70	
MEMBER1512 513	G4	L	5.005.005.000	
MEMBER OFFSETS		-14.70	-14.70	

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	
PHASE: DETAILED ENGINEERING	
DISCIPLINE: CIVIL	REV.A DATE : 08-08-13
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	
PAGE 129 OF 140	

MEMBER1513 514 G4	L 5.005.005.000
MEMBER OFFSETS	-14.70 -14.70
MEMBER1513 516 G4 000011000011	L 3.003.003.000
MEMBER OFFSETS	-14.70 -14.70
MEMBER1515 516 G4	L 5.005.005.000
MEMBER OFFSETS	-14.70 -14.70
MEMBER1516 517 G4	L 5.005.005.000
MEMBER OFFSETS	-14.70 -14.70
MEMBER1516 519 G4 000011000011	L 3.003.003.000
MEMBER OFFSETS	-14.70 -14.70
MEMBER1518 519 G4	L 5.005.005.000
MEMBER OFFSETS	-14.70 -14.70
MEMBER1519 520 G4	L 5.005.005.000
MEMBER OFFSETS	-14.70 -14.70
MEMBER1114 116 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1114 118 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1116 120 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1118 120 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1120 122 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1120 124 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1122 126 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1124 126 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1214 216 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1214 218 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1216 220 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1218 220 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1220 222 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1220 224 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1222 226 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1224 226 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1337 339 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1337 341 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1339 343 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1341 343 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1343 345 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1343 347 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1345 349 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1347 349 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1427 429 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1427 431 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819
MEMBER1429 433 G5 000011000011	L 5.835.835.830 5.00
MEMBER OFFSETS	-3.819 -3.819

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	
PHASE: DETAILED ENGINEERING	
DISCIPLINE: CIVIL	REV.A DATE : 08-08-13
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	
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MEMBER1431 433 G5	000011000011	L	5.835.835.830	5.00
MEMBER OFFSETS			-3.819	-3.819
MEMBER1433 435 G5	000011000011	L	5.835.835.830	5.00
MEMBER OFFSETS			-3.819	-3.819
MEMBER1433 437 G5	000011000011	L	5.835.835.830	5.00
MEMBER OFFSETS			-3.819	-3.819
MEMBER1435 439 G5	000011000011	L	5.835.835.830	5.00
MEMBER OFFSETS			-3.819	-3.819
MEMBER1437 439 G5	000011000011	L	5.835.835.830	5.00
MEMBER OFFSETS			-3.819	-3.819
MEMBER1507 509 G5	000011000011	L	5.835.835.830	5.00
MEMBER OFFSETS			-3.819	-3.819
MEMBER1507 511 G5	000011000011	L	5.835.835.830	5.00
MEMBER OFFSETS			-3.819	-3.819
MEMBER1509 513 G5	000011000011	L	5.835.835.830	5.00
MEMBER OFFSETS			-3.819	-3.819
MEMBER1511 513 G5	000011000011	L	5.835.835.830	5.00
MEMBER OFFSETS			-3.819	-3.819
MEMBER1513 515 G5	000011000011	L	5.835.835.830	5.00
MEMBER OFFSETS			-3.819	-3.819
MEMBER1513 517 G5	000011000011	L	5.835.835.830	5.00
MEMBER OFFSETS			-3.819	-3.819
MEMBER1515 519 G5	000011000011	L	5.835.835.830	5.00
MEMBER OFFSETS			-3.819	-3.819
MEMBER1517 519 G5	000011000011	L	5.835.835.830	5.00
MEMBER OFFSETS			-3.819	-3.819
MEMBER 213 113 G6		L	2.002.00	
MEMBER 215 115 G6		L	2.002.00	
MEMBER 216 116 G6		L	2.002.00	
MEMBER 218 118 G6		L	2.002.00	
MEMBER 219 119 G6		L	2.002.00	
MEMBER 221 121 G6		L	2.002.00	
MEMBER 222 122 G6		L	2.002.00	
MEMBER 224 124 G6		L	2.002.00	
MEMBER 225 125 G6		L	2.002.00	
MEMBER 227 127 G6		L	2.002.00	
MEMBER 336 213 G6		L	2.002.00	
MEMBER 338 215 G6		L	2.002.00	
MEMBER 339 216 G6		L	2.002.00	
MEMBER 341 218 G6		L	2.002.00	
MEMBER 342 219 G6		L	2.002.00	
MEMBER 344 221 G6		L	2.002.00	
MEMBER 345 222 G6		L	2.002.00	
MEMBER 347 224 G6		L	2.002.00	
MEMBER 348 225 G6		L	2.002.00	
MEMBER 350 227 G6		L	2.002.00	
MEMBER 426 336 G6		L	2.002.00	
MEMBER 428 338 G6		L	2.002.00	
MEMBER 429 339 G6		L	2.002.00	
MEMBER 431 341 G6		L	2.002.00	
MEMBER 432 342 G6		L	2.002.00	
MEMBER 434 344 G6		L	2.002.00	
MEMBER 435 345 G6		L	2.002.00	
MEMBER 437 347 G6		L	2.002.00	
MEMBER 438 348 G6		L	2.002.00	
MEMBER 440 350 G6		L	2.002.00	
MEMBER 506 426 G6		L	2.002.00	
MEMBER 508 428 G6		L	2.002.00	
MEMBER 509 429 G6		L	2.002.00	
MEMBER 511 431 G6		L	2.002.00	
MEMBER 512 432 G6		L	2.002.00	
MEMBER 514 434 G6		L	2.002.00	
MEMBER 515 435 G6		L	2.002.00	
MEMBER 517 437 G6		L	2.002.00	
MEMBER 518 438 G6		L	2.002.00	
MEMBER 520 440 G6		L	2.002.00	
MEMBER1119 222 G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	
PHASE: DETAILED ENGINEERING	
DISCIPLINE: CIVIL	REV.A DATE : 08-08-13
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	
PAGE 131 OF 140	

MEMBER1121 224	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1122 225	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1124 227	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1125 228	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1127 230	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1210 113	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1212 115	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1213 116	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1215 118	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1216 119	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1218 121	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1219 345	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1221 347	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1222 348	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1224 350	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1225 301	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1227 303	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1298 213	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1300 215	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1336 216	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1338 218	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1339 219	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1341 221	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1342 435	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1344 437	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1345 438	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1347 440	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1348 395	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1350 397	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1392 336	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1394 338	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1426 339	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1428 341	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	
MEMBER1429 342	G7	000011000011	L	3.603.603.600	5.00
MEMBER OFFSETS			-3.580	-3.580	

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	
PHASE: DETAILED ENGINEERING	
DISCIPLINE: CIVIL	REV.A DATE : 08-08-13
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	
PAGE 132 OF 140	

MEMBER1431 344 G7 000011000011	L 3.603.603.600 5.00
MEMBER OFFSETS	-3.580 -3.580
MEMBER1432 515 G7 000011000011	L 3.603.603.600 5.00
MEMBER OFFSETS	-3.580 -3.580
MEMBER1434 517 G7 000011000011	L 3.603.603.600 5.00
MEMBER OFFSETS	-3.580 -3.580
MEMBER1435 518 G7 000011000011	L 3.603.603.600 5.00
MEMBER OFFSETS	-3.580 -3.580
MEMBER1437 520 G7 000011000011	L 3.603.603.600 5.00
MEMBER OFFSETS	-3.580 -3.580
MEMBER1438 475 G7 000011000011	L 3.603.603.600 5.00
MEMBER OFFSETS	-3.580 -3.580
MEMBER1440 477 G7 000011000011	L 3.603.603.600 5.00
MEMBER OFFSETS	-3.580 -3.580
MEMBER1472 426 G7 000011000011	L 3.603.603.600 5.00
MEMBER OFFSETS	-3.580 -3.580
MEMBER1474 428 G7 000011000011	L 3.603.603.600 5.00
MEMBER OFFSETS	-3.580 -3.580
MEMBER1506 429 G7 000011000011	L 3.603.603.600 5.00
MEMBER OFFSETS	-3.580 -3.580
MEMBER1508 431 G7 000011000011	L 3.603.603.600 5.00
MEMBER OFFSETS	-3.580 -3.580
MEMBER1509 432 G7 000011000011	L 3.603.603.600 5.00
MEMBER OFFSETS	-3.580 -3.580
MEMBER1511 434 G7 000011000011	L 3.603.603.600 5.00
MEMBER OFFSETS	-3.580 -3.580
MEMBER 509 0000 SL T000011000111	
MEMBER 511 0000 SL T000011000111	
MEMBER 515 0000 SL T000011000111	
MEMBER 517 0000 SL T000011000111	
JOINT	
JOINT 113 -6. 4. 0. 74.300	
JOINT 114 -6. 0. 0. -25.700	
JOINT 115 -6. -5. 0. -25.700	
JOINT 116 -3. 4. 0. 74.300	
JOINT 117 -3. 0. 0. -25.700	
JOINT 118 -3. -5. 0. -25.700	
JOINT 119 0. 4. 0. 0.001 74.300	
JOINT 120 0. 0. 0. 0.001-25.700	
JOINT 121 0. -5. 0. 0.001-25.700	
JOINT 122 3. 4. 0. 74.300	
JOINT 123 3. 0. 0. -25.700	
JOINT 124 3. -5. 0. -25.700	
JOINT 125 6. 4. 0. 74.300	
JOINT 126 6. 0. 0. -25.700	
JOINT 127 6. -5. 0. -25.700	
JOINT 1XY -9. -5. 0. -25.700	110000
JOINT 1XY 10.000 10.000	ELASTI
JOINT 210 -9. 4. 2. 74.300	
JOINT 212 -9. -5. 2. -25.700	
JOINT 213 -6. 4. 2. 74.300	
JOINT 214 -6. 0. 2. -25.700	
JOINT 215 -6. -5. 2. -25.700	
JOINT 216 -3. 4. 2. 74.300	
JOINT 217 -3. 0. 2. -25.700	
JOINT 218 -3. -5. 2. -25.700	
JOINT 219 0. 4. 2. 0.001 74.300	
JOINT 220 0. 0. 2. 0.001-25.700	
JOINT 221 0. -5. 2. 0.001-25.700	
JOINT 222 3. 4. 2. 74.300	
JOINT 223 3. 0. 2. -25.700	
JOINT 224 3. -5. 2. -25.700	
JOINT 225 6. 4. 2. 74.300	
JOINT 226 6. 0. 2. -25.700	
JOINT 227 6. -5. 2. -25.700	
JOINT 228 9. 4. 2. 74.300	
JOINT 230 9. -5. 2. -25.700	
JOINT 298 -9. 4. 4. 74.300	

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	REV.A
AREA: MACOTAL AREA	DATE : 08-08-13
PHASE: DETAILED ENGINEERING	PAGE 133 OF 140
DISCIPLINE: CIVIL	
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	

JOINT 2XY	9.	-5.	0.	-25.700
JOINT 300	-9.	-5.	4.	-25.700
JOINT 301	9.	4.	4.	74.300
JOINT 303	9.	-5.	4.	-25.700
JOINT 336	-6.	4.	4.	74.300
JOINT 337	-6.	0.	4.	-25.700
JOINT 338	-6.	-5.	4.	-25.700
JOINT 339	-3.	4.	4.	74.300
JOINT 340	-3.	0.	4.	-25.700
JOINT 341	-3.	-5.	4.	-25.700
JOINT 342	0.	4.	4.	0.001 74.300
JOINT 343	0.	0.	4.	0.001-25.700
JOINT 344	0.	-5.	4.	0.001-25.700
JOINT 345	3.	4.	4.	74.300
JOINT 346	3.	0.	4.	-25.700
JOINT 347	3.	-5.	4.	-25.700
JOINT 348	6.	4.	4.	74.300
JOINT 349	6.	0.	4.	-25.700
JOINT 350	6.	-5.	4.	-25.700
JOINT 392	-9.	4.	6.	74.300
JOINT 394	-9.	-5.	6.	-25.700
JOINT 395	9.	4.	6.	74.300
JOINT 397	9.	-5.	6.	-25.700
JOINT 3XY	-9.	4.	0.	74.300
JOINT 426	-6.	4.	6.	74.300
JOINT 427	-6.	0.	6.	-25.700
JOINT 428	-6.	-5.	6.	-25.700
JOINT 429	-3.	4.	6.	74.300
JOINT 430	-3.	0.	6.	-25.700
JOINT 431	-3.	-5.	6.	-25.700
JOINT 432	0.	4.	6.	0.001 74.300
JOINT 433	0.	0.	6.	0.001-25.700
JOINT 434	0.	-5.	6.	0.001-25.700
JOINT 435	3.	4.	6.	74.300
JOINT 436	3.	0.	6.	-25.700
JOINT 437	3.	-5.	6.	-25.700
JOINT 438	6.	4.	6.	74.300
JOINT 439	6.	0.	6.	-25.700
JOINT 440	6.	-5.	6.	-25.700
JOINT 472	-9.	4.	8.	74.300
JOINT 474	-9.	-5.	8.	-25.700
JOINT 475	9.	4.	8.	74.300
JOINT 477	9.	-5.	8.	-25.700
JOINT 4XY	9.	4.	0.	74.300
JOINT 4XY	10.000	10.000		110000
JOINT 506	-6.	4.	8.	74.300
JOINT 507	-6.	0.	8.	-25.700
JOINT 508	-6.	-5.	8.	-25.700
JOINT 509	-3.	4.	8.	74.300
JOINT 510	-3.	0.	8.	-25.700
JOINT 511	-3.	-5.	8.	-25.700
JOINT 512	0.	4.	8.	0.001 74.300
JOINT 513	0.	0.	8.	0.001-25.700
JOINT 514	0.	-5.	8.	0.001-25.700
JOINT 515	3.	4.	8.	74.300
JOINT 516	3.	0.	8.	-25.700
JOINT 517	3.	-5.	8.	-25.700
JOINT 518	6.	4.	8.	74.300
JOINT 519	6.	0.	8.	-25.700
JOINT 520	6.	-5.	8.	-25.700
JOINT COG	0.	0.	3.	6.000 111000
JOINT 0000	0.	0.	28.	111111

LOAD

LOADCN 1 1.102

LOADLB1 DEAD LOAD: D

DEAD

DEAD -Z

LOADCN 2

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	
PHASE: DETAILED ENGINEERING	
DISCIPLINE: CIVIL	REV.A DATE : 08-08-13
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	
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LOADLB2 EL CABLE TRY LOAD
LOAD Z 506 507 3. 75000-0. 35001. 25000-0. 3500 GLOB UNIF
LOAD Z 509 510 3. 75000-0. 35001. 25000-0. 3500 GLOB UNIF
LOAD Z 512 513 3. 75000-0. 35001. 25000-0. 3500 GLOB UNIF
LOAD Z 515 516 3. 75000-0. 35001. 25000-0. 3500 GLOB UNIF
LOAD Z 518 519 3. 75000-0. 35001. 25000-0. 3500 GLOB UNIF
LOAD Z 507 508 -0. 35004. 50000-0. 3500 GLOB UNIF
LOAD Z 510 511 -0. 35004. 50000-0. 3500 GLOB UNIF
LOAD Z 513 514 -0. 35004. 50000-0. 3500 GLOB UNIF
LOAD Z 516 517 -0. 35004. 50000-0. 3500 GLOB UNIF
LOAD Z 519 520 -0. 35004. 50000-0. 3500 GLOB UNIF
LOAD Z 506 507 2. 58000-0. 59000. 30000-0. 5900 GLOB UNIF
LOAD Z 509 510 2. 58000-0. 59000. 30000-0. 5900 GLOB UNIF
LOAD Z 512 513 2. 58000-0. 59000. 30000-0. 5900 GLOB UNIF
LOAD Z 515 516 2. 58000-0. 59000. 30000-0. 5900 GLOB UNIF
LOAD Z 518 519 2. 58000-0. 59000. 30000-0. 5900 GLOB UNIF
LOADCN 4
LOADLB4 PIPING&EQUIPMENT LOAD-EMPTY: DE
LOAD Z 113 114 0. 82000-3. 6900 GLOB CONC
LOAD Z 116 117 0. 82000-3. 6900 GLOB CONC
LOAD Z 119 120 0. 82000-3. 6900 GLOB CONC
LOAD Z 122 123 0. 82000-3. 6900 GLOB CONC
LOAD Z 125 126 0. 82000-3. 6900 GLOB CONC
LOAD Z 113 114 1. 50000-3. 30001. 85000-3. 3000 GLOB UNIF
LOAD Z 116 117 1. 50000-3. 30001. 85000-3. 3000 GLOB UNIF
LOAD Z 119 120 1. 50000-3. 30001. 85000-3. 3000 GLOB UNIF
LOAD Z 122 123 1. 50000-3. 30001. 85000-3. 3000 GLOB UNIF
LOAD Z 125 126 1. 50000-3. 30001. 85000-3. 3000 GLOB UNIF
LOAD Z 114 115 -3. 60003. 92000-3. 6000 GLOB UNIF
LOAD Z 117 118 -3. 60003. 92000-3. 6000 GLOB UNIF
LOAD Z 120 121 -3. 60003. 92000-3. 6000 GLOB UNIF
LOAD Z 123 124 -3. 60003. 92000-3. 6000 GLOB UNIF
LOAD Z 126 127 -3. 60003. 92000-3. 6000 GLOB UNIF
LOAD Z 213 214 1. 80000-5. 5200 GLOB CONC
LOAD Z 216 217 1. 80000-5. 5200 GLOB CONC
LOAD Z 219 220 1. 80000-5. 5200 GLOB CONC
LOAD Z 222 223 1. 80000-5. 5200 GLOB CONC
LOAD Z 225 226 1. 80000-5. 5200 GLOB CONC
LOAD Z 213 214 2. 71000-5. 5200 GLOB CONC
LOAD Z 216 217 2. 71000-5. 5200 GLOB CONC
LOAD Z 219 220 2. 71000-5. 5200 GLOB CONC
LOAD Z 222 223 2. 71000-5. 5200 GLOB CONC
LOAD Z 225 226 2. 71000-5. 5200 GLOB CONC
LOAD Z 213 214 3. 70000-2. 10001. 30000-2. 1000 GLOB UNIF
LOAD Z 216 217 3. 70000-2. 10001. 30000-2. 1000 GLOB UNIF
LOAD Z 219 220 3. 70000-2. 10001. 30000-2. 1000 GLOB UNIF
LOAD Z 222 223 3. 70000-2. 10001. 30000-2. 1000 GLOB UNIF
LOAD Z 225 226 3. 70000-2. 10001. 30000-2. 1000 GLOB UNIF
LOAD Z 214 215 -2. 10001. 17000-2. 1000 GLOB UNIF
LOAD Z 217 218 -2. 10001. 17000-2. 1000 GLOB UNIF
LOAD Z 220 221 -2. 10001. 17000-2. 1000 GLOB UNIF
LOAD Z 223 224 -2. 10001. 17000-2. 1000 GLOB UNIF
LOAD Z 226 227 -2. 10001. 17000-2. 1000 GLOB UNIF
LOAD Z 337 338 3. 90000-6. 9000 GLOB CONC
LOAD Z 340 341 3. 90000-6. 9000 GLOB CONC
LOAD Z 343 344 3. 90000-6. 9000 GLOB CONC
LOAD Z 346 347 3. 90000-6. 9000 GLOB CONC
LOAD Z 349 350 3. 90000-6. 9000 GLOB CONC
LOAD Z 336 337 2. 03000-4. 50000. 80000-4. 5000 GLOB UNIF
LOAD Z 339 340 2. 03000-4. 50000. 80000-4. 5000 GLOB UNIF
LOAD Z 342 343 2. 03000-4. 50000. 80000-4. 5000 GLOB UNIF
LOAD Z 345 346 2. 03000-4. 50000. 80000-4. 5000 GLOB UNIF
LOAD Z 348 349 2. 03000-4. 50000. 80000-4. 5000 GLOB UNIF
LOAD Z 336 337 3. 43000-3. 30000. 72000-3. 3000 GLOB UNIF
LOAD Z 339 340 3. 43000-3. 30000. 72000-3. 3000 GLOB UNIF
LOAD Z 342 343 3. 43000-3. 30000. 72000-3. 3000 GLOB UNIF
LOAD Z 345 346 3. 43000-3. 30000. 72000-3. 3000 GLOB UNIF
LOAD Z 348 349 3. 43000-3. 30000. 72000-3. 3000 GLOB UNIF

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	REV.A DATE : 08-08-13
PHASE: DETAILED ENGINEERING	
DISCIPLINE: CIVIL	
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	PAGE 135 OF 140
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	

LOAD Z 426 427 0.95000-0.4800 GLOB CONC
 LOAD Z 429 430 0.95000-0.4800 GLOB CONC
 LOAD Z 432 433 0.95000-0.4800 GLOB CONC
 LOAD Z 435 436 0.95000-0.4800 GLOB CONC
 LOAD Z 438 439 0.95000-0.4800 GLOB CONC
 LOAD Z 426 427 1.70000-8.2500 GLOB CONC
 LOAD Z 429 430 1.70000-8.2500 GLOB CONC
 LOAD Z 432 433 1.70000-8.2500 GLOB CONC
 LOAD Z 435 436 1.70000-8.2500 GLOB CONC
 LOAD Z 438 439 1.70000-8.2500 GLOB CONC
 LCOMB
 LCOMB 100 1 1.10002 1.00004 1.0000
 LCOMB 101 100 1.2100
 LCOMB 121 101 1.0000
 LCOMB 210 121 1.1500
 LCOMB 211 210 1.6000
 LCOMB 220 121 1.0000
 LCOMB 221 220 1.6000
 LCOMB LLUG 121 1.3000
 END

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	REV.A DATE : 08-08-13
PHASE: DETAILED ENGINEERING	
DISCIPLINE: CIVIL	
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	PAGE 136 OF 140
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	

APPENDIX C.3 LIFTING BAR DESIGN (HOLD)

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	
PHASE: DETAILED ENGINEERING	REV.A DATE : 08-08-13
DISCIPLINE: CIVIL	
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	PAGE 137 OF 140
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	

APPENDIX D REFERENCE DRAWING

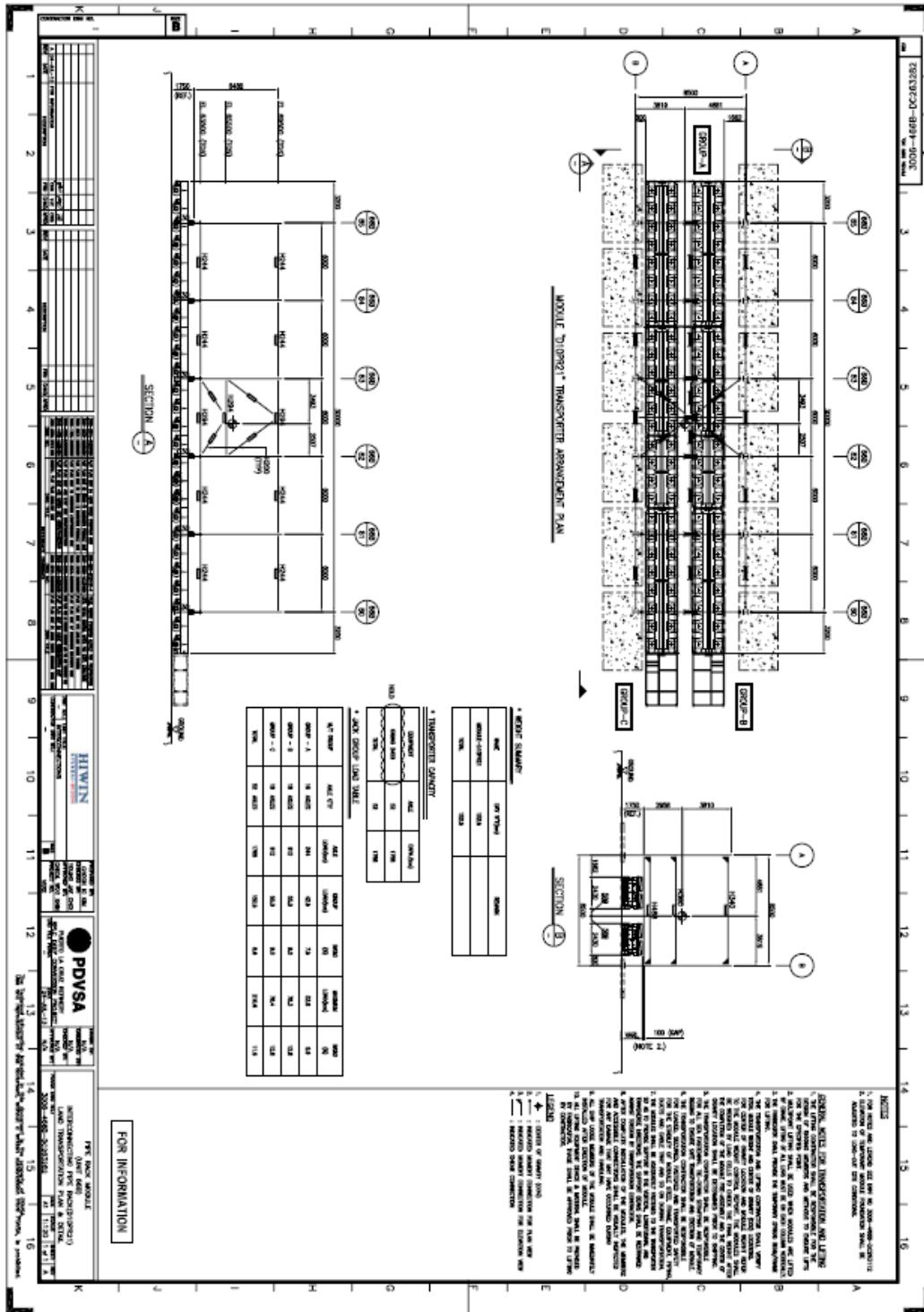


HIWIN
HYUNDAI-WISON

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	
PHASE: DETAILED ENGINEERING	REV.A
DISCIPLINE: CIVIL	DATE : 08-08-13
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	PAGE 138 OF 140
PDVSA PROJECT NO.: 3006; HYUNDAI-WISON PROJECT NO.: VERE	

D.1 Load out/Land transportation Drawing





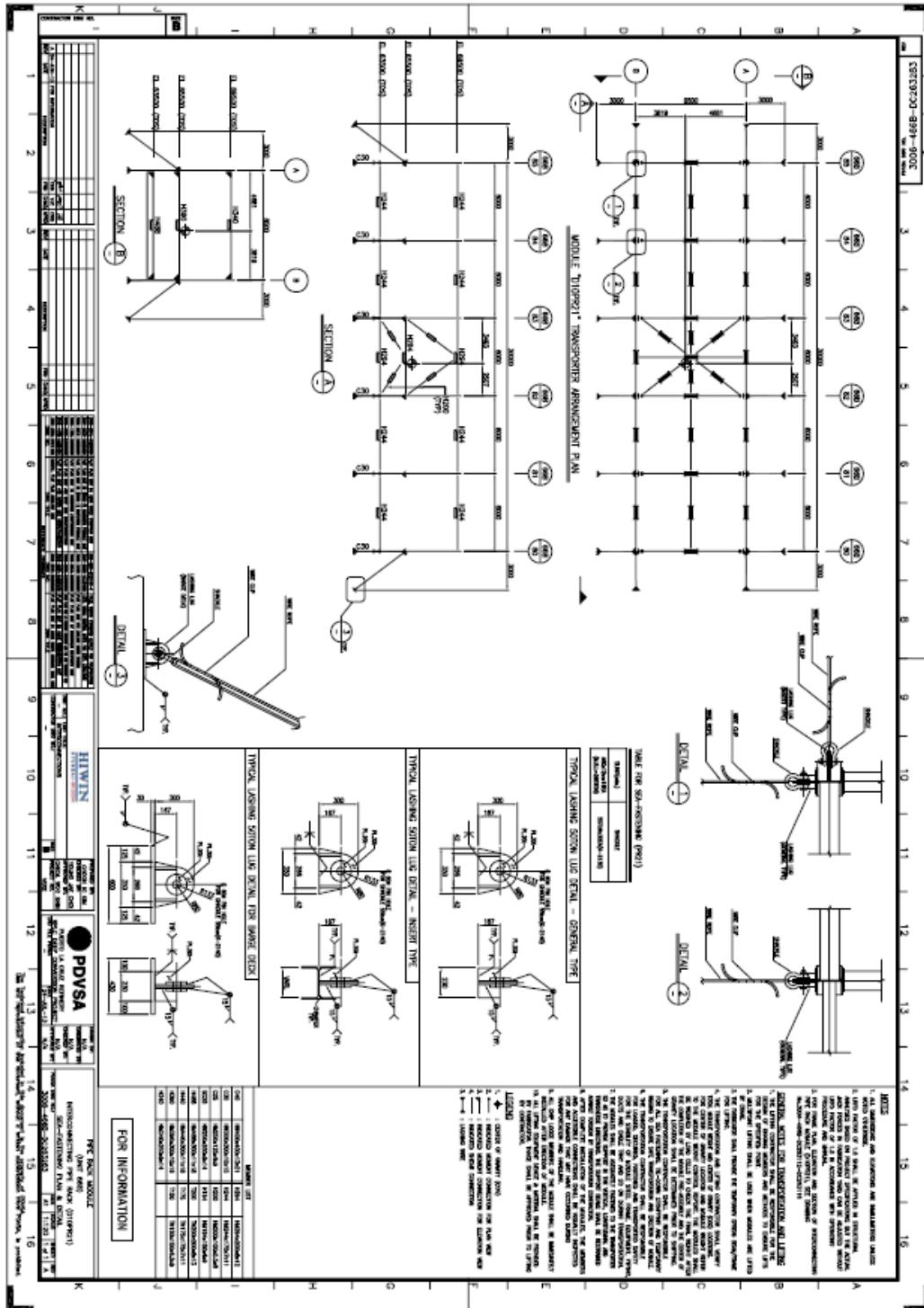
PDVSA



REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	
PHASE: DETAILED ENGINEERING	REV.A
DISCIPLINE: CIVIL	DATE : 08-08-13
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	PAGE 139 OF 140
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D.2 Sea-Fastening Drawing





PDVSA

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HYUNDAI-WISON

REFINING MAJOR PROJECTS GENERAL MANAGEMENT

PROJECT: RPLC DEEP CONVERSION PROJECT	PDVSA DOC. No. 3006-466C-DC406121
SUBPROJECT: OFFSITES	HYUNDAI-WISON DOC. No. N/A
UNIT: INTERCONNECTIONS	
AREA: MACOTAL AREA	
PHASE: DETAILED ENGINEERING	REV.A
DISCIPLINE: CIVIL	DATE : 08-08-13
TITLE: CALCULATION NOTES FOR UNIT 66C INTERCONNECTING PIPERACK MODULE (C30PR03,PRE-SERVICE)	PAGE 140 OF 140
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D.3 Lifting Drawing

