

Roy Hill SMP&EI Project

Crane and Rigging Study

SCT Document No.	100RH-H315-4000-ME-CAL-3042
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Lift Study no.	C195-HSE-PLN-121
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Install Car Dumper 421 CDU-101

Total lifted weight (kgs)	524633
Crane	Demag CC8800
Area	Car dumper 421-CDU101

B	Rigging gear revised	16/06/2015	RP
A	Issued for comment	14/03/2015	RP
Rev	Description	Date	Prepared by

**THIS DOCUMENT IS NOT VALID FOR USE UNLESS IT IS REV 0 OR
HIGHER AND HAS BEEN APPROVED BY SAMSUNG C&T**

Critical Lift Control Form

OHS-F-013-0

Single Crane Lift

Lift Category **CRITICAL**

REV	B
Date	16/06/2015

Project Name	Roy Hill - PKG3 Area A (Unloading) (SMP E&I Works)
Lift Location	Car dumper 421-CDU101
Job No.	ROYSC-T-S045
Planned lift date	0/01/1900
Lift description	Install Car Dumper 421 CDU-101

Crane details;

Make	Demag
Model	CC8800
Maximum WLL (t)	1600
Configuration	SSL
Upper cwt (t)	295
Lower cwt (t)	60
Superlift cwt	640
Superlift cwt radius	25
Main boom length	84
Main boom angle (if luffing)	N/A
Jib length	N/A
Jib offset (if fixed)	N/A

Used hook capacity (t)	800
Used rope line pull (kgs)	35000
Parts of rope	18
Theoretical max pull (t)	630000
Line pull utilisation	81.0%

Track or O/rigger centres	10.5
Dia. winch rope in use	40

Weight calculations; (Refer to attached drawings)

Crane components (kgs)	32200
Rigging equipment (kgs)	35433
Lifted item (kgs)	457000

Total Lifted Weight **524633**

Crane Utilisation;

Pick radius	36
SWL at Pickup radius (kgs)	552000
Utilisation	95.0%
Place radius	36
SWL at Place radius (kgs)	552000
Utilisation	95.0%

Ground bearing pressures;

Crane pad limit	450 (TBC)	kPa
Crane GBP	TBA	kPa

Maximum wind speed (from load chart)

10	m/sec
36	km/hr

NOTE; Each lift must be individually assessed depending on sail area and prevailing winds

Approvals;

	Name	Signature	Date
Prepared by;	Russell Parker		16/06/2015
Reviewed and approved by; Crane & Rigging Superintendent, Senior Engineer or Area Manager			
Reviewed and approved by; Senior Project Manager (Critical Lifts only)			
Reviewed and approved by; SCT Representative			

PRE LIFT ASSESSMENT SHEET

Roy Hill Project

PRE LIFT		
Have all lifting points been tested and assessed for strength?	☐ Yes	☐ No
Can the load be lifted by one crane or are multiple cranes required?	☐ Yes	☐ No
Is the crane within radius and not exceeding 75% of its maximum lifting capacity?	☐ Yes	☐ No
Is the proposed crane rated for the load?	☐ Yes	☐ No
Is there anything in the area that could affect the crane/s during the lift?	☐ Yes	☐ No
Is the centre of gravity of the load identified?	☐ Yes	☐ No
THINGS TO CHECK		
The crane set up location(s) and the initial position of the load		
Checking boom, load rigging, and sling clearances during the erection and lifting phases		
Inspect the condition and certification of the crane and lifting equipment		
Ensure that the outrigger/crawler loads do not exceed the soil capacity (Ground bearing calculations to be provided)		
Ensure that the crane is set up correctly before the lifting begins		
Ensure that all involved are fully aware of the plan, rules and work method		
WHAT SHOULD COMPRISE THE LIFT STUDY		
The rationale for the selection of appropriate cranes based on capacities, accessibility, and availability		
A written plan for the lifting task		
Elevation, rigging and matting drawings for the task		
Detailing the lift sequence, especially for multi crane lifts		
The provision of safety precautions related to wind, communications or other site specific hazards		
DOCUMENTS TO BE INCLUDED IN THE LIFT STUDY & ATTACHED TO THE LIFT STUDY PROFORMA		
Place tick in box below for document submission:		
A copy of the Safe Working Procedure for the work and / or JHA.	☐	
A drawing of the lift and load in its position from lifting to final placement.	☐	
Plan view drawings of crane position for the lift.	☐	
Lift calculation sheet/s associated with the lift.	☐	
Detailed rigging arrangement drawings.	☐	
Lift Study / methodology.	☐	
The load charts for the lifting crane/s.	☐	
The certification for the rigging equipment to be used.	☐	
Written (detailed) weight calculations of the item to be lifted and a drawing of item.	☐	
Details of any design or supply of any custom lifting equipment.	☐	
Test certificates or documentation for lifting lugs and other attachments supporting the load.	☐	
Any testing certificates for lifting lugs or other equipment.	☐	

PRE LIFT ASSESSMENT SHEET

Roy Hill Project

LIFT STUDY - PRE-LIFT SIGNOFF (Immediately Prior to Lift)					
Structural or Lift Hazards identified:	☐ Yes	☐ No	Rigging arrangement checked and correct:	☐ Yes	☐ No
Ground conditions are adequate:	☐ Yes	☐ No	Pre-Lift meeting has been held:	☐ Yes	☐ No
Electrical Hazards identified:	☐ Yes	☐ No	JHA is in place:	☐ Yes	☐ No
Lift study checked and correct:	☐ Yes	☐ No	Lifting areas are safely barricaded:	☐ Yes	☐ No
Name:		Signature:		Date:	
Supervisor:					
Crane Operator:					
Senior Rigger:					
Comments:					
The section below is for lift day change management. That is, changes to rigging, crane position or any other deviation from the provided rigging and crane drawings and/or methodology.					
Lift Adjustment – in the event that the rigging methodology requires alteration, the subcontractor representative shall ensure to provide revised rigging configuration and/or equipment and document below					
Comments:					
SCT Representative to complete the section below					
Rigging adjustment provided?	☐ Yes	☐ No	JHA amended and approved?	☐ Yes	☐ No
Rigging checked by competent person	☐ Yes	☐ No	Lift study checked and correct:	☐ Yes	☐ No
Lift approval must be obtained prior to recommencement of lifting activity					
Signature		Date			
Reviewed and approved by SCT Engineer/Lift Specialist or delegate:				Page 2	
Authorised by Subcontractor Lift Supervisor:					

Lift study no. C195-HSE-PLN-121
REV B
Date 16/06/15

ATTACHMENT 1

WEIGHT CONTROL DRAWINGS AND INFORMATION



SAMSUNG C&T

ROY HILL IRON ORE PROJECT

Supplier Queries/Instruction

SPQ No: RHHP1-P033-2000-GE-SPQ-0045 Date: 13 February 2015

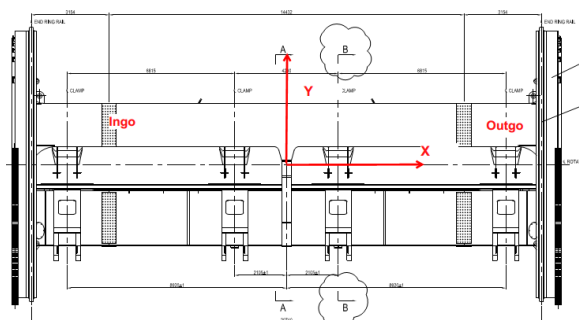
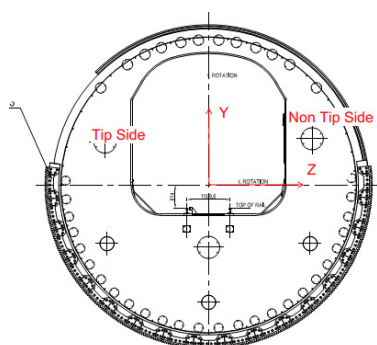
Contract/PO No. : P033 Rev: 0

PO Description:

Supplier : DHHI/DFA Location: WBS 4211

SPQ Title: Car Dumper – Mass and Centre of Gravity of Cell

Contractor requests that the Subcontractor confirms the fully dressed Car Dumper Cell mass and centre of gravity (CoG) location. Subcontractor is requested to provide the CoG coordinates in accordance with the below coordinate system.



Attachments:

Nil

Cost Impact:	Yes / No: No	Schedule Impact:	Yes / No: No
Estimate Attached:	Yes / No: No	Schedule attached:	Yes / No: No

Estimated Value: N/A

Agreement to Proceed: N/A

☐ Existing Unit price
 ☐ New unit price
 ☐ Cost Plus
 ☐ Time rate
 ☐ Other (Specify)

	Name	Signature	Date
DHHI Interface Coordinator	John O'Brien		13/02/2015
Package 3 Engineering Team	Matt Luplau		13/02/2015

Distribution: Package Engineer (Copy) ☒ , Package Buyer (Original) ☐ , Project/SCT Manager (Copy) ☒ , Supplier (Copy) ☐ , Project Controller (Copy) ☐ , Others (Copy) ☐

Supplier Response

Please see the response in the file attached:

"MASS AND COG OF CAR DUMPER.PDF"

Title	Name	Signature	Date
Project Manager	Manuel A. Gonzalez		11/03/2015
Project Manager	John Roche		11/03/2015

CAR DUMPER ROTARY CELL - CENTRE OF MASS

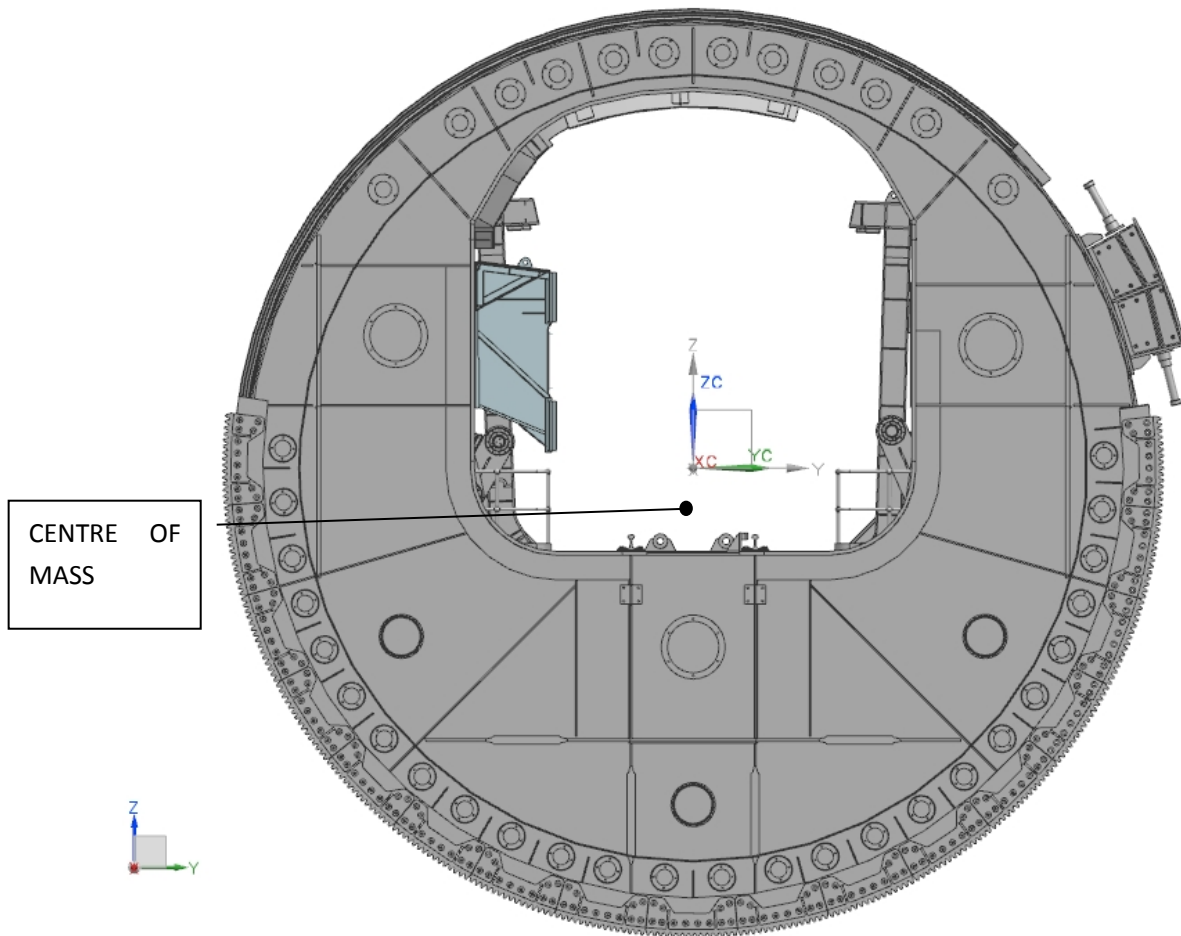
MASS: 457 t (EXCEPT Dustproof Cover, Carrier Roller Device, Maintenance of Jack, Drive Device, Bracket of Limit Switch ON EARTH)

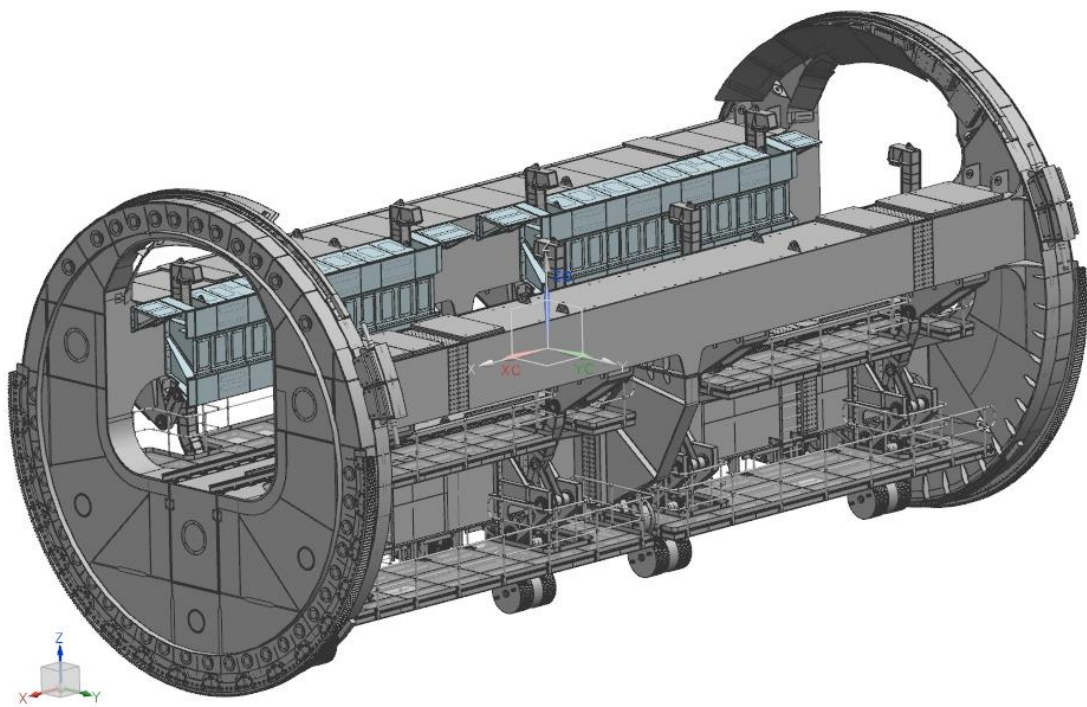
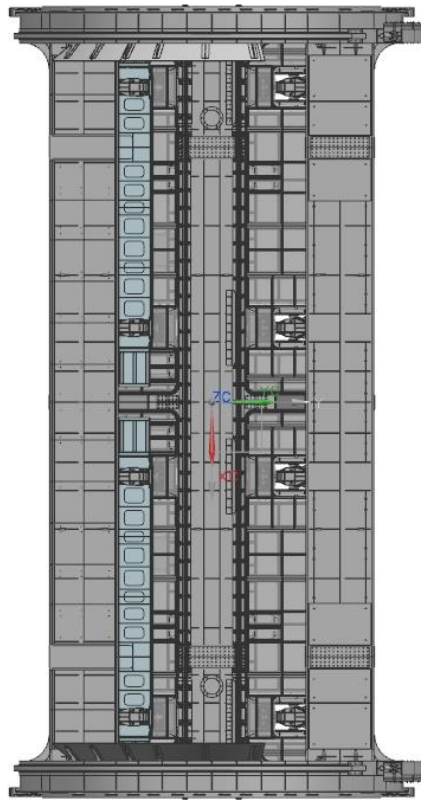
CENTRE OF MASS:

X = 0 mm

Y = -4.1 mm

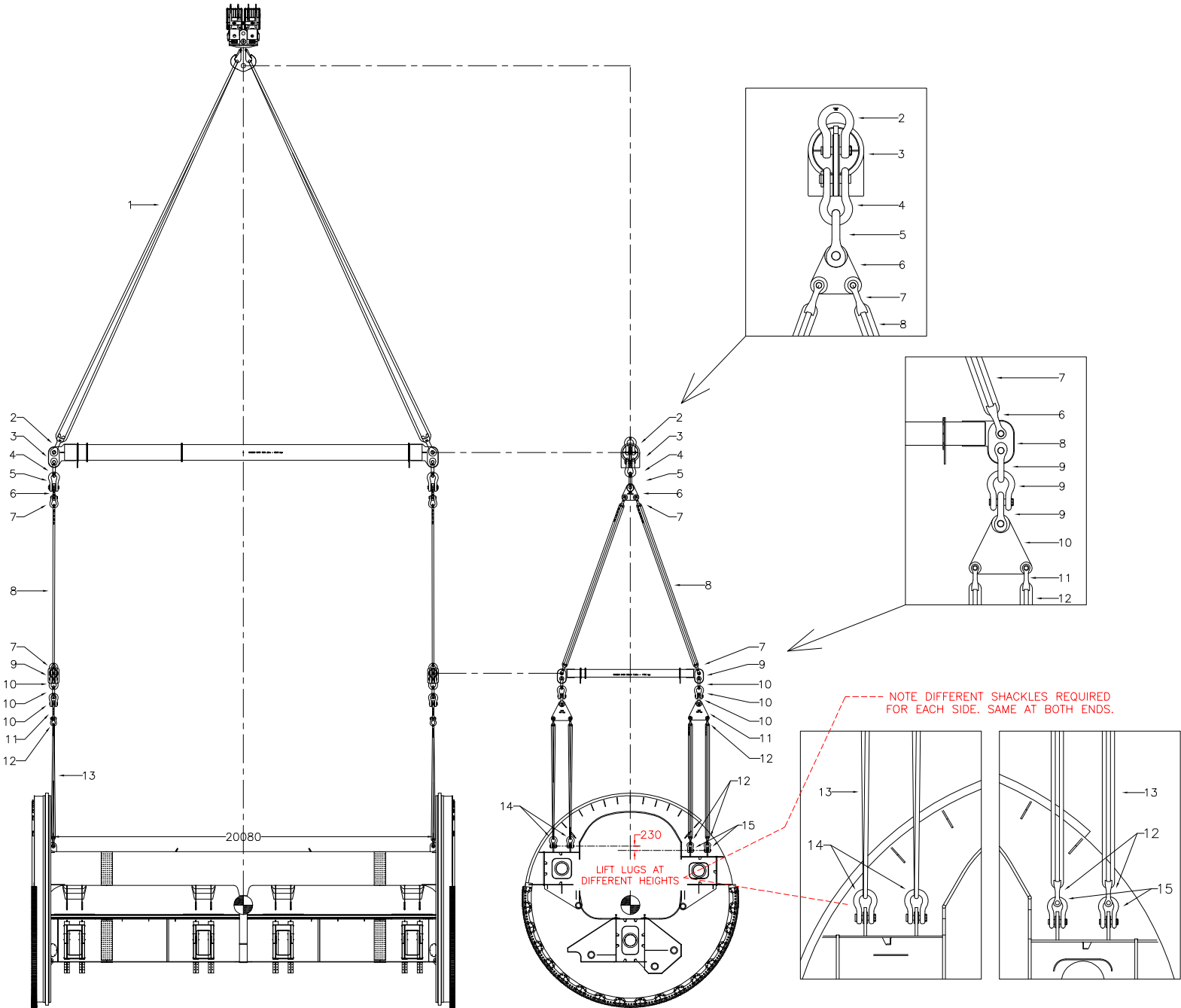
Z = -431 mm



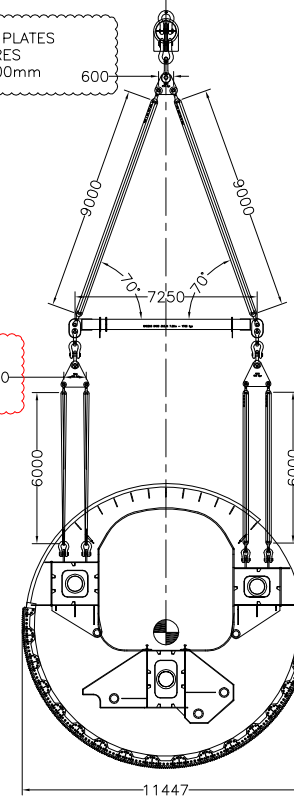


ATTACHMENT 2
CRANE & RIGGING DRAWINGS

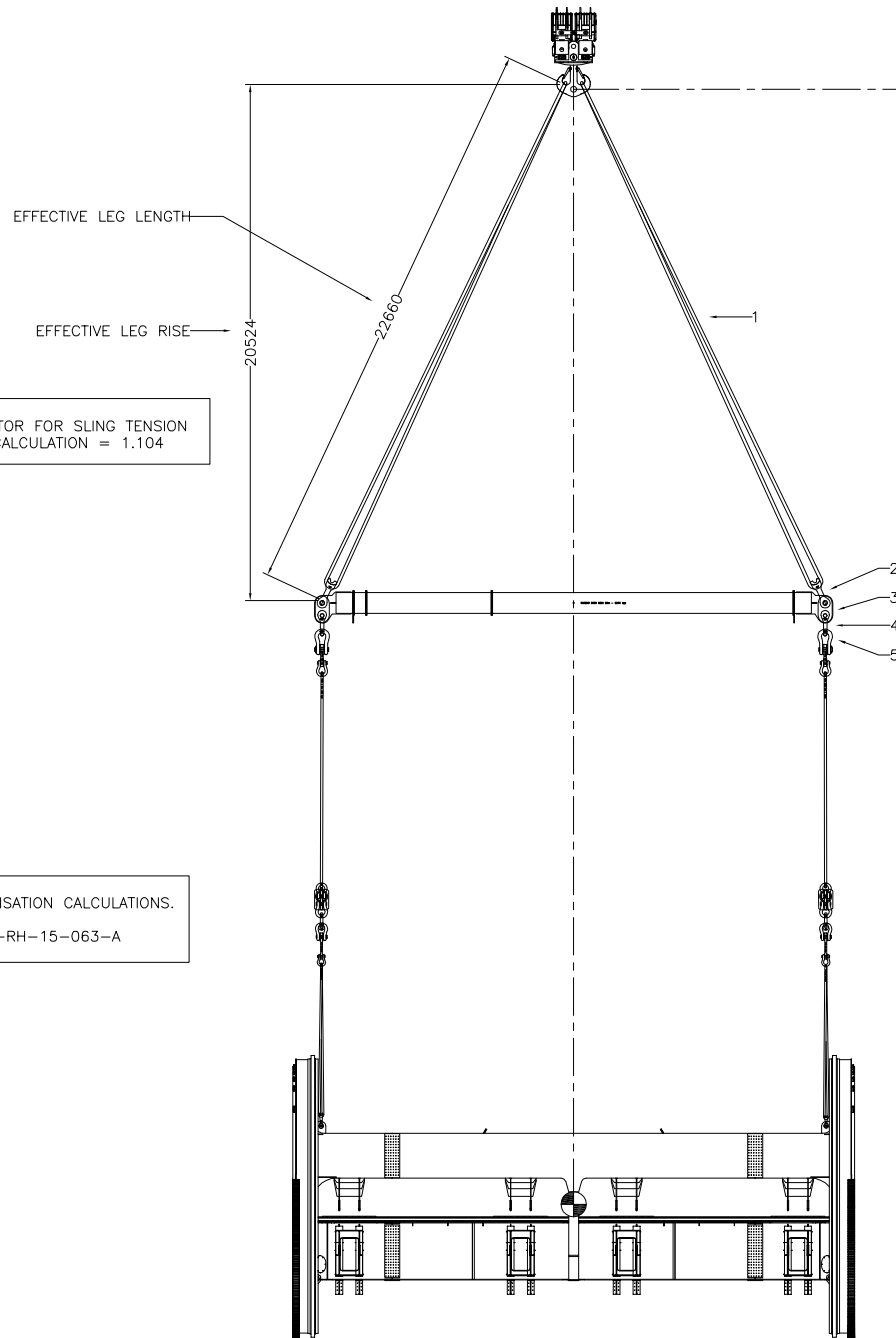
TOTAL LIFTED WEIGHT CALCULATIONS							
CRANE COMPONENTS; DEMAG CC8800							
MAIN HOOK	800t					18000	
MAIN ROPE	—	kg/mtr	—	mtrs HEIGHT	—	FALLS	—
AUX. HOOK	40t					7700	
AUX. ROPE	—	kg/mtr	—	mtrs HEIGHT	—	FALLS	
AUX. JIB						2200	
	HALF WEIGHT OF WU RODS ON MAIN BOOM					4300	
SUB TOTAL - CRANE COMPONENTS						32200	
RIGGING COMPONENTS;							
ITEM	DESCRIPTION		WEIGHT	QTY	MASS		
1	22m 325t FSWR SLINGS (E)		1450	2	2900		
2	SHACKLES – 600t (WB)		1100	2	2200		
3	SPREADER BAR SWL 1000t		15045	1	15045		
4	SHACKLES – 400t (STD)		560	2	1120		
5	SHACKLES – 300t (STD)		340	4	1360		
6	EQUALISING PLATES SWL 300t		475	2	950		
7	SHACKLES – 150t (WB)		115	8	920		
8	9m 158t FSWR SLINGS (E)		507	4	2028		
9	SPREADER BARS SWL 303t		1785	2	3570		
10	SHACKLES – 150t (STD)		160	12	1920		
11	EQUALISING PLATSE SWL 150t		400	4	1600		
12	SHACKLES – 75t (WB)		53	12	636		
13	6m 70t SYNTHETIC SLINGS		75	8	600		
14	SHACKLES – 125t (WB)		84	4	336		
15	SHACKLES – 85t (STD)		62	4	248		
SUB TOTAL - RIGGING COMPONENTS						35433	
CAR DUMPER 421 CDU–101						457000	
TOTAL WEIGHT ON CRANE						524633	
ALL WEIGHTS IN KILOGRAMS							
RIGGING NOTES;							
1. FSWR SLINGS (E) DENOTE ENDLESS GROMMET TYPE							
2. FSWR SLINGS (S) DENOTE SINGLE PART SOFT EYE TYPE							
3. SHACKLES (WB) DENOTE WIDE BODY SLING SAVER TYPE							
4. SHACKLES (STD) DENOTE STANDARD SAFETY PIN BOW TYPE							



DISCLAIMER: THIS DRAWING IS BASED SOLELY ON THE INFORMATION PROVIDED BY THE NAMED CLIENT AND / OR CONTACT PERSON. NO LIFT OR PROCEDURE DESCRIBED HEREIN SHOULD BE CARRIED OUT WITHOUT REFERENCE TO THE SPECIFIC LOADCHART AND / OR OPERATION MANUAL FOR THE CRANE/S AND/OR PLANT DEPICTED. UNLESS OTHERWISE NOTED IT IS ASSUMED THAT THE GROUND OR OTHER SUPPORTING STRUCTURE IS LEVEL AND OF SUFFICIENT COMPACTION OR STRENGTH TO SAFELY WITHSTAND IMPOSED LOADINGS FROM THE EQUIPMENT DEPICTED UNDER ALL OPERATING CONDITIONS.	DRAWING PROVIDED BY:		FOR:		ROY HILL PROJECT CAR DUMPER INSTALL CAR DUMPER 421 CDU-101		NOT TO SCALE		DRAWN		RP	13/3/15	REVISIONS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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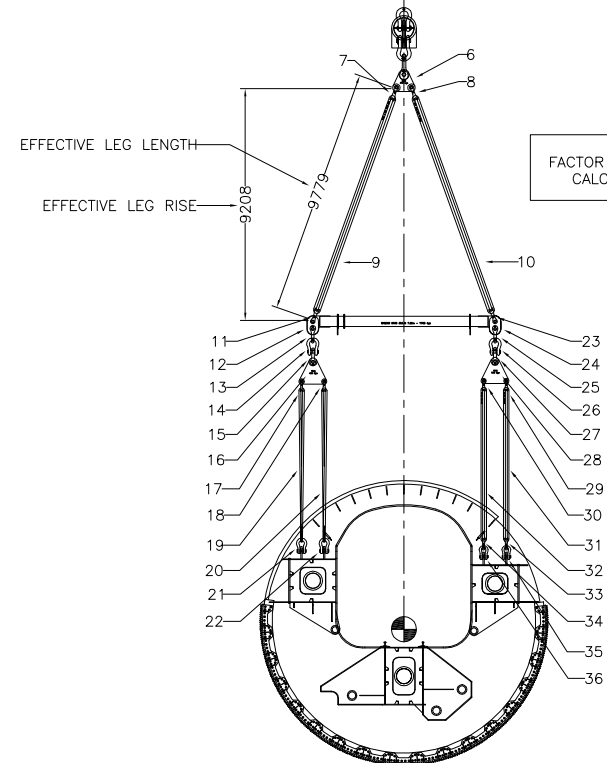


NOT TO SCALE	DRAWN	RP	13/3/15	REVIEWS			
	CHECKED						
DRAWING No	REV	APPR. CIVMEC					
C-RH-15-061	B	APPR. SAMSUNG			B	16/3/15	RIGGING GEAR REVISED
				A	13/3/15	ISSUED FOR REVIEW	



FACTOR FOR SLING TENSION
CALCULATION = 1.104

RIGGING TENSION AND UTILISATION CALCULATIONS.
REFER TO DRAWING No. C-RH-15-063-A



FACTOR FOR SLING TENSION
CALCULATION = 1.062

DISCLAIMER:
THIS DRAWING IS BASED SOLELY ON THE INFORMATION PROVIDED
BY THE NAMED CLIENT AND / OR CONTACT PERSON. NO LIFT OR
PROCEDURE DESCRIBED HEREIN SHOULD BE CARRIED OUT WITHOUT
REFERENCE TO THE SPECIFIC LOADCHART AND / OR OPERATOR
MANUAL FOR THE CRANE/S AND/OR PLANT DEPICTED. UNLESS
OTHERWISE NOTED IT IS ASSUMED THAT THE GROUND OR OTHER
SUPPORTING STRUCTURE IS LEVEL AND OF SUFFICIENT CAPACITY
OR STRENGTH TO SAFELY WITHSTAND IMPOSED LOADINGS FROM THE
EQUIPMENT DEPICTED UNDER ALL OPERATING CONDITIONS.

DRAWING PROVIDED BY:
PRIME CRANE SERVICES
ABN 32 787 702 770
Russell Parker
Mob; 0408 929 885
Email; prime@westnet.com.au

FOR:
ROY HILL PROJECT
CAR DUMPER
INSTALL CAR DUMPER 421 CDU-101

RIGGING DETAILS

NOT TO SCALE		DRAWN	RP	13/3/15	REVISIONS			
DRAWING No	REV	CHECKED						
C-RH-15-062	B	APPR. CIVMEC						
		APPR. SAMSUNG						
					B	16/6/15	RIGGING GEAR REVISED	
					A	13/3/15	ISSUED FOR REVIEW	

Install Car Dumper 421 CDU-101

Rigging tension and utilisation calculations

Refer to drawing no. C-RH-15-062-A

This calculation sheet considers the tensions through one side of the total rigging arrangments. C of G is central. Tensions through the other side of rigging arrangement will be identical

Item	Description	SWL (kgs)	Self weight (kgs)	Applied weights (kgs)	Tension factor for inclined legs	Inclined leg tensions (kgs)	Utilisation
1	Sling	325000	1450	263256	1.104	290635	89%
2	Shackle	600000	1100	261806	1.104	289034	48%
3	Half spreader weight		7523	260706			
4	Shackle	400000	560	253183			63%
5	Shackle	300000	340	252623			84%
6	Plate	300000	475	252283			84%
7	Shackle	150000	115	117184			78%
8	Shackle	150000	115	117246			78%
9	Sling	158000	507	117069	1.062	124327	79%
10	Sling	158000	507	117131	1.062	124393	79%
11	Shackle	150000	115	116562			78%
12	Half spreader weight		893				
13	Shackle	150000	160	115669			77%
14	Shackle	150000	160	115394			77%
15	Shackle	150000	160	115234			77%
16	Plate	150000	400	115074			77%
17	Shackle	75000	53	57337			76%
18	Shackle	75000	53	57337			76%
19	Sling	70000	75	57284	1	57284	82%
20	Sling	70000	75	57284	1	57284	82%
21	Shackle	125000	84	57209			46%
22	Shackle	125000	84	57209			46%
23	Shackle	150000	115	116624			78%
24	Half spreader weight		893				
25	Shackle	150000	160	115616			77%
26	Shackle	150000	160	115456			77%
27	Shackle	150000	160	115296			77%
28	Plate	150000	400	115136			77%
29	Shackle	75000	53	57368			76%
30	Shackle	75000	53	57368			76%
31	Sling	70000	75	57315	1	57315	82%
32	Sling	70000	75	57315	1	57315	82%
33	Shackle	75000	53	57240			76%
34	Shackle	75000	53	57240			76%
35	Shackle	85000	62	57187			67%
36	Shackle	85000	62	57187			67%

TOTAL weight (half of rigging)	17378
Load share (half of cell)	228500
Half load share	114250
Quarter load share	57125

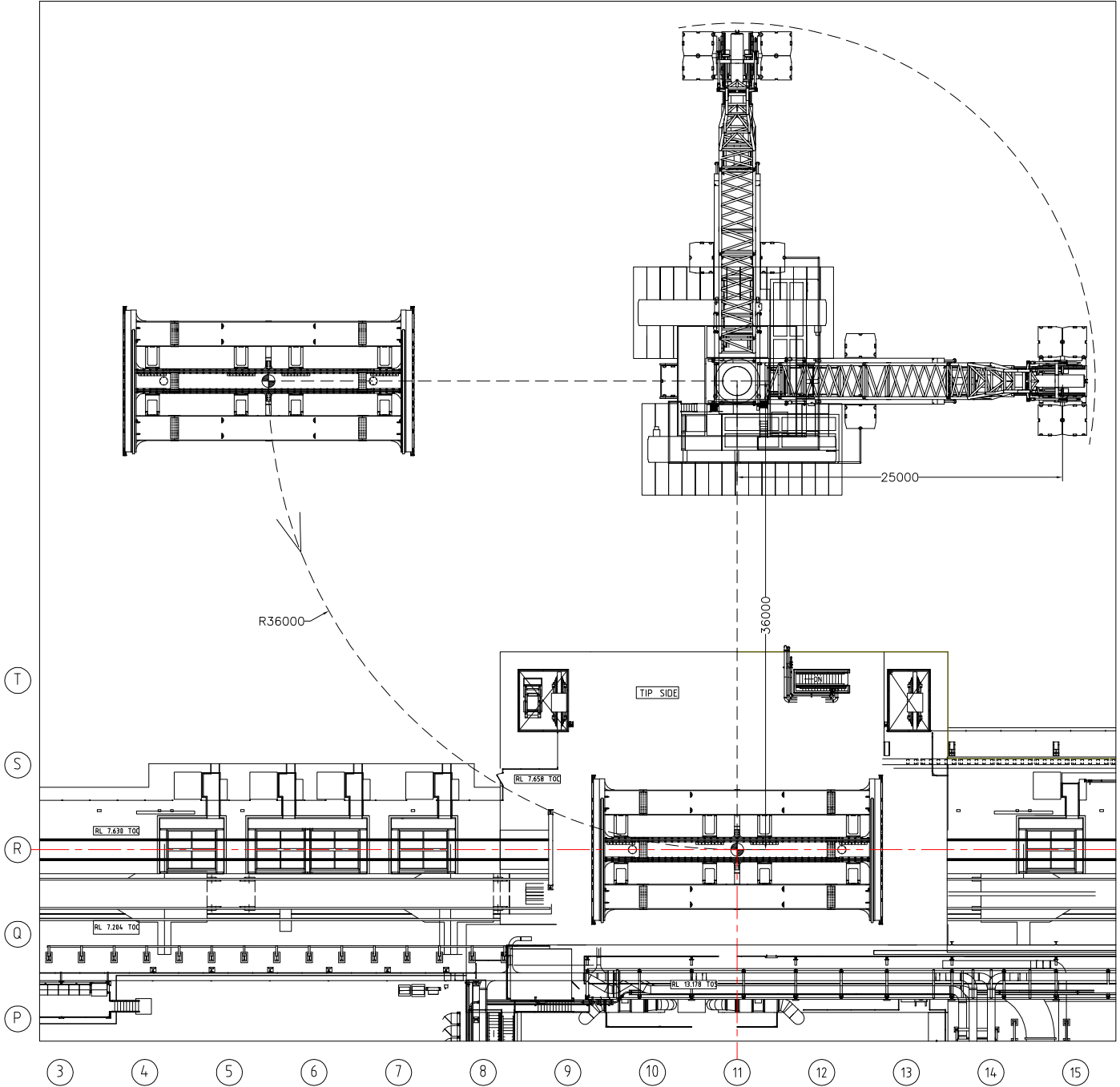
Spreader bars;

Main bar SWL	1000000
Total applied weight	471610
Utilisation	47%

Lower bars SWL	250000
Total applied weight	231170
Utilisation	92%

CRANE DETAILS		
MAKE	DEMAG	
MODEL	CC8800	
MAXIMUM WLL	1600	t
SLEW RANGE	0 – 360	deg
TRACK WIDTH	10.5	m
UPPER CWT	295	t
LOWER CWT	60	t
MAIN BOOM LENGTH	84	m
SL MAST LENGTH	50	m
SL MAST RADIUS	22	m
SL CWT RADIUS	25	m
SL CWT TOTAL	640	t
MAX. LIFT RADIUS	36	m
SWL	552000	kg
LIFTED WEIGHT DETAILS		
LOAD MASS	457000	kg
CRANE COMPONENTS	32200	kg
RIGGING	35433	kg
TOTAL LIFT WEIGHT	524633	kg
CRANE UTILISATION	95.0	%
REEVING CHECK		
PARTS OF LINE	18	
LINE PULL	35000	kg
TOTAL LINE PULL	630000	kg
WEIGHT ON HOOK	510433	kg
HOIST UTILISATION	81.0	%

CRITICAL LIFT



DISCLAIMER:
THIS DRAWING IS BASED SOLELY ON THE INFORMATION PROVIDED
BY THE NAMED CLIENT AND / OR CONTACT PERSON. NO LIFT OR
PROCEDURE DESCRIBED HEREIN SHOULD BE CARRIED OUT WITHOUT
REFERENCE TO THE SPECIFIC LIFT CHART AND / OR OPERATOR
MANUAL FOR THE CRANE/S AND/OR PLANT DEPICTED. UNLESS
OTHERWISE NOTED, IT IS ASSUMED THAT THE GROUND OR OTHER
SUPPORTING STRUCTURE IS LEVEL AND OF SUFFICIENT CAPACITY
OR STRENGTH TO SAFELY WITHSTAND IMPOSED LOADINGS FROM THE
EQUIPMENT DEPICTED UNDER ALL OPERATING CONDITIONS.

DRAWING PROVIDED BY:
PRIME CRANE SERVICES
ABN 32 787 702 770
Russell Parker
Mob: 0408 929 885
Email: prime@westnet.com.au

FOR:

ROY HILL PROJECT
CAR DUMPER
INSTALL CAR DUMPER 421 CDU-101

CRANE DETAILS

NOT TO SCALE

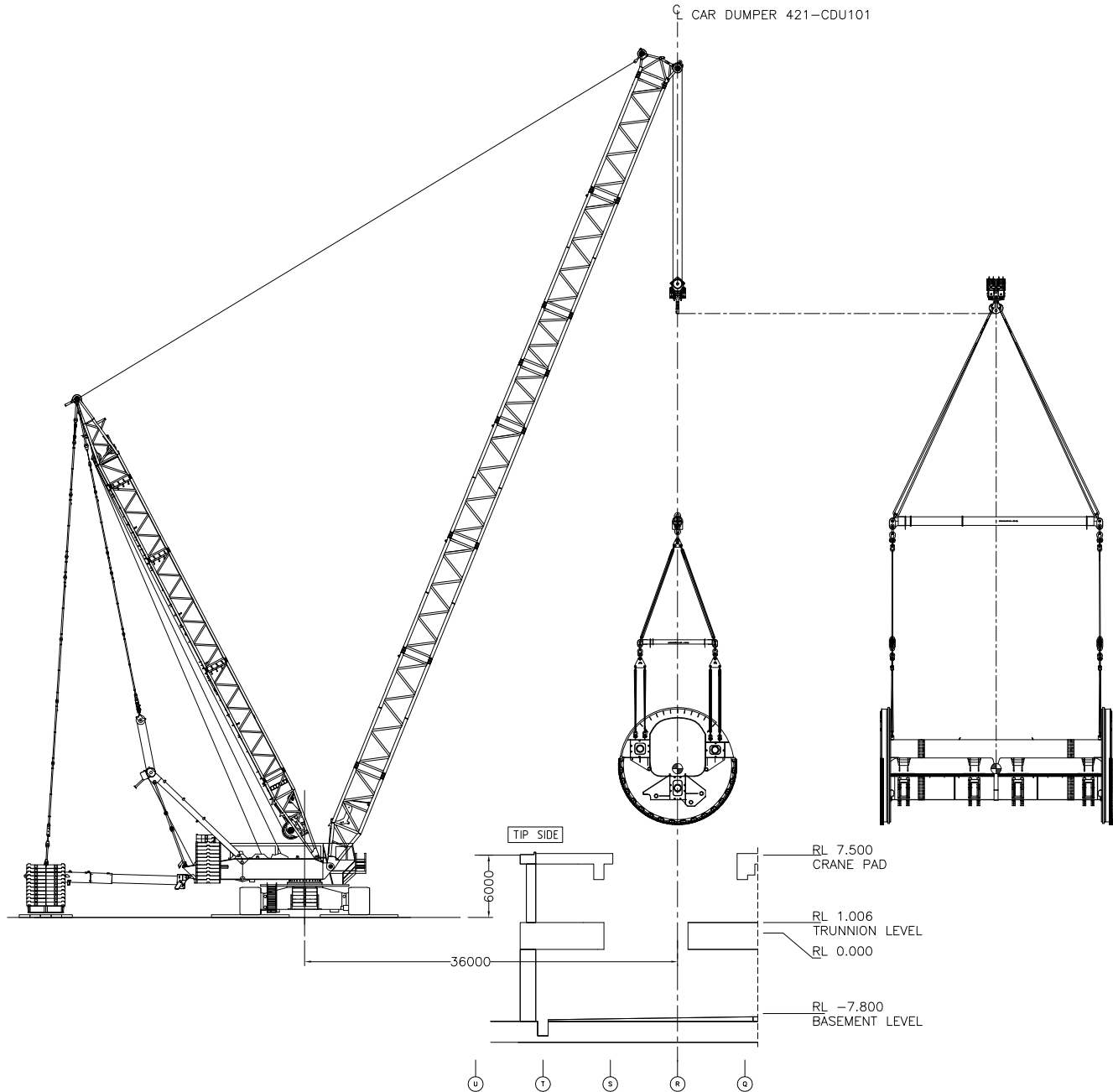
DRAWING No REV
C-RH-15-064 B

DRAWN	RP	14/3/15
CHECKED		
APPR. CIVMEC		
APPR. SAMSUNG		

REVISIONS			
B	16/6/15	RIGGING GEAR REVISED	
A	14/3/15	ISSUED FOR REVIEW	

CRANE DETAILS		
MAKE	DEMAG	
MODEL	CC8800	
MAXIMUM WLL	1600	t
SLEW RANGE	0 – 360	deg
TRACK WIDTH	10.5	m
UPPER CWT	295	t
LOWER CWT	60	t
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PARTS OF LINE	18	
LINE PULL	35000	kg
TOTAL LINE PULL	630000	kg
WEIGHT ON HOOK	510433	kg
HOIST UTILISATION	81.0	%

CRITICAL LIFT



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OTHERWISE NOTED IT IS ASSUMED THAT THE GROUND OR OTHER
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OR STRENGTH TO SAFELY WITHSTAND IMPOSED LOADINGS FROM THE
EQUIPMENT DEPICTED UNDER ALL OPERATING CONDITIONS.

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ASBN 32 787 702 770
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FOR:

ROY HILL PROJECT
CAR DUMPER
INSTALL CAR DUMPER 421 CDU-101

CRANE DETAILS

NOT TO SCALE

DRAWING No REV
C-RH-15-065 B

DRAWN	RP	14/3/15
CHECKED		
APPR. CIVMEC		
APPR. SAMSUNG		

REVISIONS			
B	16/6/15	RIGGING GEAR REVISED	
A	14/3/15	ISSUED FOR REVIEW	

ATTACHMENT 3
CRANE LOAD CHARTS

CC8800 - 1

Capacities on Main Boom with
Superlift

SSL

"tele-SL"

Capacity (t) = Load + Hook Block

Slew Range	0-360 °
Main Boom Length	84 m
SL-Mast Length	50 m
Track Width	10,5 m
Counterweight	295 t
Central Ballast	60 t
SL-Mast Radius	22 m
Superlift Radius	25 m

Superlift Counterweight (t)
Radius (m)

	0	100	180	240	340	440	540	640
12	528*	748*	923*	967*	(969*)	(969*)	(969*)	(969*)
14	451	643*	796*	911*	969*	(969*)	(969*)	(969*)
16	392	562*	698*	800*	925*	(969*)	(969*)	(969*)
18	344	497	619*	711*	830*	928*	(969*)	(969*)
20	305	444	555*	639*	751*	841*	931*	(965*)
22	273	400	502	579*	685*	768*	851*	933*
24	245	363	457	528*	623*	705*	782*	859*
26	222	331	419	484	566*	646*	718*	789*
28	202	302	380	439	518	593*	661*	728*
30	181	271	343	397	477	546*	613*	675*
34	146	223	285	332	409	470	531*	587*
38	119	187	241	282	350	410	464	517
42	96,5	159	207	244	304	362	411	460
46	79	136	180	213	267	322	367	412
50	61,5	117	155	187	237	287	331	372
54								338
58	43,1	88	123	149	191	233	274	309
62	34,8	76,5	110	134	173	212	251	284
66	27,8	66,5	98	121	158	194	231	262
70	22	58,5	87,5	109	144	179	213	243
74	17,1	51,5	79	99,5	133	165	198	227
76	15	48,6	75	95,5	128	159	191	219
	15	15	15	15	15	15	15	15
	16	16	16	16	16	16	16	16
DS-Code	0114000013	0114000013	0114000013	0114000013	0114000013	0114000013	0114000013	0114000013

INTERPOLATED SWL AT 36m RADIUS = 552t

double hook block *
single hook block
DS-Code

Attention!

Loads in brackets () do not lift up the SL-counterweight from ground.

In case of runner mounted: reduce the load!

Reduce the load by the weight of runner and hook block on the runner!

If the jib suspension rods WU are on the main boom:

Reduce the load by the half weight of the rods!

only valid for "tele-SL".

INSTALL CAR DUMPER 421 CDU-101

ATTACHMENT 4
GROUND BEARING PRESSURES