



INTRODUCTION
COMPANY PHILOSOPHY
PRELIMINARY WORK
MECHANICAL
CIVIL/STRUCTURAL
PROJECTS

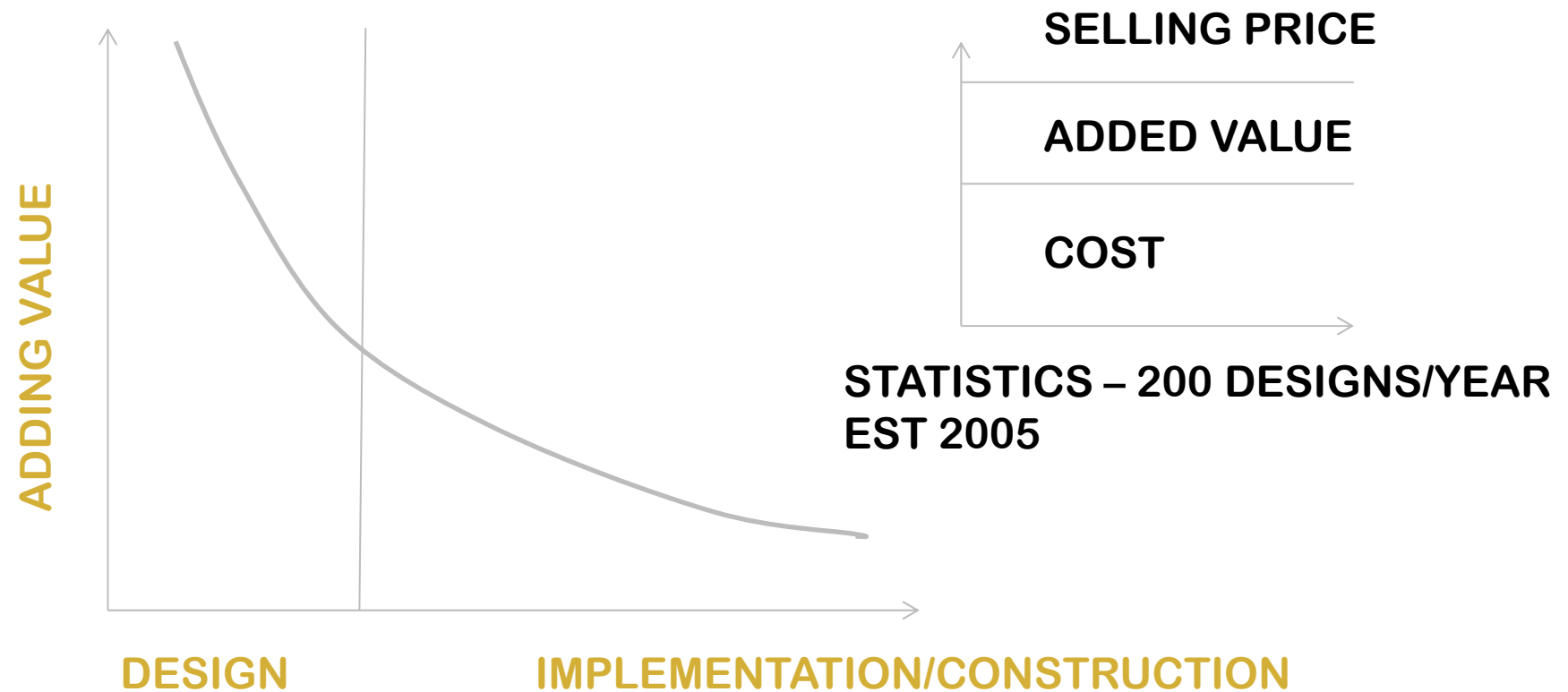
COMPANY PHILOSOPHY

- Small, specialised (Mechanical / Civil / Structural)
- Customer orientated company



COMPANY PHILOSOPHY

- Adding value vs selling cost



PRELIMINARY WORK

- SCOPE DEVELOPMENT (SOMETIMES BY CLIENT)
- RISK ASSESMENT WORKSHOPS
- LAYOUTS

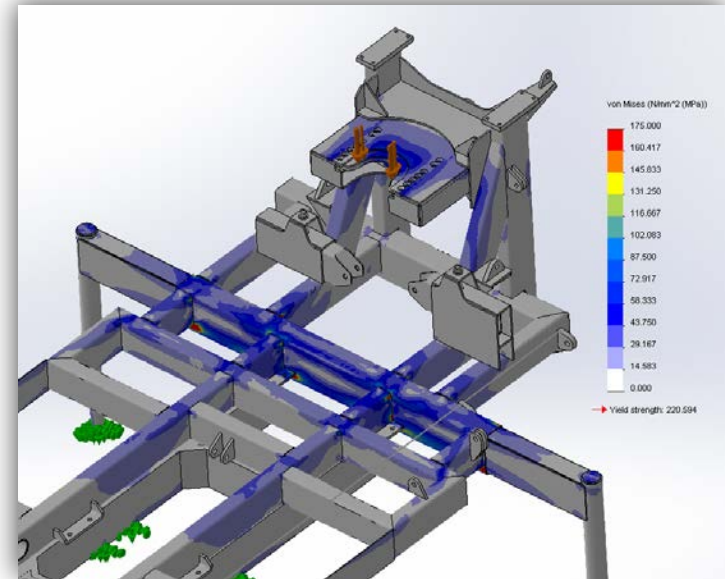
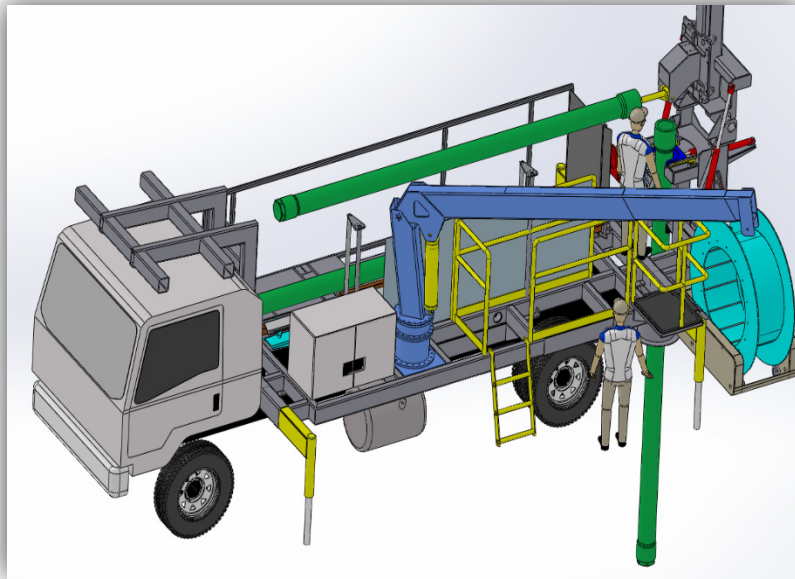
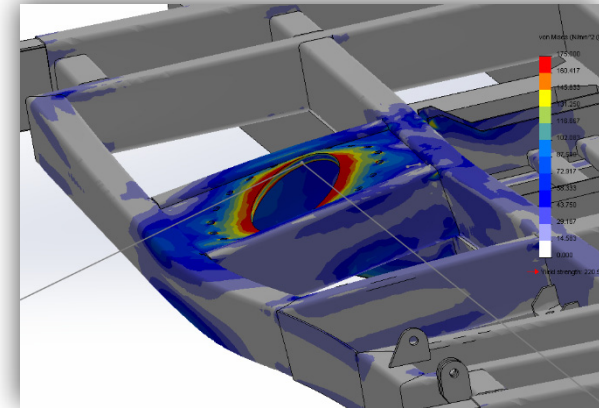
Risk Ranking Matrix					
Absolute Rankings	Insignificant	Minor	Moderate	Major	Catastrophic
	1	2	3	4	5
Almost Certain A	15	10	6	3	1
Likely B	19	14	9	5	2
Possible C	22	18	13	8	4
Unlikely D	24	21	17	12	7
Rare E	25	23	20	16	11

Risk Categories	Insignificant	Minor	Moderate	Major	Catastrophic
	1	2	3	4	5
Almost Certain A	High	High	Extreme	Extreme	Extreme
Likely B	Moderate	High	High	Extreme	Extreme
Possible C	Low	Moderate	High	Extreme	Extreme
Unlikely D	Low	Low	Moderate	High	Extreme
Rare E	Low	Low	Moderate	High	High

Risk Register - Perseverance Drilling 8-9 Feb 2010						Sheet 2 of 2		10/02/2010				
Area / Type (Keyword)	Description of Risk Event	Pure Risk		Before Mitigation		Mitigation Strategy	Person Responsible	Follow-up Monitoring and Control	Residual Risk		After Mitigation	
		Impact	Prob	Impact	Prob				Impact	Prob		
Add rods	Rods slipping leading to damage of equipment and personnel	4	d	12	High	Regular maintenance and inspection. Part of daily service. No unauthorised personnel in.	Dave		4	e	16	High
Add rods	Uncontrolled movement of equipment	4	d	12	High	Regular maintenance and inspection. Part of daily service. No unauthorised personnel in.	Dave		4	e	16	High
Add rods	Slings of rods leading to personal injury	2	c	18	Moderate	SOP, slow crane movement (DAVE)	Dave		2	e	23	Low
Removing rods	Crunching/pinching when using breakout C spanner	4	c	6	Extreme	SOP and use correct equipment, PPE	Andrew		4	e	16	High
Removing rods	Same as adding....											
Demob	Uncontrolled release of energy (hydraulics, potential energy, electrical charge, water release)	5	b	2	Extreme	SOP. Follow site rules to isolation	Craig		5	e	11	High
Demob	Trip hazards left when demobbing (concrete pads with pins)	2	c	15	Moderate	Knock down pins following SOP	Craig		2	e	23	Low
Demob	Something dropping through hole or from hole	4	c	6	Extreme	Request client to provide 4 bolts that mesh can be checked to SOP	Craig		4	e	16	High
Demob	Back injury because of hoses and other containers not fully drained	2	c	18	Moderate	SOP, training, assessment	Craig		2	e	23	Low
Carrier	Damage to equipment due to poor visibility	3	c	13	High	Adequate reflective strips or reflective tapes to be added that will be visible from all directions	Dave		3	e	20	Moderate
Guarding	Injury to personnel due to lack of adequate guarding	5	d	7	Extreme	Install mesh screen over hot components (engine). Guard around the front of the Derrick	Craig		5	e	11	High
Machine limits	Damage to equipment or injury due to machine specifications exceeded	4	b	5	Extreme	Pressure relief valves to be set during load testing - and controlled by lock box	Dave		4	e	16	High
Fatigue damage	Fatigue damage to rig due to driving on rough roads	3	b	9	High	Design and install tie down support for rig	Dave		3	d	17	Moderate
Machine limits	Damage to equipment and/or injury due to rig and simba rolling over	5	c	4	Extreme	SOP to specify drilling and positioning with outriggers set and jib central	Craig		5	e	11	High
Fire	Damage or injury due to fire	4	c	9	Extreme	Fire suppression system installed. To be maintained/inspected at the required	Dave		4	e	16	High
Previous history	Reviewed previous history (back to 2006) of incidents and accidents - all covered above, but most injuries due to non-											

MECHANICAL

- STRESS ANALYSIS
- MACHINE DESIGN

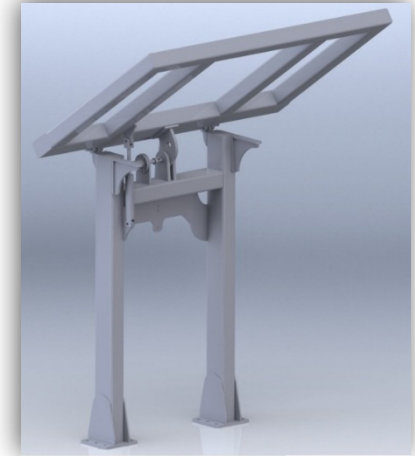


MECHANICAL

- ROPS (ROLL OVER PROTECTION)
- FOPS (FALLING OBJECT)

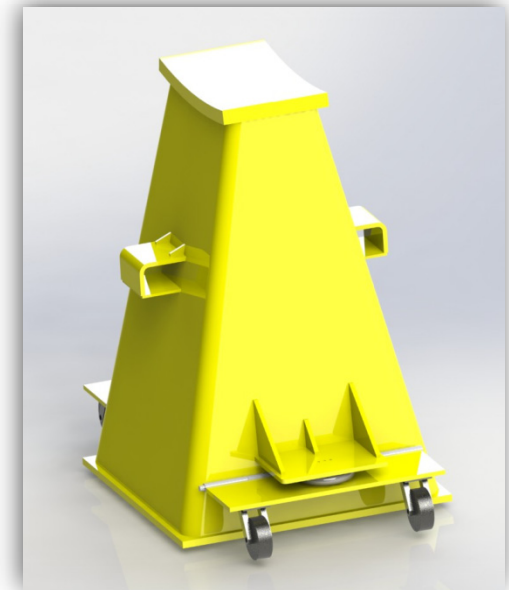
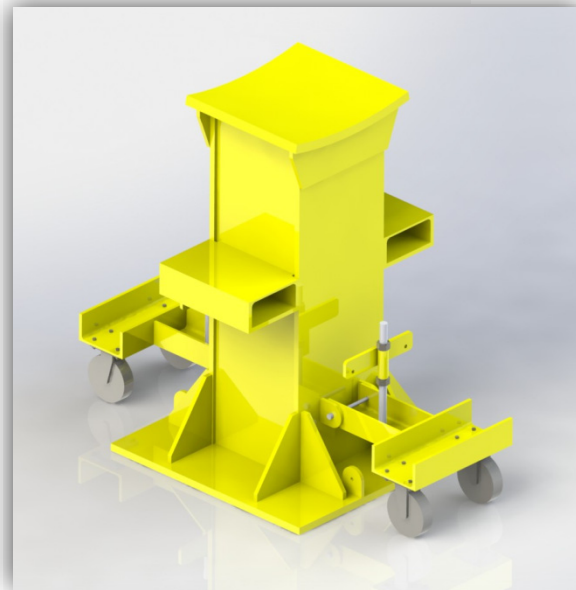
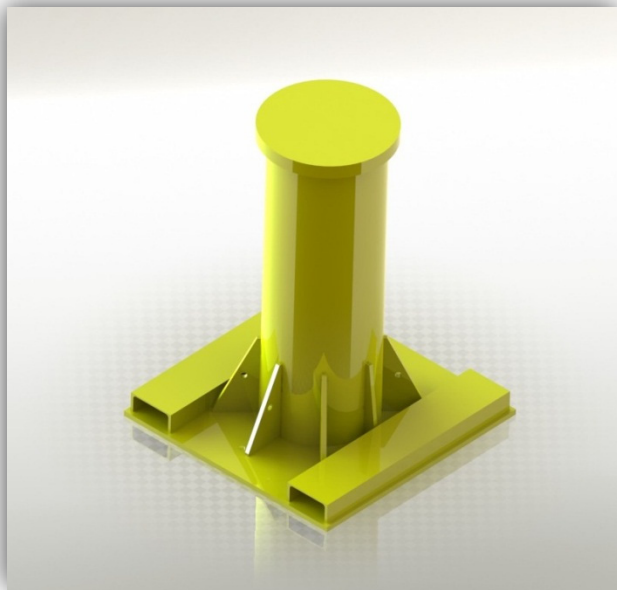


middle hit.mpg



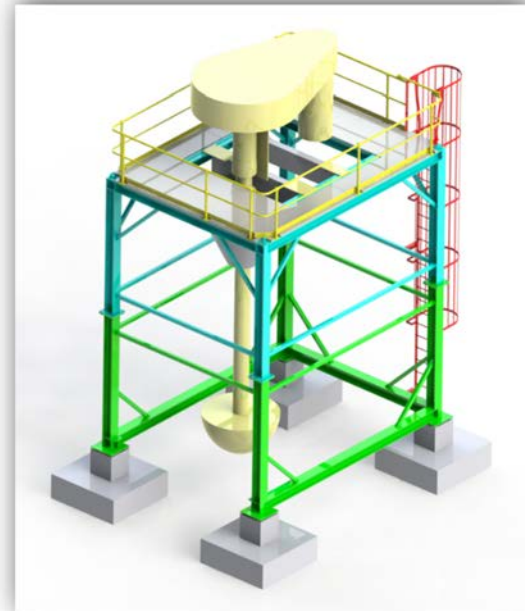
MECHANICAL

- **MAINTENANCE STANDS**



MECHANICAL

- **FIXED PLATFORMS**
- **MAINTENANCE PLATFORMS**



MECHANICAL

- **SCISSOR LIFT (NATIONAL TOOL)**



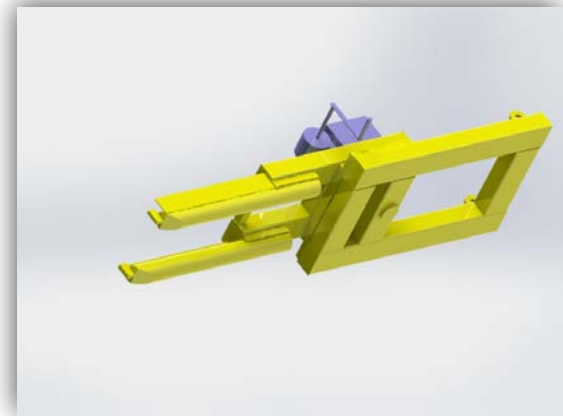
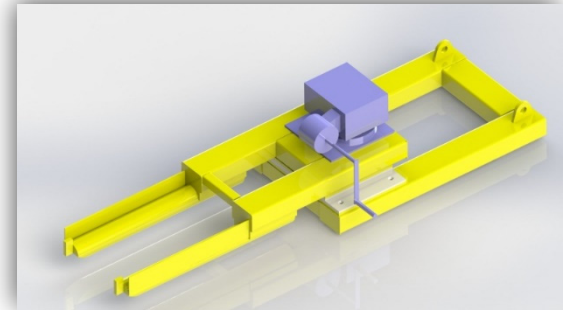
MECHANICAL

- **PORTABLE/MOVABLE PLATFORMS**



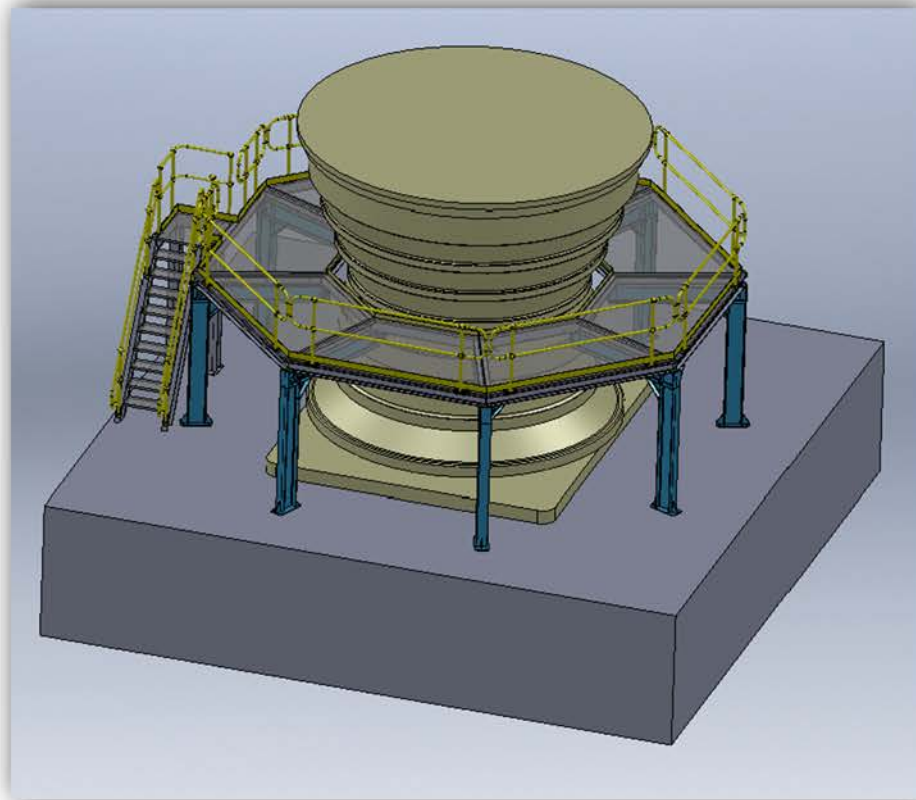
MECHANICAL

- FORKLIFT ATTACHMENTS



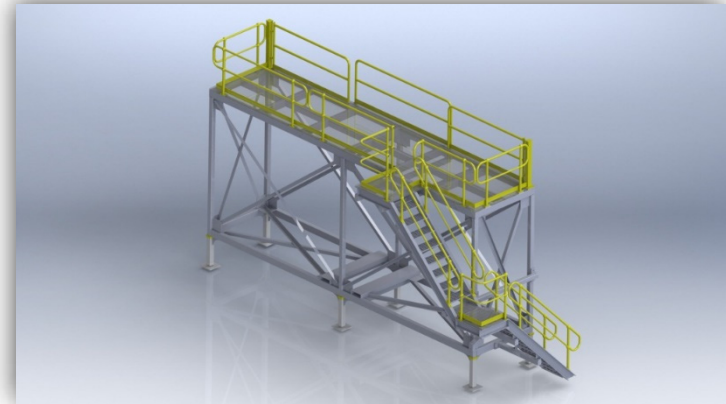
MECHANICAL

- SPECIAL APPLICATIONS



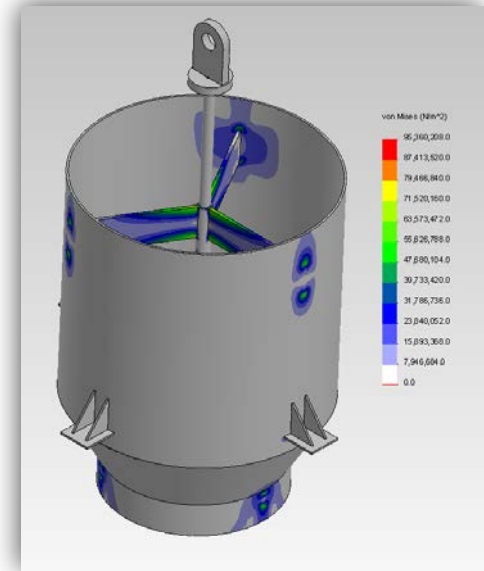
MECHANICAL

- SPECIAL APPLICATIONS



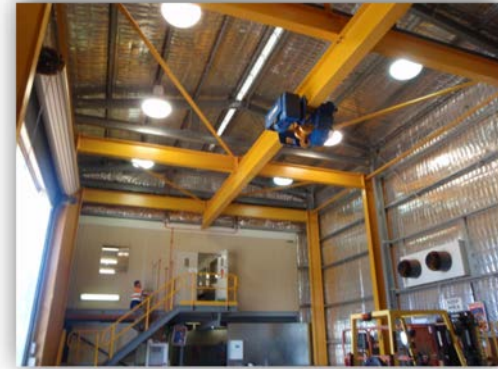
MECHANICAL

- BALL CHARGING SYSTEMS



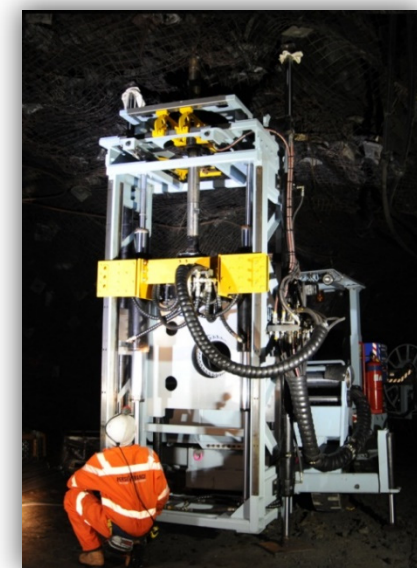
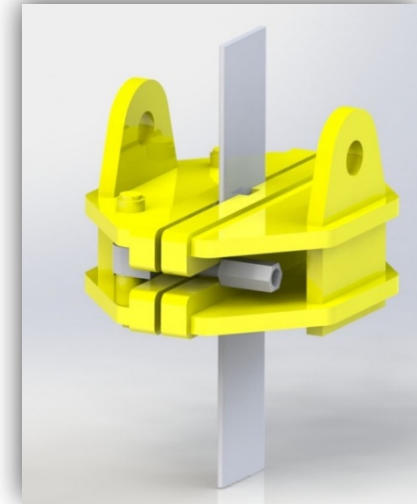
MECHANICAL

- **MONORAILS (MAINTENANCE ACCESS)**



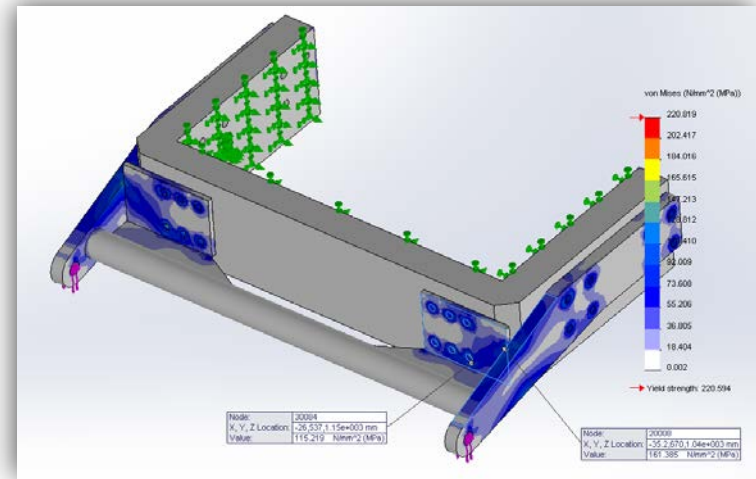
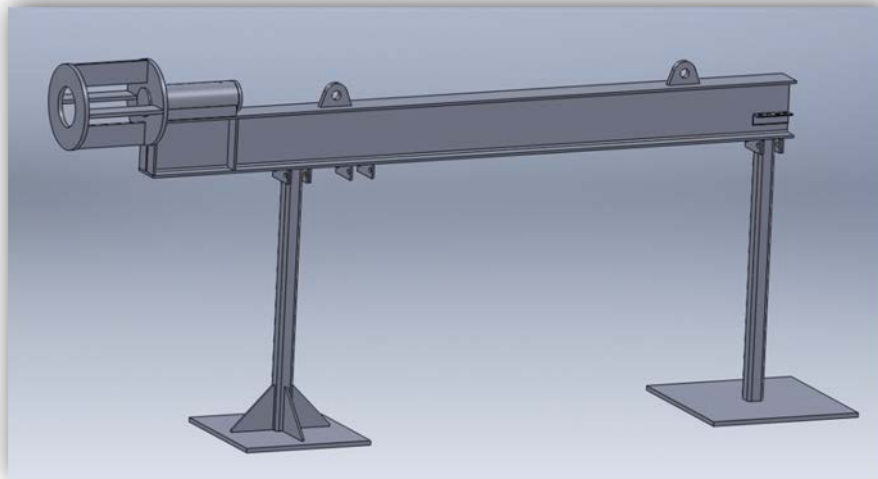
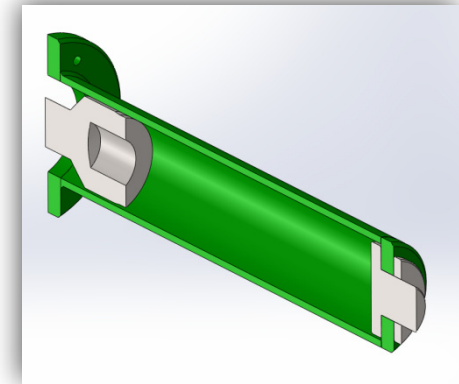
MECHANICAL

- MACHINE DESIGN AND DRAFTING
- SPECIALISED LIFTING EQUIPMENT



MECHANICAL

- ARMATURE LIFTERS (BALANCED)
- BEARING AND WHEEL PULLERS
- TOWING FRAMES



MECHANICAL

- DRILLING EQ CERTIFICATION
- LIFTERS
- CALCS

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Design Analysis Report

Date	12 October 2014	Analyst	DAE
Project	Drill pipe, Drill Rod	Subject	Design verification
File Name	000-000-000-000.dwg		
Revision	1		

0.75 PCD Rev the Drill Rod (per Appendix A) was evaluated to establish the following:
(1) the tensile load due to its weight and whether it lies within the safe zone limits and
(2) the torque load for the design.

The 0.75 PCD Rev the Drill Rod (per 000-000-000 Rev. 1), consists of a pin test joint (per 000-000-000 Rev. 1), a base test joint (per 000-000-000 Rev. 1), with a drill pipe between them. The total length of the assembly is 1m. The total required length of the drill rod assembly is 2000mm.

The tensile load limit of the drill pipe will be analysed first to find a preliminary tensile and torque limit. Then the test joint will be analysed to find the tensile load and torque limits after which all the limits will be plotted on one graph to find the safe zone limits.

Note:
The specification applicable to the design analysis is "Recommended Practice for Drill Stem Design and Operating Limits, API RP 93, Aug 1988. Some of the equations given are in English units - hence the need to convert the units throughout the report.

Material	Tensile Strength (MPa)	Tensile Strength (ksi)	Yield Point (MPa)
API 93, Appendix A, 1.1	1000	145	600
API 93, Appendix A, 1.2	1000	145	600

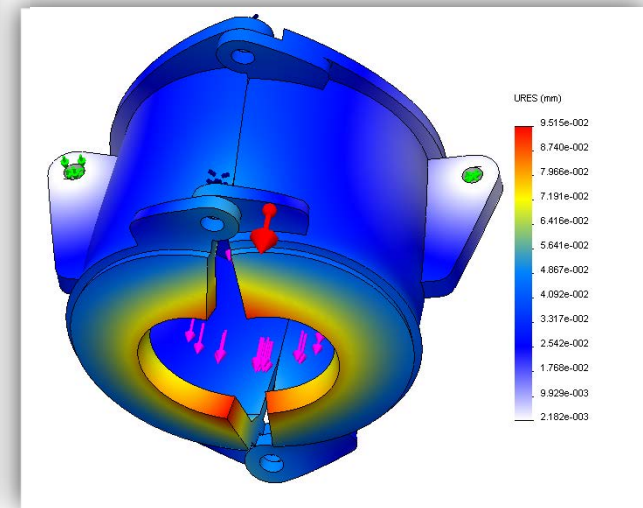
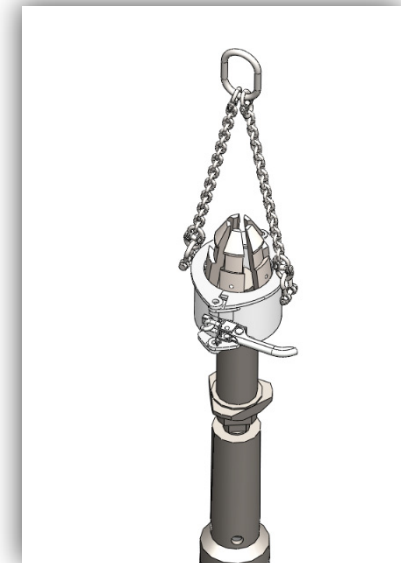
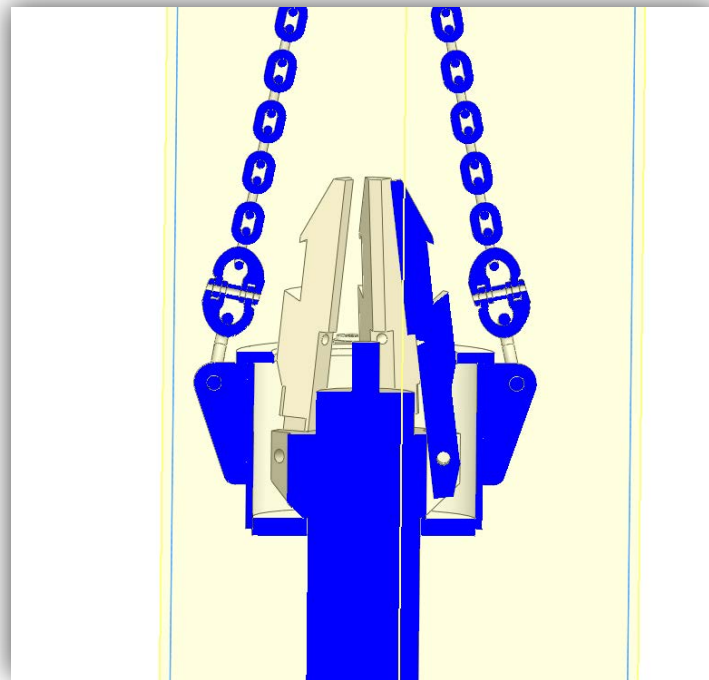
Note 1: Material properties

The weight of the 2000mm drill pipe is not negligible and will cause a tensile tension within the drill rod.

The weights of the joints and drill pipe were estimated 200 kg for the drill rod - Refer to Appendix G.
Since the pipe is 2000mm, 100.0 drill rods will be needed with a total mass of approximately 20000 kg and a weight of approximately 200kN.

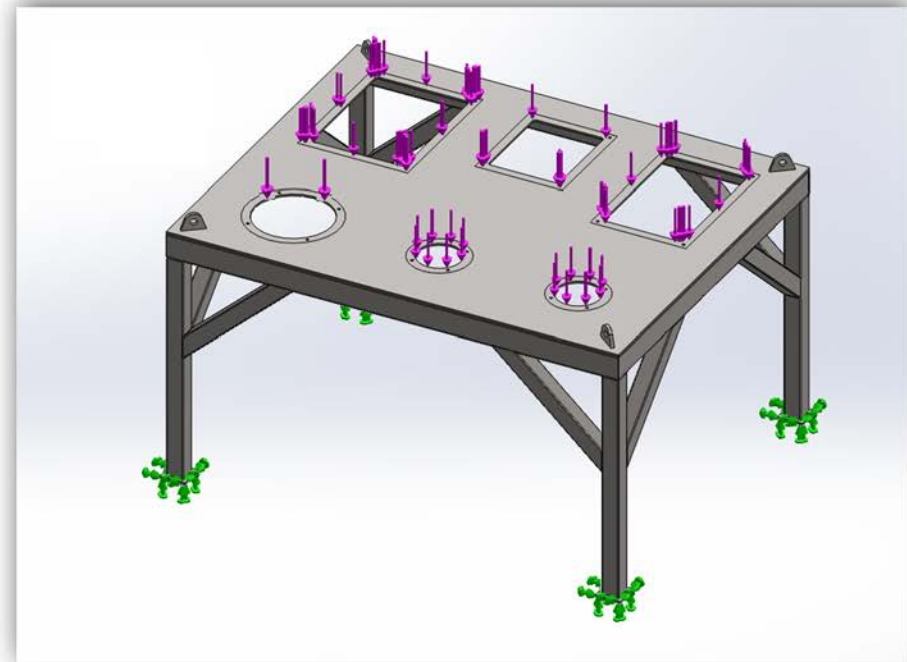
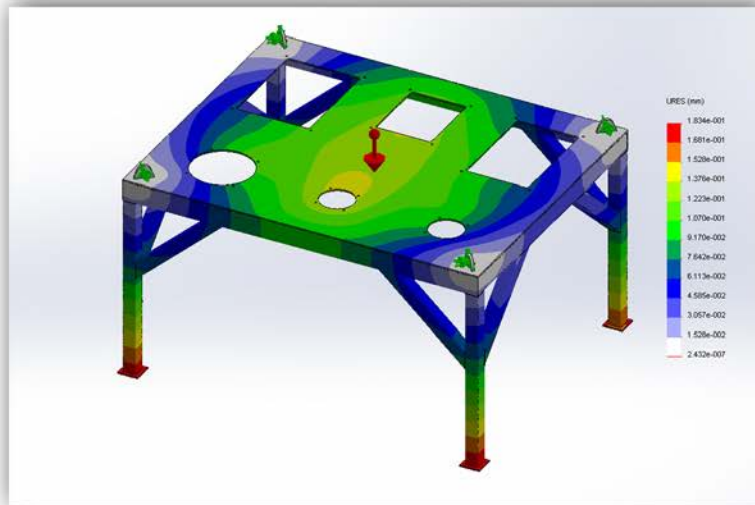
The tensile strength and the torque yield strength of the drill pipe were calculated. The results are summarised in the table below. The relationship between the torque and tension is shown in graph 1 below the table.

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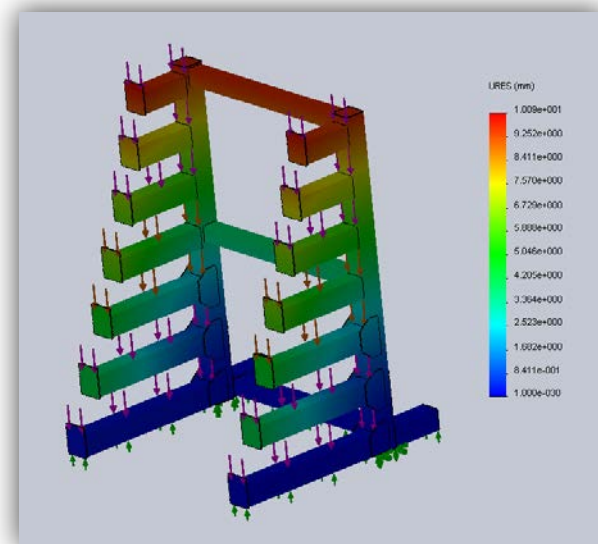
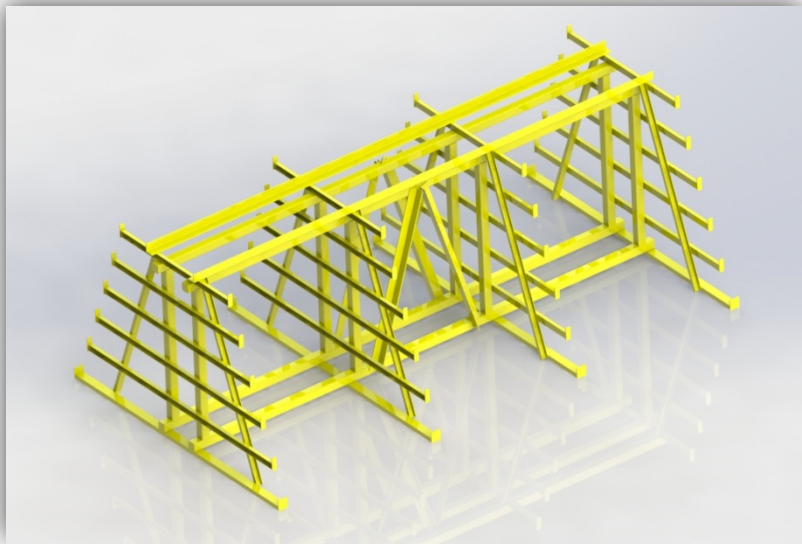
MECHANICAL

- MAINTENANCE BENCHES
- FOLDING HANDRAILS
- TIE DOWN POINTS



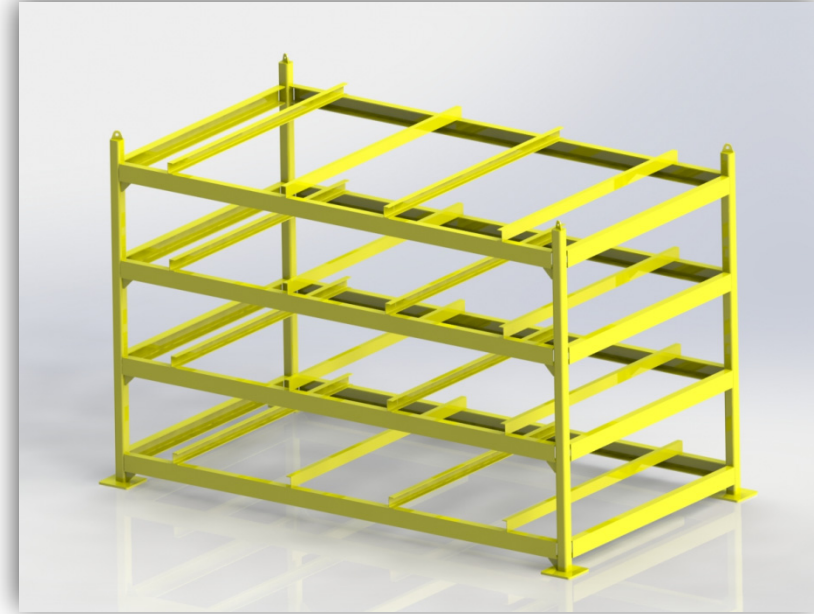
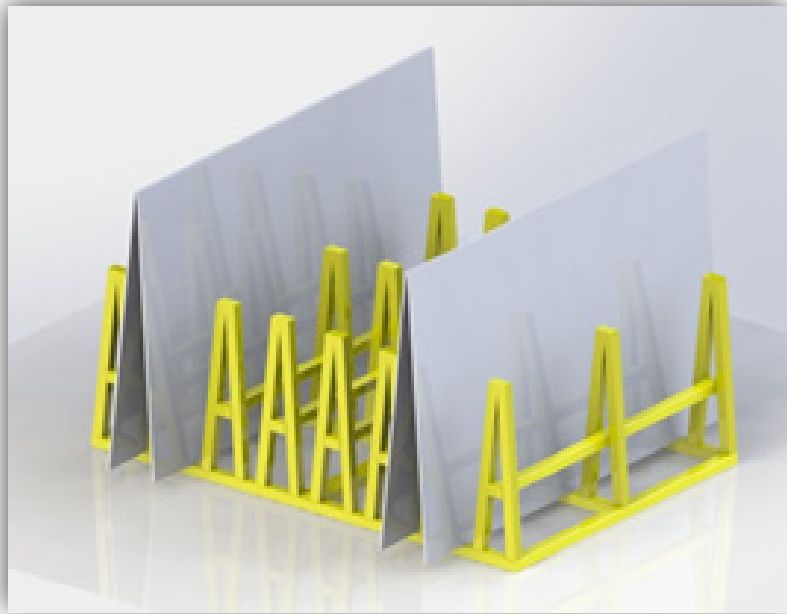
MECHANICAL

- STORAGE RACKS



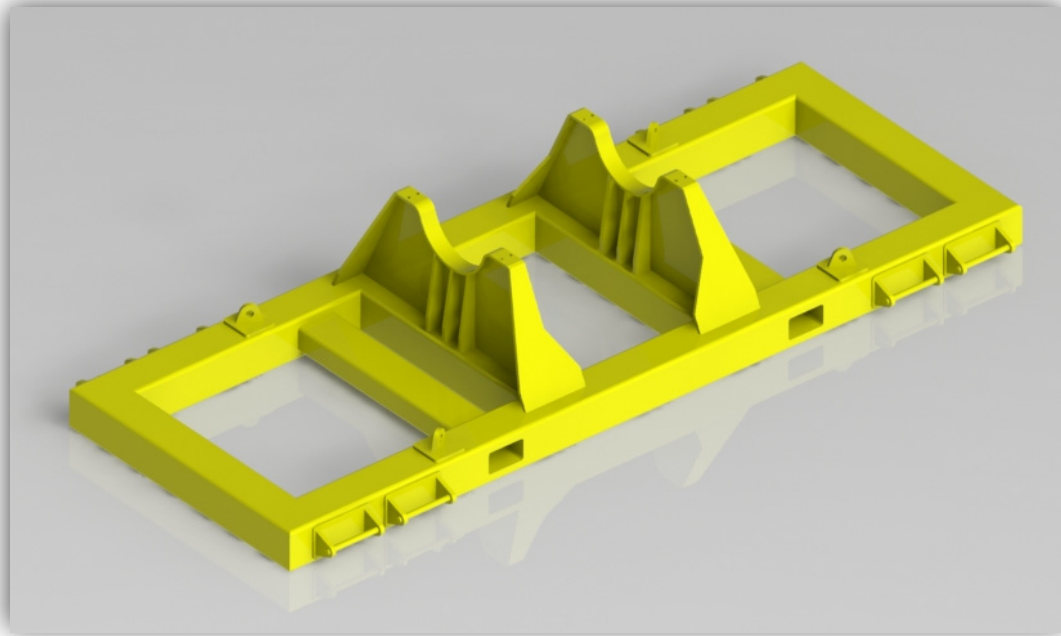
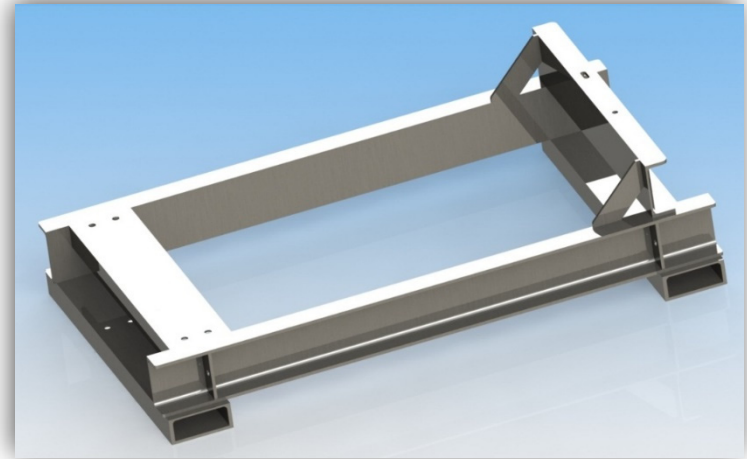
RACKS

- **PLATE RACKS**



MECHANICAL

- TRANSPORT FRAMES
- NTC LOAD RESTRAINT GUIDE



MECHANICAL

- PUMPING CALCULATIONS (PUMP SKIDS)
- PROCESS IMPROVEMENTS

Calculation Record

PROJECT: 2017-144 PACKAGE: 2017-144 App A

DESCRIPTION: 20% Flow Increase

Client: [Redacted] Project No: [Redacted] Rev: [Redacted]

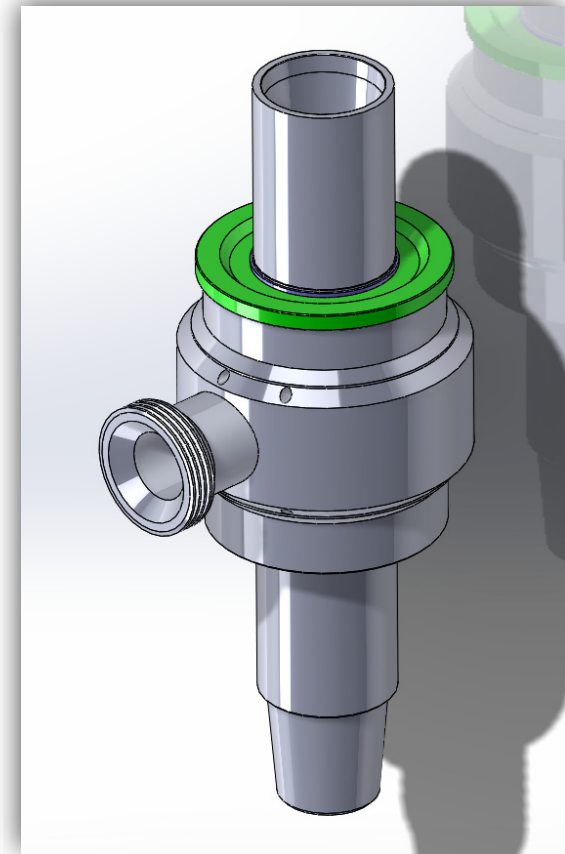
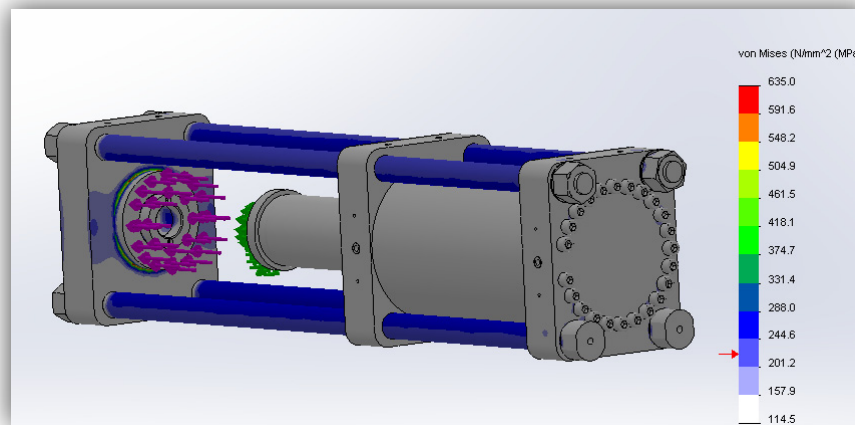
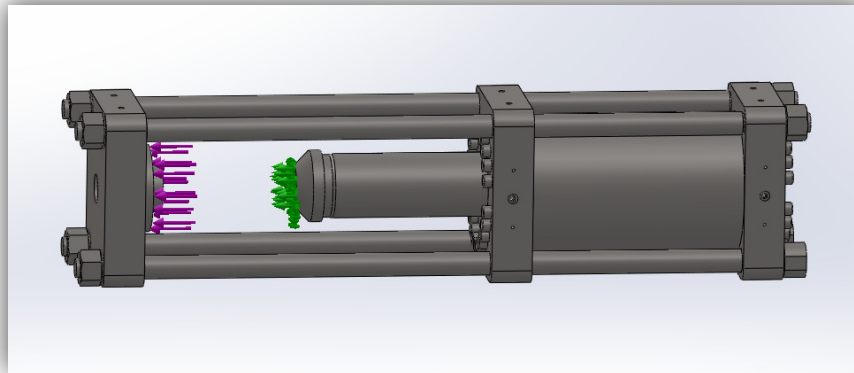
Drawn By: [Redacted] Checked By: [Redacted] Date: [Redacted]

Parameter	Minimum	Design (max)	Notes on source	Comments
1. Density of water at temp.	999.84	999.84	999.84	
2. Viscosity of water at temp.	0.0001002	0.0001002	0.0001002	
3. Volume of solids to be transported	1	2	2	
4. Volume flow of water	13	18	18	
5. Volume flow of slurry (water + solids)	14	20	20	Increase by 50%
6. Volume Concentration of solids (C _s)	7.14%	7.14%	7.14%	
7. Weight concentration of solids (C _w)	20%	20%	20%	
8. Relative Density of the mixture	1.33	1.34	1.33	
9. Slurry Viscosity	0.0001002	0.0001002	0.0001002	

C _s (%)	μ _r / μ _w	C _w (%)	μ _r / μ _w
1	1.000	0.0	1.000
2	1.000	0.0	1.000
3	1.000	0.0	1.000
4	1.000	0.0	1.000
5	1.000	0.0	1.000
6	1.000	0.0	1.000
7	1.000	0.0	1.000
8	1.000	0.0	1.000
9	1.000	0.0	1.000
10	1.000	0.0	1.000
11	1.000	0.0	1.000
12	1.000	0.0	1.000
13	1.000	0.0	1.000
14	1.000	0.0	1.000
15	1.000	0.0	1.000
16	1.000	0.0	1.000
17	1.000	0.0	1.000
18	1.000	0.0	1.000
19	1.000	0.0	1.000
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29	1.000	0.0	1.000
30	1.000	0.0	1.000
31	1.000	0.0	1.000
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40	1.000	0.0	1.000
41	1.000	0.0	1.000
42	1.000	0.0	1.000
43	1.000	0.0	1.000
44	1.000	0.0	1.000

MECHANICAL

- PRESSURE EQUIPMENT



CONVEYORS

- BRAKING AND OTHER PERFORMANCE CHECKS



CONVEYOR DESIGN REPORT Dynamic Analysis Graphs

Prepared for
Newcrest Telfer Project
JN11-27
Western Australia

JN11-27

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15/03/2011

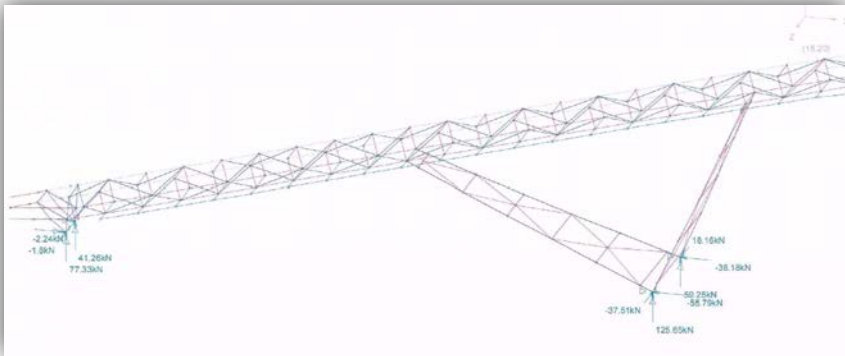
CONVEYOR NUMBER 268-CV-003

Page 1 of 35



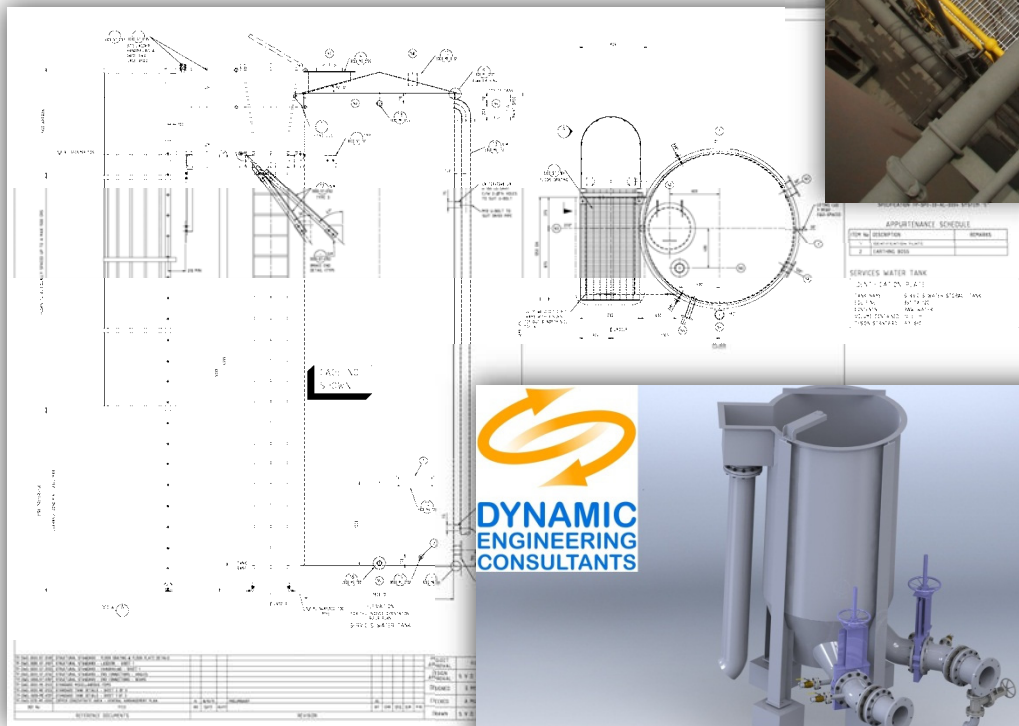
CONVEYORS

- STRUCTURAL



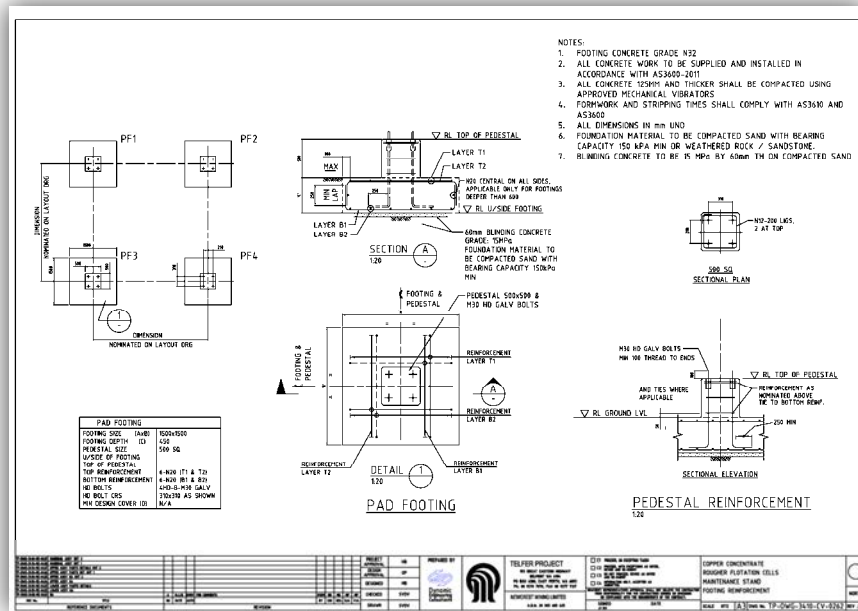
TANKS

- TANKS TO API 650



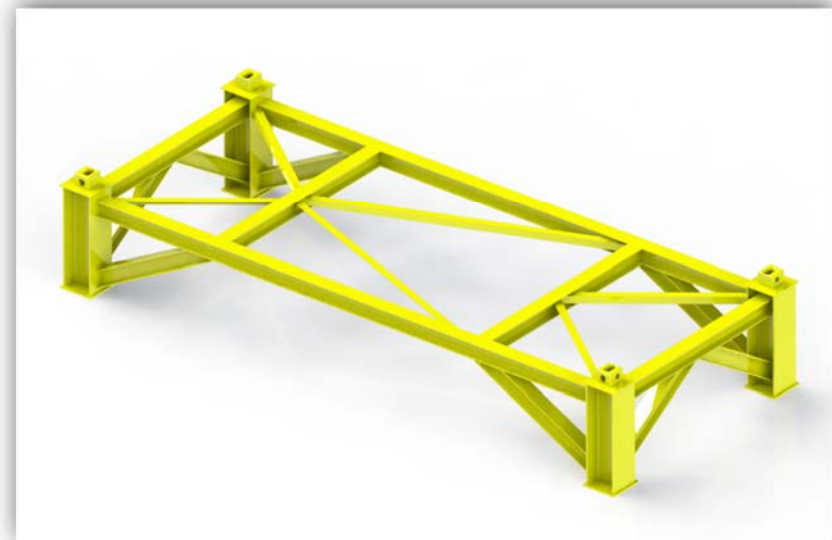
CIVIL/STRUCTURAL

- FOOTINGS
- MACHINE FOUNDATIONS
- CYCLONE RATING



CIVIL/STRUCTURAL

- FOUNDATIONS
- CONTAINER STANDS



CIVIL/STRUCTURAL

- CLADDING SYSTEMS



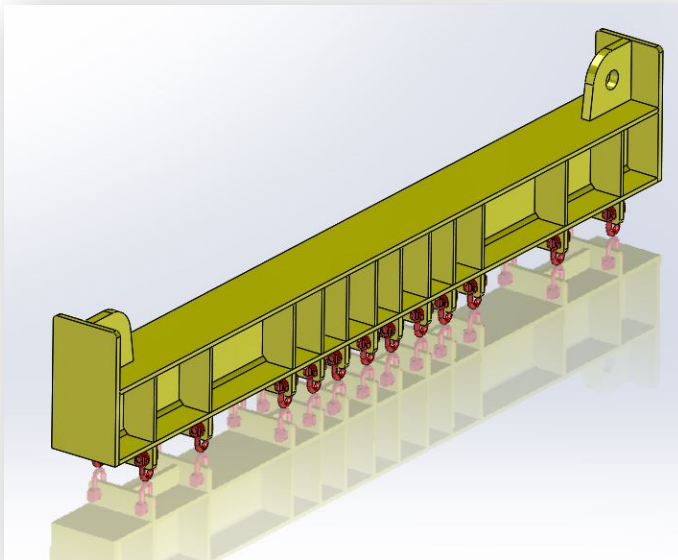
CIVIL/STRUCTURAL

- SITE INSPECTIONS / REPORT
- REPAIR PROCEDURES/ENGINEERING



CIVIL/STRUCTURAL

- **LIFTING BEAMS**



PROJECTS

- BUDGET AND SCHEDULE DEVELOPMENT, LAYOUTS, PROJECT SCHEDULES, DAILY MANAGEMENT, SCOPE OF WORKS ETC

