

SIEMAG TECBERG



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Winder Controls



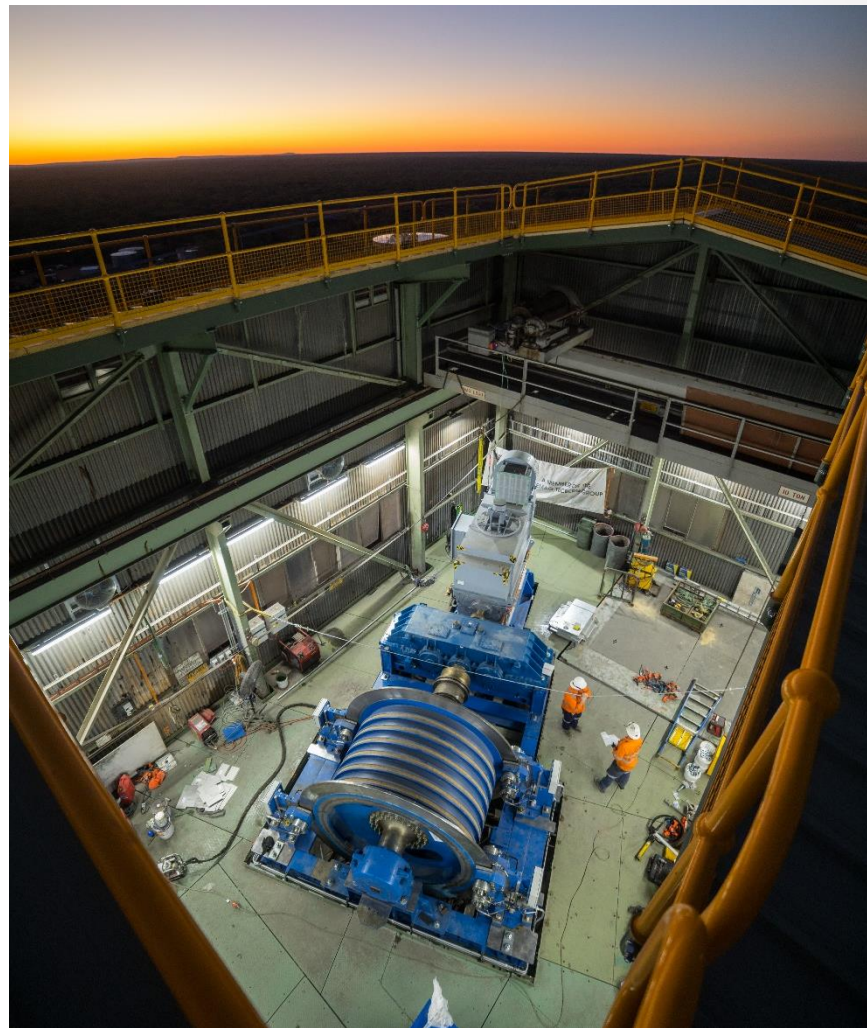
TECBERG

Industrial Systems

Infrastructure
Defence
Marine
Materials Handling



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Presentation Overview

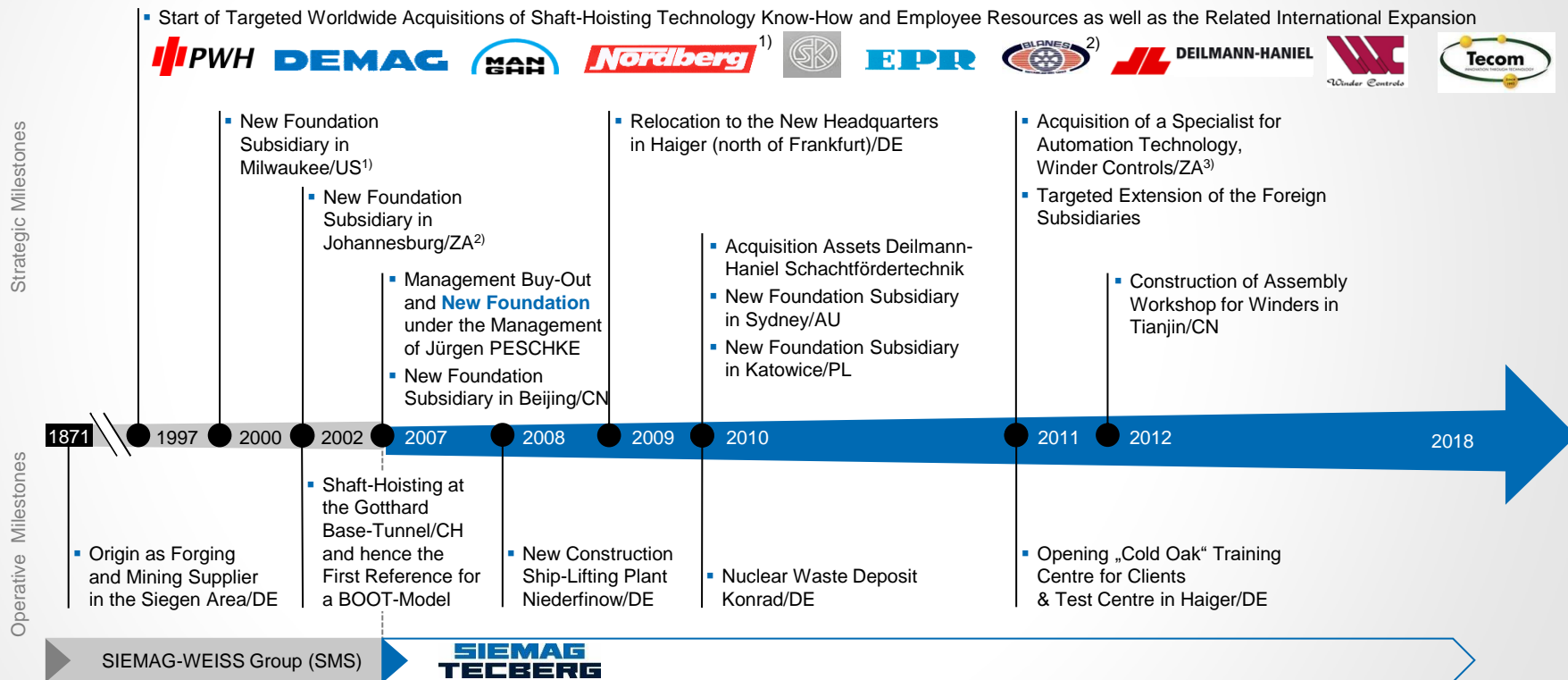
- Company introduction & capabilities
- Design
- Testing
- Manufacture, Assembly & Overhauls
- Service & spare parts
- Condition monitoring
- Previous projects



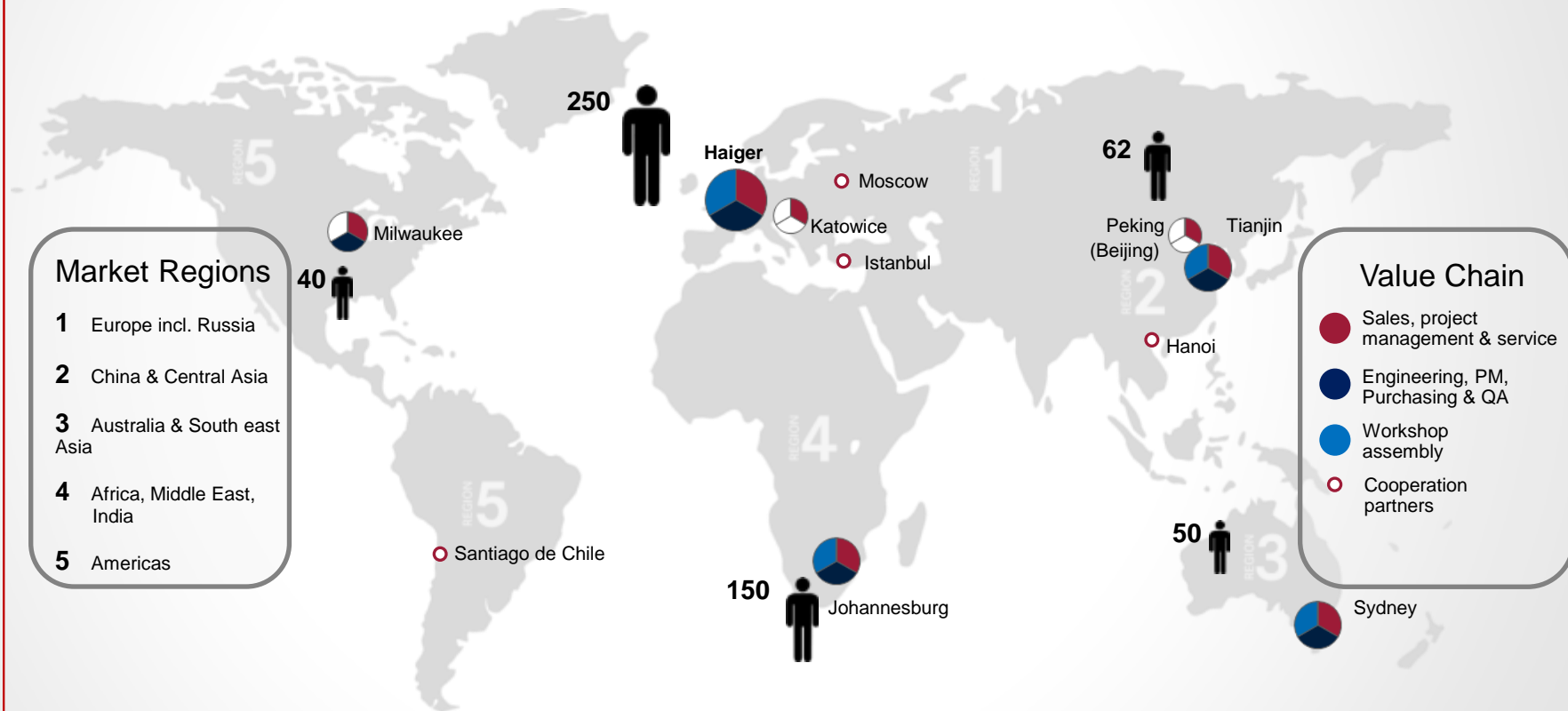
Introduction

- At Winder Controls we offer our customers a local team supported by regional and global functions. We are proud to have built a loyal customer base and operate offices in countries around the globe.
- At Winder Controls we have developed and built over 250 complete systems and more than 1000 hoists worldwide. We serve the infrastructure Industry with electrics and Controls Systems.
- Furthermore, TECBERG Industrial Systems (a division of Winder Controls Australia) serves the materials handling industry with Conveyor Systems, Unloading & Loading Stations, Headframes and associated plant & mine cooling

A SUCCESS STORY



8 locations on 5 continents



The Group Companies

**SIEMAG
TECBERG**

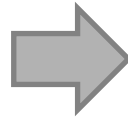


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Global

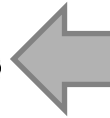


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Australia

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TECBERG
Industrial Systems

Infrastructure
Defence
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WCA Turnkey Capabilities

- Hoisting systems
 - Winders and Winches
 - Arrestor Systems
 - Skips & Conveyances
 - Overhauls, rebuilds, upgrades & repairs
 - Rope Handling
- Materials Handling Systems
 - Headframes
 - Ore Bins
 - Conveyors, Chutes & Transfer towers
 - Underground loading stations & flasks
 - Shaft steelwork
 - Unloading stations
 - Feeders and hoppers
- Mine Cooling



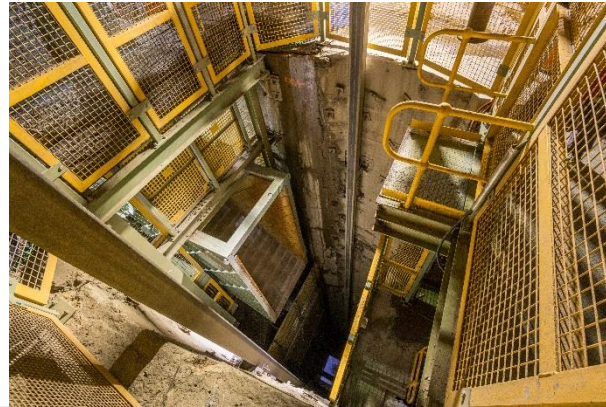
Surface Infrastructure



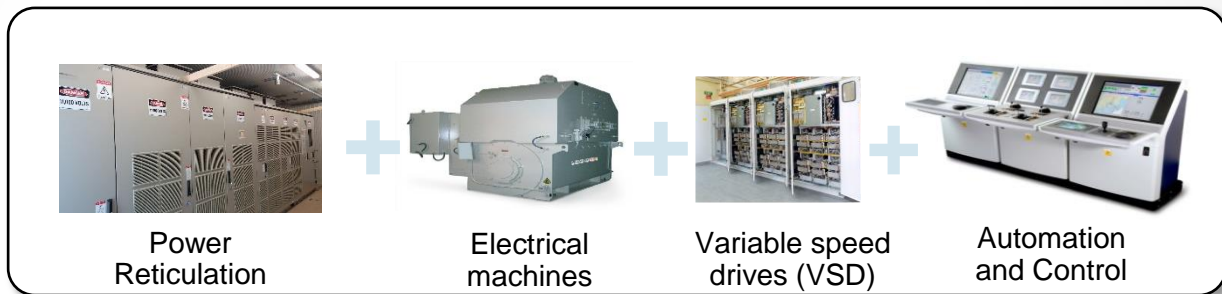
- Headframe
- Winder
- Winder house
- Head sheaves
- Safety arrestors & overwind safety catch system
- Clamping & lifting device
- Men & Materials Cage
- Coal/ore bin & unloading station
- Feeder & surface conveyors

Underground & In-shaft Infrastructure

- Fixed Guides/ Guide Ropes
- Head ropes
- Tail ropes
- Conveyances- cages, skips & counterweights
- Man cage platforms
- Loading stations
- Shaft bottom arrestors



Capabilities – Electrical Systems



■ Power Reticulation

- Construction Power & Lighting
- Permanent 11kV Power Supply: Consumer Mains, Main Switchboard, Distribution Cabling, 11kV to 433V Dry Type Transformers
- 415V Main & Sub-Main Distribution Boards
- Circuit Breaker Interface Panels
- Cables & Support Systems
- UPS

■ Electrical Machines and VSD's

- AC & DC motors
 - Voltages 380 to 11kV
 - 15kW to 25MW
 - Frame sizes 160 to 1000
- Variable Speed Drives
 - Thyristor DC
 - IGBT & IEGT AC
 - 4-quadrant operation

■ Plant Automation & Control

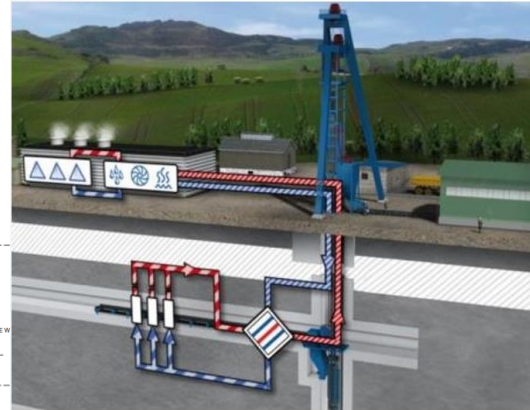
- Experience with Rockwell, Siemens & other PLC platforms.
- Common design philosophy for hardware, software and operator interfaces (HMI, Desk and control stations).
- IEC 61508 compliant Functional Safety related systems
- System integration testing in house prior to commissioning.

Capabilities- Cooling systems

- Supplier of chillers through SIEMAG TECBERG owned company DK (Deutsche Kältechnik)
 - Air Chillers & Air Coolers
 - Water cooling
 - Heat Exchangers
 - Standard water chiller sizes 1.5MW_r, 2MW_r 3.2MW_r
 - Typically R407c or R134a refrigerant



- Three chamber feeder/Pressure Exchange System
 - Underground mine cooling with chillers on surface
 - Hydro hoisting using motive water



Design & Engineering

- At Winder Controls we have specialised design & engineering capability for both Electrical & Mechanical design
- WCA conduct extensive peer reviews, both with local engineers and through our head office in Haiger, Germany
- Independent Design Verification is also conducted when applicable



Winder Controls Australia

Design Structure

Responsibility Matrix

Key: Example

Still Required

Not Required



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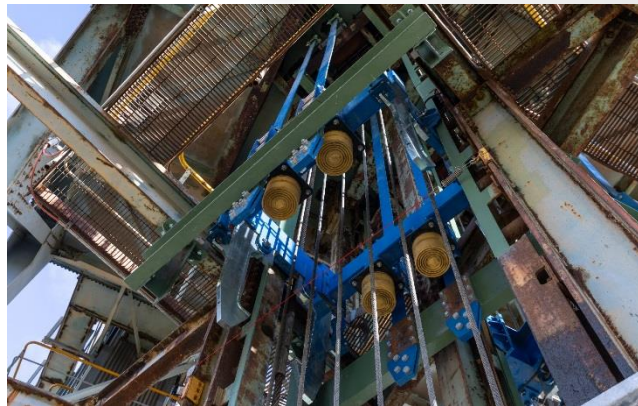
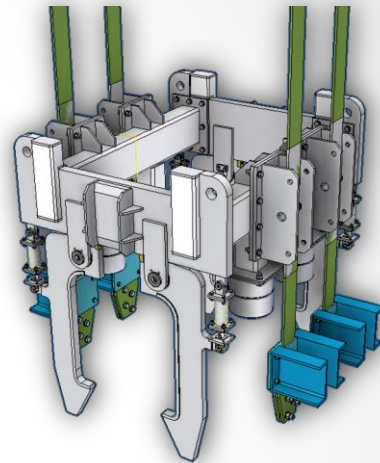
Winder Controls

Project:	26.1001 Cobar #2
Last Updated:	26/07/2016

Item	Design Description	Doc. ID	Design By	Date Completed	Latest Revision	Internal Review By	Date of Review	Review Document ID	External Verification
Example: Item/Function	Parameter that is to be designed/calculated	00.0000.EXAMPLE.XXXX.pdf	Name & Surname	1/01/2016	2.0	Name & Surname	2/02/2016	00.0000.EXAMPLE.YYYY.pdf	Company / Person
Foundations									
Foundation	Winder Foundations	26-1001.CAL.02-RevB.pdf	Om Rajak	11/05/2016	B	Ian D'Arth	29/07/2016	26.1001.CAL02- document sign off sheet	Advitech
Foundation	Brake Post Foundations								
Base Frame									
Base Frame	Loading Calculations	26-1001.CAL.02-RevB.pdf	Om Rajak	11/05/2016	B	Ian D'Arth	29/07/2016	26.1001.CAL02- document sign off sheet	Advitech
Drum									
Winder Drum	Calculations	26-1001.REP.01-RevA.pdf	Om Rajak	15/04/2016	B	Ian D'Arth	29/07/2016	26.1001.REP01- document sign off sheet	Advitech

Safety Catch System

- Winder Controls Australia are able to offer custom designed solutions to problematic or unusual areas
- The Combined Arrest & Catch(CAC) system on CSA Winder 2 is an example of this:
 - Winder 1 is able to use a traditional jack catcher
 - This arrangement on winder 2 would have required 6m of jack catchers per catch point (48m total) or extensive racks on the bridles which would have impacted operation and payload
 - The combined arrest & catch system allows for minimal modification to the bridles



COMBINED ARRESTOR- CATCH SYSTEM (CAC SYSTEM) FOR VERTICAL SHAFT CONVEYANCES

Full Scale Function Test: ENTRY VELOCITY: 15 m/sec

- Hooks and spring geometry for test built in same scale to final product.
- Arrestor frame and Arrestors used in similar configuration of final product.
- Slow motion videography used to record and review the performance.
- Slow motion clip of the test in next slide.
- Meets Test Requirements of AS3785.1-2006

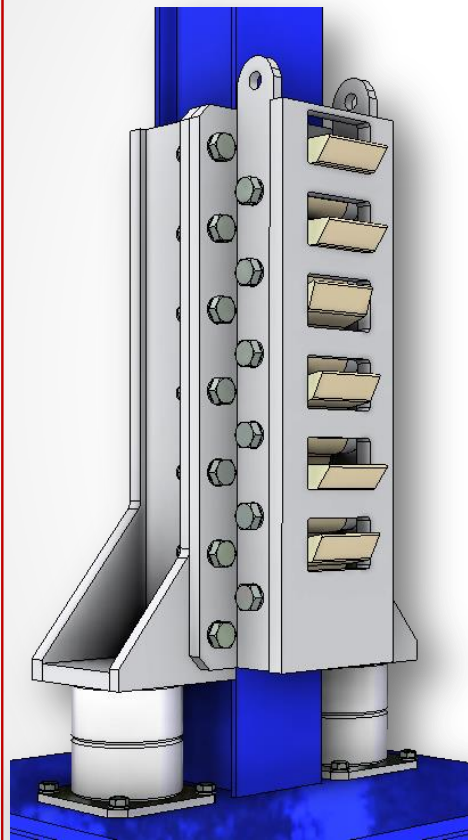


COMBINED ARRESTOR- CATCH SYSTEM (CAC SYSTEM) FOR VERTICAL SHAFT CONVEYANCES

Full Scale Function Test:
ENTRY VELOCITY: 15 m/sec

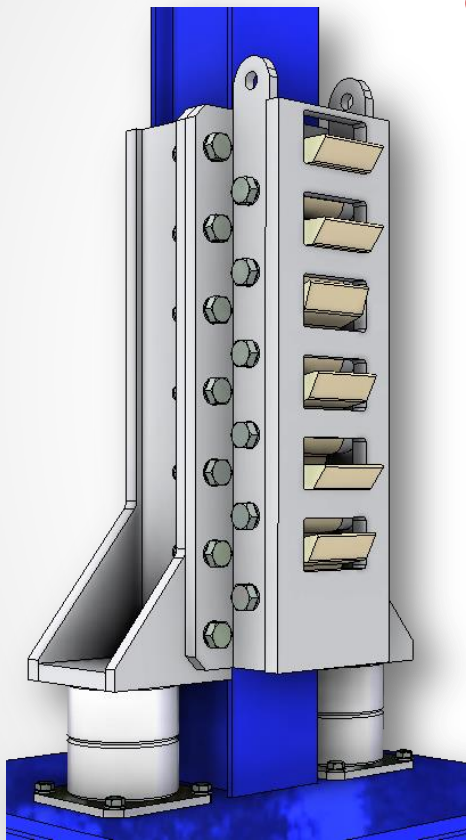


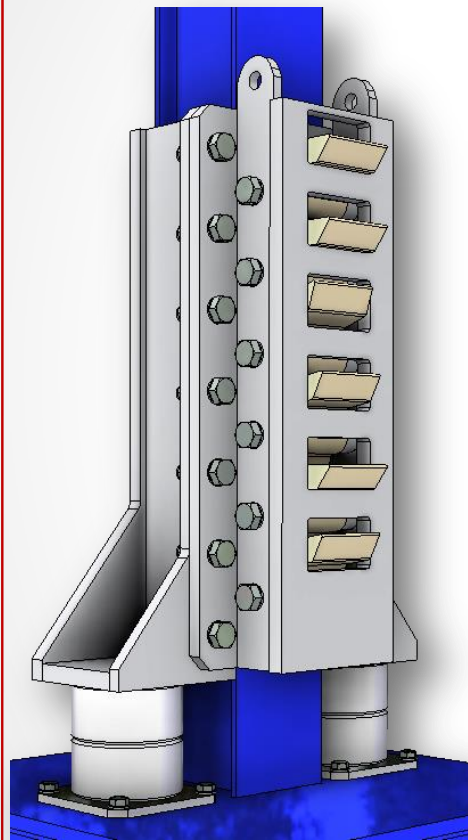
WINDER 1 OVERWIND SAFETY CATCH SYSTEMS



OVERWIND SAFETY CATCH SYSTEM FOR VERTICAL SHAFT CONVEYANCES

Full Scale Function Test
ENTRY VELOCITY: 23 m/sec





OVERWIND SAFETY CATCH SYSTEM FOR VERTICAL SHAFT CONVEYANCES

Full Scale Load Test AS3785.1-2006

Test mass dropped: 5.6 Tonnes

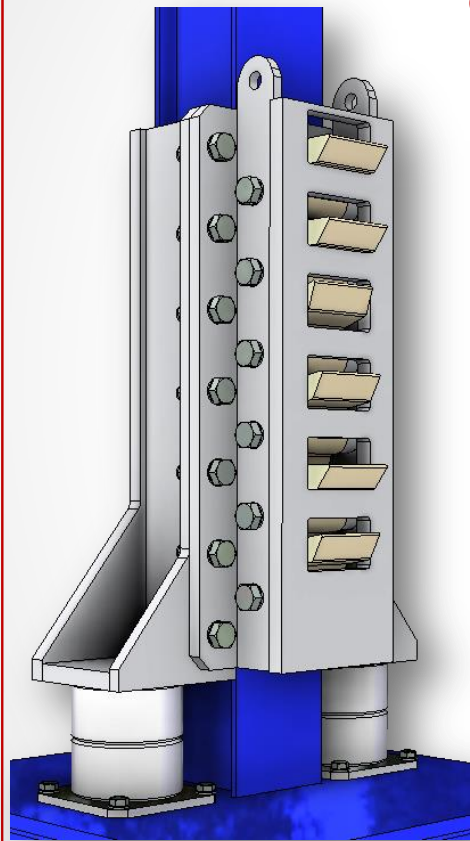
Fall back distance: 73 mm

Slow motion video in next
slide.



OVERWIND SAFETY CATCH SYSTEM FOR VERTICAL SHAFT CONVEYANCES

Full Scale Load Test

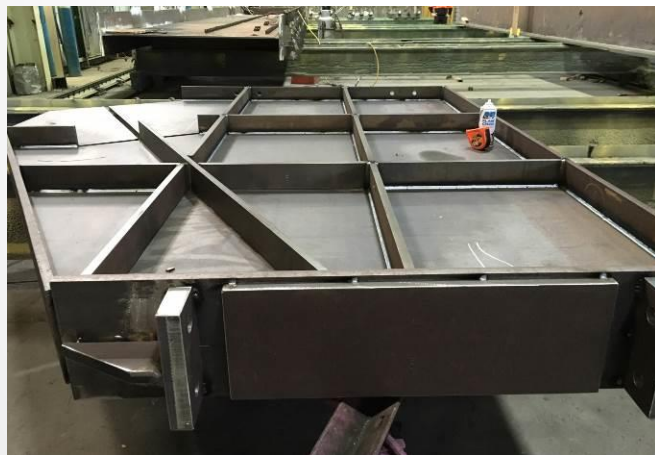


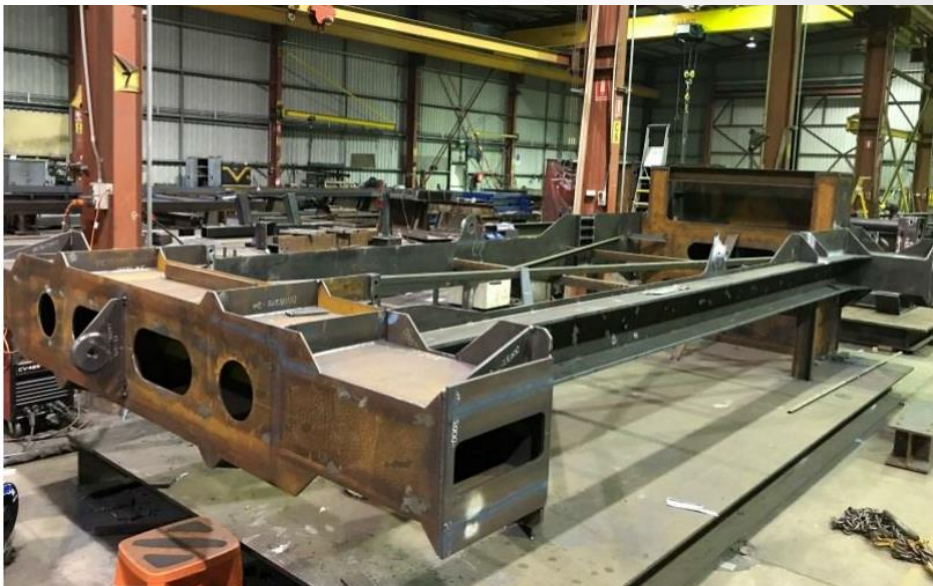
Manufacturing

- WCA conduct extensive manufacturing for machinery, including winders, hydraulic power units, shaft conveyances, structural steel, conveyors & headframes
- Extensive workshop surveillance is conducted to ensure quality standards are achieved and schedule maintained



Manufacturing - mechanical





Manufacturing – Electrical



Workshop Testing & Assembly

- WCA conduct extensive workshop testing to prove the designs, over and above what would be required for verification, particularly for ultimate safety systems involving personnel



Factory Acceptance Testing



Machinery Assembly

- WCA perform complete machine assembly using experienced personnel & precision equipment



Overhauls & Rebuilds

- 40 man car
- Clark Bridle
- Winders & Winches



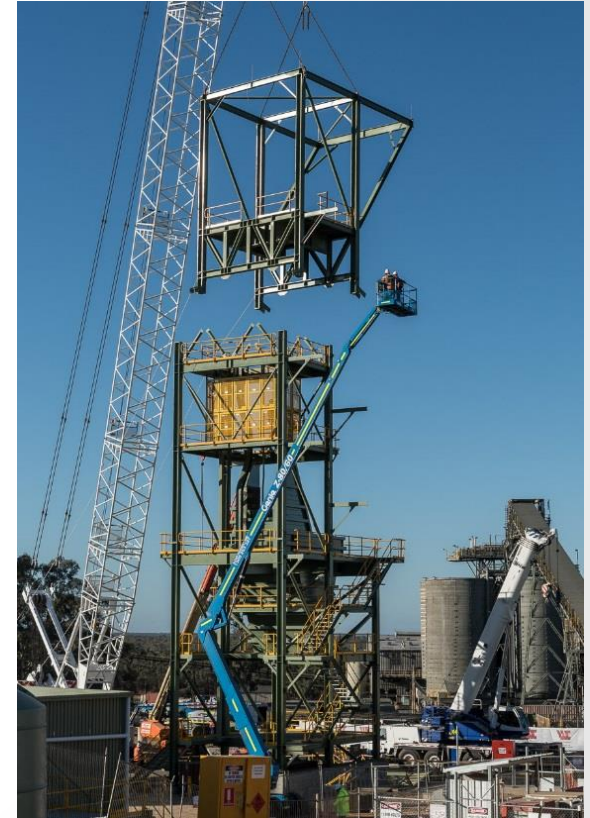
Proof load testing

- Proof load test of bridles as per AS3785.4
- Witnessed by client & independent verifier



Project Delivery Expertise

- Our project delivery expertise is based on the following key elements
 - Safety
 - Cooperation & collaboration with the stakeholder
 - Planning
 - Communication
 - Documentation
 - Supervision
 - Flexibility and agility



Previous Projects



Cobar Winder 1- Single Drum

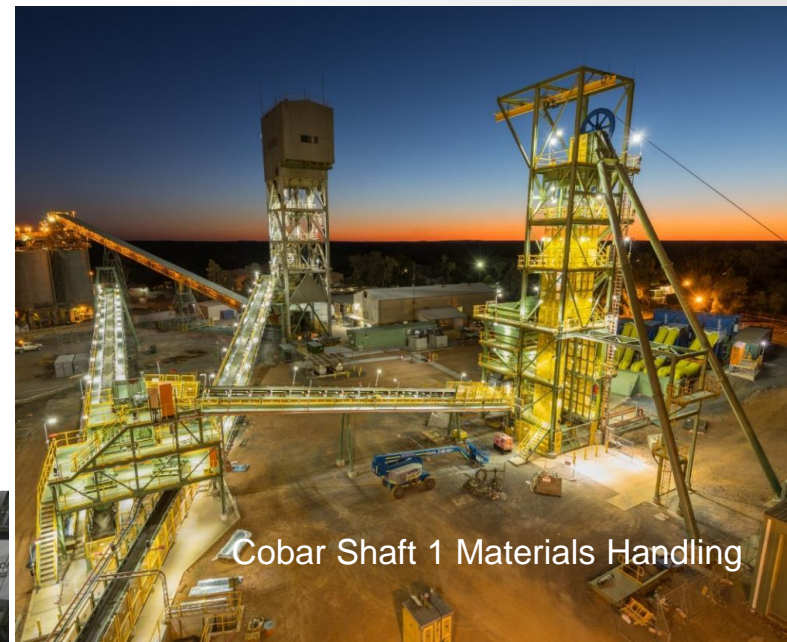


Cobar Winder 2- Friction Winder

Old winder



New winder



Cobar Shaft 1 Materials Handling

Previous Projects



Metro Drift Winder



Whenan Service Winder



Whenan Haulage Winder

Service & Spare Parts



Services

- Major services of winding system
- Condition monitoring
- Commissioning
- Training
- Spare parts for winding system
- Liners

Condition Monitoring

- WCA install condition monitoring equipment on key components of the hoisting system, such as the winder bearings, gearbox, motor and sheave bearings.
- 24 hr live condition monitoring is able to be offered by WCA



CSA Winder 2 Installation



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