ONYX PROJECTS

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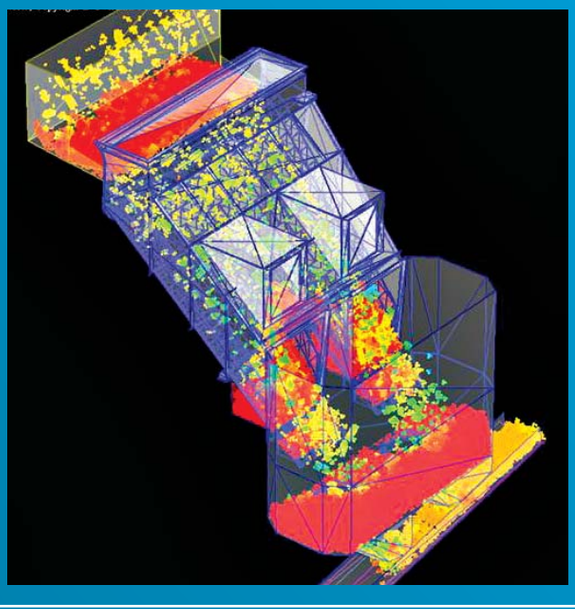
Sustaining Projects and Site Support Services

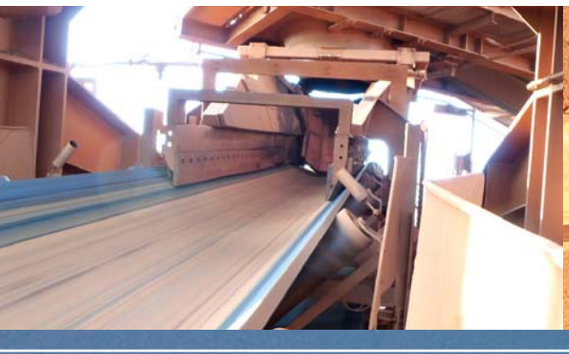


Onyx Projects delivers engineering and project management services to the resources sector.

We have a solid track record of adding value to our clients' businesses through the delivery of sustaining projects and providing a range of site services.

Our experience covers the project lifecycle from initial opportunity screening through to final handover to site operations.

About us



Sustaining Projects

Our involvement often starts by working jointly with site operations on problem identification, root cause analysis, providing recommended options and preliminary estimates of total installed cost and schedule. Our focus is on reliability improvement and production enhancement.

Following project sanction we can complete engineering only or, if required, full EPCM services up to and including final acceptance and project close-out support. Alternatively we can offer Design & Construct services through our well established relationships with construction contractors.

Site Services

We offer a range of site services, including:

- Engineering surveys, inspection and condition assessments
- Contract management
- Safety management
- Construction supervision
- Commissioning and ramp-up support
- Project and engineering support / secondment



Transfer Chutes

A large number of our sustaining projects involve rectification of problematic transfer chutes with issues including excessive liner wear, belt tracking / wear, chute blockage / spillage and restricted operational access. Following site audits, and in close collaboration with key site stakeholders, we determine root causes and develop practical solutions which are drawn from our experience of solving similar issues. Discrete Element Modelling (DEM) techniques may be undertaken to assist in benchmarking the issue and develop pragmatic solutions. Onyx has experience with various industry wear liners and their relative advantages and limitations: we provide our clients unbiased, independent advice on optimum liner selection.
We have successfully reduced downtime, improved reliability and capacity on transfer chutes with products ranging from primary crushed ore through to highly cohesive and adhesive fines and tails materials. Our experience covers the entire process plant transfer systems from ROM bin through to rail loading and ship loading.

"Our independently run annual customer satisfaction survey in 2016 recorded a 5% increase to 90% for both overall customer satisfaction and likelihood of using Onyx again. The likelihood of recommending Onyx to others, stands at an impressive 85%.

These results are reflected in the high levels of repeat business from satisfied clients and calls from new clients who have heard positive feedback on Onyx Projects from industry colleagues."

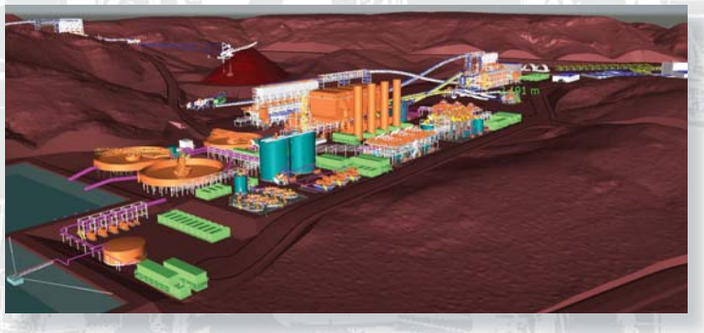
Ian Beaumont
Onyx Projects Managing Director

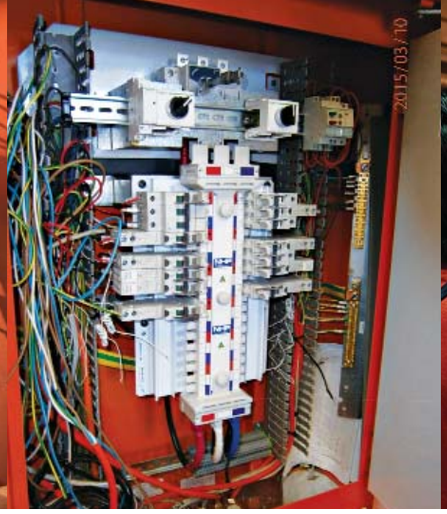
Conveyors

We undertake audits, studies and re-designs on materials handling systems from primary crushed ore through to ship loading of lump and fines products.
We conduct root cause analysis for a range of problems such as belt tracking, spillage, start-up and blocked chutes pull-out issues, belt and pulley failures, tramp metal, and equipment failures.
By undertaking site audits, dynamic conveyor analysis, referencing latest design standards and considering the problems holistically our pragmatic re-designs improve operability and reliability.

Modelling and Design Tools

Our engineers have in-house DEM and FEA modelling expertise allowing continuity of resources for site audits and inspection, advanced analysis, detailed design and site supervision covering fabrication, installation and handover to site operations. Single point accountability for the full project lifecycle improves quality and successful outcomes for our clients.
We utilise industry standard design tools including BFA, Rocky, Microstation, AutoCAD/ Revit, Helix, SmartPlant, SpaceGass, Strand7, and a range of other specialist and in-house software tools to produce designs, 3D models and construction drawings depending on project needs and client requirements.





Structural Integrity Management

Mine and port facilities have a large base of structures supporting on-going operations. These structures are generally high risk being highly specialised, heavily loaded and exposed to demanding operating conditions.
We assist resources operators in managing their risks by undertaking the audit, inspection, advanced structural analysis, calculations and engineering reporting for a range of steel, concrete, earth retaining structures, mobile equipment, cranes, hoists and winches used in the resources sector.
Structural Integrity Management is becoming increasingly important for our clients as assets reach the end of their original design life.

Electrical, Instrumentation and Control System Services

In addition to discipline engineering for sustaining projects, we deliver a range of specialist services covering:

- Project and system reviews (eg benchmarking studies)
- Audits (eg standards compliance, obsolescence, system failures, energy efficiency, reliability, Functional Safety)
- Specialist studies (eg instrumentation selection and design, smart instrumentation network design, alarm rationalisation / abnormal situation analysis, operator graphics, equipment failure root cause analysis, option selection, lightning, lighting, load flow, network and protection, process control, Functional Safety, equipment life extension, maintenance, spares and OPEX reduction)
- Site as-building and upgrade designs
- Site services (including secondment of senior personnel, construction supervision, commissioning, ramp-up and optimisation, system configuration and maintenance).

Outcomes and Client Benefits

Client benefits include:

- Cost-effective and fit-for-purpose designs that stand up to challenging service conditions
- Designs can be easily fabricated and constructed: often by the site maintenance crew in the case of defective elimination
- Successfully delivered sustaining projects resulting in improved plant reliability and reduced variance between plant nameplate capacity, production forecast and actual plant capacity
- Reduced risks and operating costs

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Our clients

Our clients include resource operators and main contractors

- Atlas Iron
- BHP Billiton
- Brierty
- CITIC Pacific Mining
- Cliffs Natural Resources
- CME
- Downer
- Fortescue Metals Group (FMG)
- Kerman
- Lendlease
- Karara Mining
- Minara Resources
- Monadelphous
- QUBE
- RioTinto
- Roy Hill
- Santos
- Southern Ports Authority
- Tellus Holdings
- Thiess
- UGL
- Valmec
- Water Corporation

Contact us

For more information on our capability visit www.onyxprojects.com or email us at admin@onyxprojects.com

Office
Level 9, Parmelia House
191 St Georges Terrace
Perth, WA 6000, Australia

Ph: +61 8 6467 2900
Fax: +61 8 6467 2949

Services

Our proven organisational capability covers:

- Project Management and Project Controls
- Process Engineering
- Mechanical and Piping Engineering
- Civil and Structural Engineering
- Electrical, Instrumentation and Control System Engineering
- 3D Layout and Design
- Procurement and Contract Management
- Construction Management
- Commissioning and Plant Start-Up
- Shutdown Management

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Structural Integrity Management

Core Competencies:

We design and execute process and infrastructure projects for the mining and mineral processing, iron and steel and water industries.

Our services cover project management, multi-discipline engineering and design, procurement and contract management, construction management and commissioning. Our involvement spans from early concept study through definition phases to project execution, handover and operations support.

Our Civil and Structural Engineering capability covers process plant, non-process infrastructure, road, rail and port facilities, buildings and specialist facilities.

Projects are increasingly fast-track with reduced design times and development phases. Meeting these challenges often requires integrated multi-functional teams to develop cost-effective, fit-for-purpose and timely designs.

Solutions:

We have an established track record of successfully implementing concept and detailed design for early civil works and structural steel across a range of projects.

Services:

Our capability and track record covers concept and detailed design of:

- Earthworks
- Design of process plant structures
- Footings for major machinery, tanks, pipe racks and large structures for process plant and infrastructure
- Mine access roads
- Camps, accommodation facilities and buildings
- HV/LV vehicle workshops, sheds and specialist facilities
- Jetties and near shore marine facilities
- Port facilities
- Water and wastewater infrastructure.

Design Tools:

We use industry standard civil and structural design and analysis tools including 12D Software, Space Gass, Tekla Structures, 2D/3D Microstation, AutoCAD/Revit, and SmartPlant to produce designs, models and construction drawings depending on project needs and client requirements.

Benefits:

Client benefits include optimised cut-and-fill site civils, cost effective designs that can be easily fabricated and constructed, shorter project schedules with early construction data issued with minimal holds and with a higher confidence level resulting in efficient fabrication and construction effort.

Our remote area experience from multiple projects with many clients means that our projects get completed safely, on time, on budget and to the required quality.

To learn more about us and our experience, please visit:

www.onyxprojects.com

DEM Modelling

Core Competencies:

We design and execute process and infrastructure projects for the mining and mineral processing, iron and steel and water industries.

Our services cover project management, multi-discipline engineering and design, procurement, contract management, construction management and commissioning. Our involvement spans from early concept study through definition phases to project execution, handover and operations support.

DEM capability covers mechanical handing on dry and wet plants and port facilities. Our DEM expertise is utilised in the project design phase and in the operational phase where it is key to our defect elimination service.

Solutions:

We have an established a track record of successful modelling, root cause analysis and proposing practical solutions drawn from our extensive operational experience. Liner design range from plastic through ceramics as required for specific applications.

Our solutions have enabled plant operators to optimise transfer, reduce downtime and drastically reduce maintenance costs.

Designs:

Our DEM capability and track record covers analysis and design of:

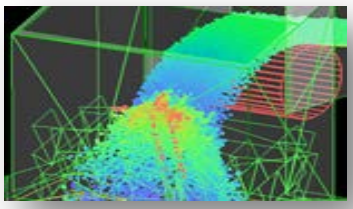
- Mechanical handling systems and equipment (including conveyors, transfer chutes, stackers, reclaimers, train load out)
- Iron ore and magnetite (lump, fines, tailings)
- Defect elimination solutions covering problematic transfers, high wear, chute blockages, belt tracking and spillage across a range of products from soft sticky to hard abrasive

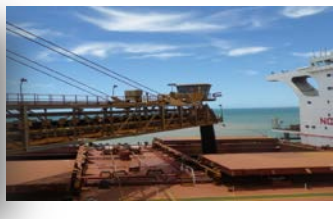
Design Tools:

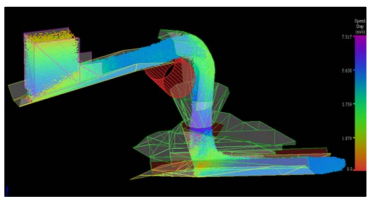
We use industry standard design tools including BFA, Rocky, 2D/3D Microstation, AutoCAD/ Revit, Helix, Smartplant and a range of other specialist and in-house software tools to produce designs, 3D models and construction drawings depending on project needs and client requirements.

Benefits:

Client benefits include cost effective and fit-for-purpose designs that stand up to the rigours of the service conditions. For defects elimination services we ensure designs can be easily fabricated and constructed: often by the site maintenance crew.







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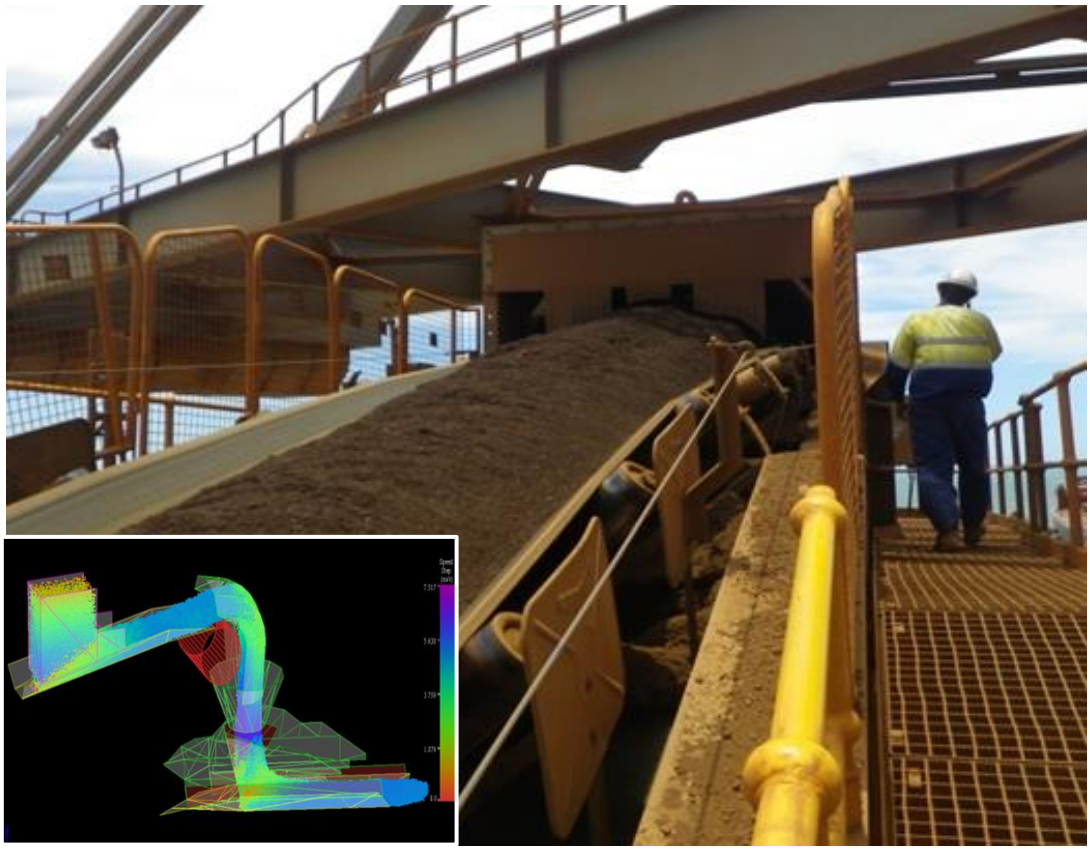


Client:

Rio Tinto

Value:

Undisclosed

Duration:

2012

Location:

Cape Lambert, Western Australia

Cape Lambert Stacker Defect Elimination

Scope of Works:

Recurring downtime issues associated with material spillage on a 10,000tph slewing and luffing stacker causing significant operational inefficiencies.

Our self-defined approach to the problem included site inspection, root cause analysis and discrete element modelling (DEM) to arrive at a robust solution.

Problem identification and solution definition rolled into detailed design, procurement and installation. We attended site for the installation and re-commissioning works.

Challenges Faced:

Fast-tracked site inspection, root cause analysis, design recommendation and subsequent detailed design, fabrication and supply completed in three weeks to meet planned shutdown. Our challenge was “Can you do it?”

Outcomes Reached:

The recommended design solution was a new maintenance replaceable soft-loading boot and different skirt liner material.

This proved to be a robust workable solution and resulted in the defect being eliminated.

All site activities were completed with no LTIs and with no significant operational issues.

The project was completed on budget, within the planned shutdown schedule.

We managed the project safely and effectively without the need for additional client resources in the project office or site teams.

Rio Tinto recognised our problem solving capabilities and “can do” attitude which resulted in requests to address further defect elimination problems and invitations to tender on their other sites and projects.

Client:

Rio Tinto

Value:

Capital Cost: Undisclosed

EPCM fee: $50,000

Duration:

May 2013

Location:

Parker Point,
Western Australia

Parker Point Shiploaders Defect Elimination

Scope of Works:

Unplanned downtime caused by material blockages on the two 11,400tph ship loaders at Parker Point.

Our scope included site inspection, root cause analysis and materials handling modelling to arrive at a robust solution.

Subsequent modifications were completed by the on-site team using our sketches.

Challenges Faced:

Completing a thorough root cause analysis on operational equipment at a busy port with limited design information.

Outcomes Reached:

The materials handling review (including DEM modelling) determined that revised wear liner material selection and minor modifications to the transfer hood should be undertaken.

Our recommendations were implemented by the client site team on both shiploaders and have successfully addressed the defect.

Rio Tinto recognised our problem solving capabilities and we have been engaged in subsequent defect eliminate projects.

Client:

Karara Mining

Value:

Capital Cost: Undisclosed

EPCM fee: $75,000

Duration:

June 2013

Location:

Geraldton Port,
Western Australia

Geraldton Double Wagon Tipper Defect Elimination

Scope of Works:

To resolve the problem of material hang up and feed-out issues on the 5,000tph double wagon tipper hoppers.

Our scope was self defined, and included site inspection, root cause analysis and materials handling modelling to arrive at a robust solution.

Once the problem was identified we moved into supporting the operations team with detailed design, procurement , installation and re-commissioning.

Challenges Faced:

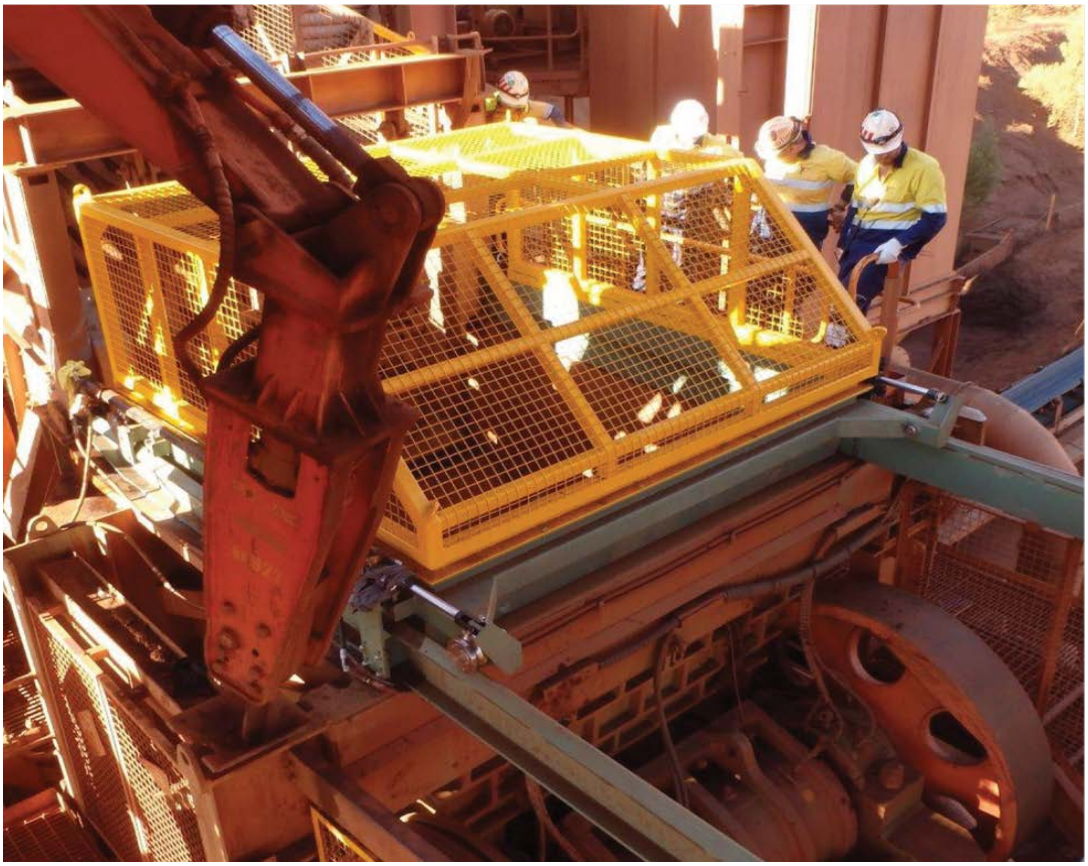
The reduction of unplanned downtime caused by magnetite material hang-up and feed-out issues resulted in ship loading delays and increased demurrage risk.

The solution has to be effective and achievable within plant operating limits.

Outcomes Reached:

We successfully identified the root cause of the problem and implementing our recommendations subsequently eliminated the defect.

Quick and effective resolution of a nagging problem further cemented our relationship with a key client leading to further work.



Client:

Rio Tinto

Value:

Capital Cost: $75k

EPCM fee: $7,500

Duration:

2014

Location:

Brockman 2, Pilbara, Western Australia

B2 Jaw Cage Defect Elimination

Scope of Works:

The jaw cage is operated by two hydraulic rams, either side of the cage, which opens and closes the cage. Even when the hydraulic rams are calibrated properly, over time they operate at different speeds, causing the cage to twist.

The scope of work was to review the current jaw design and provide recommended changes to improve the jaw cage reliability and allow for any subsequent repairs to be complete in-situ.

Challenges Faced:

The jaw cage is subject to significant mechanical stress during operation and a robust and cost effective design was required.

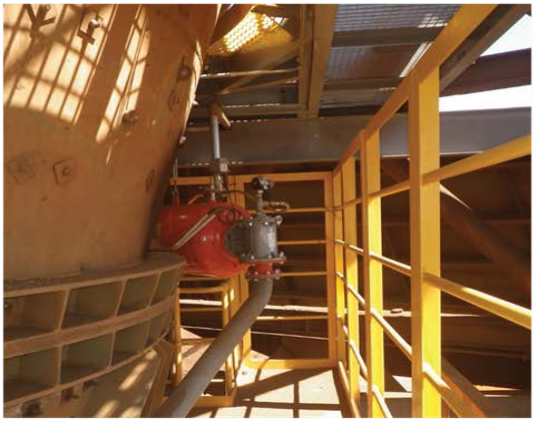
Installation of the replacement jaw cage required plant outage - the design had to minimise this outage.

Outcomes Reached:

Onyx Projects completed the design review and made a number of recommendations that were accepted by Rio Tinto.

The replacement design was fabricated and installed on time and on budget with no safety incidents.

Post installation of the replacement design the replacement jaw cage operated successfully thus ensuring that any projectiles could be safely contained. This reduced the likelihood of personnel injury or equipment damage.



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Client:

Rio Tinto

Value:

Capital Cost: $560k

EPCM fee: $114K

Duration:

2014

Location:

Brockman 4, Pilbara, Western Australia

BS4 TLO Bin Material Hang-up Defect Elimination

Scope of Works:

Due to increased material hang-up in the TLP bins associated with below water table mining, air cannons and maintenance platforms for liner change-out was required.

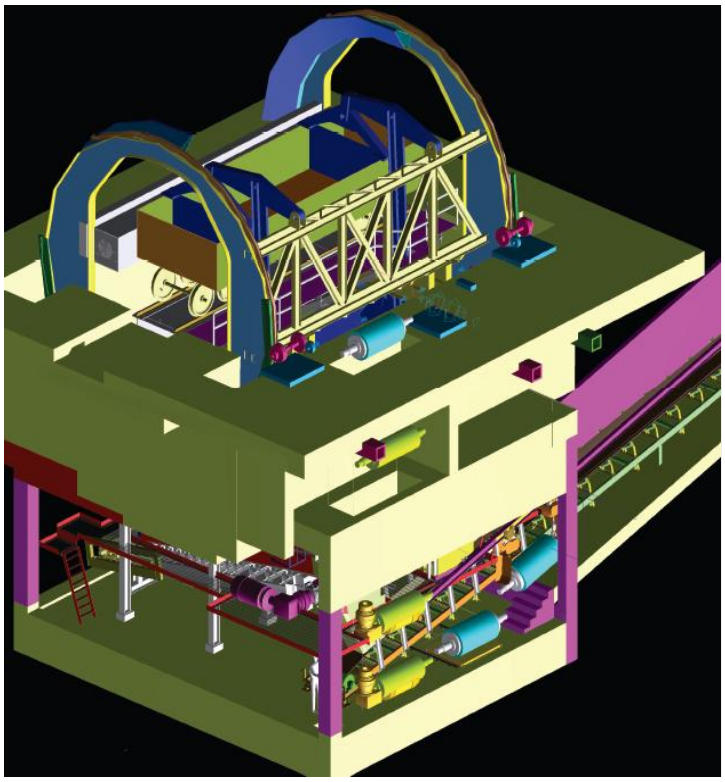
Onyx scope of work was completed in three phases: design review of Rio Tinto's concept design and initial engineering; detailed design; site implementation including commissioning and handover to operations.

Challenges Faced:

Implementation of brownfield modifications on an operational site raises a number of challenges including scope definition, interface management, shutdown minimisation, system commissioning and handover to operations.

Outcomes Reached:

Detailed site surveys, 3D model development, clash detection and elimination, combined with close liaison with site operations on their requirements for the operation and maintenance of TLO air cannons led to a successful project.



Client:

Cliffs Asia Pacific Iron Ore

Value:

AUD $3 million

Duration:

2011

Location:

Esperance Port, WA

Esperance Rotary Car Dumper Vault Safe Access

Scope of Works:

Esperance Port operations identified an opportunity to improve maintenance access to the RCD vault for safety reasons. Our scope included extensive survey work to establish as-built status, detailed 3D modelling to the optimise design and construction methods, risk and constructability reviews, detailed construction methodology and cost and schedule development. We then managed the procurement, installation and commissioning work.

Challenges Faced:

Significant engineering, logistical and construction challenges:

1. Works to be completed prior to major RCD outage in October 2011
2. Construction to be co-ordinated with daily iron ore rail car unloading operations
3. Sheet piling immediately adjacent to an operating rail line and building
4. Relocation of operating services and utilities working in confined space with limited laydown and work space
5. Complex, high risk construction
6. Highly specialised underwater concreting activities.

Outcomes Reached:

This was one of our most challenging and rewarding projects, where innovative solutions were necessary to meet the objectives.

The complete engineering and construction team worked together to a shared vision: to provide the site maintenance crew a safe means of accessing and maintaining plant.

Despite the significant risks, work was completed with no LTIs, on budget and on schedule.

Client:

Cliffs Asia Pacific Iron Ore

Value:

Total Project:
AUD $321 million

Port Upgrades:
AUD $26 million

Duration:

2010 - 2011

Location:

Esperance Port,
Western Australia

Esperance Port - Iron Ore Circuit Upgrades

Scope of Works:

The result of our front end engineering studies revealed that Esperance Port facilities had to be upgraded to support the expansion of the Koolyanobbing iron ore handling plant from 8.5 to 11 Mtpa. Work on the port iron ore circuit involved: converting all conveyor drives to variable speed; converting transfer chutes to hood and spoon geometry; RCD hopper replacement and installation of belt feeders in the vault and installation of a tramp metal magnet on the ship loading circuit.

Our involvement in the project started in 2009 with a series of project studies into the port export facilities. Our scope of work increased as Cliff's confidence in our ability to engineer and manage a complex site upgrade under tight time schedules grew. In 2010 we were engaged to complete detailed engineering, procurement, fabrication and on-site management of the upgrade via a series of closely planned shutdowns.

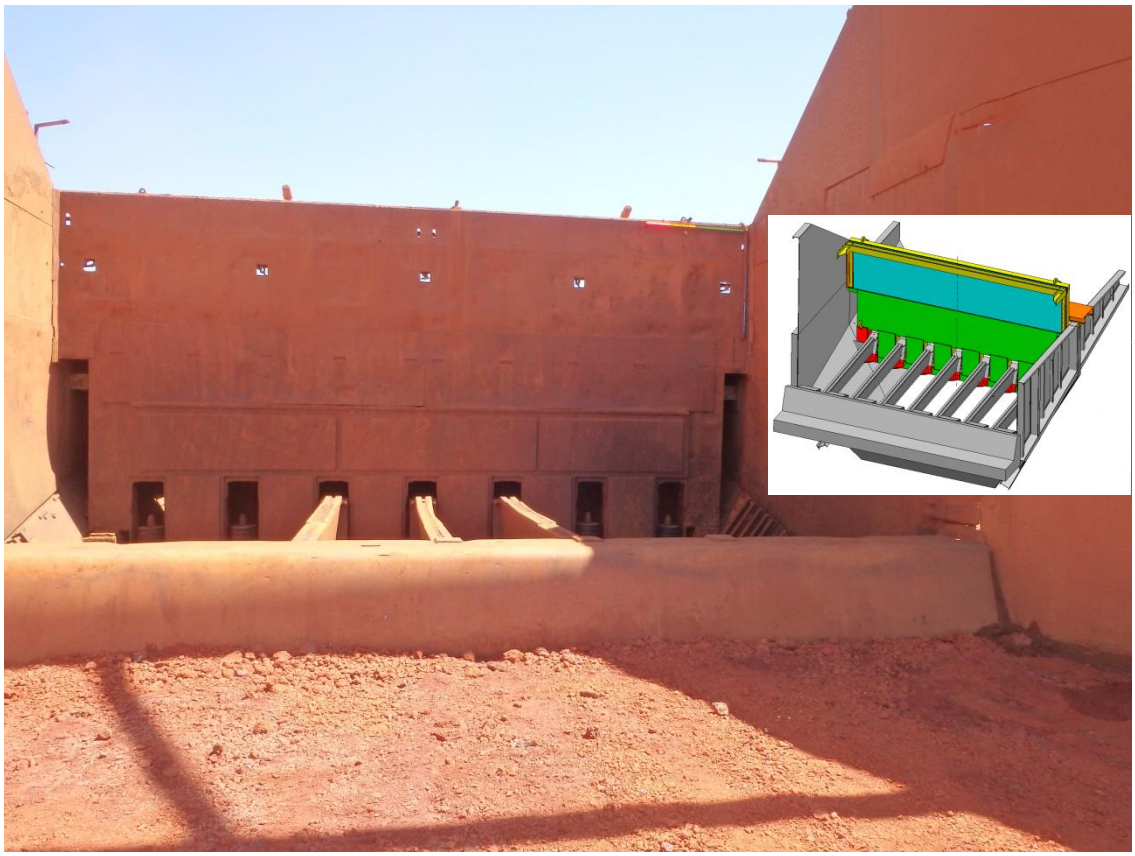
Challenges Faced:

Export facilities at Esperance Port are Cliff's only "channel to market". Upgrades had to be completed between scheduled ship loadings - any delays resulting in significant reputational and financial impact. A "work first time" approach was essential to protect Cliffs production commitments. In particular the clearing and reinstatement of equipment in the RCD vault during a 20 day shut had to be treated as extremely high risk requiring significant planning.

Outcomes Reached:

All site activities were completed within the allocated shutdowns, with no LTIs and no significant operational issues. The project was completed on budget, within schedule.

Cliffs recognised our efforts and thereafter assigned us as their preferred engineer securing involvement in the majority of their subsequent projects.



Client:

Rio Tinto

Value:

Capital Cost: Undisclosed

Design Cost: $65,000

Year: 2015

Location:

Brockman 2,
Western Australia

Brockman 2 ROM Bin Structural Repairs

Scope of Works:

Unplanned downtime caused by grizzly bar pin failures and subsequent failure of the ROM bin wall.

Our scope included site inspection, root cause analysis, temporary structural repairs, shutdown technical support and detailed design of the new ROM bin wall and grizzly bar design.

Challenges Faced:

The corroded conditions of the existing structure and multiple upgrades to the bin over its life resulted in a lack of as-built drawings. The design needed to be robust allowing for impact loads to be absorbed into the existing structure in its current state and also a simple design that can be implemented in the shortest possible shutdown duration.

Outcomes Reached:

The shutdown for the repairs discovered the condition of the bin was worse than expected and identified the failed sections. A temporary solution was designed and implemented during the shutdown by Onyx. Since the shutdown there have been less frequent failures of the grizzly bar pins and the wall integrity is remaining intact.

A new design has been completed that utilises rubber impact buffers to reduce the load transferred to the existing structure. As a result of the lack of as-built information the design allows for flexibility to alter the wall dimensions to suit the final site measurements.

Rio Tinto recognised our problem solving capabilities and have requested our technical services during the implementation shutdown in early 2016.