



Project Summary

Organization:
PDC Consultants

Solution:
Mining

Location:
Pilbara, Western Australia

Project Objective:

- Integrate a design team distributed over multiple locations
- Accelerate information sharing and communications across project teams
- Facilitate rapid deployment of project team
- Achieve client's aggressive schedule milestones
- Provide deliverables with highest level of accuracy

Products used:
ProSteel

Fast Facts

- Facilities included a primary and secondary crushing facility; product screening facility; product sampling stations; stacker, reclaimer, stockpile, train lead-out bin; and 10 interconnecting conveyors and transfer stations.
- Deliverables included mine information modeling systems, fully intelligent 3D review models, 42,000 2D shop-detailed drawings, electronic fabrication data, and detailed material take-offs

ROI

- Company completed deliverables four months earlier than expected
- Using ProSteel helped cut the production of 2D review drawings by 50 percent in the design and detailing phase of this \$1.5 billion project
- ProSteel enabled collaboration across the project cycle—specifically across the detailed engineering phase—cutting 10 to 20 percent off the estimated modeling man-hours

ProSteel Helps PDC Consultants Cut the Production of 2D Review Drawings by 50 Percent

Company Completes Deliverables Four Months Earlier Than Expected for Iron Ore Surface Mining Operation Expansion

Model of Clash-Detection Efficiency

PDC Consultants is an Australian engineering design and drafting company serving the mining, oil and gas, processing, and industrial sectors worldwide. The company has developed an advanced 3D modeling process that integrates the leading technologies to enable full clash detection in the final design of a project. The process includes Bentley's ProSteel 3D modeling software for structural steel detailing and fabrication, which cut the production of 2D review drawings by 50 percent in the design and detailing phase of a \$1.5 billion project for the international mining group Rio Tinto.

"PDC's objective is always to use our technology to provide whole-life project solutions and also achieve zero rework during construction."

— *Martyn Weir, Managing Director, PDC Consultants*

Rio Tinto is the second largest supplier to the world's iron ore trade. Through its "Mine of the Future" initiative, the company is using automation and remote operation to produce more tons, more efficiently, and in ways that minimize the impact on the environment and improve the lives of those who live and work in the local communities. Rio Tinto's iron ore operations are concentrated in the Pilbara region of Western Australia, where there are 13 mines, three shipping terminals at two ports, and a 1,400-kilometer rail network.

A multibillion-dollar expansion program has already doubled production capacity in the region and aims to reach 333 million tons per annum (MTPA) by 2015. Initiated in 2008 as part of this program, the Brockman Syncline No. 4 project opened in September 2010 with a capacity of 22 MTPA. The operation will ramp up to 40 MTPA by 2013, becoming Rio Tinto's second largest iron ore mine.

PDC provided engineering design and detailing, as well as engineering construction support on the project. The major goal was to ensure that Rio Tinto's schedule milestones were achieved while ensuring the highest level of accuracy in the provision of client deliverables. These deliverables included Mine Information Modeling (MIM) systems, fully intelligent 3D review models, 42,000 2D shop-detailed drawings (with four MIM reports per drawing), electronic fabrication data, and detailed material take-offs.

The Brockman Syncline No. 4 project involved 3D modeling and shop detailing for more than 4,000 tons of mechanical and structural steel and associated platework. The facilities included a primary and secondary crushing facility; product screening facility; product sampling stations; stacker, reclaimer, stockpile, and train lead-out bin; and 10 interconnecting conveyors and transfer stations.

The project was primarily modeled in Bentley's ProSteel software. The software is ideally suited to tasks such as laying out complex structures, producing shop drawings, assembling all connections, and managing bills of material. ProSteel increases productivity by providing the automatic creation of documentation and details. PDC used the software to model



This image shows Brockman Syncline No. 4 Project-Rendering with ProSteel structural members.

ProSteel provided an efficient 3D modeling and shop detailing solution that enabled collaboration across the project cycle, especially during the detailed engineering phase.

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and detail the more complex mechanical items, including bins, curved trusses, transfer chutes, and liner systems.

Intelligent Modeling Accelerates Delivery

Interfacing design across multiple facilities and disciplines was a major challenge. PDC used its advanced 3D modeling technology to create a powerful intelligent viewing tool and MIM solution. This enabled collaboration among a design team that was distributed over multiple locations. The intelligent models facilitated collaboration with the client in several important ways, including:

- Early involvement with the design team
- Improved scope definition
- Email exchange of drawings, models, and project information
- Parallel workflows among disciplines
- Accurate visualization for risk management
- Model integration for clash checking
- Constructability studies
- Quantity surveying
- RFI Management
- Conflict/problem identification
- Project information integration and distribution

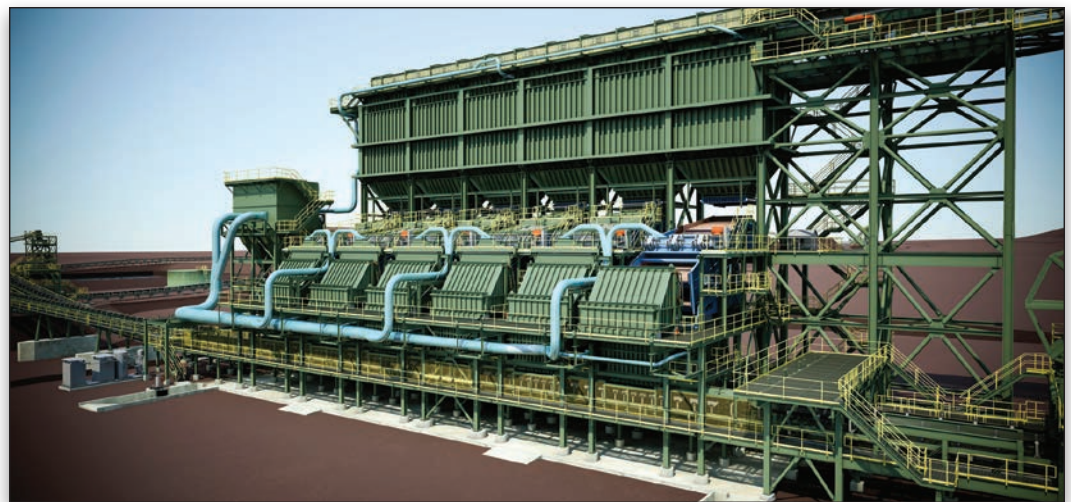
Using ProSteel software within the 3D modeling process, PDC ensured the most efficient use of resources. The client reviewed the electronic 3D models with linked PDF files, reducing the production of 2D review drawings by 50 percent. A materials database was used throughout the project lifecycle, and fabricators received electronic DXF and NC data—eliminating manual data entry.

ProSteel provided an efficient 3D modeling and shop detailing solution that enabled collaboration across the project cycle, especially during the detailed engineering phase. This allowed PDC to cut 10 to 20 percent from the estimated modeling and detailing man-hours and ensure that the project was completed within the client's aggressive schedule. PDC estimates that ProSteel helped them finish the project three to four months earlier than if they'd used a less collaborative and non-integrated approach.

During the construction phase, tools such as color coding, construction sequencing, logistics and construction planning, and value engineering within the PDC 3D modeling process helped to deliver an accelerated construction program. The high-quality modeling, with millimeter-perfect deliverables, significantly reduced variations and on-site rework. "Our objective is always to use our technology to provide whole-life project solutions and also achieve zero rework during construction," said PDC Managing Director Martyn Weir.

PDC worked closely with the project engineer to ensure the milestones at Brockman Syncline No. 4 were achieved with the highest level of accuracy. Integration of geospatial/mapping, mine, civil utilities, mechanical, and structural disciplines within the 3D modeling environment allowed PDC to conduct interdisciplinary interface checks and ensure the accuracy of the fabrication drawings. While the project was under construction, the intelligent 3D models were used in material coordination and on-site erection. PDC also provided a high-resolution animation to assist with health and safety checks.

By reducing on-site rework and enabling more accurate materials estimating, the PDC 3D modeling process helped to reduce construction costs and avoid waste. As part of this solution, ProSteel provided significant short-term and long-term benefits to Rio Tinto's Brockman Syncline No. 4 project.



A rendered perspective of Brockman Syncline No. 4 project.