



Project Summary

Organization:

MCC Capital Engineering & Research Incorporation Limited Technology Institute

Solution:

Mining and Metals

Location:

Wuxi, Jiangsu Province, China

Project Objective:

- Design steel plant for annual output of 700,000 tons of billets and 720,000 tons of steel
- Replace 2D design with 3D design platform for multidiscipline coordination and clash detection
- Generate bills of material automatically, and solve pipeline clashes with 3D design tool

Products used:

Bentley Architecture, Bentley Building Mechanical Systems, Bentley OpenPlant, MicroStation, ProjectWise, Structural Modeler

Fast Facts

- Approximately 30 engineers participated in the project and used ProjectWise for data and file exchange.
- A total of 3,743 A1 construction drawings, 593 modeling files, and 92 material list files were generated.
- MCC-CERI was the first engineering design institute in China to use Bentley OpenPlant.

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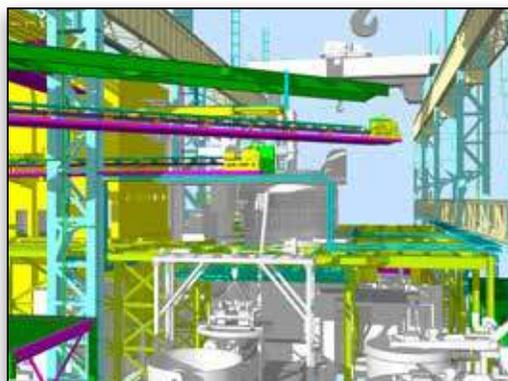
- Approximately 5 percent cost savings from man-hour reduction during design.
- 20 percent time savings creating bills of material.
- At least 20 percent design time savings moving from 2D to 3D design.

MCC-CERI Reduces Steelworks Design Time by 20 Percent With Bentley OpenPlant

3D Design Solution Helps Meet Six-month EPC Schedule by Avoiding Pipeline Clashes and Automating Materials Take-off

\$300 Million Workshop Designed With Bentley OpenPlant

Headquartered in Beijing, China, MCC Capital Engineering & Research Incorporation Limited Technology Institute (MCC-CERI) provides services to mining, machinery, paper-making, electric, construction, municipal, highway, utilities, and other industries. MCC-CERI became the first company in China to use Bentley OpenPlant when the 3D design solution was implemented for a user's \$300 million steelmaking and casting workshop in Wuxi, Jiangsu Province, China. Replacing traditional 2D design with 3D design resulted in a 20 percent savings in man-hours, which reduced project design costs by approximately 5 percent.



Design time was reduced by 5 percent through 3D design providing a full image of the facility.

Collaborating to Meet Aggressive Schedule

Design of the user's steel plant was initiated in September 2010, and construction was completed in March 2011. When fully operational, the plant has an annual output of 700,000 tons of 130x130 mm, 150x150 mm, and 200x200 mm billets and 720,000 tons of molten steel. The project consisted of the main steelmaking workshop and supporting facilities, a continuous casting workshop and supporting facilities, a boiler room, water treatment facilities, and other related facilities. The main equipment includes a 100-ton electric furnace, a 100-ton ladle furnace, a 100-ton vacuum degassing furnace, and one square/round billet caster.

MCC-CERI assigned approximately 30 engineers to the project. The team's challenge was to work together to meet the six-month EPC schedule. Integrating a 3D design platform into the project operations not only facilitated collaboration and coordination among disciplines but also solved the challenge resolving of pipeline clashes and other interferences during design to save time and money during construction. The engineers were able to use the 3D model to automatically generate accurate bills of material, which allowed MCC-CERI to meet the accelerated construction plan.

Implementing Integrated 3D Design Platform

MCC-CERI adopted Bentley OpenPlant for pipeline design and plant layout. In addition, the company implemented MicroStation® for design and modeling, Structural Modeler for steel structure and concrete modeling, Bentley Architecture for architectural modeling, Bentley Building Mechanical Systems for architectural equipment design, and ProjectWise® for collaborative design management.

Visuals produced using the 3D design software facilitated communication and coordination among project stakeholders. MicroStation visualization tools were used to render the model and generate pictures in JPG format. Animations were produced to create a video tour and generate files in the AVI format. Files were easily shared by using MicroStation's 3D print function to convert the model into PDF files with real-time rotation, zooming, panning, and cutting functions.

MCC-CERI Deputy Director Keming Chen said, "Bentley products are easy to operate and powerful. They are suitable for the metallurgical industry's complicated equipment and structures."

Bentley OpenPlant, in particular, was easy to operate and provided good visual effects for clash detection and elimination. The 2D and 3D plant design engineering software suite provided a large-scale database as the platform for maintaining and managing project data. By integrating Bentley OpenPlant with ProjectWise information management and collaboration software, MCC-CERI was able to enhance design collaboration and significantly reduce design time.

"Bentley OpenPlant and other products provide a unified, powerful 3D modeling solution that's easy to operate.

They are suitable for the metallurgical industry's complicated equipment and structures.

By integrating ProjectWise and 3D design, design collaboration was greatly enhanced, with a large amount of time saved."

— Keming Chen, Deputy Director, MCC Capital Engineering & Research Incorporation Limited

Resource-hour Reduction Produces Cost Savings

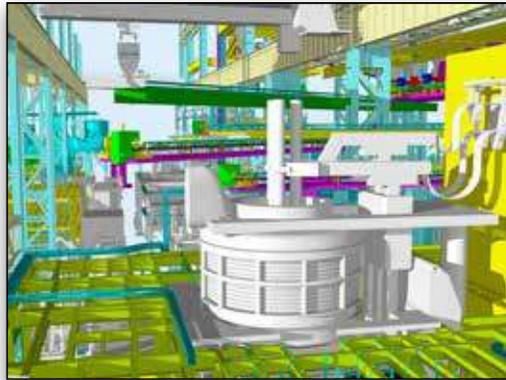
Using Bentley OpenPlant in conjunction with Bentley's other 3D design products allowed MCC-CERI to achieve a unified platform for 3D project file management and collaboration among different disciplines and departments. All the engineers who participated in the project used the ProjectWise platform for data and file exchange.

The project generated a total of 3,743 A1 construction drawings, 593 modeling files, and 92 material list files. MCC-CERI was confident that the engineering data collected

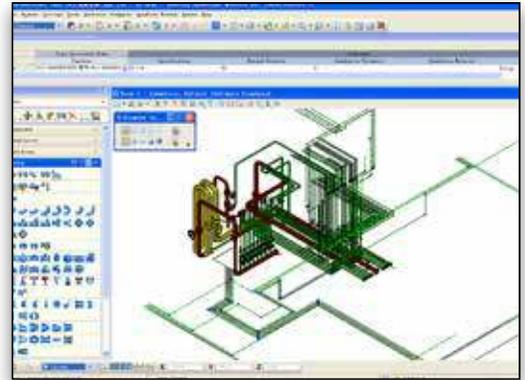
and published was informed and reasonable. The critical data required for preparing bills of material (BOM) was easily accessible, which saved approximately 20 percent of the time required to create BOM.

Overall, Bentley solutions helped MCC-CERI to reduce project design time by at least 20 percent compared to traditional 2D design. This reduction in resource-hours resulted in project cost savings of approximately 5 percent. The integrated solution also added value for the project owner.

Implementation of the 3D design platform allowed MCC-CERI to easily publish and hand over the project data to Valin Steel for use in operations management and maintenance.



Complete 3D models were critical to creating early, accurate BOMs to meet the accelerated construction plan.



Bentley OpenPlant Modeler provides an intuitive interface to easily accomplish complex piping design.

Find out about Bentley at: www.bentley.com

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