



Project Summary

Organization:

CISDI Engineering Co., Ltd.

Solution:

Mining and Metals

Location:

Xichang, Sichuan, China

Project Objective:

- Optimize Panggang Group's iron and steel production capacity in Sichuan Province
- Design the iron making, steel making, steel rolling, and external pipelines for the Panxi Iron & Steel Project
- Leverage 3D design platform to enable multidiscipline collaboration, improve design quality and efficiency, and add value to engineering design services

Products used:

Bentley Architecture, Bentley Building Mechanical Systems, Bentley Navigator, Bentley Rail Track, Bentley Structural, PlantSpace Design Series, MicroStation, ProjectWise

Fast Facts

- More than 200 designers during project design and implementation
- CISDI designers delivered the largest 3D collaborative design project in China's metallurgical industry
- The Bentley platform provided a total clash-detection solution
- The 3D model ProjectWise provided improved project visibility to the owner

ROI

- Saved one month and \$200,000 through resolving clashes and reworking the Steel-making Sub-project
- Saved one month and \$300,000 through more rational pipeline layout in the blast furnace area
- Reduced amount of on-site construction service required

CISDI Cut Construction Costs by \$500,000 on Panxi Iron & Steel Project Using Bentley 3D Design Software

Bentley's Collaborative Design Platform Resolves On-site Clashes and Shortens Construction Time by 2 Months

Panggang Commissions \$3 Billion Iron and Steel Plant in China

The \$3 billion Panggang Xichang Vanadium and Titanium Resources Integrated Utilization Iron & Steel (Panxi Iron & Steel) project is located in Jingjiu Township near Xichang City, the seat of Liangshan Prefecture within China's Sichuan Province. Covering nearly 5 square kilometers, the plant will have an annual production capacity of 3.8 million tons of billet and over 3.7 million tons of hot roll steel strips. CISDI Engineering Co., Ltd., (CISDI) accelerated the project's design and construction by implementing 3D collaborative design with Bentley software.

Past Problems With Clashes Detected Only During Construction

The Panxi Iron & Steel Project was the largest 3D collaborative design project to date in China's metallurgical industry. More than 200 designers from CISDI took part during design and implementation. Multiple sub-projects involved a dozen disciplines, including architectural, structural, power, and hydraulic engineering.

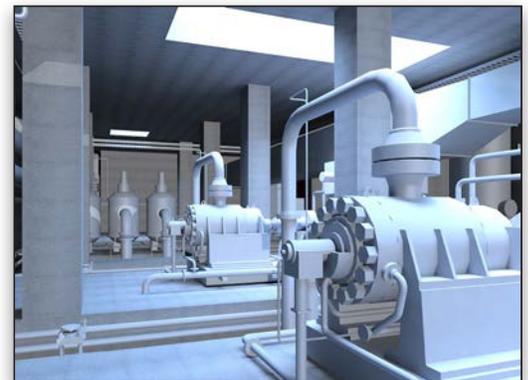
CISDI replaced traditional 2D design on this project in an effort to reduce the problems with on-site clashes that had occurred on similar projects. The challenge was to customize project workflows in accordance with the requirements of the owner-operator while efficiently and conveniently checking, marking, and eliminating collisions.

Implementing multidiscipline 3D collaborative design resolved these difficulties. CISDI adopted Bentley's 3D design software including ProjectWise®, MicroStation®, Bentley Navigator, Bentley Architecture, Bentley Structural, and PlantSpace Design Series.

Smooth Transition From 2D to 3D

To ensure a smooth transition to the Bentley platform, CISDI enlisted its CAD System Department to provide software training, consulting services, and technical support during project implementation. Bentley China helped establish the project organizational structure and operational mode, and provided related technical support services, solutions, and customizations.

Bentley China's engineers assisted CISDI's R&D team in leveraging the MicroStation development environment to customize the Bentley platform. This enabled CISDI to use customized workflows, standardized inspection procedures, and ISO drawings in accordance with the owner's project requirements.



3D design helps to clearly understand physical layout and avoid clashes before construction.

The CAD System Department also cooperated with the Project Management Department to carry out project organization and management, data collection and sorting, design coordination, and progress and quality control. With the help of Bentley China, ProjectWise training and on-site technical guidance were organized to enable CISDI's designers to complete 3D model and document examination, verification, modification, authorization, and version control.

The coordinated activities of CISDI's CAD system, project management, and R&D departments, in conjunction with Bentley China's engineers, ensured the smooth execution of 3D collaborative design, as well as the realization of standardized design and rational project management.

Total Solution for Clash Detection

Bentley's innovative platform demonstrated the many advantages of 3D collaborative design. The technology improved design quality and efficiency, as well as added value to the design process and deliverables. Most importantly,

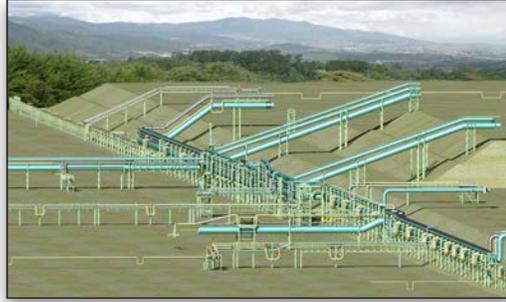
The integrated, 3D model helped reduced the collision of on-site objects and achieved much smoother construction and installation, saving time, money and human resources.

— *Chen Le, deputy director, power design department, CISDI Engineering Co., Ltd.*

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3D models integrated with physical topology ensure accuracy within local constraints.

3D models integrated with Bentley Navigator provided a total clash-detection solution.

The 3D design models allowed engineers to simulate objects, optimize their designs, and virtually eliminate the occurrence of clashes between design objects. Bentley China provided guidance on how to use Bentley Navigator to mark clashes between multidiscipline design models and transmit this information to the relevant engineering teams. Bentley Navigator enabled accurate multidiscipline clash detection, the recording of drawings and tables, specification of responsible parties, and the release of clash data on the ProjectWise platform. This process permitted seamless and accurate transmission of information among all disciplines.

In general, the Bentley platform accelerated information exchange among all project participants. The facilitated interactions between engineers, engineers and project managers, design institute and construction contractor, and design institute and owner-operator served to reduce cycle time. CISDI engineers were able to promptly view the designs of other project participants while completing their own

design, thus making all design intentions known. This improved design quality and reduced on-site rework.

Faster Construction With Fewer Changes

The 3D models created during the collaborative design process not only improved project management and design quality but also ensured a realistic construction plan and steady construction progress. The 3D models also enabled CISDI to control material usage and guide construction.

All this helped CISDI achieve significant time and cost savings during construction of the Panxi Iron & Steel Project. Chen Le, deputy director, power design department, explained, "The integrated 3D model helped reduced the collision of on-site objects and achieved much smoother construction and installation, saving time and money. In the past we needed at least three construction service personnel for a similar project. Now, one person is enough. Bentley's solution has greatly reduced our on-site manpower inputs."

In the Steelmaking Sub-Project, CISDI shortened construction time by approximately one month and saved approximately \$200,000. In addition, the rational pipeline layout in the blast furnace area reduced on-site clashes and sped up construction, saving another month and \$300,000.

3D Collaborative Design Adds Value

CISDI's collaborative design process yielded 3D models that were eventually archived and delivered as a digital plant. The engineering database turned over to the owner-operator will be used for operations, maintenance, and management of the Panxi Iron & Steel plant. This will help the Panggang group to establish information-based plant management, which will improve the quality and efficiency of operations.