
3D MODELING IMPROVES TEAMWORK IN DEMANDING POWERHOUSE RENOVATION.

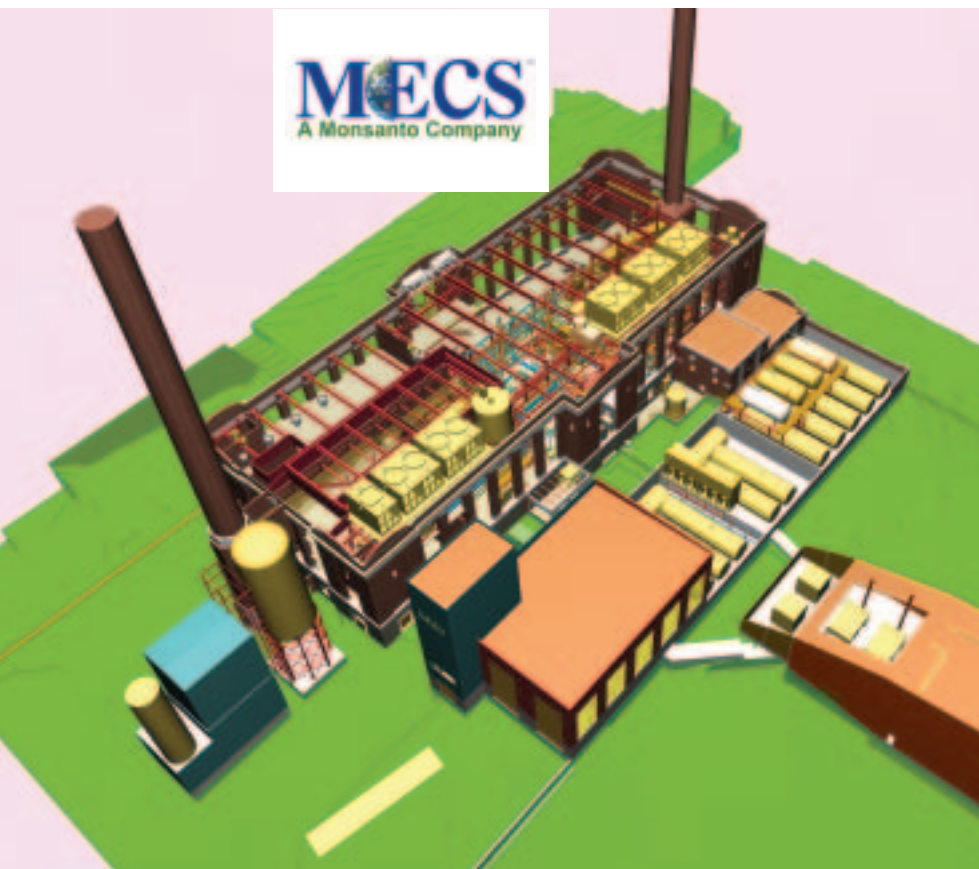
FROM DESIGN TEAM TO CONSTRUCTION TEAM, WORKERS GET REAL-TIME DATA FOR DECISIONS.

When a Midwestern college took a look at its need for a system of four new boilers in a 100-year-old facility, it was more than an issue of just getting more efficient steam production.

“They needed to upgrade their boiler systems to meet [U.S. Environmental Protection Agency] regulations, and the boiler replacement project was expected to meet their steam production needs for the next 20 years,” said Tony Smith, senior mechanical engineer for MECS, Inc. of St. Louis, which coordinated the design project for the new system. Formerly Monsanto Enviro-Chem Systems, MECS changed its name in August 2005 after management purchased the company from Monsanto.

“We also had to maintain the architectural features of the brick powerhouse building,” Smith said. “This was a historic building.

There was one other crucial consideration. “The utilities couldn’t be turned off, and couldn’t be disturbed for any length of time.” said Mike Reim, MECS piping designer. “There was university research that had been in place for 15 to 20 years. If we lost the utilities, that would all be for naught.”



PROJECT OVERVIEW

Project

Powerhouse Renovation

Organization

Monsanto Enviro Chem Systems, Inc

BE Awards Category

Visualization

Project objectives

- Replace four existing boilers in a power plant with four new boilers.
- Maintain the architectural features of the brick powerhouse historic building.
- Allow the facility to meet today’s steaming capacities and future steam and utility demands.

Fast facts

- When new boiler and new piping models were completed, engineers could design within 1/16th of an inch using 3D models.
- Utilizing Bentley AutoPLANT Explorer workers from the design team to the construction team saw real-time measurements.

Bentley products used

- Bentley AutoPLANT Piping™
- Bentley AutoPLANT Equipment™
- Bentley AutoPLANT Structural™
- Bentley AutoPLANT Explorer™
- AutoPIPE®
- ISOGEN

Little wonder Smith said, "Due to the large scale of this project, the mass of existing piping and equipment, and the need to keep the facility operating undisturbed, it was a very complicated project both in terms of engineering and construction planning."

3D MODELS GIVE CLEAR VIEW OF EXISTING AND NEW PIPING

One asset for MECS staff was the ability to work with 3D models of the boiler system, giving them a clear view of how the existing pipe system would work with the new system.

"3D modeling is an enormously useful tool," Smith said. "When we had the new boiler and the new piping models completed, we were able to design to within one-sixteenth of an inch."

"We'd go to the field, take measurements, model those measurements, and put the new piping in. We didn't have to rely on what our gut feelings were on the clearances," Reim added.

The system also allowed designers to see the plant model in a CAD format, so the entire design staff could see the existing boiler system piping. Field workers equipped with a laptop computer and Bentley® AutoPLANT® design software could input data on-site and have that updated information available to everyone working on the project. Using Bentley AutoPLANT Explorer, workers from the design team to the construction team saw real-time measurements and were able to make critical design decisions sooner and more effectively.

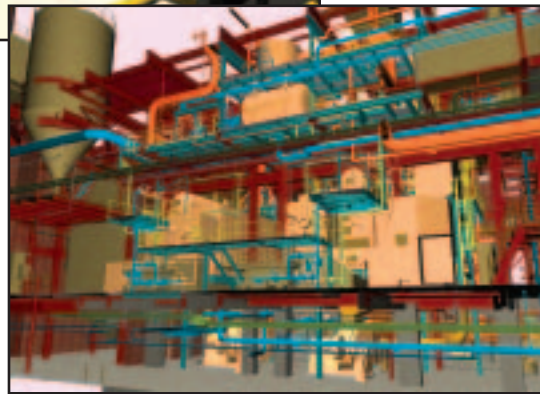
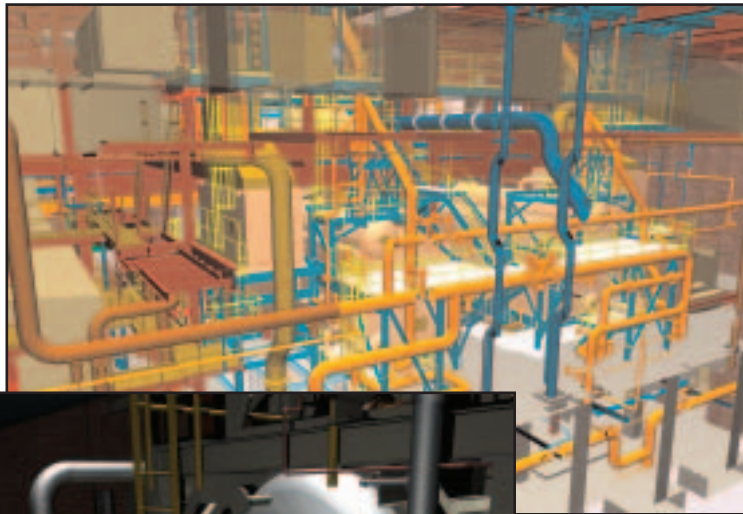
AUTOPLANT EXPLORER™ EXTENDED PROJECT-WIDE

MECS gradually made AutoPLANT Explorer available across the project team. "We started with three engineers, and as the project progressed at any given time, we'd have from four to 12 people looking at the 3D model," said Jim Cope, CAD system administrator.

"Now we have it deployed across the building on 50 to 75 desktops."

Bentley® AutoPIPE® also allowed for stress analysis to be done by computer, rather than by trial and error. "Once you cut into piping, the existing guides and supports act differently," Reim said. "We had to plan very carefully not to overload the system. There was potential for huge damage."

In the end, the 3D CAD system made a tough project manageable because of its portability, flexibility and its modeling capabilities. Said Reim: "When an issue would arise, we were easily able to go into the model and explore different solutions." ■



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