
STREAMLINING DESIGN AND ENGINEERING

USFILTER ELECTROCATALYTIC PRODUCTS (USFEP)

USFilter Electrocatalytic Products (USFEP), a group within USFilter, recently made the decision to integrate Bentley® MicroStation® and plant design solutions to improve quality, meet schedules, and reduce costs. One of the key selling points in this decision was MicroStation's ability to work with AutoCAD drawings.

USFEP is a leading provider of hypochlorination and electrochemical equipment designed to control biological fouling and corrosion at power plants, petrochemical facilities as well as ships and offshore facilities. To better serve the users of its customers, USFEP determined that it needed design software that was spec-driven and could easily produce isometric and fabrication drawings.

Moving to a New CAD Solution

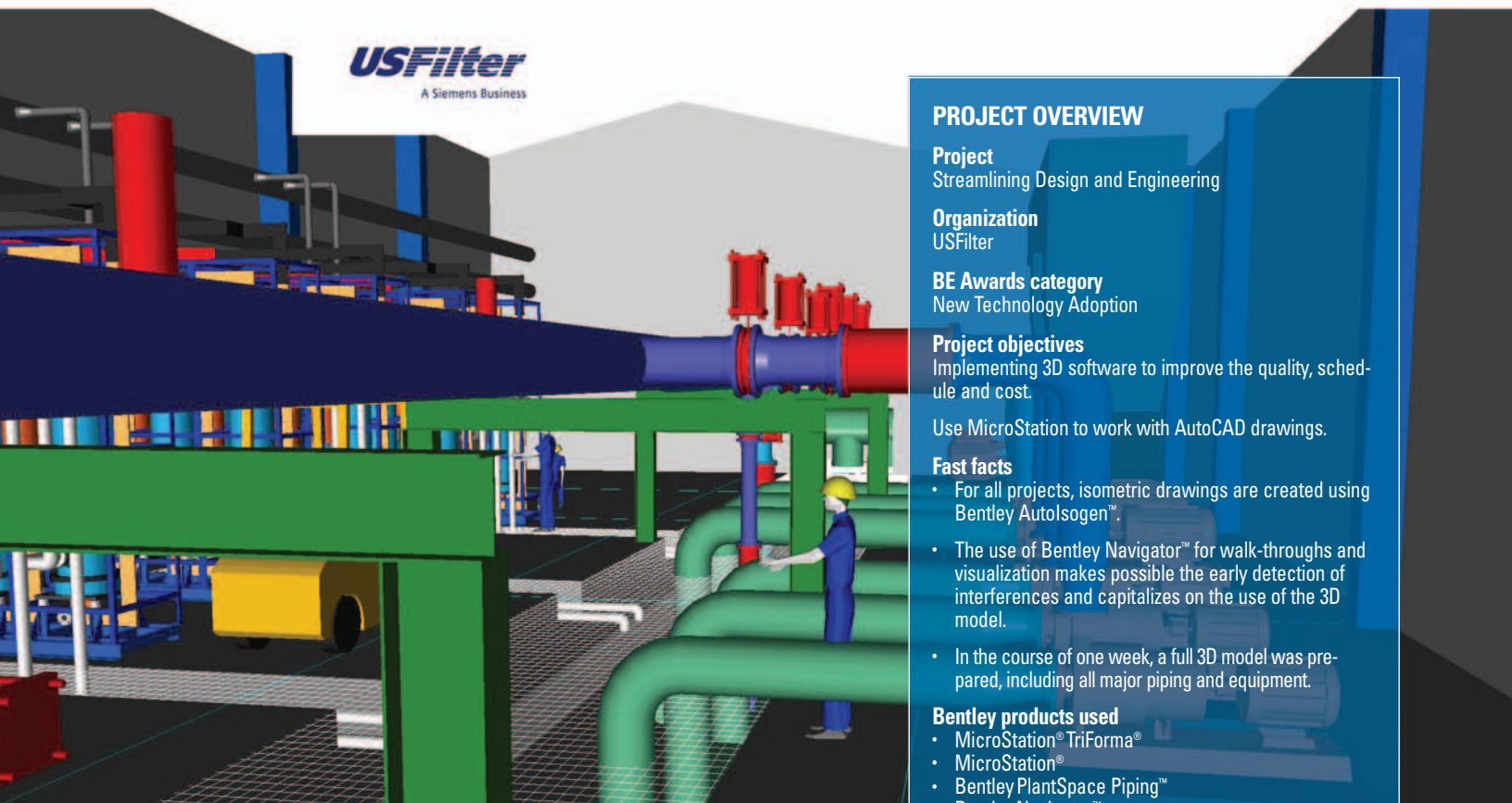
Because AutoCAD was the primary CAD tool used in the office and there were thousands of drawings in this format, the ability to re-use these files was critical in the selection of the new design software. For this reason alone, MicroStation, along with its accompanying design solutions, was the natural choice since it allowed the design engineers to continue the use of both MicroStation and AutoCAD to maintain the drawings.

In addition, since USFEP has a global client base, the company has to deliver drawings in many different formats, including AutoCAD, MicroStation, PDF, and TIFF. Therefore, the ability to use one software program to achieve all deliverables was essential. The components library developed from previous software was easily converted via STEP into MicroStation. The Bentley Plant design tools were then used to add intelligence to these components. This saved a tremendous amount of time that would have been wasted creating very complex components.

Integrating Plant Design Solutions

With the base of MicroStation in place, the decision to use the Bentley Plant suite of software was an easy one. To begin with, there was experience to leverage, since several members of the engineering and design group were very familiar with Bentley Plant solutions. With project deadlines looming, the ability to deploy the software with minimal up-front work was important.

Still more important, however, was the ability to use the data in multiple downstream applications. "From the very beginning, the standard USFEP products were modeled in 3D, with intelligence applied to each component," said Dennis Perez, design supervisor. "This allowed detailed material take-offs for entry into the MRP system for purchasing. There are a multitude of small



PROJECT OVERVIEW

Project

Streamlining Design and Engineering

Organization

USFilter

BE Awards category

New Technology Adoption

Project objectives

Implementing 3D software to improve the quality, schedule and cost.

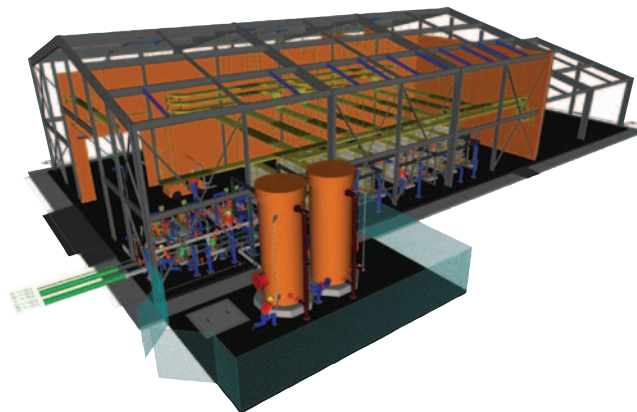
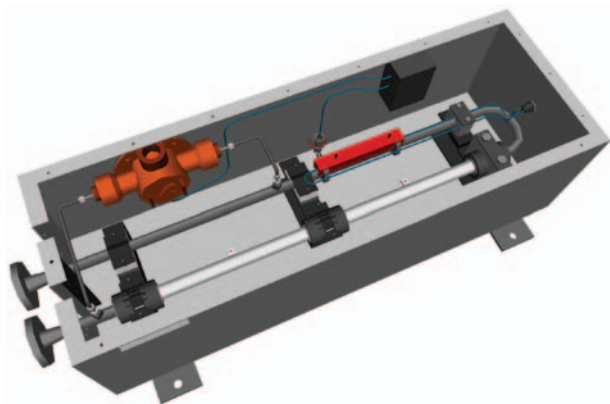
Use MicroStation to work with AutoCAD drawings.

Fast facts

- For all projects, isometric drawings are created using Bentley AutoIsogen™.
- The use of Bentley Navigator™ for walk-throughs and visualization makes possible the early detection of interferences and capitalizes on the use of the 3D model.
- In the course of one week, a full 3D model was prepared, including all major piping and equipment.

Bentley products used

- MicroStation® TriForma®
- MicroStation®
- Bentley PlantSpace Piping™
- Bentley Navigator™
- Bentley Structural™



components that make up the cells that produce water treatment chemicals from seawater, so it made sense to have these components saved in a cell library for quick use.”

USFEP is responsible for not only the engineering and design of the units, but, in most cases, also for the supply of process equipment, piping, cable, cable trays, and a multitude of other items on a fully assembled and operational skid. “The ability to produce highly accurate material take-offs for process piping minimizes the chance of missing components when assembly begins,” Perez said. “Whether in the field or in our shop, we can be confident that the materials needed for the project are available.”

Isometric drawings are created for all process piping on the project, with varying formats used for field and shop installed units. For all projects, isometric drawings are created using Bentley Autolsogen™. It allows for the automatic output of spooling for pipe, reducing the amount of time spent checking drawings and measuring pipe.

For skid-mounted units, the use of 3D enables the shop production personnel to see the unit in its completed state before assembly ever begins. These model reviews are used to help the shop plan its work and identify areas of concern before they become a crisis during fabrication.

Use of Visualization

Many of the units supplied by USFEP are located on offshore platforms or vessels where space is at a premium. This presents the challenge of designing skids for better use of space and to allow for ease of maintenance. The use of Bentley Navigator® for walk-throughs and visualization makes possible the early detection of interferences and capitalizes on the use of the 3D model.

With very limited time to complete the proposal, a team of engineers and designers spent one week sizing equipment, piping, and instrumentation. The piping on the project was very large and costly. In the course of the week, a full 3D model was prepared, including all major piping and equipment. Material take-offs were prepared to validate the basis of the proposal.

By taking the extra effort in modeling the project, it was possible to provide a bid with a high level of confidence. Multiple layouts were prepared for the client to show how subtle changes in building layout and equipment could have a large impact on the cost of the project.

USFEP Projects

In the past year, thirteen USFEP projects have used Bentley Plant solutions. Some projects have been fabricated and shipped, while others are in various stages of design and fabrication. They include:

Land-based projects:

- STEP import was used to bring existing components into MicroStation 3D and PlantSpace® from the solids software.
- Proposal prepared in one week’s time using Bentley solutions. The level of detail in the proposal phase helped secure the project.

Offshore projects :

- Oil Platform 2x3.2 kg/hr: the structural steel was referenced from 3D AutoCAD file from a civil engineering consultant.

Standard marine projects:

- Bentley solutions used to design a marine 2 lb/hr unit, a commercial on-site electrochlorination unit, and a standard land-based generator unit.

Residual chlorine analyzers:

- Chlorine analyzer units: two chlorine analyzer units created and used in conjunction with USFEP skids to monitor chlorine levels; one is land-based and the other is marine-based for on-board ships.

Workflow Improvements

The use of an integrated software suite provides the ability to capitalize on the time spent in one phase of the design. The 3D model is the basis for all of the down-stream deliverables on a project. All projects are now modeled in 3D, irrespective of the project size. Two-dimensional drawings are created from hidden-lines of the 3D model. Isometrics are produced automatically from the 3D model. Material take-offs, previously done by hand, are available at the click of a button. Visualization is made easier and time is spent more effectively in the design phase, where changes are easy.

“The use of the Bentley solutions has reduced the hours required for mechanical design by approximately half,” said Perez. “This allows us to execute projects in less time and for less money than previously required. An added benefit is that the design and CAD deliverables are more detailed and more accurate than ever before.”

For more information on Bentley, please visit www.bentley.com or call 1-800-BENTLEY.

