

Leading mining industry companies use CATIA to help meet the world's increased energy demands



Overview

■ **The Challenge**

In partnering, a coal producer and a construction company seek a 3D CAD and PLM system that can streamline the design, construction, and operation of high-capacity coal processing plants

■ **The Solution**

CATIA was selected for its ability to create and manage all aspects of a plant's design and operations, including the engineering, procurement, construction and maintenance phases

■ **The Benefit**

Provides big savings in time and costs, benefiting both the construction company and the coal producer



Wanted: More power

The production and consumption of power is critical to today's economy. Farnham & Pfile Construction, Inc. of Belle Vernon, PA (USA) is partnering with CONSOL Energy of Library, PA (USA) to be in the forefront of supplying the energy the world demands.

Farnham & Pfile's Engineering and Construction Division is focused on turnkey projects in the process industry, particularly mineral processing and energy production. They perform the full scope of work including new construction, retrofitting and upgrades to existing coal processing plants.

CONSOL Energy Inc. is the largest producer of high-BTU bituminous coal in the United States, and the largest exporter of U.S. coal. CONSOL Energy has 27 bituminous coal mining complexes in seven states, two Canadian provinces and Australia. For the fiscal year 2001 CONSOL Energy reported revenue of \$2.4 billion with net income of \$183.7 million.

The future of coal mining is here

Dan Yanchak, Plant Superintendent for CONSOL Energy, is responsible for production and maintenance for CONSOL's processing plants. These plants clean and separate the coal, making it usable to a power plant or steel mill. They include everything necessary to process raw coal for its intended use, including conveyors, pumps, piping and equipment needed to crush, clean and separate the coal into various sizes.

Farnham & Pfile and CONSOL Energy adopt the CATIA IES approach for improving the fundamentals of the plant business from concept to operations and maintenance



Tom Porterfield, Vice President of Operations at Farnham & Pfile, is responsible for the engineering and construction of new plants and upgrades of existing plants. Both he and Yanchak are enthusiastic about the team concept.

Porterfield explains, "We're an industrial contractor and we have teamed up with CONSOL Energy and combined our expertise for the highly competitive energy industry."

The team is currently building a \$50 million state-of-the-art, computer-controlled plant for CONSOL Energy's McElroy mine near Moundsville, West Virginia, which will be one of the most efficient in the world.

The CONSOL Energy facility is an example of the higher-capacity coal processing plants the energy industry is advancing toward. Big coal producers are increasing their processing capacities in order to keep up with their high production mines.

The new West Virginia plant will handle up to 3,000 TPH or thirteen million tons of coal a year, operating 24x7.

CATIA powers a new way

The first step in the plant process is design. Over the last ten years, Farnham & Pfile has moved from the drafting board to a 2D CAD system, and then on to IBM CATIA solutions. Farnham and Pfile has made CATIA its system of choice, primarily due to its ability to handle a broad range of integrated functions.

Porterfield explains, "Starting from scratch with the process flow sheet, the piping, equipment and all processing is done in CATIA."

"The system knows what parts to use based on the measurements we give it. It generates a list of required parts, bills of material and 2D fabrication drawings, orthographic and elevation views. We export this data to our vendors, which is a big help in the bidding process."

Getting it right the first time

CATIA is being used to create a corporate catalog of parts and equipment and systems assemblies. This standardization brings efficiencies to Farnham and Pfile. They can build repeatable systems and create standard corporate designs, which can be used on multiple projects.

A major area of accomplishment with CATIA is Farnham and Pfile's intelligent piping library that is unique in the industry. "Due to the abrasive nature of coal slurry, steel or plastic pipes quickly wear out, so we use ceramic pipes. These are very expensive—depending on size, they can be around \$400 per foot. We have to get the design right the first time and CATIA makes this possible. This gives us a big advantage over our competition. They have to take their best shot—the old way—but we know that our designs will be right."

“Our ceramic pipe suppliers have never seen anything like it. CATIA models provide exact cut lengths, isometric and fabrication details. Since we give suppliers detailed drawings, they have less liability from potential errors. We have been able to reduce our supplier costs by up to 30%. With \$5 million worth of piping in a plant, that can be a big savings.”

“CATIA designs all of our piping, which ranges from 4-30 inches in diameter. It also handles the routing, angles, slopes and connections. Network analysis, isometric and interference checking with structures and equipment are performed.”

“Since a section of pipe might be ten feet long and weighing 16,000 lbs., we have to get it right the first time. We can’t have any interferences, due to the cost of replacing pipes, the time lost and the labor needed to do the rework.”

Reducing waste

By avoiding rework costs, the cost of building a plant is lower. With CATIA, we can pass the savings of avoiding rework on to our partner.”

“Our accuracy rate is much higher. We can now get a new plant online much sooner. By bringing a plant online sooner, we can relate that to savings that we can pass right along to our team.”

Ahead of schedule and under budget

Farnam & Pfile’s reputation is very important to the company. Porterfield says, “We have a simple motto, ‘build your future ahead of schedule and under budget.’ If we say it is going to happen, it will!”

“Our competition doesn’t have these capabilities,” says Porterfield. “Farnham & Pfile has sold jobs based solely on the ability to walk a customer through the process using CATIA 4D Navigator. Our reputation has helped us in having a major coal producer, CONSOL Energy gave us the opportunity to partner with them in this project from inception through to maintenance.”

From design to maintenance

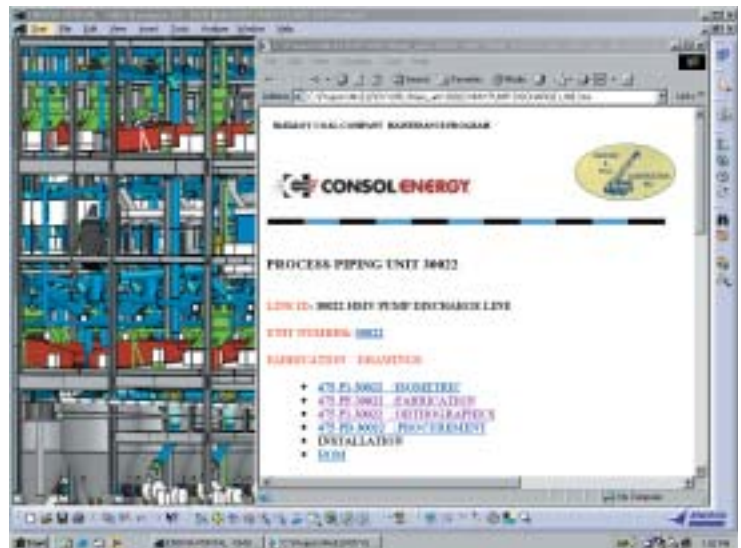
CONSOL Energy and Farnham & Pfile share the entire project, starting with a negotiated design and construction process. When the construction phase is done, the relationship will continue with an online CATIA maintenance system. “This is new in our industry,” says Porterfield. “Once CONSOL Energy saw the powerful lifecycle capabilities of CATIA, they were sold.

We now have a solid, established team that will be working together for many years to come. I’m very excited about the future.”

Up and running: the ongoing maintenance phase

The extensive data collected during the design and build phase makes CATIA a natural choice to support a plant’s operations and maintenance processes. Plant data includes the history of each equipment unit and its role in the facility; such as the number of hours a pump has been running, and connected piping and equipment. CATIA systems help predict when a replacement will be needed and show how long the maintenance activity will take. It can also provide relevant fabrication drawings and service bulletins.

According to Yanchak, “Plant owners and operators must maximize productivity while minimizing maintenance costs and related downtime. We want maximum availability.”



"Using the old school method, contractors would produce maintenance manuals for the customer that were as many as 30 volumes, 3-4 inches thick a piece and they were soon out of date. With CATIA digital mock-up and reviewing tools the commissioning data is digitally available and other information is always current, always online."

A bright future

CONSOL Energy's Dan Yanchak sees that CATIA can be invaluable to the efficient, on-going operation of a plant. For example, CONSOL Energy plans to integrate the newest version of CATIA, CATIA V5, with their SAP system for a tight integration with their business processes.

"Once CONSOL Energy saw the powerful lifecycle capabilities of CATIA, they were sold. We now have a solid, established team that will be working together for many years to come. I'm very excited about the future."

*Tom Porterfield
Vice President of Operations
Farnham & Pfile
Engineering & Construction*

"This is only the tip of the iceberg," says Yanchak. "This CATIA system is really going to pay off for us. Our teamwork with Farnham and Pfile in the use of CATIA will keep us in the forefront of our industries."

CATIA IES, the right approach to plant business

The process and power industry has progressed beyond stand-alone CAD solutions to a search for new plant lifecycle management methodologies. CATIA Industrial Equipment and Systems (IES) solutions from IBM and Dassault Systemes provide the technologies that enable the industry to satisfy the fundamentals of their plant business.

CATIA V5 addresses the plant process from equipment and systems design, fabrication, and construction, to IES operation and maintenance. The IES supply chain includes the IES equipment supplier, the EPC's (Engineering Procurement and Construction) and the Owner Operators.

CATIA IES solutions for the plant business are based on proven PLM solutions successfully implemented in manufacturing and shipbuilding. These effective methods have been applied to plant by utilizing repeatable standards and creating new systems of parametric "building blocks." Therefore great economic gains can be achieved.

For more information

Contact your IBM Marketing Representative, IBM Business Partner or visit the IBM PLM Web site at ibm.com/solutions/plm.



© Copyright IBM Corporation 2002

IBM Corporation
2900 Charlevoix Drive S.E.
Grand Rapids, MI 49546

Printed in the United States of America
01-02
All Rights Reserved

IBM and the IBM logo are trademarks or registered trademarks of IBM Corporation in the United States, other countries, or both.

CATIA, ENOVIA and DELMIA are registered trademarks of Dassault Systemes, S.A.

CADAM is a registered trademark of Dassault Systemes of America.

Microsoft, Windows, Windows NT and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.

Other company, product and service names may be trademarks or service marks of others.

References in this publication to IBM products or services do not imply that IBM intends to make them available in all countries in which IBM operates.



Printed in the United States on recycled paper containing 10% recovered post-consumer fiber.



G121-7306-00