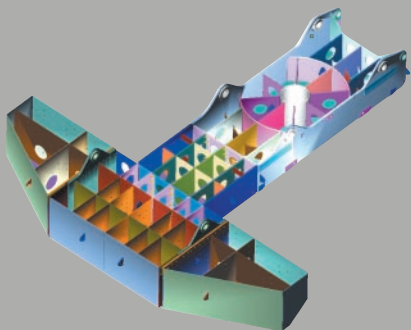


Bucyrus International, Inc.

MOVING THE SURFACE MINING EXCAVATION MARKET WITH SOLIDWORKS



The SolidWorks integrated mechanical design system supports a collaborative approach to assembly and subassembly design at Bucyrus International, Inc.

→ Since the company's founding in 1880, the name Bucyrus® has become synonymous with excavating equipment. Used extensively on the excavation of the Panama Canal, one of the largest excavation projects of the early twentieth century, Bucyrus machinery has evolved over time in both size and sophistication. Headquartered in South Milwaukee, Wisconsin, Bucyrus International, Inc. has earned a world-wide reputation for innovation in the design and manufacture of surface mining equipment, including shovels, drills, and draglines, through its commitment to leveraging technology to help its customers meet their productivity goals.

A global leader in the manufacture of shovels, drills, and draglines for the surface mining industry, Bucyrus International, Inc. grew in 1997 through the acquisition of the Marion Power Shovel Company. As part of that acquisition, Bucyrus began an assessment of how the merged companies developed products. The obvious starting point was the company's design and engineering tools, according to Designer Frank Szepek.

"With 2D drafting, final assembly detail drawings for such things as hydraulic plumbing runs were occasionally completed after the actual factory fit-up was done," Szepek explains. "We knew 3D solids were the way to go to achieve improved efficiencies, so we acquired several seats of SolidWorks® software and began experimenting, using it in a limited role on small projects."

Delivering products faster, setting a new standard

Bucyrus's early experience with SolidWorks software led the company to select the package as its standard design tool. According to Rick Correll, computer graphics administrator, Bucyrus chose SolidWorks 3D modeling software because of its ease of use, large assembly capabilities, 3D visualization and animation features, and tight integration with product data management (PDM) and analysis tools. By using SolidWorks, Bucyrus has shortened its product design cycle by 25 percent, reduced its analysis time by 20 percent, and raised product confidence by 25 percent.

Because Bucyrus uses SolidWorks software to design machines in subassemblies or "zones" such as the operator cab assembly, the utility room assembly, the lube room assembly, the ballast box assembly, and the electric room assembly, the company now delivers machines by shipping subassemblies in stages, providing improved organization and instructions to field assembly personnel. Under the new system, Bucyrus has virtually eliminated assembly changes in the field and reduced field assembly time on its latest electric shovel product line from 90 to 60 days, setting a new standard for product delivery in the surface mining equipment market.

Dynamic assemblies

Bucyrus leverages the physical dynamic assembly capabilities in SolidWorks to perform clearance checks on large assemblies and moving pieces in its machines. The company also uses SolidWorks assembly capabilities to make sure there are no interference problems.

"All of our machines are big and involve thousands of components. SolidWorks helps us to easily resolve problems that in the past were not discovered until we began assembling the machines," notes Rick Correll, computer graphics administrator.

Bucyrus can also simulate cab visibility in SolidWorks to ensure nothing obstructs the operator's view, according to Designer Derrick Juul. "With SolidWorks, we have a better handle on where everything is located because it's all modeled in 3D," Juul says.



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- Reduced analysis time by 20 percent
- Improved product confidence by 25 percent
- Reduced field assembly from 90 to 60 days

- A global leader in the manufacture of shovels, drills, and draglines for the surface mining industry, Bucyrus International, Inc. began evaluating 3D CAD systems in 1997 in an effort to improve design productivity and create computer visuals. Bucyrus selected SolidWorks software because of its ease of use, large assembly capabilities, 3D visualization and animation features, and close integration with PDM and analysis tools.
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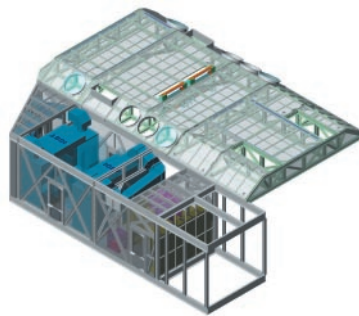
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Integrated applications save time

By using applications integrated with SolidWorks software, Bucyrus has taken a concurrent approach to engineering and realized additional productivity gains. Through consulting services provided by IMPACT Engineering Solutions, Inc., a SolidWorks Certified Gold Services provider, Bucyrus performed an audit of its engineering information flow and developed and implemented a plan to address a full range of integration and process issues, including infrastructure, training, and maintenance.

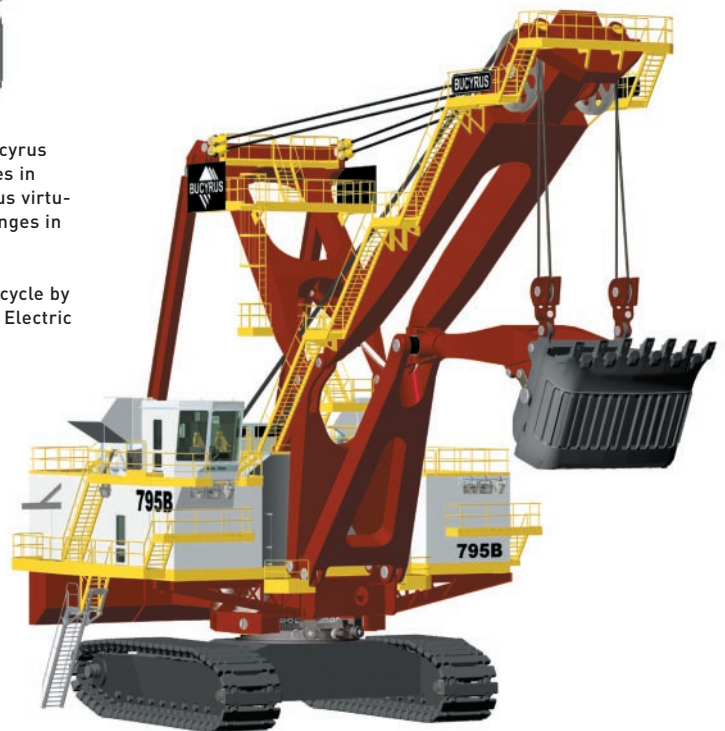
Using the Matrix® product data management (PDM) system to manage SolidWorks design data, separate teams work in parallel on different subassembly zones during conceptual design. "By bringing information out of Matrix into SolidWorks, we kept current with the other design teams," Szpek says.

Using COSMOSWorks® analysis software, which is fully integrated with SolidWorks software, Bucyrus has cut its analysis time on the project by 20 percent, Correll said. The number of Bucyrus engineers who can perform analysis has doubled as a result. Bucyrus also uses SolidWorks design communication tools to create photorealistic animations for customer presentations. "Instead of doing shadow casts and trying to make 2D drawings come to life, the graphics we produce now take the conversation to an entirely new level," says Marketing Manager Kent Henschen.



With SolidWorks software, Bucyrus engineers can design machines in subassemblies or "zones," thus virtually eliminating assembly changes in the field. **ABOVE**

Bucyrus shortened its design cycle by 25 percent on the Model 795B Electric Mining Shovel. **RIGHT**



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