An international consulting firm, Consultec Ltd. has provided complete design engineering services for industrial projects worldwide since 1975. The firm handles all aspects of plant development and has built a reputation for technical excellence and high standards through the successful completion of over 2,000 development projects.

Until 2008, Consultec utilized AutoCAD® 2D design tools. However, the availability of integrated 3D solutions enabled Consultec to take a leadership role in establishing a new 3D design paradigm for plant and factory development.

“The traditional approach to plant design was to complete work on different systems—process equipment, mechanical, structural steel, electrical, piping, etc.—in separate 2D development silos,” says President Alex Ochrym. “All of those disconnected system designs had to be reconciled, often resulting in lengthy delays, unplanned retrofits, and additional costs.”

“Our Integrated Plant Design (IPD) concept utilizes multidisciplinary teams, who collaborate on every facet of plant design using a single, common 3D model,” Ochrym continues. “The IPD approach and the processes that we have developed to support it save time, reduce costs, improve quality, and streamline plant development. To make IPD a reality, we needed a robust, integrated 3D design platform.”

Anthony Di Donato, Consultec director of IPD, says the firm evaluated 3D systems before standardizing on SolidWorks® software as the best development environment for supporting IPD. “At its core, IPD means that all project drawings are produced from a single SolidWorks 3D model,” Di Donato explains. “While modeling of process equipment is by no means a new phenomenon, the concept of IPD takes matters a step further. All project deliverables—ducts, piping, steel, concrete, cable trays—are produced directly from the (SolidWorks) model.”

**Challenge:**
Streamline and integrate minerals processing plant design to accelerate project completion.

**Solution:**
Implement SolidWorks Professional and SolidWorks Premium design software, SolidWorks Enterprise PDM (EPDM) product data management software, and SolidWorks Simulation analysis software to deliver Integrated Plant Design (IPD) capabilities to the development of minerals processing plants.

**Results:**
- Improved plant design completion speed by 40 percent
- Reduced plant design man-hours by 40 percent
- Facilitated project integration/collaboration
- Streamlined change management
Consultec chose SolidWorks software to drive IPD, which the firm intends to market to plant developers, because SolidWorks solutions are easy to use, facilitate the handling of large assemblies through the use of weldments, and support an integrated approach to plant development. Consultec acquired 25 licenses of SolidWorks Professional and SolidWorks Premium design software, 40 licenses of SolidWorks Enterprise PDM (EPDM) product data management software, and SolidWorks Simulation analysis capabilities.

**IPD saves time and man-hours**

Using SolidWorks software for IPD on a recent material handling project, Consultec documented time savings of 40 percent—both in the length of the project and the man-hours required. “For Consultec, the initial investment (in SolidWorks) has already been paid off as we are realizing a close to 40 percent speed efficiency gain, which translates into not only higher profitability in engineering, but improves the overall efficiency of project execution and construction, which has potentially a much larger cost-savings impact,” Ochrym explains.

“After adopting the IPD process using SolidWorks, we’ve realized a 40 percent reduction in man-hours as well,” Di Donato adds. “There is little doubt that an IPD approach to project delivery will become the norm in minerals processing engineering.”

**Improved collaboration and integration**

With SolidWorks EPDM, Consultec has established an IPD-based project workflow that enhances integration and facilitates collaboration. For example, on a recent material handling project, the company broke the project down into a series of process areas, using a “driving sketch” of the entire model to define the geometry. By establishing key global references for all process area subassemblies, the IPD-based driving sketch provided a significant breakthrough in terms of guiding collaboration, integrating systems development, and eliminating costly rework.

“Because our multidisciplinary team works on a single model for the project, not only are there fewer surprises and miscommunications, there’s also more collaboration, resulting in innovative ideas and approaches,” Ochrym notes.

**Easier to visualize and change designs**

Using SolidWorks software to drive IPD has also led to better project visualization, design communication, and change management. For example, through regular web meetings, plant maintenance staff was able to comment directly on accessibility issues, equipment vendors could delineate interconnection boundaries, and construction contractors clearly visualized the scope of work. “With a parametric-based model, changes to key data can be seamlessly carried down through all project deliverables,” Di Donato says.

Other advantages of using SolidWorks to drive an IPD approach to project engineering include visualizing the entire project at a single glance, helping plant personnel study operational requirements through animated walk-throughs, reducing engineering time, compressing the overall project schedule, making change management easier, and producing bills of materials (BOMs) or construction quantities directly from the design model and automatically updating them as design changes are made.

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