

Market: *Oil and Gas*

Sondex gets down to business with oil and gas well instrumentation designed in SolidWorks® 3D CAD software

A lot of things can go wrong several miles below the seabed where pressure builds up to 20,000 pounds per square inch (PSI) and temperatures inside an oil or gas well can reach 200 degrees centigrade. For example, the metal lining of the well can develop weak spots that could crack and cause petroleum companies and their investors serious headaches.

Longstanding methods for dealing with such problems involve “controlled” mini explosions to cut out the weak areas, cap the pipe and start with a new well, or sending down corrosive chemicals to cut out the pipe at the weak link before re-setting it. Both methods are inexact and their success is questionable.

“Big money is at stake. Petroleum companies can’t afford to have a single well out of commission because the production loss can cost millions,” said Nick Broom, design office manager at U.K.-based downhole oilfield technology company Sondex plc. “Repairing those wells quickly and dependably is paramount.”

Sondex has used SolidWorks® 3D CAD software to develop a line of precision mechanical cutting tools that oil rig operators send down the well to fix weakened areas of the pipe and begin pulling oil from the ocean’s floor again. Sondex, whose customers include global giants Halliburton and Schlumberger, has made a reputation for developing tools that help well operators better understand what’s going on with their wells including temperature variations, fluid identification and flow levels.

The company’s tools have to be precise and durable to stand up to extreme conditions. That’s why the company adopted SolidWorks software in place of the 2D drafting tools it formerly used. SolidWorks allows Sondex engineers to visualize the close-fit tolerances and structural integrity of the small mechanical devices that global oil companies depend on.

Keeping wells in order

Maintaining wells so they deliver maximum petroleum products around the clock can be tricky. For example, oil rigs in the North Sea must contend with extreme temperatures and vicious storms that can rattle a platform. Additionally, obtaining accurate information about a well’s health and the conditions affecting extraction can be difficult from miles away.

Sondex had been using 2D software to design its tools, but the software was inflexible, forcing engineers to re-work designs to fix errors and produce several prototypes. The process delayed product development and increased prototyping costs. Sondex adopted SolidWorks to identify and fix errors before *prototyping* begins. Sondex uses 25 licenses of SolidWorks Office Professional in offices in the U.K., Calgary in Canada, and Louisiana in the U.S.


Sondex PLC

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Challenge: Design small, durable downhole instrumentation components that stand up to harsh environments.

Strategy: Adopt SolidWorks 3D CAD software to improve design visualizations, reduce errors and streamline development.

Results: Cut costs and reduced time to market by eliminating second phase prototyping.



“SolidWorks’ biggest advantage for us is right-first-time design,” said Broom. “We can now see exactly how precision components fit together and prevent interference. The software helped us design the actuator that ensures the cutting tool is in the exact spot it needs to be, even though the entire assembly is in a tight space. That vision allows us to avoid a second stage of making physical models so we can begin production sooner and more affordably.”

Sondex designed a cutting tool that operators use to make a precise cut below a damaged area of the metal pipes that line the well. The operator will then retract the damaged section of the pipe down to the cut, allowing replacement or repair.

Design accuracy and communication

To manage all of the design data the company generates, Sondex uses SolidWorks PDMWorks® Workgroup product data management software. PDMWorks Workgroup enables multiple engineers to work concurrently on the same design or multiple designs without introducing errors or creating version control problems. PDMWorks safely vaults all design data while providing project managers with an audit trail to see who has provided what design work when.

“PDMWorks allowed us to establish proper work flow to ensure the correct drawing controls are applied,” said Broom.

Though Sondex’s vendors and manufacturing partners use a variety of CAD platforms, Sondex shares design information with them using SolidWorks eDrawings® e-mail-enabled design communication tool. eDrawings allows recipients to view, rotate, and edit solid models or 2D drawings of projects regardless of whether they have CAD software.

“The SolidWorks’ product family has proved indispensable to our process,” said Broom. “Part costs can be very high, and the software lets us maximize those parts in development and manufacturing so oil and gas rig workers can depend on our products to ensure production continues smoothly.”

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