

NIKKISO CRYO, INC.

Accelerating cryogenic pump development with SolidWorks Professional

NCI utilized SolidWorks Professional design solutions to increase throughput in the development of cryogenic pumps for the natural gas and cryogenic fluids industries.



Cryogenic pumps are critically important for the natural gas and cryogenic fluids industries, and Nikkiso Cryo, Inc. (NCI), has risen to become a leading manufacturer of these vital pieces of equipment. From its global development center near Las Vegas, the company designs, produces, and tests submerged motor-driven centrifugal pumps, which are used for moving cryogenic fluids, such as liquefied natural gas (LNG), methane, ethane, ethylene, nitrogen, propane, and butane. Development of these pumps is particularly challenging because they must perform while submerged in a cryogenic fluid, often at temperatures well below 0°C.

Until 2007, Nikkiso Corporation performed all of its design work in Japan, with LNG testing performed at its NCI facility in Las Vegas. Engineering Manager Mark Geldmacher joined the company at that time and undertook the task of migrating product development to the United States. By sharing the design, assembly, and testing of pumps between both facilities, Nikkiso Corporation management believed the manufacturer could shorten delivery times and gain a competitive advantage in the global marketplace.

"I was brought into the company to help develop an engineering capacity at the NCI facility in Las Vegas," Geldmacher recalls. "Part of my coming on board was the stipulation that we would only use a 3D CAD system and develop a solid model-based engineering group. 3D is the only way that we can achieve the productivity gains required to consistently beat the competition. We began with PDF files of previous 2D pump designs and had to select a 3D system to create models of existing designs and drive future product development."

Geldmacher evaluated 3D solutions and chose SolidWorks® Professional software. Nikkiso Cryo standardized on SolidWorks software because it is easy to learn and use, facilitates design reuse, supports high-quality design visualization, and includes SolidWorks Routing capabilities.

"Time is of the essence in our industry, and I liked the SolidWorks approach, including how well integrated it is with other tools," Geldmacher explains. "We had a big job ahead of us, and I saw SolidWorks as the best modeler for helping us get it done."

Challenge:

Establish a model-based engineering department to take over product development from the parent company in Japan and perform at a level that exceeds the competition.

Solution:

Implement SolidWorks Professional design software to support a model-based engineering environment.

Results:

- Reduced design cycle time by 33 percent
- Increased annual throughput from six to over 100 pumps
- Assumed bulk of corporation's pump development effort
- Improved communications with customers

Shorter development cycles

Since implementing SolidWorks Professional software, Nikkiso Corporation has not only successfully migrated product development to its NCI facility at the Las Vegas location but has also shortened design cycles by an average of 33 percent. Annual throughput of pumps engineered at NCI has grown from six pumps during the first year of the migration to over 100 pumps in 2011.

"Our pumps are all custom-engineered for specific applications, yet we have still been able to maximize design reuse to generate greater efficiencies," Geldmacher points out. "Even though our pumps come in a variety of sizes and shapes, there are many individual components and assemblies that we can share or quickly modify from one product to another. We make great use of design configurations in SolidWorks to facilitate design reuse and quickly create component designs of different lengths, heights, and travel times. Nikkiso Cryo production used to take up to 18 months. Using SolidWorks, we have been able to speed up that process to no longer than 12 months."

Routing the Cryogenic Pump Test Facility (CPTF)

Using SolidWorks Routing tools, Nikkiso Cryo has realized additional productivity gains at its test facility. Product Testing Engineer Sylvia Duran uses SolidWorks to develop customized tooling to accommodate and test every pump that the company produces. "Our test pad consists of roughly 250 pipe sections," Duran says. "With SolidWorks Routing, I have the flanges, pipes, valves—everything that I need to develop a testing system for each pump."

"I'm setting up and modifying the test pad to replicate each customer's conditions," Duran continues. "With SolidWorks, I can bring the pump model into the test pad model and see where I have to make changes or create tooling. I have to make sure that it all works when we test the pump, and SolidWorks enables us to do that in a way that saves time and money."

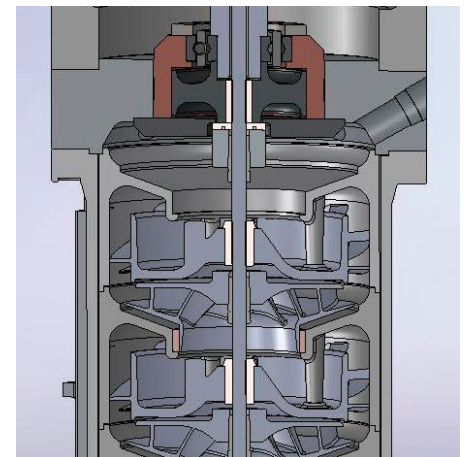
Gaining an edge on the competition

The SolidWorks implementation has given Nikkiso Cryo an advantage over its competitors, most of which still utilize 2D technology. From the sales and marketing phase through development, production, and testing, SolidWorks design visualization tools allow Nikkiso Cryo to accelerate delivery and improve communications with its customers.

"We're at least three months faster than everyone else," Geldmacher stresses. "In addition to offering shorter delivery times, the fact that we're model-based means that we can show customers what we are doing and how the pump will work. Clearly, SolidWorks gives us a competitive advantage."

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Mark Geldmacher
Engineering Manager



Using SolidWorks Routing tools, NCI can efficiently develop test systems for its pumps.



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