By moving from 2D tools to SOLIDWORKS 3D design software, WZI not only realized productivity gains in the design of its valve products, the company also is benefiting from a 3D-model-based definition (MBD) approach to manufacturing.
Challenge:
Transition from 2D to 3D design to take advantage of finite element analysis (FEA) tools and extend the use of 3D CAD technology beyond design to support a more efficient and cost-effective model-based definition approach to manufacturing.

Solution:
Implement the SOLIDWORKS 3D product development platform.

Benefits:
- Cut dimensioning time by 40 percent
- Reduced NC code generation time by 80 percent
- Decreased configuration modeling time from one week to one day
- Shortened R&D prototyping by six months

Wuzhong Instrument Co., Ltd. (WZI) is a leading global manufacturer of industrial control valve products. The company’s control valves, which became the preferred solution in the Chinese industrial market throughout the 1980s and 1990s, are now exported to markets around the world, including the United States, Japan, Korea, Malaysia, Mongolia, Singapore, Iran, Pakistan, Israel, Burma, and India. Today, WZI produces a complete range of control valve products—including ball valves, butterfly valves, and specialty valves—which are used for automation purposes in the petroleum, natural gas, chemical, power, metallurgy, paper, pharmaceutical, food processing, and environmental protection industries.

For many years, WZI utilized AutoCAD® 2D tools to develop its products. However, as many Chinese companies began to move from 2D to 3D product development, WZI management also decided to make the transition to 3D, according to Project Manager Chang Zhandong. “There’s been a real dynamic paradigm shift from 2D to 3D for product development and manufacturing in China,” Zhandong says. “Everyone around us was moving from 2D to 3D—and we didn’t want to be behind. The ability to efficiently use finite element analysis (FEA) to run design simulations, which require a 3D model, was also a critical driver of our move to 3D.”

After evaluating the Pro/ENGINEER® and SOLIDWORKS® 3D design systems, WZI chose SOLIDWORKS software because it is easy to use, supports model-based definition manufacturing, and provides the best combination of functionality and price. “We tried Pro/ENGINEER, but it’s too complicated, difficult to learn, and expensive,” Zhandong recalls. “SOLIDWORKS is the easiest to learn of all the 3D CAD products, which can be attributed to the innovation of its interface and workflow design. For example, it’s very easy to customize the part library and reuse library components. Designers can also define their own frequently used commands. For us, SOLIDWORKS was the best fit in terms of capabilities, ease of use, and value.”

TRANSITIONING TO 3D SAVES TIME
When WZI transitioned to SOLIDWORKS design software, the company’s designers and engineers immediately benefited from the software’s configuration, interference detection, and simulation capabilities. The ability to create a family of model configurations using a design table that is linked to the initial design produced substantial time savings—reducing the process from a week to one day—and the application of interference detection tools helped to minimize design errors.

Using SOLIDWORKS SimulationXpress, WZI conducts static stress analyses on parts to verify valve wall thicknesses and validate that the stresses caused by torque near inlets and outlets will not result in failure or impede performance. “SOLIDWORKS shortens new product R&D cycles, intuitively presents design details, and facilitates design structure evaluation,” Zhandong notes. “For new model prototypes, SOLIDWORKS stress analysis and dynamic simulation tools saved us significant R&D cycle time and costs. We didn’t measure the cost savings, but a recent case showed about six months of time savings.”

We decided to define everything in 3D, populate our 3D models with product manufacturing information—such as tolerancing, dimensioning, process card, and routing sheet information—and output SOLIDWORKS models to automatically generate NC code and SOLIDWORKS eDrawings instead of paper to more efficiently drive production.”

— Chang Zhandong, Project Manager

TAKING ADVANTAGE OF MODEL-BASED DEFINITION
After successfully transitioning to SOLIDWORKS 3D, WZI management realized that it was still outputting paper 2D drawings to drive production and spending a lot of time and resources on 2D. To extend the benefits of 3D to the production side of its operations, the company decided to install touch-screen terminals on the shop floor, equip them with the SOLIDWORKS eDrawings® Viewer, and utilize a model-based definition approach to manufacturing its products.
“We decided to define everything in 3D, populate our 3D models with product manufacturing information—such as tolerancing, dimensioning, process card, and routing sheet information—and output SOLIDWORKS models to automatically generate NC code and SOLIDWORKS eDrawings instead of paper to more efficiently drive production,” Zhandong explains.

**MAKING PRODUCTION MORE EFFICIENT**

By using SOLIDWORKS software to drive model-based definition manufacturing, WZI has automated and accelerated production, reducing NC code generation time by 80 percent, cutting dimensioning time by 40 percent, and streamlining the handling of engineering change orders (ECOs), all while completely eliminating 2D tasks and the company’s reliance on paper drawings.

“SOLIDWORKS enables us to present the product manufacturing information in 3D digital format on the shop floor,” Zhandong stresses. “We embed the tolerancing and dimensioning information in the sketch, and use the models’ default values for design that we are very sure about. For the exceptions, we use the SOLIDWORKS DimXpert™ to add tolerancing and dimensioning information. This approach has automated manufacturing, and the transition to SOLIDWORKS has paid dividends in both development and production.”

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