Sichuan Kehong Oil and Gas Engineering, Ltd.

Customer Success Story

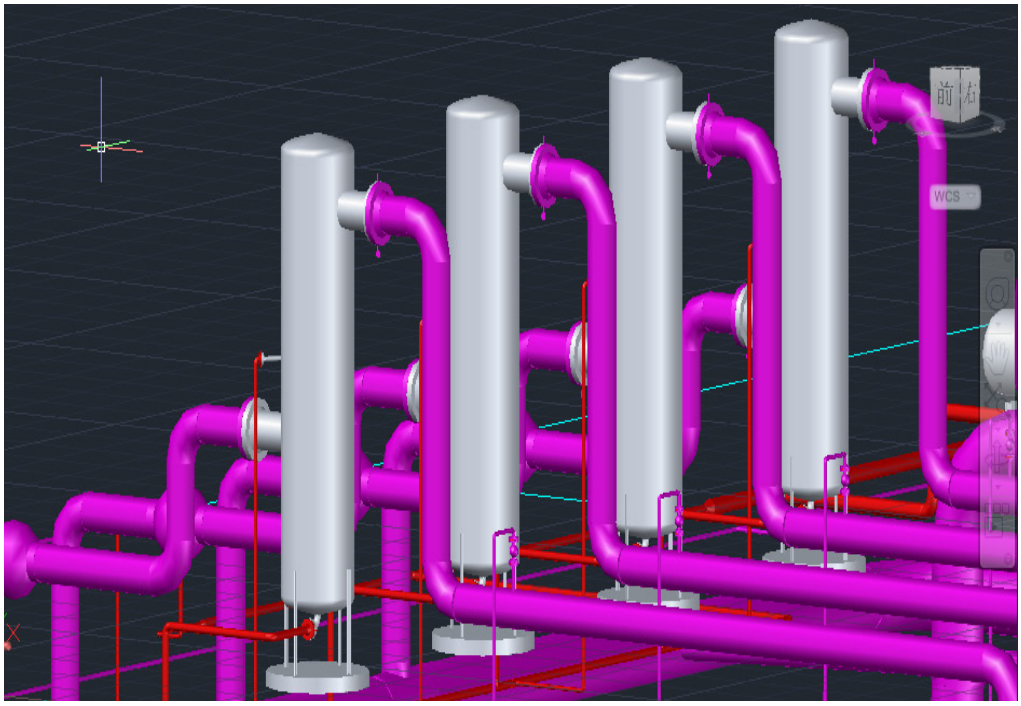
AutoCAD® Plant 3D
AutoCAD® P&ID

Oil and gas engineering firms must work with many kinds of nonstandard equipment and pipe fittings that are unique to the industry. AutoCAD Plant 3D and AutoCAD P&ID can support these industry needs and improve work efficiency and accuracy for customers.

—Chen Li
Engineer
Sichuan Kehong

1,600-kilometer pipeline goes 3D.

Sichuan Kehong turns to AutoCAD Plant 3D and AutoCAD P&ID to help accelerate design on major natural gas pipeline.



Project Summary

Sichuan Kehong Oil and Gas Engineering Co., Ltd. (Sichuan Kehong) is an exploration and design company owned by CNPC Chuanqing Drilling Engineering Company. Sichuan Kehong delivers engineering and design services to the oil and gas industry in China and other countries. Employing more than 500 people in seven offices within China, the company has grown to meet increasing demand for its services. The Zhongwei-Guiyang Natural Gas Connection Line Engineering Project exemplifies the company's engineering and design capabilities. Encompassing three trunk lines, the project will connect three major regions within China and help ensure reliable natural gas supplies in the country. The three lines will cover more than 1,600 kilometers, cross 26 rivers, and include 55 ridge tunnels. To help execute this ambitious project, Sichuan Kehong turned to AutoCAD® Plant 3D and AutoCAD® P&ID software from Autodesk. Using these 3D design tools from Autodesk, the company has been able to:

- Begin using 3D software in less than two weeks
- Develop P&IDs faster and more automatically
- Produce materials lists in one hour instead of three days
- Complete isometric ISO drawings in as little as one hour

The Challenge

The size of the Zhongwei-Guiyang Natural Gas Connection Line Engineering Project presents a number of challenges. Crossing several provinces in China, the scale of the project requires that the team grapple with changing topography and elevations. The new lines also must connect to a number of existing lines and avoid colliding with other types of underground infrastructure. The 2D tools the team used in the past do not provide sufficient ability to manage all the complex factors in the project efficiently. Additionally, the 2D tools require manual processes to track the materials used on the project, which would take significant time.

Wu Xiaoli, Sichuan Kehong's 3D group leader, explains one of the disadvantages of 2D software: "Drawing modification is inevitable in the project implementation process. In the 2D era, construction drawing modification and material statistics consumed both time and effort, and data inaccuracies were common."

The Solution

After winning the project, Sichuan Kehong decided to adopt 3D design software to help its team execute the project. However, the company believed it was important to choose the correct 3D tools. It had tried 3D software on a limited

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Autodesk solutions help speed design on major natural gas pipeline.

scale in the past, but the software's unfamiliar, English language-based interface made it difficult to learn and use. Sichuan Kehong decided to adopt AutoCAD Plant 3D software to model the pipeline and AutoCAD P&ID software to develop P&IDs for the project.

According to engineer Chen Li, the fact that AutoCAD Plant 3D and AutoCAD P&ID software are based on the familiar AutoCAD® interface helped drive the choice. "AutoCAD Plant 3D and 2D AutoCAD software products share many operating instructions. Moreover, AutoCAD Plant 3D software has visual Chinese interfaces and is easy to use," he says. "In less than two weeks, we were able to use AutoCAD Plant 3D and AutoCAD P&ID skillfully and meet the design needs of the Zhongwei-Guiyang Natural Gas Connection Line Engineering Project."

Faster P&IDs

One of the first things the design team did on the Zhongwei-Guiyang project was use AutoCAD P&ID to develop P&IDs for the pipeline's many stations, such as gas transmission head stations, compressor stations, and pipe clearing stations. The intelligent, automatic functions in AutoCAD P&ID enabled the design team members to improve work efficiency. They discovered AutoCAD P&ID includes features such as automatic disconnection of pipelines at intersections that allow for faster and convenient pipeline processing. The software also supports pipe movement when the pipeline and equipment are connected. These features helped save significant time during design adjustment in the preliminary design stage.

Improved Efficiency

As valuable as the team found AutoCAD P&ID software, they were even more impressed with the 3D capabilities of AutoCAD Plant 3D software. Being able to view their work in 3D is helping Sichuan Kehong's team members identify and address interferences more easily. But the advantages are not just visual. The intelligent model helps the team keep track of materials automatically.

"AutoCAD Plant 3D allows users to modify drawings on 3D models directly and view modified results, thus improving project implementation," says Wu Xiaoli. "In particular, these 3D models can automatically generate material report forms based on modified construction drawings and thus, help to save time and improve work efficiency."

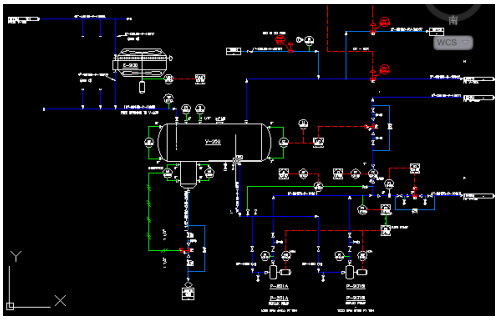
Chen Li adds, "In the past, for projects similar to the Zhongwei-Guiyang project in terms of complexity and size, it would take at least three to four days for skilled design personnel to collect statistics on material tables and equipment lists. With AutoCAD Plant 3D models, this process can be completed within less than one hour."

More Connected Processes

The team found AutoCAD Plant 3D particularly helpful as they designed the piping within the many stations along the pipeline. This is because AutoCAD Plant 3D allowed the team to work with so many elements of the design as an integrated model. For example, being able to use a more connected, model-based process for pipeline ISO drawings helped save significant time. Without AutoCAD Plant 3D, the team would have had to develop their ISOs on refraction graphs on 2D drawings, a process that would have taken as long as three weeks.

"AutoCAD Plant 3D allows direct exchange of data with 3D models, pipelines, instruments, ISO drawings, and layout and section drawings," says Sichuan Kehong engineer Che Xiaokun. "With the software, designers can more quickly search and edit information inside the drawings to promote information consistency, timeliness, and accuracy."

Chen Li gives additional detail. "In the AutoCAD Plant 3D environment, designers can easily



complete ISO drawings within one hour by just punching several keys," he says. "Plain layout is another example. This used to take around three weeks. After 3D drawings are produced, plain layout basically can be completed on the models within one or two hours."

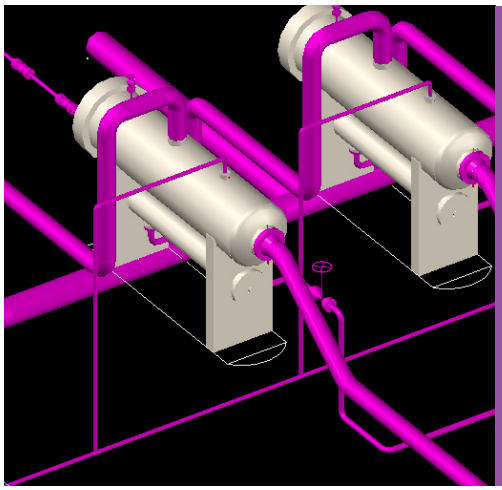
Results

The team at Sichuan Kehong is not only pleased with the timesaving enabled by AutoCAD Plant 3D and AutoCAD P&ID, they are satisfied with the way the applications support the needs of their industry. "Oil and gas engineering firms must work with many kinds of nonstandard equipment and pipe fittings that are unique to the industry," says Chen Li. "AutoCAD Plant3D and AutoCAD P&ID can support these industry needs and improve work efficiency and accuracy for customers."

Wen Hairong, project manager with Sichuan Kehong, sums up his view of the advantages of using AutoCAD Plant 3D: "I have found AutoCAD Plant 3D to be an excellent plant design, modeling, and construction drawing software. AutoCAD Plant 3D has brought the most modern design workflow to engineers and achieved the effects I expected."

Learn More

Gain the advantages on AutoCAD Plant 3D and AutoCAD P&ID on your pipeline projects. Visit **www.autodesk.com/autocadplant3d** to learn more.



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Images courtesy of Sichuan Kehong

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