DASSAULT SYSTEMES

ENERGY, PROCESS & UTILITIES CASE STUDY

YELLOW RIVER ENGINEERING CONSULTING CO. LTD.

Challenge:
To gain a larger market share in a rapidly expanding but intensely competitive water conservation, hydropower and mega civil works industry, China's engineering consulting firm Yellow River Engineering Consulting (YREC) needed to improve its efficiency and the quality of its designs, and to deliver more value throughout their projects' full lifecycle.

Solution:
The company chose Dassault Systèmes' **3D**EXPERIENCE platform and the *Engineering Excellence* industry solution experience for collaborative design and innovative production.

Benefits:
With the **3D**EXPERIENCE platform, YREC has revolutionized design and engineering through digitization, enabled multi-disciplinary collaboration through a single source of information, and improved stakeholders' responsiveness.

CHINA'S RAPID INFRASTRUCTURE DEVELOPMENT CREATES NEW OPPORTUNITIES

China's Yellow River is one of the world's most difficult rivers to control. As a result, the Ministry of Water Resources of the People's Republic of China adopted various flood management plans dedicated to managing and developing this waterway. Their objectives are to protect the lives, property and safety of millions of people living along the river as well as to support the economic development of the adjacent regions. Yellow River Engineering Consulting (YREC) is an engineering consulting firm devoted to river management and development, water conservation and hydropower-related projects. The company was restructured into a technology company in 2003 and has since successfully designed and built more than 30 large and middle-scale water conservation facilities and hydropower utilities on the Yellow river and its tributaries. "China is experiencing rapid infrastructure development, which is why there is an increasing need for water management, hydropower and civil engineering projects," Xindai An, president, YREC, said. "The market has huge growth potential and the competition is fierce. If a company wants to win a share of this market, it must improve the design quality of projects as well as its efficiency while reducing costs."

"Today's engineering design teams face difficult challenges that include higher design complexity, shorter cycle times and clients asking to view their project`s progress throughout the creation process," said Shunqun Yang, leader of YREC's engineering design academy. Even though opportunities abound, the design industry must evolve to win new business.

EFFICIENT COLLABORATION, FASTER DESIGN

To improve YREC's success rate in this competitive landscape, the company adopted Dassault Systèmes' **3D**EXPERIENCE® platform for collaborative design and innovative production. "We extensively tested several solutions before concluding that **3D**EXPERIENCE was best positioned to improve our efficiency and the quality of our work," Yang said. "The platform has revolutionized our traditional design approach thanks to its 'what you see is what you get' capabilities. This way, our clients have a precise idea of what the end result will be and how it fits into the surrounding environment before construction teams even break ground. In the past we mainly relied on 2D drawings for our projects. On the construction site the owner and supervisor were not easily able to see last minute, onsite changes. Geographic conditions in the field often change and 2D drawings are unable to reflect these changes in real-time, making field response time very slow. Now, thanks to 3D models, and the collaborative capabilities of the **3D**EXPERIENCE platform, communication between those working on-site and our designers in the office has considerably improved. Everyone can access the latest models and make decisions and changes in real time, saving significant time and money," he said. "In addition to owners, the **3D**EXPERIENCE platform also improves communication with government officials, which facilitates and accelerates project decisions," Xindai An emphasized.

"In the past designers and those in the field would exchange files through email but errors in versioning or lost information generated frustration and a series of problems," Lili Guo,

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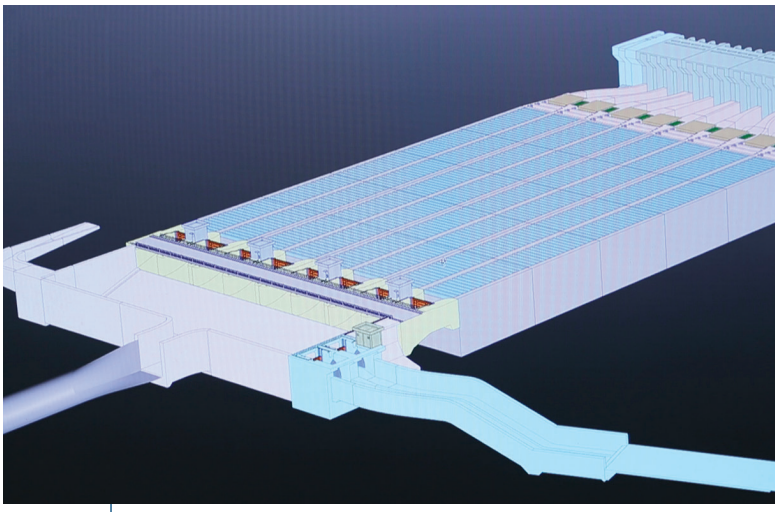
— Xindai An
President of Yellow River Engineering Consulting

director of digital engineering center of the Engineering Design Academy at YREC said. "With the **3D**EXPERIENCE platform we design using one single data source and can see each other's work, which significantly improves the quality of our communication. Design reviews are done on line and an error can immediately be corrected. It's a very straightforward, intuitive and efficient way of working," she said.

Excavation design is one of the most challenging tasks that each project faces in the earliest stages. "In engineering construction projects related to water conservation and hydropower, excavation design is a discipline involving complex space," Guo said. "The probability of making a mistake is high because the different disciplines intervening do not adequately consult each other during the preparation stages. With the **3D**EXPERIENCE platform, multiple involved disciplines can concurrently open a model and can analyze various interactive influencing factors for the excavation design before choosing the best approach, all in a digital environment. It's a huge advantage," she said.

Hydropower structures are massive and generally contain civil works and machinery that may impact a range from several kilometers to tens of kilometers. "With the previous solution, we would have to scale down civil works models, but the machinery equipment was designed on a 1:1 scale," Guo said. "When we would combine the two, we often ran into problems. Now with **3D**EXPERIENCE, we create our designs in real scale, which is convenient. Moreover, interfacing with third party software in the past was a problem because our previous solution did not support a geodetic coordinate. This is no longer an issue since with the **3D**EXPERIENCE platform we can base our designs fully on geodetic coordinates."

"In the past, many of our designs, especially those with irregular structures, could not be prototyped but only visualized after they were built," Yang said. "With the **3D**EXPERIENCE platform, the real component shapes for complex structures like our spiral castings can now be visualized directly once the design is completed. Another area where digital simulation is useful is when laying out rebars in reinforced concrete structures. As we position them in the virtual environment, the system automatically detects interferences, which we can then easily correct in advance. In this way, we can present our project to the customer with confidence."



Top image: 3D Design and project management within the **3D**EXPERIENCE platform

Bottom image: View of a 3D model on the **3D**EXPERIENCE platform

Focus on Yellow River Engineering Consulting
Engineering consulting firm and general contractor devoted to water conservation and hydropower projects.

Projects: planning, investigation, design, consulting, scientific research, project supervision and general contracting for water conservation, hydropower, road and bridge, industrial and civil construction, municipal, subway, thermal power, wind power, photovoltaic power, ecological water conservation projects.

Employees: approximately 1920

Headquarters: Henan, China

For more information
www.yrec.cn

CAPITALIZE PROFESSIONAL KNOW-HOW AND EXPERIENCES

The civil works industry is subjected to high worker turnover and retaining professional know-how and experiences is a major challenge. "We can now capture corporate knowledge and experiences in the **3D**EXPERIENCE platform. As a result, design engineers including newcomers or colleagues working on other sites, can leverage the knowledge to efficiently complete their work," Guo said. "Worker safety is another major concern so our designers use this platform to test the comfort and safety of their design in an immersive digital environment, making their design green and worker-friendly."

Xindai An believes adopting the Dassault Systèmes' solutions was the right move. "The **3D**EXPERIENCE platform is the perfect solution for a design organization like YREC whose goal is to improve product design expression, quality and efficiency while optimizing engineering costs."

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