

# CASE STUDY



# CADWorx & Analysis Solutions



## MAJA Consulting introduces PEMEX to intelligent as-built 3D modeling

"We greatly improved our corporate image among clients using 3D modeling technologies."

Emmanuel Vega, Engineer at Maja Consulting Group

### PRODUCT INDEX

Intergraph® CADWorx® fieldPipe

### INDUSTRIES SERVED

• Petrochemical

Headquartered in Veracruz, Mexico, MAJA Consulting Group S.A. de C.V., provides innovative design and engineering solutions to clients. A major client is Petroleos Mexicanos (PEMEX), in charge of all exploration, production and sales in Mexico. With more than US\$ 106 billion in revenue, PEMEX is one of the largest companies in Latin America. PEMEX refinery subsidiary's facility in the Madero-Cadereyta corridor is one of the most important installations in northern México. To support a proposed renovation, PEMEX asked MAJA to model these six stations, including mechanical systems, pipelines, instruments, auxiliary services, civil engineering and processes.

### Modeling dispersed facilities in a short period of time

The US\$10 million project would require models of all processes, including twenty turbines, more than seventy pumps, electric motors, seven 200,000 barrel oil storage tanks, twenty-four filtering systems, six sets of instrument air systems, 52,000 meters of pipes ranging from ½ to 36 inches in diameter and more. This would require high levels of detail due to the numerous interconnected systems. Another challenge, for this eight-month project, was the early twenty-eight day window that was set aside for surveying the eighty acres of industrial facilities.

### Introducing intelligent three-dimensional 3D modeling to PEMEX

Convinced of the advantages of 3D models, the project's lead engineers, Ana Maria Macías Juárez and Gustavo Juárez Solís, and engineer Emmanuel Vega and his team of specialists, broke paradigms within PEMEX and established for the first time the intelligent 3D modeling of their industrial facilities. Their objective was to develop intelligent 3D models to help PEMEX support the proposed renovation and new technological developments regarding facilities and surface processes. The decision to use the Intergraph CADWorx platform for the intelligent 3D models proved beneficial for all stakeholders.

### Linking laser scanning with 3D models

Using a Laser Scanner HDS 6100, they captured civil work, pipe supports, pipelines, machines and equipment in just one scan with a high degree of accuracy and used CADWorx fieldPipe for Leica fieldPro to model the piping in the field in real time during the surveying. With CADWorx, they captured representative data then developed the entire 3D model, including pipelines, instrumentation, equipment, supports, and other components, interacting easily with Leica CloudWorx data. This required just three survey people in the field using the scanner to capture point cloud data and five specialists building models.

### Reducing survey time 70%, completing in record time

This first project for PEMEX using the CADWorx platform delivered great results. Surveying time was reduced by 70%, and they reduced project resources and production costs, completing the models in four months. They also saw improved visual results in the finished model while users reported ease of developing modeling skills and greater versatility in editing components. "We greatly improved our corporate image among clients using 3D modeling technologies," explained Vega. "We also eliminated the high costs of having dedicated servers to handle the software and removed the specialization of disciplines, with two users working across disciplines at the same time." These intelligent CADWorx 3D models will help PEMEX optimize operating procedures and the scheduling of maintenance activities. With real information on the state of equipment, decisions are easier regarding risks and the feasibility of upgrades, replacements, and extensions of proposed improvements. With this new perspective of their facilities and projects, PEMEX will have a better way to develop their activities.

### Intergraph CAS

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