HEXAGON

Case Study

WeldFit Energy Group, United States

Key Facts

Company: WeldFit Energy Group

Website: www.weldfit.com

Industry: Oil & Gas

Country: United States

Products Used:
PV Elite®

Key Benefits:

- Addressed high wind loading due to wind speed over a large area
- Accommodated rigging design for erecting the very tall vessel
- Enabled safe transportation of more than 1,000 miles by truck
- Reduced training time by one week

WeldFit Uses PV Elite® to Design Extremely Tall Process Tower

WeldFit Energy Group is a leading manufacturer of high-quality oilfield and pipeline equipment including hot tap tees, Sureloc line stop tees and Automated Pigging Systems. WeldFit's extrusion expertise, along with extensive machining and welding capabilities, give the company the ability to create a variety of standard and custom products. WeldFit's commitment to quality is evident in its ISO 9001:2008 certification and work carried out for the pipeline, oilfield, refining and petrochemical industries.

Large fabrication products include ASME boilers, API tanks, specialty skid units and modular pipe assemblies. Finished product sizes can range up to 18 feet in diameter, 110 feet long and 40 tons in weight.

Identifying Goals

WeldFit Energy Group was selected to design a 140-foot process tower using multiple disciplines of engineering and design codes.

The goals were to fully design and fabricate, in-house, all aspects of the pressure vessel at the highest standard capabilities.

Overcoming Challenges

WeldFit chose PV Elite to design the 140-foot double chamber cryogenic cold gas separator and demethanizer tower. The tower consisted of two chambers – a lower carbon steel chamber and upper stainless steel chamber – connected by an intermediate skirt.

The initial design challenge involved high wind loading due to wind speed over a large area. Major contributing factors to this area were vessel height, vessel diameter, and insulation thickness. The solution was to increase the shell thickness at the base of vessel and telescope the thickness with elevation. PV Elite was able to provide quick results on wind deflection during this iterative design process.

The second design challenge was rigging design for erecting the vessel. Since traditional top-mounted lifting lugs would induce high bending stresses mid-length, the use of trunnions was the ideal choice.

The solution was to use PV Elite's CodeCalc to perform the trunnion analysis. Once it arrived on-site, it had to be carefully lifted with trunnions.

The final design challenge was transportation. The tower was fabricated in Houston and transported more than 1,000 miles to Colorado by truck.

The solution was to design support saddles and analyze overhang bending stresses using PV Elite.

Realizing Results

"PV Elite takes all the different aspects of vessel design and puts them all together," said Jonathon Mauritz, P.E., design engineer at WeldFit. "PV Elite encompasses the multiple disciplines of engineering required to design a process tower along with up-to-date design codes."

With PV Elite, modeling and revising the model is quick and easy. The software provides real-time results and can quickly run a full analysis. The organized and well formatted PV Elite analysis enables an easy detailed review.

"Our estimator will use PV Elite to provide accurate quoting, and engineering will use PV Elite for detailed design," said Mauritz.

The intuitiveness of PV Elite saves about a week of training that is required for most engineering software. "This allows nearly instant employee productivity when starting new or existing pressure vessel projects," said Mauritz.

"PV Elite is very intuitive. You can teach yourself how to use it," said Mauritz. He stated that once employees receive training, there are a variety of tools that can help them perform work even faster.

"I highly recommend using PV Elite for pressure vessel design," said Mauritz. "The PV Elite and CodeCalc package allow for nearly all aspects of pressure vessel design."

About Hexagon

Hexagon is a global leader in sensor, software and autonomous solutions. We are putting data to work to boost efficiency, productivity, and quality across industrial, manufacturing, infrastructure, safety, and mobility applications.

Hexagon's PPM division empowers its clients to transform unstructured information into a smart digital asset to visualize, build and manage structures and facilities of all complexities, ensuring safe and efficient operation throughout the entire lifecycle.

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