CASE STUDY

Fichtner Consulting engineers solve project complexities with Octave Forte 3DWorx and Aspect Pipe Stress

Key facts:

Company: Fichtner Consulting Engineers Provate Limited

Website: www.fichtner.co.in

Industry: Power & Utilities

Country: India

Octave products used: Forte 3DWorx *(CADWorx Plant Professional),* Aspect Pipe Stress *(CAESAR II)*

Key benefits:

- Addressed complex project challenges with interoperable design and analysis solutions
- Avoided remodeling and eliminated errors which helped reduce labor-hours

Headquartered in Mumbai, India, Fichtner Consulting Engineers Private Limited provides comprehensive engineering solutions for a wide range of utility and captive power projects.

Identifying goals

JSW Steel Limited Salem Works, part of JSW Group, selected Fichtner Consulting Engineers-Mumbai to provide detail engineering for a US$30million project for two 30 MW turbines for a power plant project in Tamil Nadu, India.

The JSW Salem Works project consisted of seven boilers including one Atmospheric Fluidized Bed Combustion (AFBC) boiler, five waste heat recovery boilers (WHRB) and one blast furnace gas (BFG) boiler supplying steam to the two 30 MW turbines. The main piping totaled 4,805 feet (1,465 meters) in length with diameters ranging from one to 16 inches and included 435 pipe fittings, 284 supports, 80 spring hangers, 19 valves, three pressure safety valve and two turbine bypass valves, with each valve weighing around 2.25 tons.

Overcoming challenges

The main steam pipe had to withstand 100 bar pressure at 520 degrees Celsius, which meant accurate design was critical. In addition, there were 750 meters between the boiler, boiler feed pump and steam turbine. As each boiler was added to the existing system, the pipe in the existing system was not replaced which accurate analyses.

To address these project's complexities, Fichtner used Aspect Pipe Stress and Forte 3DWorx to design the main steam pipe as a single model, to create 3D piping layouts, produce stress isometrics, stress calculations and special support details, submitting the stress calculations for India regulatory approvals.

Turbine flanges were misaligned and were not parallel during initial construction. Using Aspect Pipe Stress analysis, Fichtner was able to correct the problem by shifting three spring hangers below by only 100 mm without moving the existing spring hangers. It also analyzed the main steam and boiler feed water piping, making minor modifications in the piping system by increasing or decreasing the pipe length and adjusting supports to achieve the required system flexibility during operation.

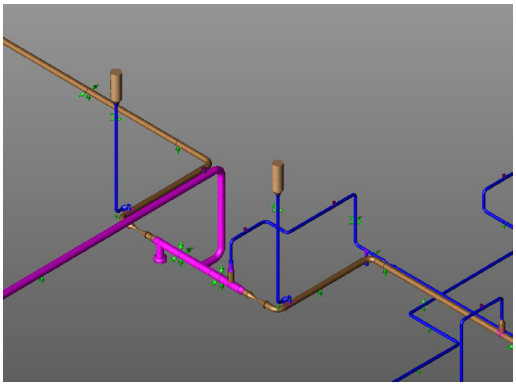
"Working in Aspect Pipe Stress is an excellent experience because the software is user friendly and gives accurate solutions to the challenges of piping analysis," said Wilson Raj of Fichtner's project team.

"Aspect Pipe Stress helped us avoid remodeling and eliminate errors at each stage and we were able to reduce labor-hours significantly."

Wilson Raj
Fichtner Consulting Engineers Private Limited

Realizing results

"Aspect Pipe Stress helped us avoid remodeling and eliminate errors at each stage and we were able to reduce labor-hours significantly," Raj added. Fichtner completed piping flexibility analysis to ensure reliability in different operating conditions and were able to model the piping systems to perfection while considering constraints such as a lack of available space and the distance to be covered. Engineering special type loops and floating headers was required. It completed the project ahead of schedule, which helped further ensure the customer's satisfaction and ensure that the seven boilers and two turbines are in successful operating condition.



About Octave

Octave is a leader in enterprise software, turning data into decisive action and intelligence into your edge. Our software solves for and simplifies complexity, from the design and build to operations and protection of people, property and assets – for any scope, at any scale. For decades, we've partnered with customers to sharpen performance, elevate efficiency and amplify results. From factory floors to entire cities, our solutions are tuned to scale up what's possible from day one onward.