CASE STUDY: MOTT MACDONALD, INDIA

FACTS AT A GLANCE

Company: MOTT MacDONALD.

Description: Mott MacDonald India (MMPL) serves clients engaged in oil and gas, pipelines, energy, manufacturing, water, and environment as well as transportation, construction, urban infrastructure, and social development.

Employees: Over 14.000

Industry: Chemical & Petrochemical, Oil & Gas Onshore

Country: India

PRODUCTS USED

- Intergraph CAESAR II

KEY BENEFITS

- Data accuracy
- Time saving
- Integrated workflow
- Improved safety

CAESAR II HELPS MOTT MACDONALD SAVE MILLIONS OF RUPEES AND WIN PROJECT TECHNICAL DISPUTES

Intergraph® CAESAR II® performs critical stress analysis and saves time in a complex engineering project for a carbon black plant in India and helped Matt Mac Dermot to confidently develop their project deliverables.

IDENTIFYING GOALS

A leading multi-disciplinary management and engineering consulting firm with offices throughout India, Mott MacDonald India (MMPL) serves clients engaged in oil and gas, pipelines, energy, manufacturing, water, and environment as well as transportation, construction, urban infrastructure, and social development.

MMPL recently provided engineering for a carbon black plant in India. Carbon black is a base product used in tires. The plant's annual capacity was 84,000 tons and it contained 6,000 m of pipe, 107 pieces of equipment, including 50 bellows. The extremely high pressure, high temperature steam lines, the huge pipe diameters of 30 to 54 inches, the minimum number of bends, and the complexity of the turbine piping presented challenges. The stress analysis required evaluating systems at very high temperature above 900°C. A critical part was designing the high pressure (64bar), high temperature steam piping feeding the 8MW steam turbine. The turbine was important because the power it generated would run the plant and also be exported to generate revenue.

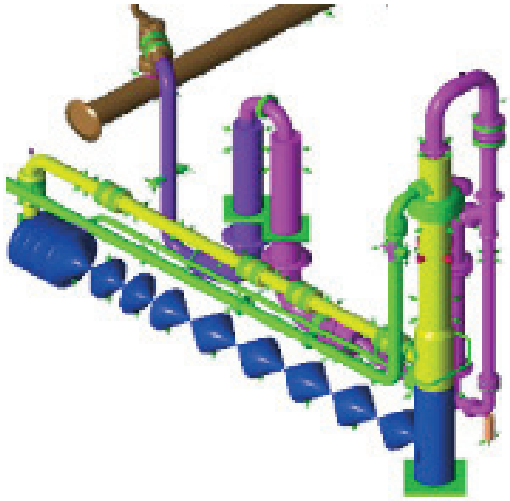
OVERCOMING CHALLENGES

Using CAESAR II, MMPL successfully analyzed high temperature systems and performed a stress analysis of all critical lines. "CAESAR II helped us confidently develop our project deliverables and its ISOGEN helped us quickly produce accurate isometric drawings," said Gaurav Bhende, deputy chief engineer at MMPL. "This helped us save time and resolve several critical situations."

With CAESAR II, MMPL eliminated incorrect settings of springs. They also were able to eliminate a proposed 54-inch expansion joint that the analysis proved unnecessary. This allowed MMPL to save millions of rupees for its client. Also during the design, the client requested a reroute. With the ISOGEN module in CAESAR II, MMPL was able to quickly generate the isometrics for various permutations and combinations on site.

REALIZING RESULTS

During initial analysis, the turbine would trip before its rated speed even though the inlet nozzle flange alignment was perfect. A possible reason put forth by the turbine vendor was strain induced by the piping loads. MMPL made minor modifications in the stress model to ensure it was site specific. They then checked the behavior of the steam line and found that it matched the CAESAR II results, and the dynamic analysis demonstrated that the natural frequency of piping was not creating any resonance. The client agreed with MMPL.



MOVING FORWARD

The turbine vendor crosschecked the CAESAR II stress analysis using another software and found that the CAESAR II report had satisfactorily answered all of the technical concerns. After several technical arguments, the turbine vendor decided to open the turbine. They found balancing problems that MMPL had suggested as a possible cause of tripping. The CAESAR II results against site observations helped MMPL to stand its ground. Without these data, it would have been impossible against the high cost of the turbine.

ABOUT INTERGRAPH

Intergraph is the leading global provider of engineering and geospatial software that enables customers to visualize complex data. Businesses and governments in more than 60 countries rely on Intergraph's industry-specific software to organize vast amounts of data to make processes and infrastructure better, safer and smarter. The company's software and services empower customers to build and operate more efficient plants and ships, create intelligent maps, and protect critical infrastructure and millions of people around the world.

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