



L&T CHIYODA LIMITED, INDIA

Key Facts

Company: L&T Chiyoda Limited

Website: www.lntchiyoda.com

Industry: Petrochemical

Country: India

Products Used:

- CAESAR II®

L&T CHIYODA ADDRESSES REFINERY ENGINEERING CHALLENGES WITH CAESAR II®

Headquartered in Vadodara, India, L&T Chiyoda Limited (LTC) was formed by leaders Larsen & Toubro Limited of India and Chiyoda Corporation of Japan. LTC's 800 team members provide engineering, procurement and construction (EPC) and project management for global clients engaged in petroleum refining, petrochemicals, chemicals, fertilizers and liquefied natural gas (LNG) and liquefied petroleum gas (LPG).

Indian Oil Corporation Limited (IOCL) awarded Larsen & Toubro the turnkey US\$25 million project to upgrade and expand the fluid catalytic cracking unit at its Mathura Refinery. L&T's role included EPC and commissioning detail engineering of the reactor regenerator (RR) facility. They had a two-month plant shutdown period to complete the project and avoid excessive down time and subsequent lost production.

ADDRESSING PROJECT COMPLEXITIES WITH CAESAR II

With 25 critical piping systems ranging from 2 inches to 54 inches and both cold and hot wall constructions with temperatures of up to 780 degree Celsius, LTC leveraged CAESAR II® to address the project's stress analysis complexities. While analyzing the high-pressure 500 C steam inlet and exhaust piping connected to the turbine running at a normal 7,000 rpm, the turbine simulation tripped at 3,000 rpm after exceeding the set vibration limit of 70 microns.

This caused the vendor and client to question the design, so LTC analyzed the system and supports in cold and hot conditions at 3,000 rpm, which again verified the CAESAR II results. LTC decided to reopen the turbine and evaluate the existing machine where they found problems with rotor balancing and oil seals. After rectification, the machine simulation ran smoothly at 7,000 rpm with no design changes required. CAESAR II helped resolve this technical dispute quickly, providing confidence for the piping designer.



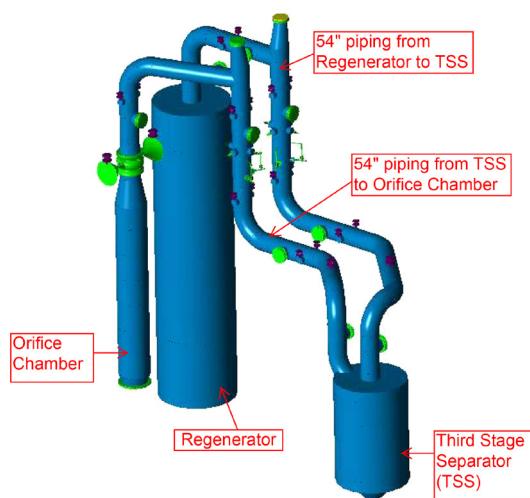
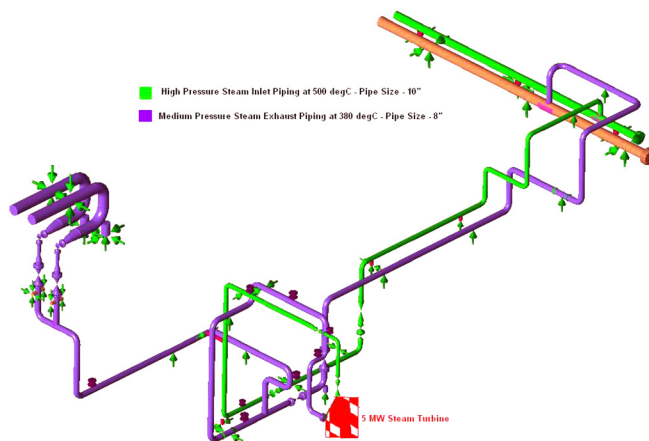
SAVING SIGNIFICANT TIME AND MATERIAL COSTS WITH CAESAR II

The 780 Celsius flue gas runs through 54 inch piping with a metal skin of 250 Celsius from the regenerator to the separator. This type of piping typically has expansion joints, and the initial proposal estimate included four large ones. However, the CAESAR II results predicted no such requirement because the stresses were well within the allowable code limit which the equipment manufacturer approved. After a review, the plant owner and the process licensor agreed, saving them US\$1 million in material costs, a significant 4% of the total project cost.

With CAESAR II, they also simulated the secondary modules, saving additional time. "We benefited enormously from CAESAR II's simple modeling technique, excellent graphic user interface, and the secondary calculation modules to complete the project tasks within the scheduled time frame," said Pradeep Darji, manager at LTC. Quick support on technical queries further accelerated completion. "Manual errors were totally eliminated and the deliverables were approved on our first submission," Darji said. With the help of CAESAR II, LTC completed the project within the two months of shutdown period with the plant commissioned on schedule.

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Pradeep Darji, Manager, L&T Chiyoda



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Our technologies are shaping urban and production ecosystems to become increasingly connected and autonomous — ensuring a scalable, sustainable future.

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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