

# Piping Stress Analysis for Vacuum Heater

## Key Features

### Technology:

Intergraph CAESER II

### Duration:

The project was completed in 1.5 months

### Deliverables:

1. Piping Stress Reports
2. C2 File
3. Assumptions, considerations & suggestions reports
4. Simplified reports for Support design

## The Client

A leader in providing quality heat transfer equipment like direct fired heaters, air preheat systems and water heat recovery systems. They innovate their designs to save fuel, matching the customer specifications, and optimize to accommodate special project requirements.

## The Business Need

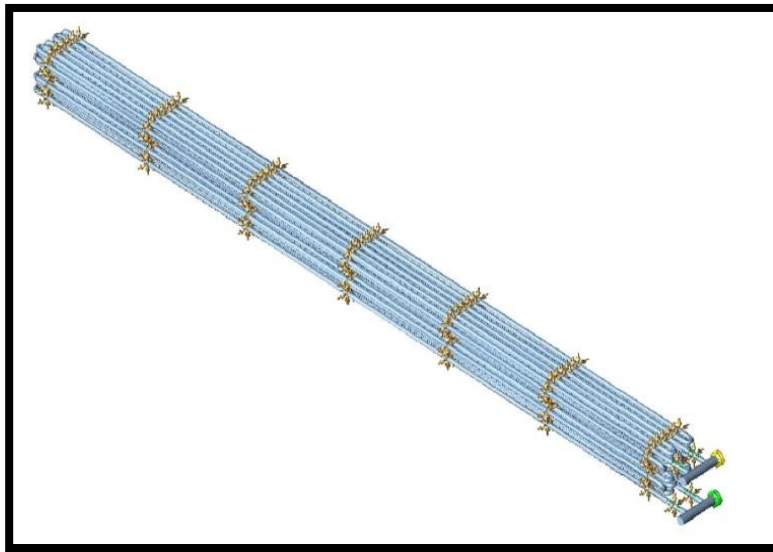
- Piping Stress Analysis as well as support in planning for process & boiler feed water coils including Bowing effect at Radiant Coil section.
- To perform a flexibility analysis on the process coil from inlet connections to outlet connections (i.e. Radiant and Convection Process Piping)
- To perform a flexibility analysis on the boiler feed water coil (upper convection) from inlet manifold to outlet manifold
- To provide support for the horizontal radiant single fired tubes in coking service which include an allowance for movement designed to accommodate or restrain lateral movement due to bowing associated with a 300°F temperature differential from tube hot face to tube cold face
- To perform analysis and evaluate the 5" lower radiant tube for the effects of bowing associated with the temperature differential

## Rishabh's Solution

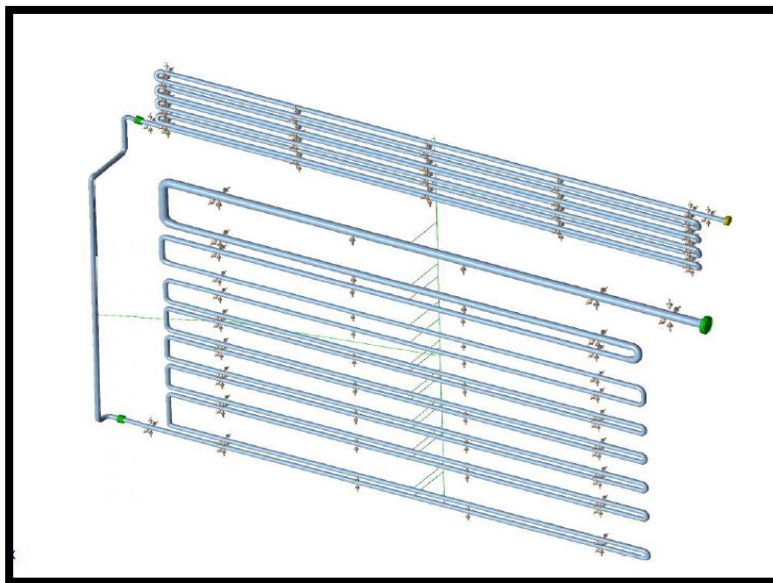
Rishabh's Engineering team suggested supports with 6" gaps to bare displacement of 6" due to bowing effect. We completed the piping stress analysis of the vacuum heater within 1.5 months with a team of 06

members (including 1 team leader). The project work was carried as per standard engineering codes and standards I.E. ASME B31.1, ASME B 31.3, API 560 codes and below design conditions:

<i>For BFW</i>	<i>For Process Coils</i>
Coil Material: A335 P22	Coil Material: A312 TP317L
Design Pressure: 1100 psig	Design Pressure: 300 psig
Design Temperature: 475°F	Design Temperature: 1029°F
Design Standard: ASME Section 1	Design Standard: ASME B31.3

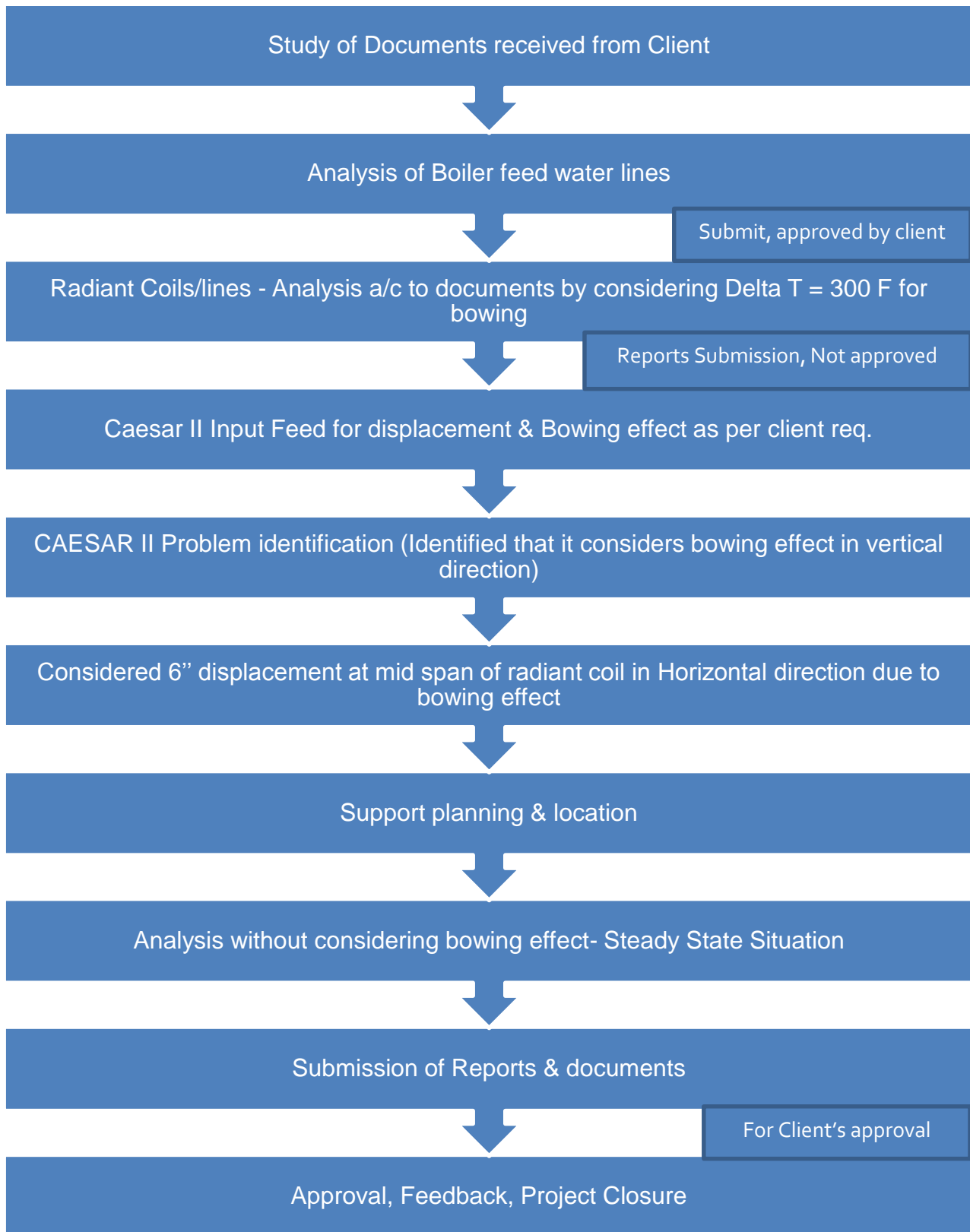


For BFW



For Process Coil (Single Pass)

## Project Execution Flow chart:



## Technology Used

- Piping Stress Analysis: CAESAR II

## Key Deliverables

- Piping Stress Output for 4passes & Boiler feed water line
- Piping Stress Reports
- Assumptions & considerations & with suggestions reports
- C2 file
- Simplified report for support design (Induced forces, moments & displacements at support locations in simplified manner)

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More information about Rishabh Engineering, please visit:

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### About Rishabh Engineering

Rishabh Engineering provides multidisciplinary engineering support services to EPC companies in industries like Oil and Gas, Petrochemical, Power and Water treatment. Our parent company, Rishabh Software is a CMMI level-3, ISO9001 and ISO27001 company that provides services in Software Development, Business Process Outsourcing (BPO) and Engineering Services Outsourcing (ESO) to clients globally. Rishabh has offices in USA, UK and India with their main delivery center in Vadodara, India.