



Piping Stress Analysis of Horizontal Heater

The Client

A global leader in manufacturing quality heat transfer equipment like Direct fired heaters, Air preheat systems, Water heat recovery systems. The heater designs are optimized to save fuel, optimized to exceed customer specifications as per the project requirements.

The Business Need

The client required Piping Stress Analysis to change the tube metallurgy for operational safety of the system. The client wanted to show the installation of a piping anchor at the radiant outlet tubes to force the thermal expansion into the heater and take the piping loads off of the transfer piping outside.

Rishabh's Solution

Rishabh Engineering was appointed by the leading fire heater manufacturer based out of Kansas City, United States to deliver piping stress analysis and confirm the new coil designs are adequate as per the metallurgy change in the convection section from 317L to 347L and the pipe diameter change in the lower radiant section.

The project design conditions are as below:

Key Features

Technology:

Intergraph CAESAR II

Autodesk AutoCAD

Duration:

The project was completed in 1 month

Deliverables:

- 1. Stress Report
- 2. CAESAR File
- 3. Stress Isometrics with support node no. markup
- 4. Estimated loads at the anchor
- 5. Tube support loads in the radiant section

Description	Conditions	
Design Parameters of Heater Coils	Normal operation- 523 PSIG @ 950 °F Furnace spalling- 70 PSIG @ 1400 °F	
	Wind	 ASCE 7-10 V=120 mph Exposure = C
Wind and Seismic Parameters	Seismic	 ASCE 7-10 Ss=0.12 S1= 0.05 Risk Category = III I-1.25
Fluid Density	51.7 lb/ft3	



Pipe Stress Analysis – Horizontal Heater



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Technology Used

- > Pipe Stress Analysis CAESAR II
- > 2D Drawings AutoCAD

Key Deliverables

- > Stress Report
- ➤ CAESAR File
- Stress Isometrics with support node no. markup
- > Estimated loads at the anchor
- Tube support loads in the radiant section

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About Rishabh Engineering

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