

## Piping Stress Analysis of Horizontal Heater

### 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

### 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

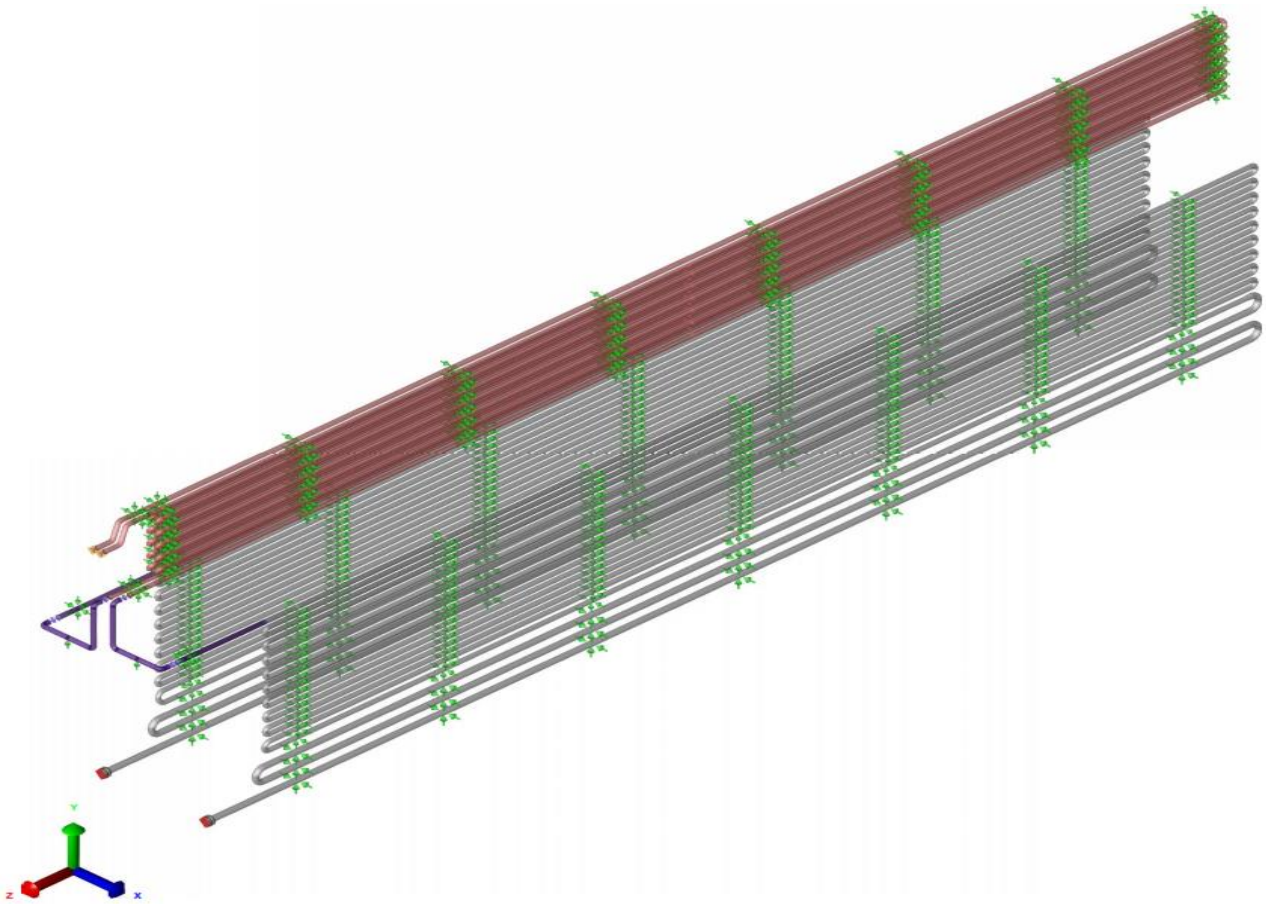
The client required Piping Stress Analysis to change the tube metallurgy for operational safety of the system. The client wanted to show the installation of a piping anchor at the radiant outlet tubes to force the thermal expansion into the heater and take the piping loads off of the transfer piping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

### Rishabh's Solution

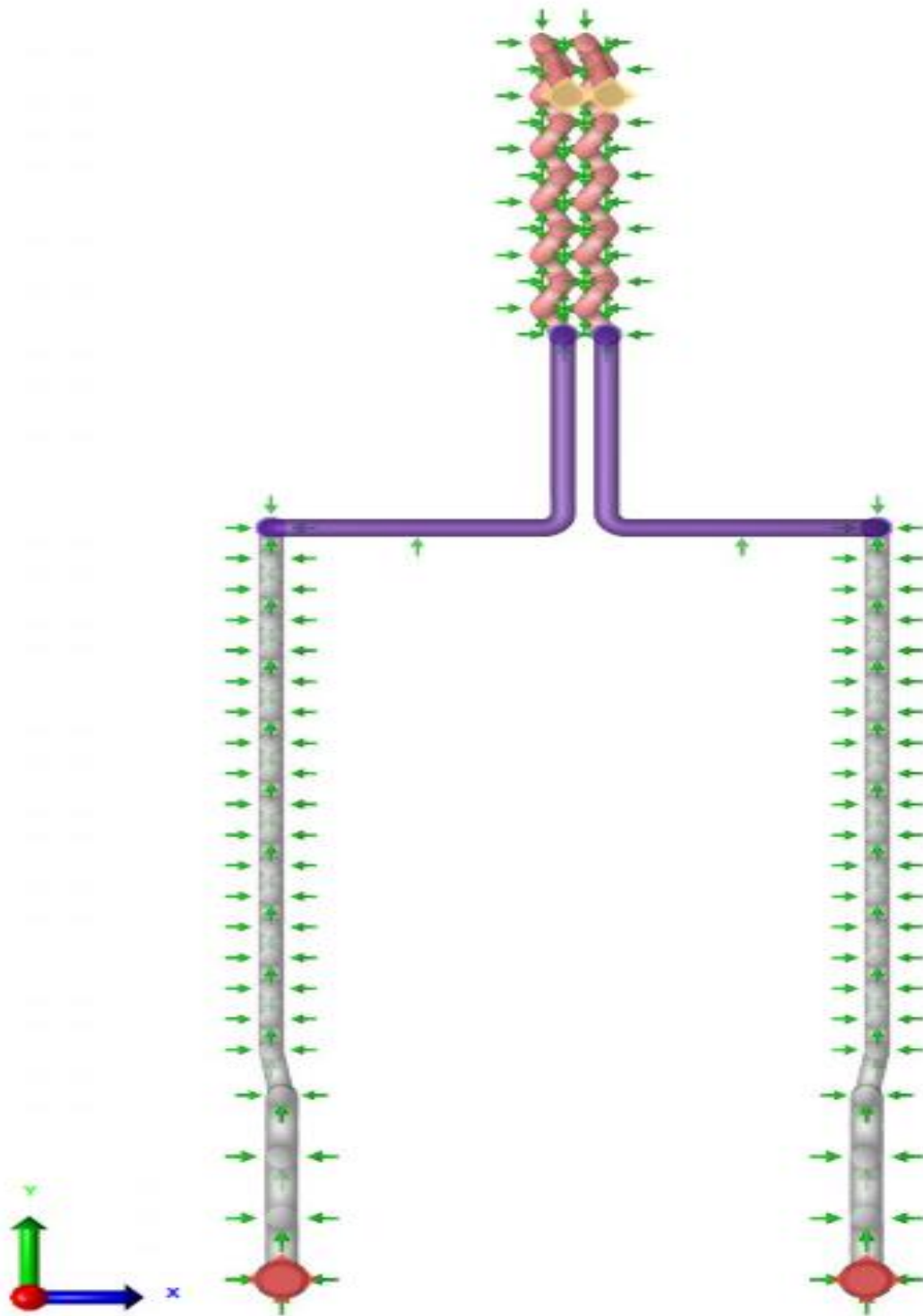
Rishabh Engineering was appointed by the leading fire heater manufacturer based out of Kansas City, United States to deliver piping stress analysis and confirm the new coil designs are adequate as per the metallurgy change in the convection section from 317L to 347L and the pipe diameter change in the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

The project design conditions are as below:

Description	Conditions	
Design Parameters of Heater Coils	Normal operation- 523 PSIG @ 950 °F Furnace spalling- 70 PSIG @ 1400 °F	
Wind and Seismic Parameters	Wind	<ul style="list-style-type: none"> <li>• ASCE 7-10</li> <li>• V=120 mph</li> <li>• Exposure = C</li> </ul>
	Seismic	<ul style="list-style-type: none"> <li>• ASCE 7-10</li> <li>• <math>S_s=0.12</math></li> <li>• <math>S_1= 0.05</math></li> <li>• Risk Category = III</li> <li>• I-1.25</li> </ul>
Fluid Density	51.7 lb/ft <sup>3</sup>	



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

### Contact Details

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More information about Rishabh Engineering, please visit:

[www.rishabheng.com](http://www.rishabheng.com) | [www.rishabhsoft.com](http://www.rishabhsoft.com) | [www.rishabhbpo.com](http://www.rishabhbpo.com)

### 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.