

# **Flexibility analysis of vacuum jacketed super insulation Liquid Nitrogen (LN<sub>2</sub>) transfer line**

## **Abstract**

A centralized distribution of liquid nitrogen (LN<sub>2</sub>) and gaseous nitrogen (GN<sub>2</sub>) has been designed and installed at IPR. This line network is ~ 270 m long having process lines of DN40 and DN25 along with their respective outer jackets of DN100 and DN 80 respectively. Based on the existing layout, constraint and available isometric of the distribution network, the project work involves the followings

- 1) Re-fine the isometric of the network with respect to as built (~ 270 m length)
- 2) Piping stress analysis and verification of the structural integrity of the network for identified load cases and
- 3) Optimization of allowable stress with respect to use of flexible components

Piping stress analysis is to ensure safety against failure that could result from loading conditions both external and internal – that are expected to occur in the lifespan of a piping system. Verifying the structural integrity against various load conditions in consideration of economic aspects and other several factors that impact different types of piping systems – making the stress analysis more complex. This project also includes the literature survey, understanding and utilization of standard software's for flexibility analysis, ASME code, analytical calculation, iterations in calculation and report preparation.

## **Academic Project Requirements:**

**1) Required No. of student(s) for academic project: 1**

**2) Name of course with branch/discipline: M.E./M.Tech Mechanical Engineering**

**3) Academic Project duration:**

**(a) Total academic project duration: 26 Weeks**

**(b) Student's presence at IPR for academic project work: 3 Full working Days per week**

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