

# **A Review of Support Configurations and Their Impact on Stress Distribution in B31.1 Piping Systems**

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**Abstract:** *In the complex world of power plant operations, the reliability and safety of piping systems are paramount. An ASME B31.1 Code for Power Piping provides all required guidelines and detailed information for designing, analyzing, and maintaining all power piping systems to resist the harsh conditions necessary for power generation and distribution industries. This paper explores the topic of piping systems starting with process layout and moving on to the structural and stress analysis as well as the supports of a piping system. Using FEA, dynamic loading analysis, and AI optimization, that improve the accuracy and speed of piping systems. Furthermore, the study brings solutions to thermal stress, compatibility of materials, and problems of access to maintenance. Last of all, the paper provides conclusions and suggestions for further studies. This part of the paper suggests techniques such as machine learning, real-time monitoring, and materials innovations for strengthening the longevity and sustainability of the piping system in power plants.*

**Keywords:** ASME B31.1, Support Configuration, Stress Distribution, Piping Systems, Hinged supports, Finite Element Analysis