

Design of a New Steam Piping System

Case study

The thermal service system of one of our clients required the installation of four new boilers and associated pipework. A number of changes to the pipework routing and components were subsequently required. EASL assessed the pipework for code compliance and to confirm that the layout and associated components were fit-for-purpose.

The solution

A representative piping model was generated using the pipe stress analysis program PSA5. The model included the tailpipes connected to each of the four boilers and the header which ran from the boiler tailpipes to the connection with the steam main.

It was assumed that pipework was insulated with 50mm of glass/rock wool and clad in 1mm thick carbon steel. Pipework components included in the model comprised flowmeters, steam strainers, valves and bellows. Four different types of pipework supports were modelled.

The stresses in the pipework were assessed against limits prescribed by BS806:1993.

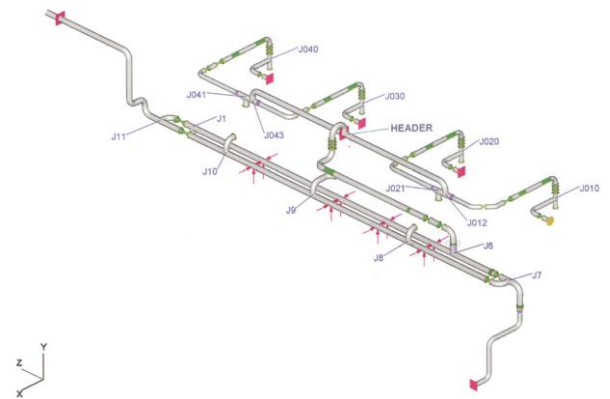


Figure 1 Pipe stress analysis model

It was identified that a large number of load cases would be required, in order to consider all the combinations of different boilers being turned on or off. Reviewing the boiler data EASL was able to identify bounding loadcases thereby reducing the analysis requirement. In turn adding value and saving the client time and money.

The support reaction forces and anchor forces and moments were obtained from the pipe stress analyses. These forces and moments were used in the design and selection of supports. The analysis results were also used to assess the imposed loading on the boiler crown valves and the boilers.

Review of initial results enabled EASL to advise on routing improvements to increase flexibility as well as improve code compliance.

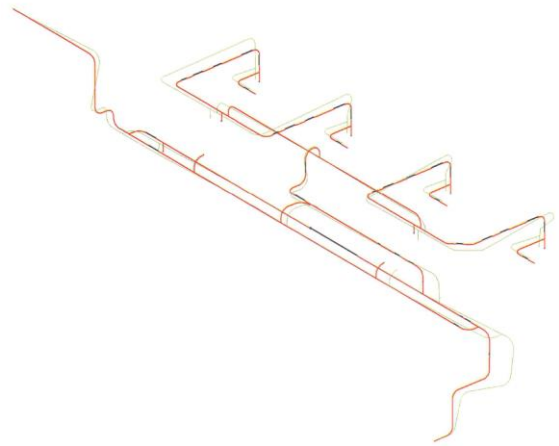


Figure 2 Displaced shape of model under hot conditions

The outcome

EASL were able to successfully show that the final pipework design satisfied the flexibility and design code requirements of BS806:1993. Additionally, analysis also confirmed that the final piping layout was fit-for-purpose.

Value delivered

The technical challenges on this task were met within the tight timescales specified. EASL was able to reduce the analysis effort by identifying bounding load cases for the pipework, effectively saving the client time and money.

EASL always work with the clients to identify cost effective solutions to operational challenges.

If you would like to discuss how EASL can help your business please get in touch.

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