Visit Suncam.com for more courses

Continuing Education Course #619
Piping Design Fundamentals
- Avoid Pitfalls in Design and Analysis

1. When considering all the piping loading conditions, which statement is true
- a. All piping loading conditions need to be analyzed
- b. All piping loading conditions need to be identified, but all are not necessarily analyzed
- c. Only the standard thermal, weight and pressure loading conditions need be analyzed in all piping systems.
- d. Loading conditions are obvious and do not require consultation with process and mechanical engineers

2. Which of the following statements are true about the SIF of piping components?
- a. Some SIF's are provided in ASME Codes
- b. SIF's may not be available for all components
- c. SIF's are undetermined when two components are close together
- d. All of the above

3. Which statement is true about dummy legs
- a. The SIF of a dummy leg to an elbow is not available from ASME codes
- b. The flexibility of an elbow with a dummy leg is stiffened compared to a dummy leg alone
- c. Both a & b

4. During the conceptual design phase analysis of a piping system, it is recommended that both the maximum calculated thermal stresses and weight + pressure stresses be a maximum of
- a. 30% of the Code allowable stress
- b. 50% of the Code allowable stress
- c. 70% of the Code allowable stress
- d. 90% of the Code allowable stress

5. Which of these statements is true about dynamic analysis of piping systems?
- a. Dynamic analysis can be deferred until after the standard weight +pressure and thermal analysis final runs have been completed
- b. Dynamic considerations may be a principal driver in pipe support types and locations
- c. The need for dynamic analysis should be identified during the conceptual phase of a piping system design
- d. b & c only.

6. The analyst's role for a piping design should include
- a. Participation in optimizing the conceptual design
- b. Calculating loads and other information for structural, mechanical and pipe support groups
- c. Reviewing final design drawings to ensure the final analysis matches the design
- d. Assuring field modifications are acceptable
- e. All of the above

7. When analyzing modifications to existing piping systems the analyst should

- a. Field confirm the existing pipe
- b. Use the original design drawings for the routing and support of the existing pipe
- c. Start the analysis by analyzing the new and existing pipe as one system
- d. Not make any recommendations for modifications to existing pipe

8. Non-linear restraint types include:
- a. limit stops
- b. Base supports
- c. supports with friction
- d. Rod supports that are modeled as restricting downward load only and do not restrict upward movement
- e. All of the above

9. Which of the following statements is true?
- a. A sag between supports due to weight of 0.5" or more is a red flag that the analysis has exceeded the small displacement limitations of the equations.
- b. Sag between supports is not an important indicator if the pipe stresses are less than Code allowable
- c. Load direction on pipe supports does not need to be evaluated
- d. Pipe will never rotate enough to lift off of base pipe supports

10. Horizontal movements in the weight analysis of a well- supported piping system are usually less than
- a. 0.01"
- b. 0.10"
- c. 0.50"
- d. None of the above

11. An analysis of flexible pipe attached to heavy wall components
- a. Is calculated accurately by most stress analysis programs
- b. Tends to calculate the higher stresses in the flexible pipe and heavy wall component than actually exist
- c. Tends to calculate lower stresses in the flexible pipe than actually exist.
- d. None of the above

12. For thermal stability of a piping system it is best to
- a. Properly support for weight loads and minimize the number of restraints
- b. Restrain the pipe to minimize movements as much as possible
- c. Increase the rotations to greater than 0.50 in as many locations as possible
- d. b& c

13. If an analysis result "Doesn't seem right", the analyst should
- a. Check the input
- b. Review the internal load tables at each node for clues to the source of the issue
- c. Call the program help desk for guidance
- d. All of the above

14. When non-linear restraints are included in an analysis model, there may be no solutions.
- a. True
- b. False

15. If an analysis with non-linear friction supports fails to converge and provide an answer, the analyst's approach should be:
- a. Modify the friction factors at one or more supports until an answer is calculated
- b. Remove friction from restraints until an answer is calculated

○ c. Complain to the software company that their program does not work
○ d. Report to the design team that this support arrangement is unpredictable and needs to be modified to remove the frictional supports.

16. Non-linear restraints in dynamic analyses
○ a. Can be included and the program will properly analyze the results
○ b. Cannot be analyzed unless changed to linear restraints

17. Frictional supports are not recommended for use if the sliding movement is greater than 0.5".
○ a. True
○ b. False

18. When evaluating the results of an analysis with non-linear restraints
○ a. Know how the program assumes if a restraint is active or inactive in each loading case
○ b. Review the loads and deflections at each restraint in each loading case to assure the movements and loads are reasonable for each case
○ c. Assure the restraint loads, pipe stresses and pipe movements are acceptable for all loading cases at each node.
○ d. All of the above

19. During a seismic event what are the primary acceptance criteria
○ a. Calculated pipe stress
○ b. Calculated pipe movement that may hit other equipment
○ c. Calculated restraint loads that may fail a support
○ d. All of the above
○ e. b&c only

20. Interpretation of the results requires an understanding of the program limitations, a feel for when the results may appear acceptable but are unstable, and an understanding of the necessary safety and reliability that should be expected for each piping system.
○ a. True
○ b. False