Course Content

Title: ASME Section VIII, Division 2 – Part 5, Design-By-Analysis

Potential PDH: 32 **Code:** BTT006

Description:

Becht Engineering's Design-By-Analysis course will introduce participants to the Design-By- Analysis portion of the ASME code Section VIII, Division 2, Part 5. Based on the rules and guidance provided in Part 5, this course is a comprehensive introduction to the requirements of performing Design-By-Analysis to the ASME Code. This course provides detailed instruction on performing finite element analysis in compliance with the Code. Example problems are presented and discussed for many of the common rules. This course is intended for engineers who are familiar with pressure vessel and piping design, and need additional guidance on applying Design- By-Analysis concepts. Experience with finite element analysis is not required, but an understanding of the fundamentals would be an asset.

Outline:

1. General Philosophy: Protection Against Failure Modes
2. Load Conditions and Load Case Combinations
3. Protection Against Plastic Collapse
   - Elastic Analysis
     - Linearization of Stress Results for Stress Classification
   - Limit Analysis
   - Elastic-Plastic Analysis
     - Elastic-Plastic Stress-Strain Curve Development
4. Protection Against Local Failure
5. Protection Against Collapse from Buckling
   - Current rules overview (limited)
   - Upcoming 2021-Edition rules changes (detailed)
6. Protection Against Failure from Cyclic Loading: Ratcheting
   - Elastic Analysis
   - Elastic-Plastic Analysis
7. Protection Against Failure from Cyclic Loading: Fatigue
   - Screening for exemption from fatigue analysis
   - Elastic Fatigure Analysis
   - Elastic-Plastic Fatigue Analysis
8. Protection Against Failure from Cyclic Loading: Fatigue of Weldments
   - Fatigue Strength Reduction Factor
   - Structural Stress Method
9. Histogram Developments and Cycle Counting for Fatigue Analysis
10. Introduction to Part 4 - Design By Rules
11. FEA / Part 5 Report Discussion

Instructor:

Trevor Seipp is currently Division Manager for Becht Engineering’s Canadian operations. In his role as Division Manager and Consulting Engineer at Becht Engineering, he has had the pleasure of solving some of the most complicated problems in the pressure equipment industry. His preferred tool for

solving these problems is the computational assistance provided by finite element analysis (FEA). Due to his broad expertise in FEA for pressure equipment, he was appointed to the ASME's Working Group on Design By Analysis, a group that reports directly to the Design Sub-Committee of ASME Section VIII. In addition, his expertise has been sought around the world, not only consulting, but also teaching courses on using FEA for solving Design-By-Analysis problems in the ASME Code. Mr. Seipp has a Bachelor of Science in Mechanical Engineering from the University of Saskatchewan and a Master of Science in Aerospace Engineering from the University of Minnesota. He is a registered Professional Engineer in the Canadian Provinces of Alberta, Saskatchewan and Ontario.