Fatigue Analysis Requirements in ASME Boiler and Pressure Vessel Code Section VIII, Division 2 – Alternative Rules *(MC123)*

A Practical, Case Study-based Training Program
Led by:

David R. Thornton, P.E.

7.5 Hours • 0.75 CEUs • 7.5 PDHs

About this MasterClass

This one-day MasterClass provides an in-depth examination of the techniques used in Fatigue Analysis of pressurized equipment. The program includes discussions on the fundamentals of fatigue, the technical background and implementation of the fatigue methods in ASME Section VIII, Division 2, and the application of the rules to solve practical problems related to cyclic operation. The fatigue analysis approaches using smooth bar and welded joint technology using the new structural stress approach will be covered in detail, including case histories to highlight the application to common Industry problems. The application of fatigue assessment to existing pressurized equipment in the new Part 14 of API 579-1/ASME FFS-1 will also be discussed.

For more information and to register, visit
http://go.asme.org/mc123

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ASME MasterClass Series

The ASME MasterClass Series focuses on applications and case studies of a particular topic. Each MasterClass is led by an ASME Master, an expert in his professional discipline, who brings a wealth of knowledge and practical examples to the forum. Participants are expected to have prior knowledge of the topic area to gain the most from this interactive environment.

Sessions are focused on real world examples and case studies, with active class discussion and analysis.

About this MasterClass

The focus of the one-day MasterClass is to provide an understanding of the fatigue methods found in Part 5 of ASME Section VIII, Division 2 and the new Part 14 of API 579-1/ASME FFS-1, and to convey practical information on how to perform analysis including the use of Finite Element Analysis (FEA). Discussion on the background of the analysis methods and their application will be presented through the ASME Pressure Technology Bulletins, *PTB-1-2013 Section VIII - Division 2 Criteria and Commentary* and *PTB-3-2013 Section VIII - Division 2 Example Problem Manual*. The attendees will gain an appreciation and understanding of how these analytical techniques can be applied to practical design situations. The class will include detailed example problems that demonstrate how the analytical techniques are to be applied, and their limitations. Detailed FEA models will be presented to help illustrate the various analytical techniques.

Participants are encouraged to discuss actual scenarios encountered as part of class discussion.

Upon completion, attendees will be able to

- Explain the fundamentals of fatigue and the implementation of fatigue design and assessment methods in ASME Section VIII, Division 2 and API 579-1/ASME FFS-1.
- Evaluate the technical basis for smooth bar and welded fatigue methodologies.
- Apply the fatigue analysis techniques for practical Industry problems.

Who Should Attend

This masterclass is intended for pressure vessels engineers working for Owner-Users, manufacturers or engineering and design construction firms in the refining, petrochemical, and other comparable industries that desire a practical understanding of one of the major areas of the new Division 2 of ASME Boiler and Pressure Vessel Code Section VIII.

About this ASME Master

David Thornton, P.E., Principal Engineer and Technical Advisor, Equity Engineering Group, has over 35 years of experience in the refining and petrochemical industries, as a specialist in pressure vessel, piping, and tank design/analysis. He has worked both as an owner-user, and a consultant, providing his expertise to refineries and chemical plants worldwide design/analysis. Currently with The Equity Engineering Group, his work has included mechanical engineering quality control for a $500 million clean fuels expansion of a Middle East refinery, FFS evaluations, Fracture mechanics evaluations, High Temperature Creep Analysis and Life Assessment, Fatigue, Structural Reliability, and Risk Assessment, etc. He is also responsible for training engineers and inspectors in API Fitness-For-Service API 579-1/ASME FFS-1, Pressure Vessel Design, and Piping Design and Analysis.

Mr. Thornton serves as a member of the joint API/ASME technical committee responsible for the development of FFS assessment techniques and the Operations and Maintenance subGroup of ASME B31.8. He has experience as the lead mechanical engineer at a major Gulf Coast refinery, providing direction and guidance to others in evaluating and solving problems associated with fixed equipment.

Mr. Thornton earned his Bachelor's degree in Civil Engineering at Drexel University, Philadelphia, PA in 1975, and his Master's degree in Theoretical and Applied Mechanics at Cornell University, Ithaca, NY in 1980.

MasterClass Requirements

This MasterClass is structured on the assumption that participants have a basic understanding of ASME B&PV Code Section VIII, Division 2, and fatigue concepts.

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AGENDA

The contents are presented in six sessions, tentatively organized as shown. The one-day schedule allows for ample discussion and interaction with attendees. The instructors reserve the right to modify the content to address the audience's needs and preferences.

Overview of Fatigue

- Mechanism/concepts of Fatigue
- Cycle counting
- Div. 2 Fatigue general requirements and new requirements in API 579-1/ASME FFS-1
- Fatigue Screening method and example

Base Metal Fatigue Analysis

- Assessment procedure
- Fatigue strength reduction factors
- Plasticity correction factor

Base Metal Fatigue Analysis

- Example problem
- Elastic-plastic fatigue method

Welded Fatigue

- Overview of welded fatigue and inherent differences vs. smooth bar fatigue
- Structural stress fatigue method background

Welded Fatigue

- Div. 2 / API 579-1/ASME FFS-1 implementation of structural stress method
- Example problem

Welded Fatigue

- Case Histories/Demonstration Examples

Summary and Wrap-Up