

Master Class Series



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 A. Osage

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 pressure vessels. 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 vessel 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.

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

ASME Training & Development

Setting the Standard for Workforce Learning Solutions



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 as well as 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 methods in ASME Section VIII, Division 2.
- 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 A. Osage, P.E.,

is internationally recognized for his expertise in the design of new equipment and as an industry expert and leader in the development and use of FFS technology. He is the President and CEO of The



Equity Engineering Group, Inc., and has over 30 years of experience in the refining and petrochemical industries. As the lead investigator and principal author of the new ASME B&PV Code, Section VIII-Rules for Construction of Pressure Vessels Division 2-Alternative Rules, he developed a new organization and writing style for this code and was responsible for introducing the latest developments in materials, design, fabrication, and inspection technologies. These technologies include new models for materials behavior suitable for use in a construction code, updated design-by-rule methods, modern design-by-analysis procedures including the introduction of elastic-plastic analysis methods, and a new fatigue method for welded joints. Mr. Osage received a Certificate of Acclamation from ASME for this work. He has served on several ASME BPV VIII Code Committees. Mr. Osage earned his Bachelor and Master's degrees in Mechanical Engineering from the Stevens Institute of Technology, Hoboken, NJ in 1977. He is a registered professional engineer in Ohio.

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.

Fatigue Analysis Requirements in ASME Boiler and Pressure Vessel Code

Section VIII, Division 2 – Alternative Rules

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.

<u>Overview of Fatigue</u>	<u>8:00 AM – 8:45 AM</u>
<ul style="list-style-type: none">• Mechanism/concepts of Fatigue• Cycle counting• Div. 2 Fatigue general requirements• Fatigue Screening method and example	
<u>Base Metal Fatigue Analysis</u>	<u>8:45 AM – 10:15 AM</u>
<ul style="list-style-type: none">• Assessment procedure• Fatigue strength reduction factors• Plasticity correction factor	
<u>Coffee Break</u>	<u>10:15 AM – 10:30 AM</u>
<u>Base Metal Fatigue Analysis</u>	<u>10:30 AM – 12:00 Noon</u>
<ul style="list-style-type: none">• Example problem• Elastic-plastic fatigue method	
<u>Lunch Break</u>	<u>12:00 PM – 1:00 PM</u>
<u>Welded Fatigue</u>	<u>1:00 PM – 2:15 PM</u>
<ul style="list-style-type: none">• Overview of welded fatigue and inherent differences vs. smooth bar fatigue• Structural stress fatigue method background	
<u>Coffee Break</u>	<u>2:15 PM – 2:30 PM</u>
<u>Welded Fatigue</u>	<u>2:30 PM – 4:00 PM</u>
<ul style="list-style-type: none">• Div. 2 implementation of structural stress method• Example problem	
<u>Coffee Break</u>	<u>4:00 PM – 4:15PM</u>
<u>Welded Fatigue</u>	<u>4:15PM – 5:00PM</u>
<ul style="list-style-type: none">• Case Histories/Demonstration Examples	