Pipeline Defect Assessment

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

Dr. Thomas Bubenik

15 Hours • 1.5 CEUs • 15 PDHs

About this Master Class (MC140)

This two-day MasterClass provides a broad overview of analysis methods for defects in pipeline. The course begins with a summary of important material properties and a review of integrity assessment methods for pipeline defects. Analysis methods for corrosion are covered, including each of the methods cited in the most recent version of ASME B31G - Manual for Determining the Remaining Strength of Corroded Pipelines. Also included are discussions on analysis methods for mechanical damage and cracks, including the log-secant method which is based on linearly elastic fracture mechanics, and J-integral methods which are based on elastic-plastic behavior.

For more information and to register, visit

http://go.asme.org/mc140
The ASME Master Class Series focuses on applications and case studies of a particular topic. Each Master Class 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.

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Analysis methods for cracks are covered in the second day, which begins with a basic introduction to fracture mechanics. Attendees learn about the methods of measuring toughness associated with linearly elastic and elastic-plastic behavior. Next, the use of failure assessment diagrams and the development of the log-secant equation are discussed, followed by J-integral based assessments. Finally, both propagating fractures and fatigue are evaluated.

Upon completion, attendees will be able to

- Identify which type of analysis tool is appropriate for common defect types
- Apply analysis tools, (such as ASME B31G and RSTRENG), for metal loss due to corrosion
- Describe the limitations of employing ASME B31G and RSTRENG
- Apply analysis methods for mechanical damage, and understand why they are less accurate than those for metal loss due to corrosion
- Explain the difference between flow stress and toughness related failures
- Identify when fracture-mechanics based analysis tools, such as the log-secant approach, must be used
- Describe how toughness affects the defect tolerance of a pipeline
- Explain how pressure cycling affects fatigue lives of crack-like defects

About this ASME Master

Dr. Thomas Bubenik

has over 35 years of experience in onshore and offshore pipeline integrity and is internationally recognized for his expertise in ILI technology and pipeline degradation. A Senior Principal Engineer at DNV GL, he develops and applies state-of-the-art technologies to real world problems. His extensive experience provides him with an excellent understanding of the regulatory requirements, integrity threats, and the costs and consequences of managing pipeline integrity.

Prior to joining DNV GL, Dr. Bubenik was Program Manager for Battelle’s Pipeline Simulation Facility and was employed by Exxon Production Research (now ExxonMobil Upstream Development) as a Research Scientist. He regularly presents papers, workshops and formal training on various aspects of his expertise. He is also Vice-Chair of ASME Pipeline Systems Division Executive Committee.

Dr. Bubenik holds a BS and MS in Mechanical Engineering from Washington University in St. Louis and a PhD in Theoretical and Applied Mechanics from Northwestern University.

Who Should Attend

This MasterClass is intended for engineers interested in learning more about analyzing defects in transmission pipelines. Attendees should have at least 2 to 4 years of experience related to pipeline integrity management and/or defect assessment technologies.
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AGENDA

The contents are presented in the sessions tentatively organized as shown below. The two-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.

Day One: 8:00am – 5:00pm

- Introduction
- Introduction to Integrity Assessment Methods
- Analysis Methods for Metal Loss
- Analysis Methods for Mechanical Damage
- Analysis Methods for Wrinkles and Buckles
- Recap Day 1

Day Two: 8:00am – 5:00pm

- Linear Elastic Fracture Mechanics
- Methods of Measuring Toughness
- Fracture Initiation Control
- Fracture Propagation Control
- Fatigue
- Recap Day 1 and Day 2