

Agenda

Presented by Gregory Fehr, P.E.

Introduction to Failures

Big
Medium
Mundane
Spectacular
Small

Material Failure Algorithm

Step-by-step sequence to maximize efficiency
Step 1 – Document the failure
Step 2 – Do dimensions match drawings
Step 3 – Easy to check mechanical properties
- Mechanical properties determined in lab
- Other destructive testing
- Macro etching
Step 4 – Do mechanicals meet specifications?
Step 5 – Chemical properties
Step 6 – Fracture morphology
Step 7 – More expensive tests if needed

Understanding the Technical Issues

Cause and effect
Low stress – low cycle fatigue failures
Basic fatigue
Ductile-brittle transition
Grain structure
Welding issues – SMAW, GMAW, TIG
Welding issues – electric resistance
Natural enemy of stainless steel
Natural enemy of aluminum
Natural enemy of copper, brass, bronze
Ductile iron vs cast iron
Corrosion mechanism
Galvanic cells
Dezincification
Variations in magnification
Documenting the details

Case studies

Material Failure Analysis
Sacramento, CA - Friday, July 13, 2018

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PO Box 278
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Learning Objectives

You'll be able to:

Understand small, medium and large material failures.

Learn the most expeditious process to determine the root causes of material failures.

Consider the step-by-step sequence for material analysis to maximize efficiency.

Prevent material failures by understanding the properties of materials.

Learn about the technical causes of failures, including basic fatigue, welding problems and corrosion.

Utilize case studies to understand past failures and learn how to prevent them.



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Discuss material failures, especially focusing on metal failures, but also covering other engineered materials

Understand the process of determining the root causes of material failures

Discuss the basic algorithm to follow to identify the most important failure-related properties

Learn about the properties of materials and how manufacturing processes (welding, forging, casting, heat treating) affect them

Enhance your understanding of material failure analysis by reviewing case studies

Continuing Education Credits

Professional Engineers

6.5 PDHs

Contractors

Non-Credit Continuing Ed.

Architects

6.5 HSW Continuing Ed. Hours*
6.5 AIA HSW Learning Units

***does not qualify for California accessibility requirement**



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Faculty

Gregory Fehr, P.E., NACE Certified Corrosion Technologist and Cathodic Protection Specialist
Advanced Technology & Marketing Group (ATMG), Nevada

Mr. Fehr is a metallurgical engineer and corrosion specialist. He is managing principal of ATMG of Nevada and he has over 35-years of experience in the field. Mr. Fehr has an engineering degree from Oklahoma University and an MBA degree from Drake University, and he has held licenses in Alabama, Iowa (Mechanical), Texas, Maine, and Oklahoma (Mechanical and Metallurgical). Previous certifications include ASNT Level III in radiographic, ultrasonic, liquid penetrant, and magnetic particle testing and NAARSO Level I. His experience includes structural condition assessment, and metallurgical testing and failure analysis of structural steel welded and bolted connections, valves, pressure vessels, pumps, pipes, fittings, and wellheads, as well as portable and fixed amusement rides. Applications include water and wastewater public works, and the fossil fuel and nuclear power industries. Mr. Fehr’s other employers have included Fisher Controls, General Electric, ARAMCO (Saudi Arabia), Parsons (Engineering & Construction) and British Petroleum. He has participated in task groups for ASTM, ASNT, API, EPRI, and NACE, and he has been published in *ELECTRICAL WORLD, The Journal for Leadership and Management in Engineering*, ASME Proceedings, NACE Proceedings, and other publications. Mr. Fehr has also been an instructor for the American Society of Civil Engineers’ national seminar, Structural Condition Assessment of Existing Structures, since 1998.

Seminar Information

Crowne Plaza Sacramento Northeast
5321 Dale Avenue
Sacramento, CA 95841
(916) 338-5800

Registration
8:00 - 8:30 am

Morning Session
8:30 am - 12:15 pm

Lunch (on your own)
12:15 - 1:15 pm

Afternoon Session
1:15 - 4:30 pm

Tuition
\$279 for individual registration
\$259 for three or more registrations.
Each registration includes a complimentary continental breakfast and printed seminar manual.
Receive a reduced tuition rate of \$101 by registering to be our on-site coordinator for the day. For availability and job description, please visit www.halfmoonseminars.org.

How to Register

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- Call customer service at 715-835-5900

Cancellations: Cancel at least 48 hours before the start of the seminar, and receive a full tuition refund, minus a \$39 service charge for each registrant. Cancellations within 48 hours will receive a credit toward another seminar or the CD/manual package. You may also send another person to take your place.

Continuing Education Credit Information

This seminar is open to the public and offers 6.5 PDHs to professional engineers and 6.5 HSW continuing education hours to architects in all states with continuing education requirements, except Florida architects. This seminar does not qualify for California’s mandated accessibility continuing education requirement for architects.

This seminar is approved by the American Institute of Architects for 6.5 HSW Learning Units (Sponsor No. J885). Only full attendance can be reported to the AIA/CES.

HalfMoon Education is deemed an approved architect continuing education sponsor in New York. HalfMoon Education is an approved continuing education sponsor for engineers in Florida, Maryland, New Jersey, New York (NYSED Sponsor No. 35), North Carolina, and North Dakota.

This course also offers a non-credit continuing education opportunity for construction contractors. Credit approval is not being sought in any state with a contractor continuing education requirement.

Attendance will be monitored, and attendance certificates will be available after the seminar for most individuals who complete the entire event. Attendance certificates not available at the seminar will be mailed to participants within fifteen business days.

Can’t Attend? Order the CD/Manual Package:

An audio recording of this seminar is available for \$289 (including shipping). Allow five weeks from the seminar date for delivery. Please refer to specific state licensing rules or certification requirements to determine if this learning method is eligible for continuing education credit.

Additional Learning

Webinar Series

National Electrical Code: Onsite Power Generation and Distribution

- **National Electric Code: Onsite Power Generation and Distribution Part 1**
Weds., June 6, 2018, 11:00 AM - 2:15 PM CDT
- **National Electric Code: Onsite Power Generation and Distribution Part 2**
Thurs., June 7, 2018, 11:00 AM - 2:15 PM CDT

HVAC Series

- **Heating, Ventilation and Air Conditioning Principles**
Thurs., June 7, 2018, 11:00 AM - 1:00 PM CDT
- **HVAC System Design Considerations**
Thurs., June 7, 2018, 1:30 - 2:30 PM CDT
- **Evaluating HVAC Systems and Equipment**
Fri., June 8, 2018, 11:00 AM - 12:00 PM CDT
- **HVAC System Controls and Techniques**
Fri., June 8, 2018, 12:30 - 2:30 PM CDT

Introduction to Vibrations

- **Introduction to Vibrations**
Thurs., June 14, 2018, 11:00 AM - 1:00 PM CDT
- **Eigenvalues, Eigenvectors and Motion**
Thurs., June 14, 2018, 1:30 - 3:00 PM CDT
- **Analysis and Test Methods**
Fri., June 15, 2018, 11:00 AM - 12:30 PM CDT
- **Designing for Vibration and Failure Analysis**
Fri., June 15, 2018, 1:00 - 2:30 PM CDT

Pedestrians and Bicycle Transport Planning

- **Introduction to Current Conditions and Trends in Biking and Walking**
Thurs., June 21, 2018, 11:00 AM - 12:30 PM CDT
- **Engineering and Infrastructure: Design for Walkability and Bikeability**
Thurs., June 21, 2018, 1:00 - 2:30 PM CDT
- **Developing a Walking and Biking Plan, Part I**
Fri., June 22, 2018, 11:00 AM - 12:30 PM CDT
- **Developing a Walking and Biking Plan, Part II**
Fri., June 22, 2018, 1:00 - 2:30 PM CDT

Structural Forensic Engineering

- **Introduction to the forensic Engineering Process**
Thurs., June 28, 2018, 11:00 AM - 1:00 PM CDT
- **Causes and Failures and the Forensic Engineering Report**
Thurs., June 28, 2018, 1:30 - 3:30 PM CDT
- **Forensic Examination of Structures and Use in Litigation**
Fri., June 29, 2018, 11:00 AM - 1:00 PM CDT

For more information visit:
www.halfmoonseminars.org/webinars/

Registration

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How to Register		Registrant Information
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Mail: HalfMoon Education Inc., PO Box 278, Altoona, WI 54720-0278		Name: _____ Occupation: _____ Email: _____ Phone: _____
Complete the entire form. Attach duplicates if necessary.		Email address is required for credit card receipt, program changes, and notification of upcoming seminars and products. Your email will not be sold or transferred.

() I need special accommodations. Please contact me.

Tuition

() **I will be attending the live seminar.** Single Registrant - **\$279.00**. Three or more registrants from the same company registering at the same time - **\$259.00** each.

() **I am not attending.** Please send me the CD manual package for **\$289.00**. (S&H included. Please allow five weeks from seminar date for delivery)

Checks: Make payable to HalfMoon Education Inc.

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