

ONLINE

Fleming

LIVE TRAINING COURSE



Materials and Corrosion in Well Engineering

3 – 5 November 2021
12:45 - 17:00 CET

Training Course Objective

This interactive course is intended for materials and corrosion specialists, well engineers, production technologists, and other disciplines involved in well design and operations in the energy related sectors. Join this unique event to develop your knowledge and obtain industry insights with the guidance of our recognised and well respected trainer Dr. Steve Paterson. The training will build on the fundamentals of materials and corrosion relevant to application in wells and will cover practical aspects related to design and operation.

Key Takeaways

At the end of the training course, the delegates will be able to:



Understand

the fundamentals of materials and corrosion in relation to Well Engineering



Recognise

typical materials used in wells and wellheads and the types of issues that can arise during manufacture and service



Learn

how to make optimum materials selection for well equipment including service in extreme environments and energy transition applications



Develop

an understanding how to manage corrosion in well equipment



Appreciate

ways to qualify materials for service in wells and how to evaluate the results



Have

the opportunity to learn about and share real experiences of downhole issues.

Your Expert Trainer



Dr Steve Paterson

Materials & Corrosion Adviser
Arbeadie Consultants Ltd.

Steve has a B.Sc. (Eng.) and Ph.D in Metallurgy from Imperial College, London. He has 40+ years experience in materials, corrosion, welding, inspection and integrity management mostly with Shell. His last position prior to retirement from Shell was as the global Principal Technical Expert for Upstream Materials. He has extensive experience in the oil & gas production, refining, chemicals, and R&D sectors and has worked in the U.K., Netherlands, Norway, Middle East and Malaysia. He has been engaged in the specification, purchasing, and application of materials in Wells, and has been directly involved in many investigations of downhole failures. He has chaired the Energy Institute Corrosion Management Committee and the EFC Oil & Gas Working Party and is currently the chair for the EFC Taskforce for corrosion in green and low carbon energy technologies. Since retiring in May 2017 he has worked as an independent consultant and as an external lecturer in materials and corrosion management at Robert Gordon University (Aberdeen). In 2019 he was awarded the prestigious Institute of Corrosion Paul McIntyre Award.



Key topics

- 💡 What is Different about Wells
- 💡 Materials Principles and Specifications in Wells
- 💡 Corrosion Mechanisms in Wells
- 💡 Materials Selection and Applications in Wells
- 💡 Application of Non-Metallic Materials
- 💡 Testing and Evaluation
- 💡 Corrosion Management in Wells
- 💡 Downhole Materials Issues
- 💡 Materials for Extreme Environment

Who should attend

- ✓ Materials and Corrosion Specialists
- ✓ Well Engineers
- ✓ Production Technologists
- ✓ Engineers and Specialists involved in well design, operations and corrosion management

Testimonials from courses led by Steve Paterson

"Great course, gave excellent insight and provided us with the tools to tackle this problem at our own plant."

Leon Kanters, Reliability Engineer, Tresa, Netherlands

"Excellent course, very informative of theory but backed up by industrial experience."

James Dwan, Principal, Dwan Forensic Engineering, Ireland

"This course gives a total insight on CUI"

Anthony Vervisch, Inspection Engineer, BASF, Belgium

"Overall a very good masterclass!"

Alwin Haverdings, Mechanical Engineer, Shell, The Netherlands

"Great course covering most aspects of stress corrosion cracking in practice. Keep up the good work! I look forward to participate at another course again."

Torstein Lange, Research Scientist, SINTEF, Norway

"Super perfect and skilled teaching."

Peter Drewsen, Technical Coordinator, Gas Storage, Denmark

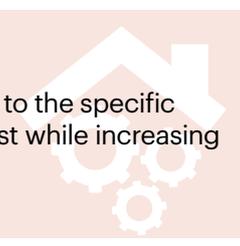
"Very valuable and useful course, mainly thanks to the excellent trainer with great deal of knowledge, practical experience and ease in clarifying complexity of SCC to the attendees."

Krzysztof Wichowski, Pressure Equipment Inspector, UDT, Poland

Create your own In-House Training

Are you looking for something more specific? Create your own In-House Training customized to the specific issues your company and your employees need to understand and resolve. Save time and cost while increasing implementation with an In-House Training held in the privacy of your company.

Read more about In-House Training opportunities



Day 1

3 November

12:45 Online Meeting Room Opens

13:00 Welcome Note from Fleming and Opening Remarks

13:05 Introduction & Speed Networking
Join with your camera turned on to meet & greet the trainer and participants, as well as to share your experience and expectations from this course.

13:15 **SESSION 1: Introduction to Materials and Corrosion in Wells**

- Features of Wells and Wellheads
- Why materials and corrosion control are important in Wells
- Some examples of significant failures will be used to highlight the key issues that need to be considered

5-min Break



SESSION 2: Basics of Well Equipment

- A brief overview will be given of key elements and applications of Well designs, including:
 - Wellheads and trees
 - Casing and tubing
 - Downhole equipment
 - Subsea applications

15-min Break



SESSION 3: Fundamentals of Corrosion

- An overview of the fundamentals of corrosion to provide a basic understanding for non-specialists
- Important electrochemical considerations and how these are applied

5-min Break



SESSION 4: Materials Principles and Specifications

- A brief description of crystal structures to help understanding of materials behaviour
- Explanation of the iron-carbon diagram and the effect of heat treatment
- Basic principles of manufacture of equipment used for Wells
- Types of corrosion resistant alloys
- Influence of fracture and fatigue
- Common standards used for Wells and Wellheads

5-min Break

EXERCISE: Application of Principles



16:45 **Q&A AND DISCUSSION**

17:00 End of Day 1



Day 2

4 November

12:45 Online Meeting Room Opens

13:00 **SESSION 5: Common Corrosion Mechanisms in Wells**

- Common corrosion mechanisms that occur in Wells will be described, including
 - CO₂ and H₂S acid corrosion
 - Hydrogen related cracking mechanisms
 - Stress corrosion cracking
 - Oxygen corrosion
 - Microbial induced corrosion

5-min Break



SESSION 6: Materials Selection and Applications

- General principles of materials selection will be described
- Guidance will be provided for materials used for:
 - Wellheads & trees
 - Casing and tubing
 - Downhole accessories

15-min Break



SESSION 7: Application of Non-metallic Materials

- Typical applications of non-metallic materials in Wells will be described, including:
 - Types of seal used
 - Types of polymers and chemistry
 - Degradation mechanisms and typical failures
 - Principles of non-metallic materials selection

5-min Break



SESSION 8: Testing and Evaluation

- Guidance will be given on approaches to testing materials for Wells
- An overview of common laboratory test methods used for qualification
- Guidance on assessment of results from testing

5-min Break



EXERCISE: Selection of Materials

16:45 **Q&A AND DISCUSSION**

17:00 End of Day 2



Day 3

5 November

12:45 Online Meeting Room Opens

13:00 **SESSION 9: Management of Corrosion in Wells**

- The basis for various methods to manage corrosion in Wells will be described including
 - Corrosion inhibitors for production
 - Treatments for water injection
 - Acidisation and corrosion control
 - Annulus and brine control
 - Cathodic protection
 - Calipers and monitoring

5-min Break



SESSION 10: Specific Downhole Materials Issues

- Guidance on specific issues that can occur with materials in Well applications, including:
 - ESP's
 - Shallow aquifers
 - Fatigue (sucker rods)
 - Erosion and wire wrap screens
 - Casing wear
 - Intervention/workover damage
 - Thread dopes
 - Miscellaneous – galling, ringworm corrosion, bolting, clamps

15-min Break



SESSION 11: Materials for Extreme Environment and Energy Transition Applications

- An overview will be provided of materials and typical issues for specific applications, including:
 - High Pressure High Temperature (HPHT)
 - Severe sour service
 - Geothermal production
 - Carbon Capture and Storage (CCS)

5-min Break



SESSION 12: Case Studies Session

- Some industry experiences to illustrate the performance of materials in Wells
- Guidance on best practices and solutions
- Opportunity for attendees to share experiences

16:45 **Q&A AND DISCUSSION**

17:00 End of the Training Course





- ✓ All sessions of this unique course online
- ✓ Live interaction options between the delegates and trainer
- ✓ Available via mobile, tablet or laptop

REGISTRATION

**Click
Here &
Register
Online**



FROM

1296 €

Join The Event

You will be transferred to secure payment gateway