



# MICROBIAL CORROSION

In theory and practice the answers



## TRAINING METHODOLOGY

This interactive training workshop includes the following training methodologies as a percentage of total tuition hours:-

- 50% Lectures
- 30% Workshops, Group Work & Practical Exercises
- 20% Videos & Software

## TARGET INDUSTRY

Oil and gas (Upstream, Downstream, on-shore & off-shore), Piping, Power generation, Chemical Industries, Shipping and Marine industries, Water & Wastewater Treatment Facilities.

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## COURSE DURATION

3 Day Course

## WHO SHOULD ATTEND

The course is intended for Corrosion Engineers, Assets Integrity Engineers, Maintenance Engineers, Materials Engineers, Pipeline Engineers, Plant Engineers, Technical Inspectors, The course is designed for the benefit of pipeline industry.

**The course is of an especial useful** to principal and senior assets managers, engineering managers, directors, plant engineers, consulting engineers, specialist contractors, asset condition inspectors and overseers, Senior pipeline engineers, material and senior and principal corrosion engineers.

## INSTRUCTOR

Reza Javaherdashti, (BSc., MSC., PhD )



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## TOPICS COVERED

- Why are corrosion management techniques effective?
- Role of Human factors in the effectiveness of corrosion management techniques
- How can a system become vulnerable to MIC?
- Prevention and mitigation methods: How effective are they in practice?
- “Myths” and misunderstandings about MIC: How much truth is there?

On the completion of this course the participants are expected to be able to:

- Have a better understanding of the importance of routine recognition and treatment methods of MIC
- Understand corrosion (especially microbial corrosion) mitigation methods more efficiently
- Estimate the required resources and human factors necessary to control MIC in a more feasible manner
- Comment on limitations of corrosion prediction software about MIC
- Have learned the most sensible and trustful way of MIC treatment
- Recognize MIC from other types of corrosion manifestations
- Give advise on materials selection and biocide control
- Differentiate “myths” from “realities” in MIC mitigation
- Design/apply prevention/mitigation of MIC practices



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## DAY 1: A REVIEW OF FUNDAMENTALS OF CORROSION

### Morning Session 8:00 – 11:30

- Economical, ecological and management importance of corrosion.
- Can microbial corrosion be always classified as a subclass of internal corrosion?

### Afternoon Session 12:30 – 5:00

- Theory of corrosion and its relevance to microbial corrosion in pipelines
- Principles of inhibitors, Coating, Cathodic Protection and Anodic Protection and their role in pipeline integrity plan

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## Day 2: MICROBIAL CORROSION AND ITS PATTERNS IN PIPELINE INTEGRITY MANAGEMENT

### Morning Session 8:00 – 11:30

- Introduction to definition of MIC, its various names and its importance
- Corrosion prediction models and MIC
- Corrosion patterns in pipelines and the place of MIC : before commissioning and during commissioning

### Afternoon Session 12:30 – 5:00

- MIC in storage tanks: how it is initiated and enhanced?
- Biofilm formation mechanism and its electrochemical importance
- Chemical Management of MIC in pipelines: Detection and treatment of MIC (biocides)



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## DAY 3: A REVIEW OF FUNDAMENTALS OF CORROSION

Morning Session 8:00 – 11:30

- What is the source of misunderstandings in MIC?
- Wrong meaning of “biofilm”!
- Why the effect of CP on MIC is unpredictable? A critical approach towards NACE recommendation
- Do bacteria get used to biocides? Semi-facts and reality

Afternoon Session 12:30 – 5:00

- Microbial corrosion and “non-microbial corrosion”: which one starts first and why?
- Hydrostatic testing and MIC
- Are SRB the most important bacteria from a corrosion point of view?-semi facts and reality
- SCC and MIC:
- Pigging and MIC
- Feedback and Course Evaluation (Test)

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### Presenter Background —Dr Reza Javaherdashti

Dr Reza Javaherdashti has more than 15 years of experience in the oil and gas industry (incl. Subsea, off-shore and on-shore) as well as other industries on issues such as fracture mechanics, forensic engineering, integrity, corrosion management, FEED, design and materials selection, both in Australia and overseas.

With a background in Metallurgy and Materials Science and Engineering, he has experience in weld inspection, mechanical failure assessment (HISC, SCC, SSCC, MICSCC) microbial corrosion treatment, biocide/inhibitor selection and application and employment of CRA, CP design, coating evaluation for both sour and sweet corrosion conditions.