Todays Programme

Speakers:

- Dr Muhammad Ejaz, (Chair of ICorr Aberdeen).
- M/s Mei Ling Cheah, (Aberdeen Branch - Young ICorr Representative).
- Mr Stephen Tate, (University Liaison Officer / Past Chair).
- Hooman Takhtechian, (Vice Chair of ICorr Aberdeen).

Programme

Introductions from the ICorr ABZ Chair and Work of Branch.

- Talk 1 – Role of Young ICorr.
- Talk 2 – YEP (Young Engineer Programme).
- Talk 3 – Introduction to Corrosion Management.

Questions from CHAT / Closing Remarks from the Chair.

Welcome from the Chair

Dr Muhammad Ejaz PhD, CEng FICorr, FIMMM

Senior Corrosion Engineer at PIM (Plant Integrity Management)

Chair, ICorr Aberdeen Branch.

Opening Remarks

Welcome to the ICorr Aberdeen Branch.

Our Branch has been active for over 40 yrs with a very strong Events Programme, comprising of Lectures, Corrosion Awareness Training and Industrial Visits.

We partner with Universities and all Major Institutes including EI, IOM3, IMechE, NACE, BINDT and TWI.

Institute of Corrosion

INSTITUTE OF CORROSION

Where's your local branch?

Our Local Branch

We have a very strong and Diverse Committee.

Aberdeen Branch Positions for 2020-2021 Session
1. Chair - **Dr Muhammad Ejaz**
2. Vice-Chair - **Hooman Takhtechian**
3. Secretary External - **Dr Nigel Owen**
4. Secretary Internal - **Zahra Lotfi**
5. Financial Officer - **Bryn Roberts**
6. Sponsorship Officer (New Position for the 2020-2021 Session) - **Dr Olubayo Latinwo**
7. Event Co-ordinator - **Amir Attarchi**
8. University Liaison & CPD Officer - **Stephen Tate**
9. Website Officer – Dr Yunnan Gao
10. Membership and Young ICorr Officer (New Position for the 2020-2021 Session) - **Mei Ling Cheah**
11. Committee Member - **Alistair Seton**
12. Committee Member (New Member joining for the 2020-2021 Session) **– Ms Lian Ling Beh**

What we do:

The Aberdeen Branch has always been active in organising technical talks, annual conferences, industrial visits as well as collaborations with other institutes in various subjects that overlap with corrosion management. On the technical aspect, attending the monthly events gives you a chance to gain perspective on how others approach their work and to stay up to date with the current corrosion management tools.

Apart from gaining knowledge, ICorr Aberdeen is a perfect setting to get out of the rut of a normal workday and to network with other like-minded people. Also, you never know if you could be talking with your next prospective employer, or client !

In addition to the technical aspects, the branch also supports and helps, young engineers progress their careers, in line with ICorr values, the latest additions to the branch committee, **Mei Ling Cheah** and **Lian Ling Beh** are perfect examples of this.

Our New Committee Members

Lian Ling Beh

Mei Ling Cheah

Our Sponsors / Industrial Links

Our Work is supported by many Companies.

ICORR GOLD SPONSORS - Corrpro Companies Europe Ltd, Helvetica Technical Consulting Sagl, Midis Energy Services Ltd, Miller Fabrications Ltd, Pipeline Technique, Pittsburgh Corning.

ICORR SUSTAINING SPONSORS - CAN Offshore, Denholm Industrial Services Ltd, Element Material Technology, ICR, Lake Chemicals & Minerals Ltd, Lux Assure Ltd, Oceaneering, Plant Integrity Management, R&R Corrosion Ltd, Sonomatic Limited.

Educational Resources

We maintain and extensive Database of Past Presentations covering all areas of Corrosion Management.

Full details of future branch events can be found on the ICorr Website https://www.icorr.org/events/list/ or by contacting: ICorrABZ@gmail.com and copies of the majority of past branch presentations can be found at: https://www.icorr.org/aberdeen/ also a photo gallery for all Aberdeen events may be found at: https://sites.google.com/site/icorrabz/event-gallery.

Our New You Tube Channel is:

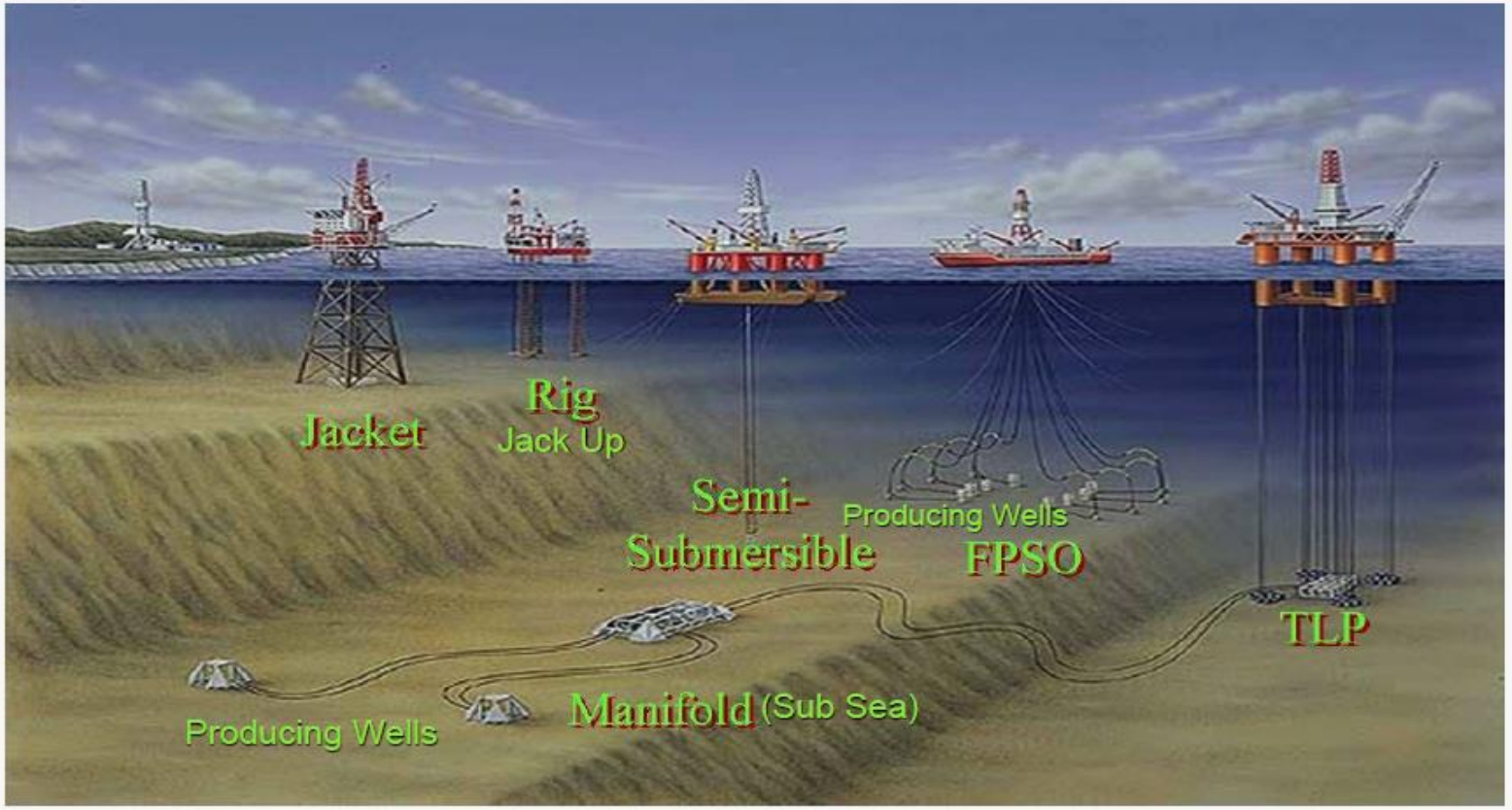
https://www.youtube.com/channel/UCNW-HoZVEMA79-4Y6k5E0ow/featured

Our Foundation

ICorr Aberdeen was built on Oil and Gas Exploration but now our Focus is increasingly: Hydrogen + Renewables.

Offshore Platforms

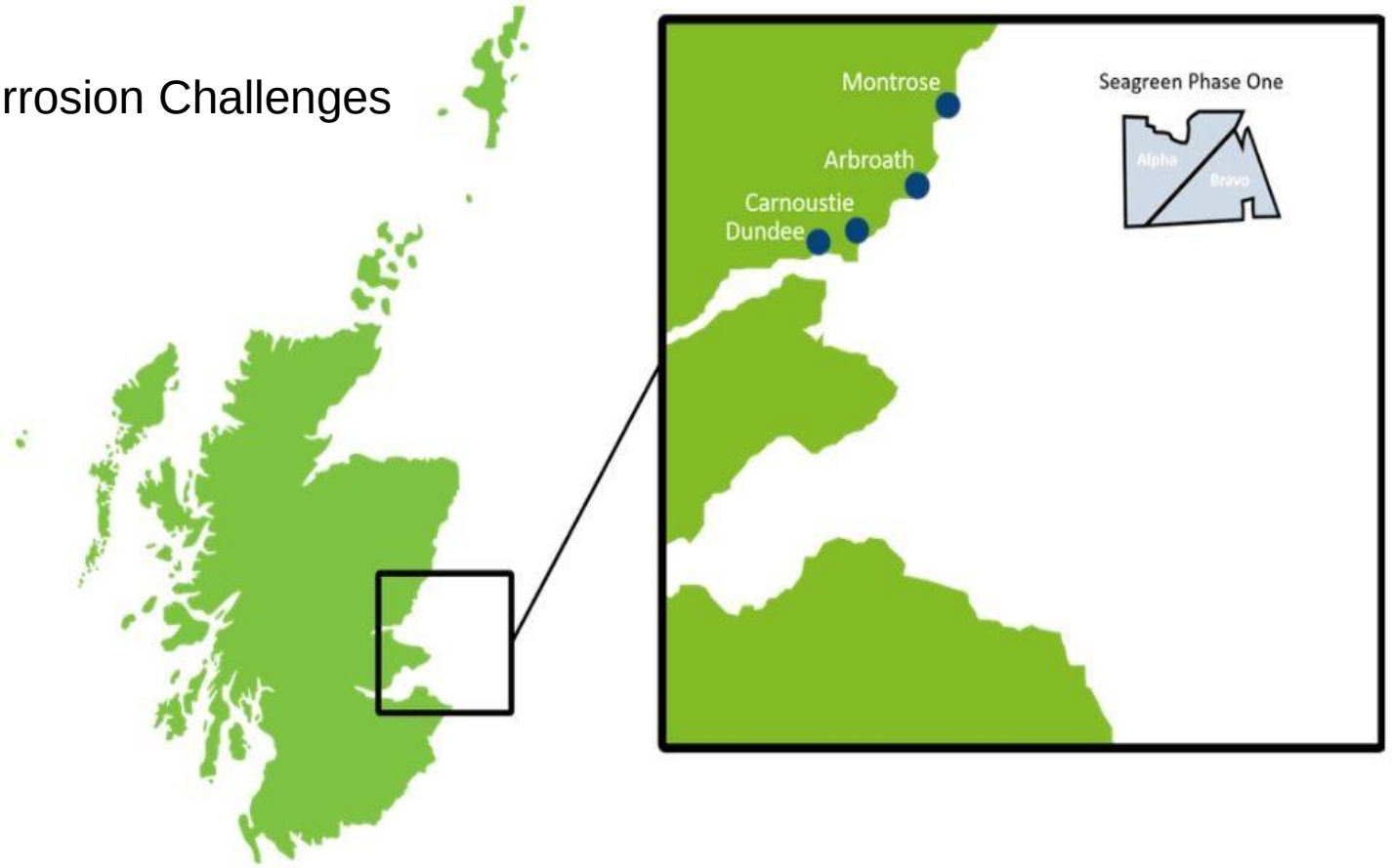
Old Corrosion Challenges



Future – Offshore Wind

O&G Operators are investing heavily towards Net Zero.

New Corrosion Challenges

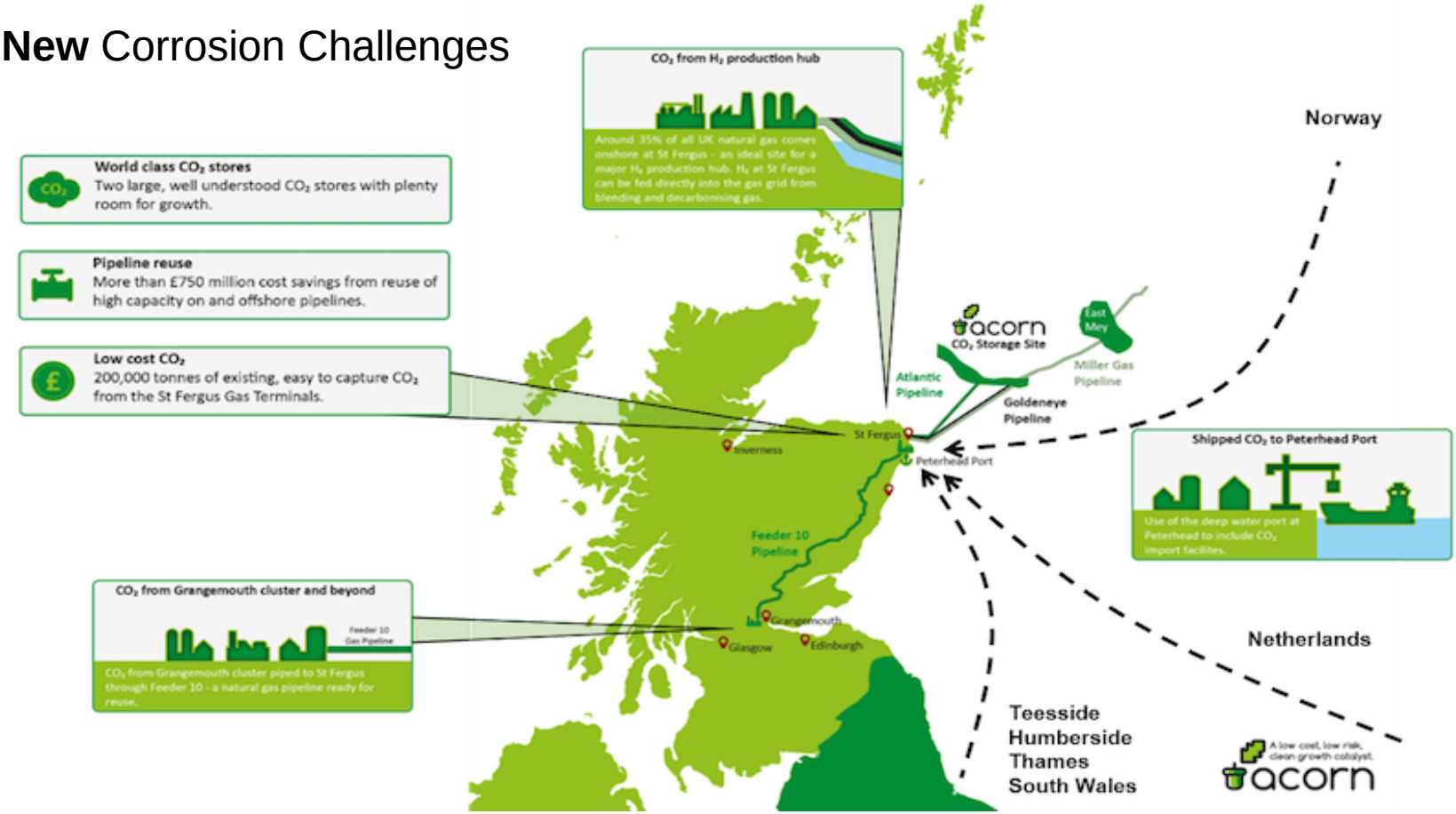


[Total Acquires 51% Stake in the Seagreen 1 Offshore Wind Farm Project]

Future – Carbon Capture / Hydrogen

O&G Operators are investing heavily towards Net Zero.

New Corrosion Challenges



https://pale-blu.com/acorn/

Introduction to Young ICorr

Mei Ling Cheah BEng, MSc

Corrosion Consultant - IMRANDD Asset Integrity Management.

Young ICorr Representative, ICorr Aberdeen Branch.

Young ICorr Mission Statement

- The Institute of Corrosion is a Learned Society and Registered Charity that has been serving the corrosion science, technology and engineering community since 1959 in the fight against corrosion, which costs the UK around 3% of GNP per annum.

- The intent of Young ICorr is **to link the network of younger professionals** who are either working or interested in the field of corrosion.

- Key demographic for Young ICorr is members of ICorr who are 35 and under, however non-members are also encouraged to join.

Institute of Corrosion

The UK's biggest community of Corrosion Academics and Professionals.

INSTITUTE OF CORROSION

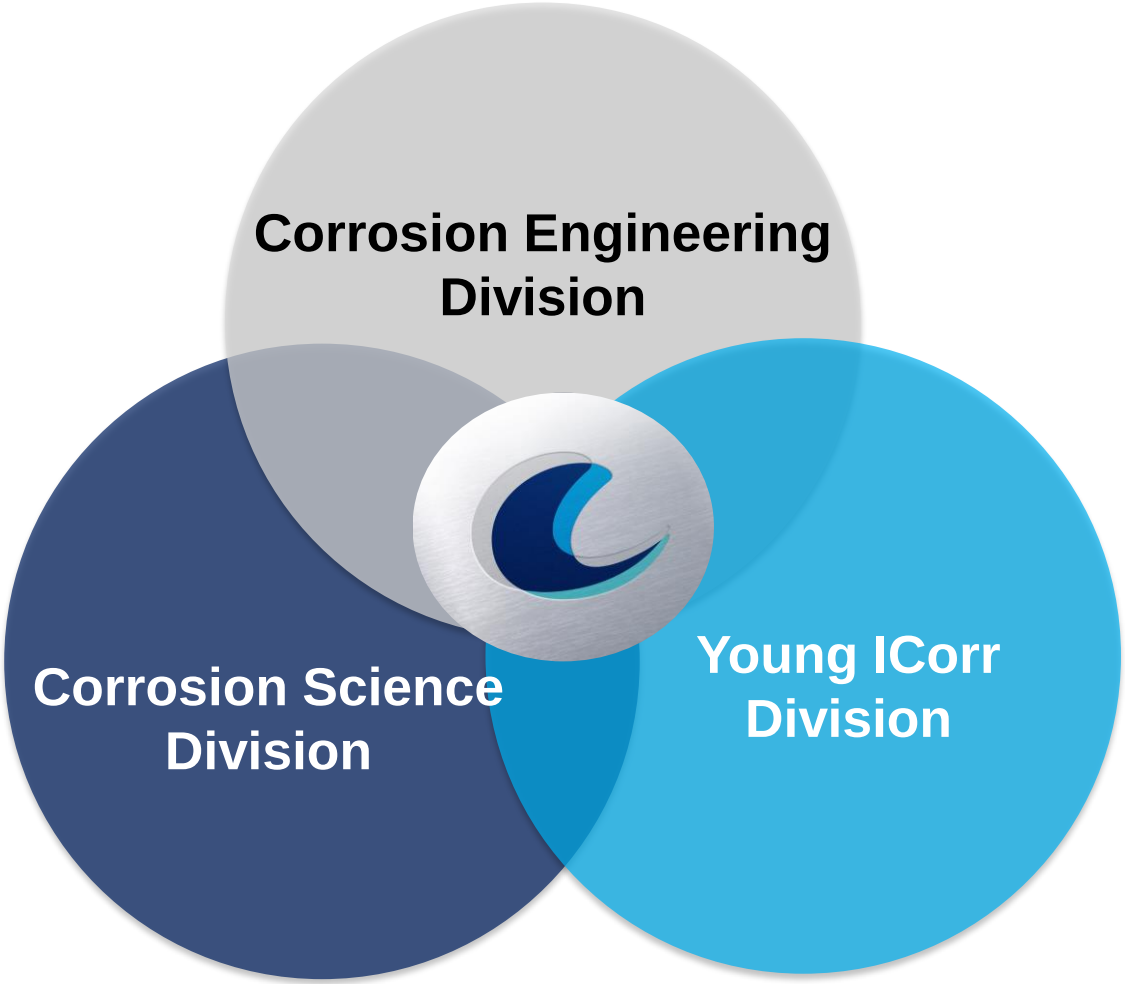
Education

Knowledge

Management Practices

Institute of Corrosion

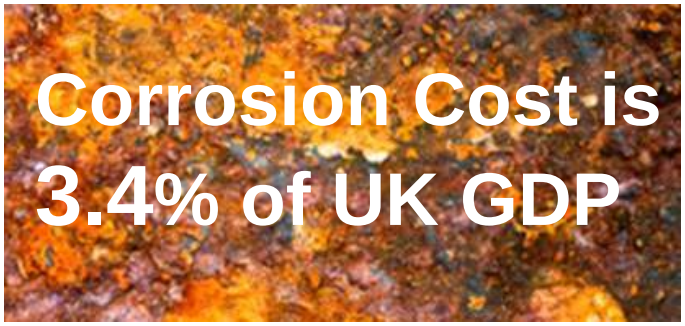
Made up of three major divisions in the United Kingdom.



Cost of Corrosion is Huge

£2,500,000,000,000

UK: £77.5 billion



Environmental Impact

Our united goal as a community is to prevent corrosion related failures!

Our Young ICorr Vision

To play our role in preserving our amazing planet.

Join us, and play your part!

Option 1

~~We carry on and do nothing…~~

OR

Option 2

Our Vision

To grow as a corrosion community

Our Vision

To grow as a corrosion community

RECRUIT

- Students
- Apprentices
- Graduates
- Engineers
- Scientists
- Researchers

TRAIN

- Apprenticeships
- Courses
- Mentoring
- Access to industry experts
- Chartership
- Increased career paths

IMPROVE

Corrosion Management and Control Strategies

- Future generations
- Reduce failures
- Reduce costs
- Improved technology

Membership Benefits

Become part of a corrosion network and gain professional recognition

Members Area

Networking Opportunities

- Technical talks
- Networking events
- Young Engineering Program

Services & Resources

- Corrosion Management journal
- Online technical forum
- Access to conference papers

Training & Professional Development

- Provides ongoing support throughout your career
- Mentorship program

Professional Status and Recognition

- Route to Chartered Status program
- Increased career opportunities

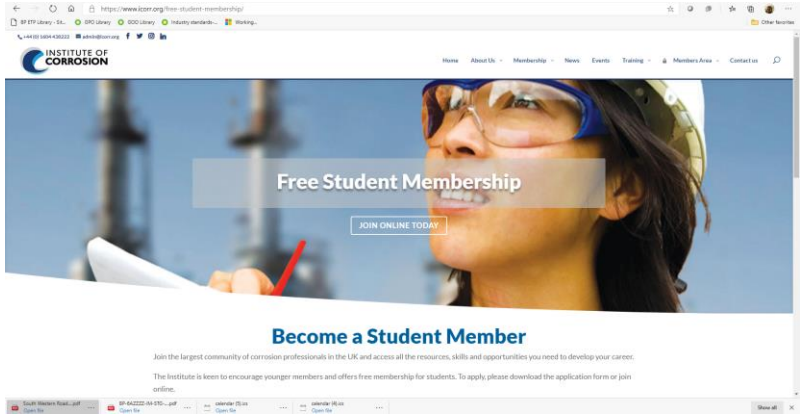
Collaboration with Other Institutes

- Networking for early career professional
- Professional development
- Training

Signing up is free and easy (for Student)..

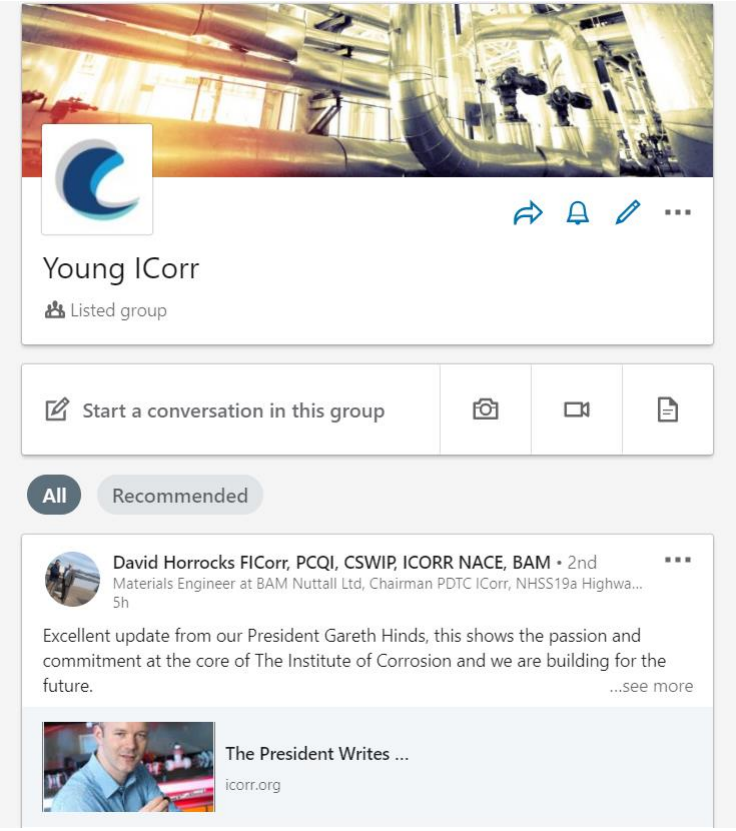
Free Student Membership towards CEng.

SCAN ME



www.icorr.org/free-student-membership/

Join “Young ICorr” on LinkedIn



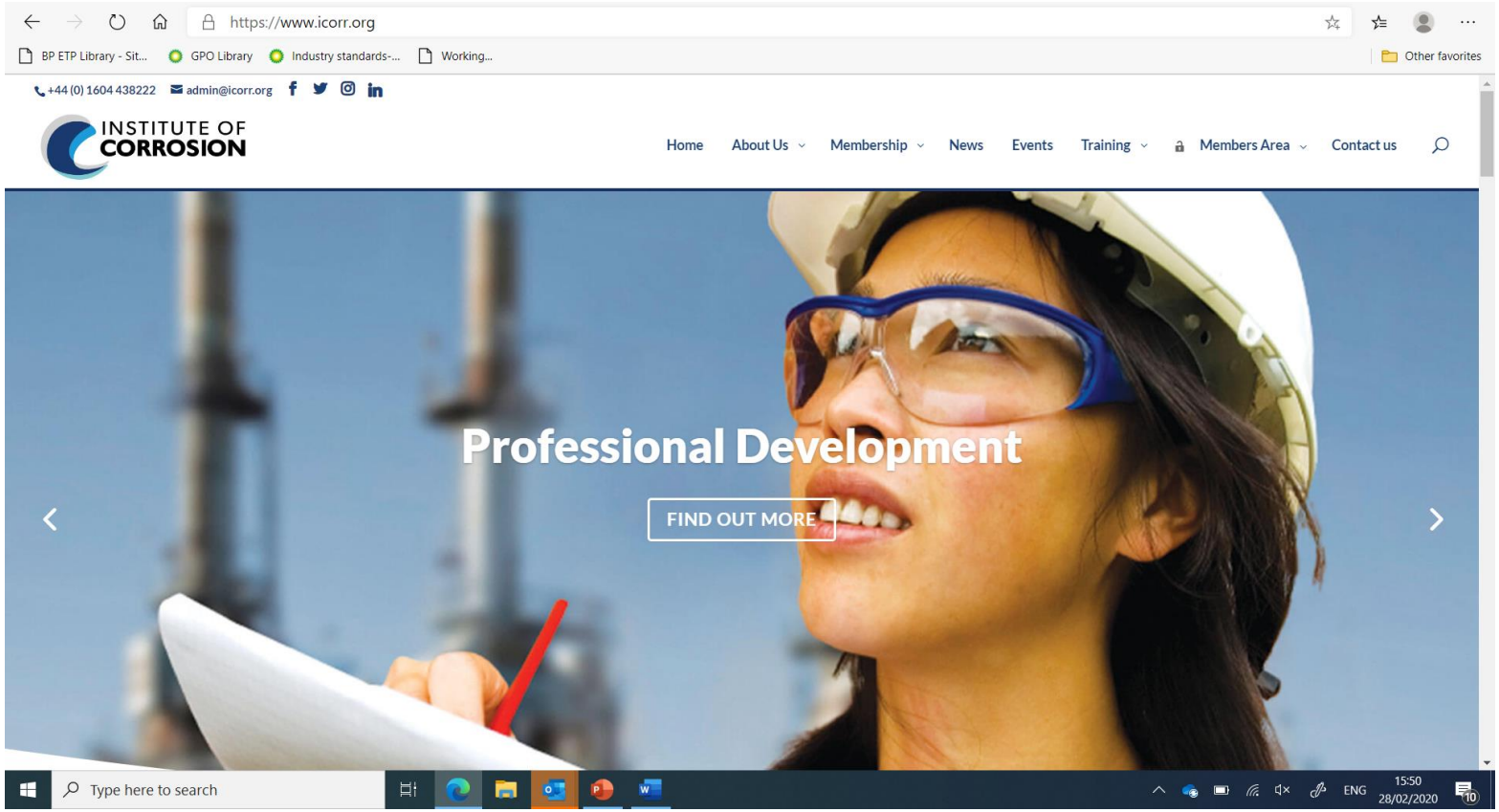
SCAN ME

Follow YICorr on Twitter

@YICorr

Find out what we can offer you!

www.icorr.org



Young Engineer Programme (YEP)

Mei Ling Cheah BEng, MSc

Corrosion Consultant - IMRANDD Asset Integrity Management.

Young ICorr Representative, ICorr Aberdeen Branch.

My Personal Story - **Mei Ling Cheah**

My journey into the field of corrosion started with her fascination on what was known as the greatest technological prediction for half a century, Moore's Law - cramming more transistors onto integrated circuit boards which lead to the age of computing and personal mobile devices. One of the challenges of keeping up with Moore's Law was around the limitations with materials science, which decided me to study Materials Engineering at university. It was during this when we had a module on energy storage and battery systems that got me interested in the subject of electrochemistry. **The process in a battery and corrosion of steel are chemically similar.**

I began my higher education in 2008, at the University of Science, Malaysia gaining a BEng (Hons) in Materials Engineering, followed by Post-Graduate studies at The University of Manchester and the award of Master of Science (MSc) in Corrosion Control Engineering in 2013.

I started work immediately as a graduate Corrosion Engineer at CAN (Offshore) Ltd., Aberdeen, acting as the Focal point for all integrity and corrosion matters for Bluewater's FPSO and was responsible for the delivery of RBI, pressure system inspection work scopes, fitness for service assessments, and technical reports outlining corrosion related issues, ensuring the constant update of risk-based assessments for all integrity related offshore facilities, and development of shutdown scenarios.

My Personal Story - **Mei Ling Cheah**

The following 3 year chapter in my life took me to Lloyd's Register Aberdeen, working as a Corrosion Engineer on asset life extension assessments for SABIC petrochemical plant static equipment and piping, for sites at Teesside (UK), Mount Vernon (USA), Burkville (USA) and Petrokemya North & South (KSA).

Other overseas related projects at Lloyd's included RBI for the S-Chem (Saudi) petrochemical refinery, and a corrosion study for the ZADCO Sulphate Reducing Plant, where the scope of work included static equipment and piping criticality assessment and generating inspection plan for all static equipment, piping and PSV's.

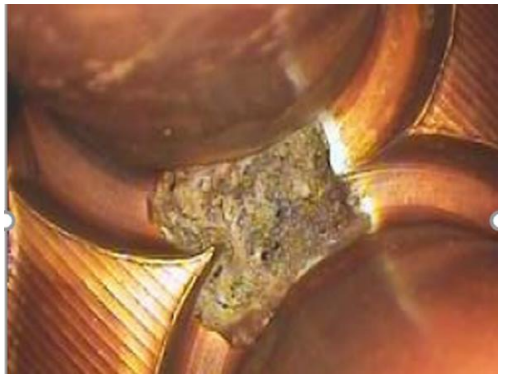
As well as dealing with a number of UK offshore facilities, new experiences of pipeline corrosion management were gained, including cathodic protection reviews and developing corrosion control schemes.

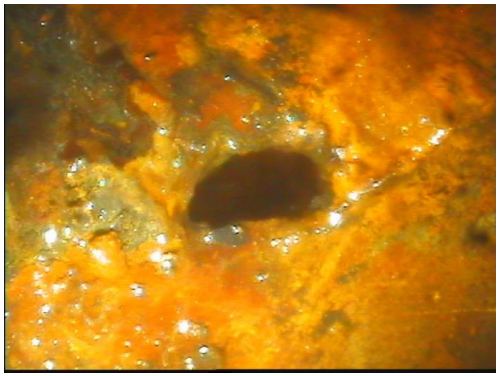
Most recently I joined the Aberdeen based IMRANDD Asset Integrity Management Firm, where I provide ongoing engineering support for Chrysaor's offshore assets - Armada, Lomond and North Everest.

What we do: CORROSION TRAINING

Reality (YEP Case Study)

Heat Exchanger Failure





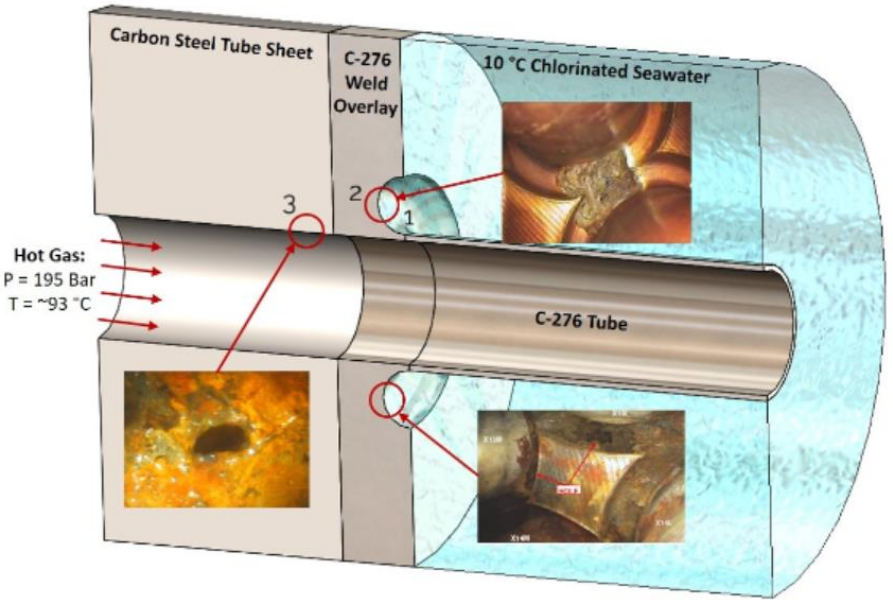
Reality (YEP Case Study) Failure Mechanism

Review Exercise 1: Summary of Corrosion Failure Mechanism

Stage 1. Initiation
Intergranular/Pitting Corrosion (accelerated in the welded/HAZ areas)

Stage 2. Propagation
Galvanic Corrosion (through the weld overlay)

Stage 3. Failure
Galvanic Corrosion (accelerated when carbon steel is exposed)



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Closing Remarks

If you are a student or newly qualified engineer working the corrosion protection industry, then, **just as myself**, remember your local ICorr branch can support you in your career development.

I am typical of new corrosion engineers, in that experienced members of the Aberdeen branch are supporting me towards MICorr and Chartered status and now Young ICorr nationally under chair Dr Caroline Allanach (BP).

Mei Ling Cheah BEng, MSc

Corrosion Consultant - IMRANDD Asset Integrity Management.

Young ICorr Representative, ICorr Aberdeen Branch.

Contacts

Icorr.org and icorr.org/aberdeen/

tinyurl.com/youngicorr or search for “Young ICorr”

F.A.O Mei Ling Cheah **ICorrABZ@gmail.com**
Please ask to join our Events Mailing List

The UK’s biggest community of Corrosion Academics and Professionals

Introduction to Corrosion Management

Stephen Tate MBA, P.G Dip. Eng MICorr
Senior Corrosion Engineer at TOTAL E&P (Technical Services)
Past Chair, ICorr Aberdeen Branch.

Integrity

(to be complete)

Ensure Facilities remain safe, productive and legally compliant.

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Consequences of Corrosion:

- Loss of mechanical strength and structural failure or breakdown
- Hazards or injuries to people
- Environmental impact due to from vessels and pipes
- Loss of time in availability of i equipment
- Reputational damage

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YEP ICorr

Corrosion Triangle:

Corrosion Control:

METAL + WATER + CORRODENT = CORROSION

~~METAL~~ + WATER + CORRODENT = NO CORROSION

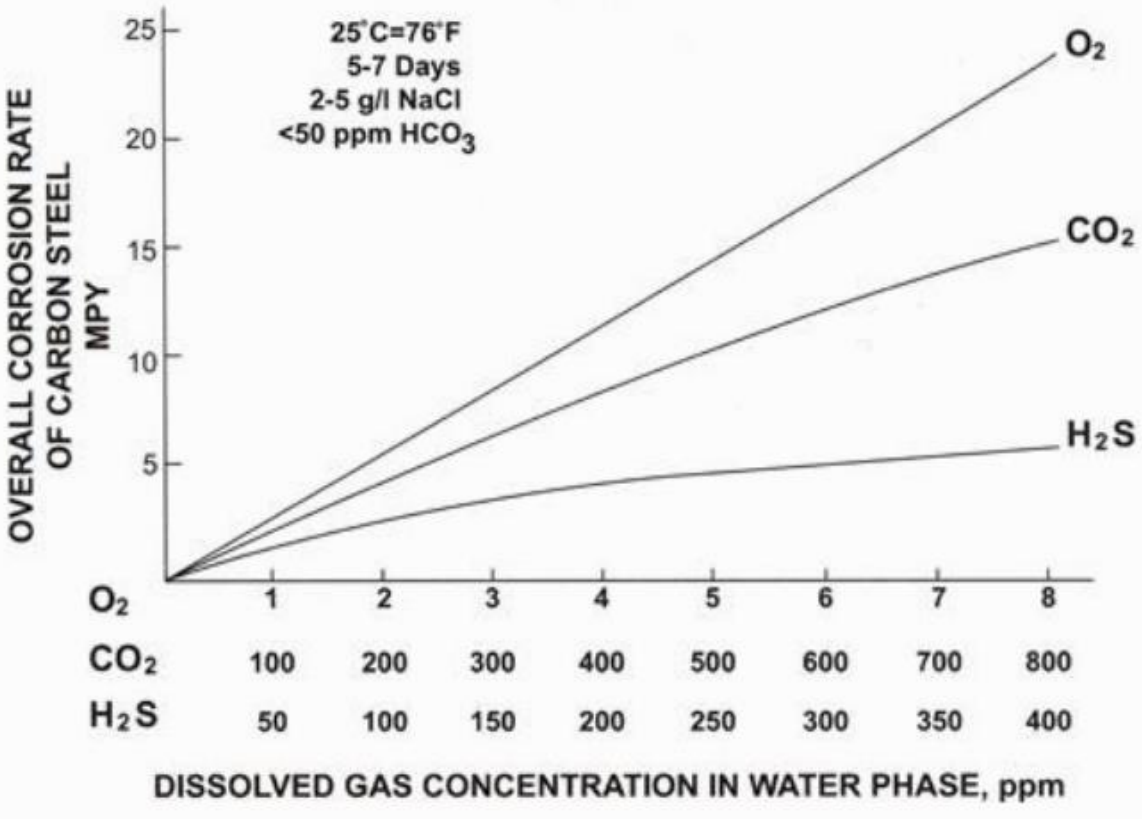
METAL + ~~WATER~~ + CORRODENT = NO CORROSION

METAL + WATER + ~~CORRODENT~~ = NO CORROSION

Design the material

Control the environment
Design a barrier

Corrosion rate of carbon steel



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Ball Valve Erosion


Choke Sand Erosion


Severe Flow Erosion


316 Flow Erosion

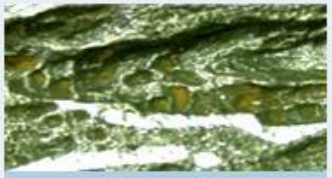

H2S Pitting


Cavitation Pitting


Bend Erosion


Isolated Pit


Sour Fluids Pitting


Severe Local Pitting


Pref.Weld Corrosion


Ext.Stainless Pitting


Cooling Crack


H2 Induced Crack


Stress Corr. Crack


Fatigue Crack

Corrosion Control Engineering

Factor	Controlling Method	Barrier	Controller
Conductivity	Stop/slowdown electrons	Non-conducting coat/paint	Coating/Painting Engineer/Inspector
Conductivity	Reduce conductivity	Keep the process dry	Process Engineer
Electrochemical reaction	Apply current	Cathodic protection	CP Engineer/Inspector
Oxygen	Stop/slowdown Oxygen	Barrier coating/paint	Coating/Painting Engineer/Inspector
Anodic reaction	Electronegativity	Corrosion resistant metal	Material/Corrosion Engineer
Electrochemical reaction	Stop/ reduce reaction rate	Corrosion inhibitor	Chemical/Corrosion Engineer
Electrochemical reaction	Stop/ reduce reaction rate	Passive layer	Material/Corrosion Engineer

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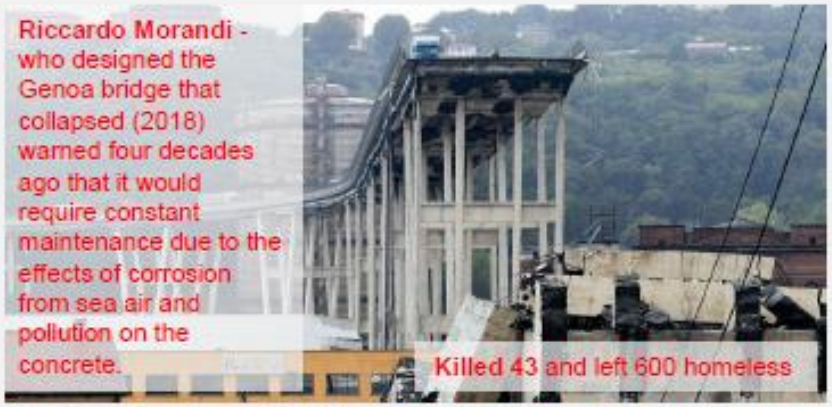
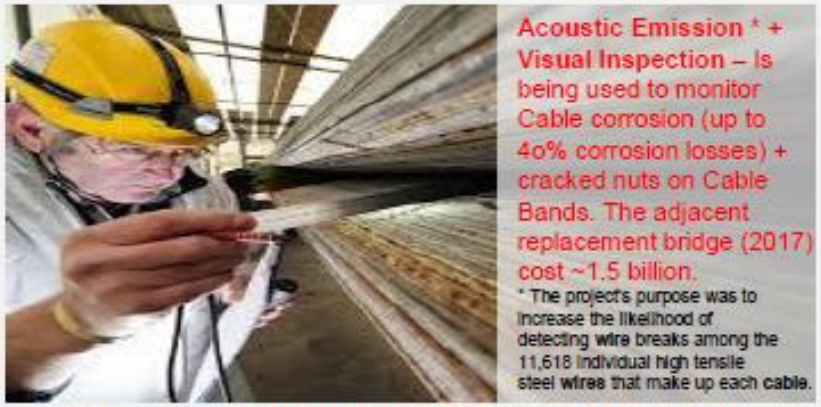
YEP ICorr
Integrity Management

Examples of Failures – Land Based Structures



The Broken Bridge of Italy – RC Failure



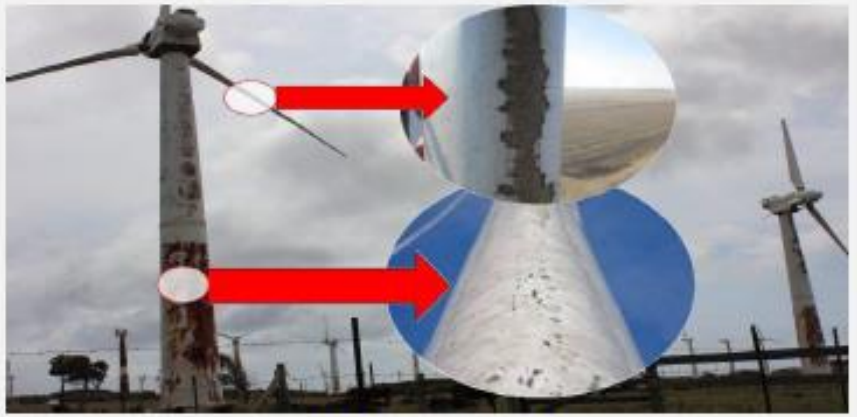
Forth Road Bridge Cable Corrosion

Safety Earthing – Typ. Galvanic Corrosion

Newbury Railway – Corroded Signal Base

Examples of Failures – Renewables (Hydrogen / Wind / Solar)

Coatings Failure



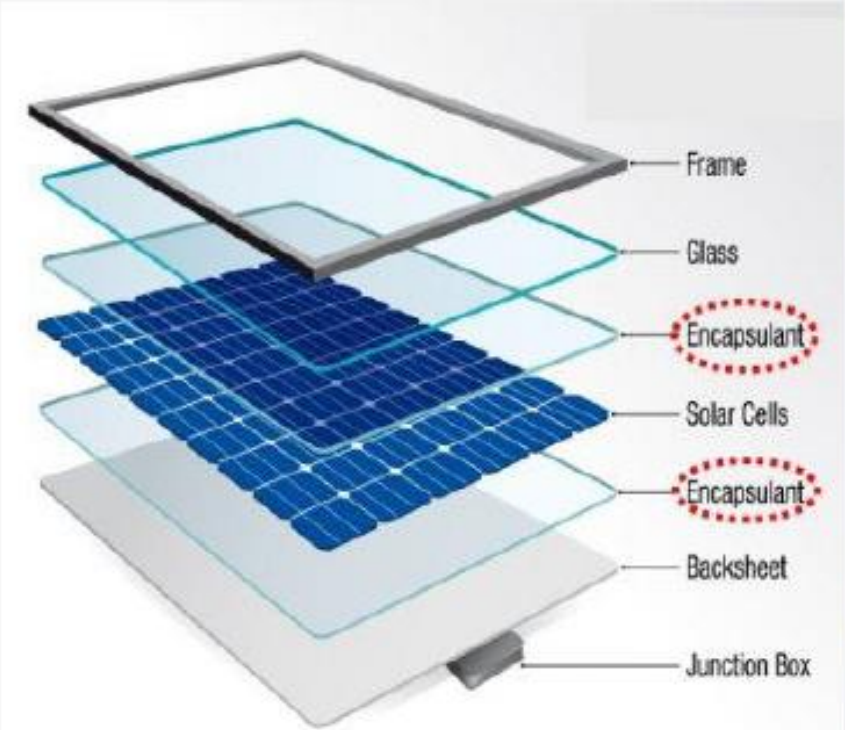
Blade Erosion

Load-out Integrity can be Short-lived

Corrosion is a continuing and major issue in all fields of energy, not excepting renewable energy. Newly engineered systems are designed for up to 30 years of service but exposure to environmental corrosion, UV, extreme temperatures and salt corrosion can challenge component durability. Exoessive component failures can lead to high maintenance cost and overall under performance of energy output.

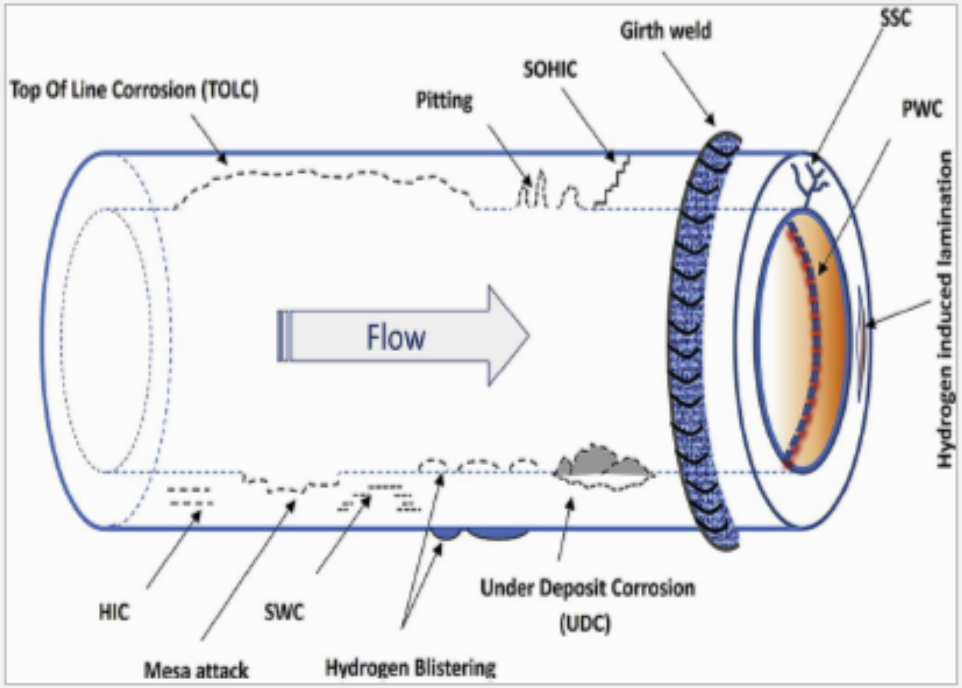
Atmospheric Corrosion

Examples of Failures – Renewables (Solar)



Browning is a change in color of the EVA film and occurs when certain additives used to prevent browning and enhance UV resistance, start to disappear. This can cause bleaching and blistering at the EVA film and the solar back-sheet, resulting in **Solar Cell Corrosion.**

Potential Failures – Renewables (Hydrogen Transportation)



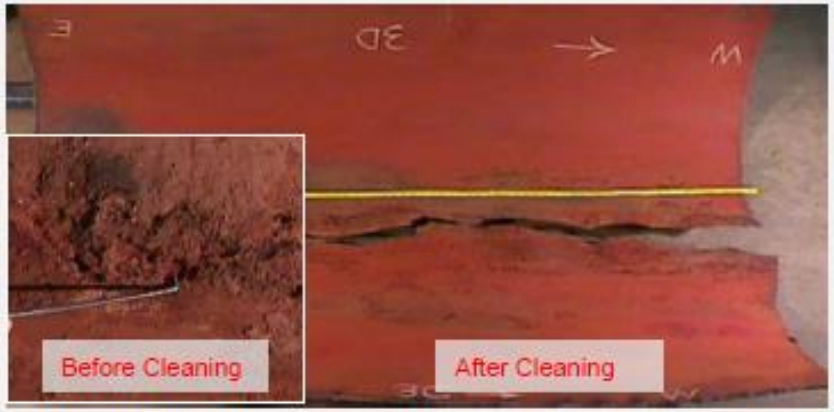
Lower Risk – Blending with Natural Gas (up to 15%) but this does not move much product !

Higher Risk – Single Product / Hydrogen use. Essential to under take full threats analysis and ILI run (ideally including some material sampling) if re-using a line. Historical records are often poor !

Pipelines used (or Re-used) for Hydrogen Transportation have many potential failure modes – both Internal and External. Worldwide there are more than 5000 km of hydrogen pipelines in total, the vast majority of which are operated by Hydrogen producers. **The longest pipelines are operated in the USA**, in the states of Louisiana and Texas, followed by Belgium and Germany. https://hydrogeneurope.eu/hydrogen-transport-distribution The most common causes of hydrogen-related hazardous failures are: **mechanical damage or damage due to material defects (from original manufacture), corrosion, enhanced embrittlement of storage tanks in low temperatures and human error (in operations).**

Examples of Failures – Pipelines

Gas Pipeline Failure – New Mexico 2000



Internal BOL Corrosion – Common Cause

Mississippi – Multiple Fatalities 2009

Resulting Hydrotest Failure

Examples of Failures – Oil and Gas Process Leaks

Humberside 2001 – Int. Erosion (New WI Pt)

Gas Explosion – Damage Adjacent Plant

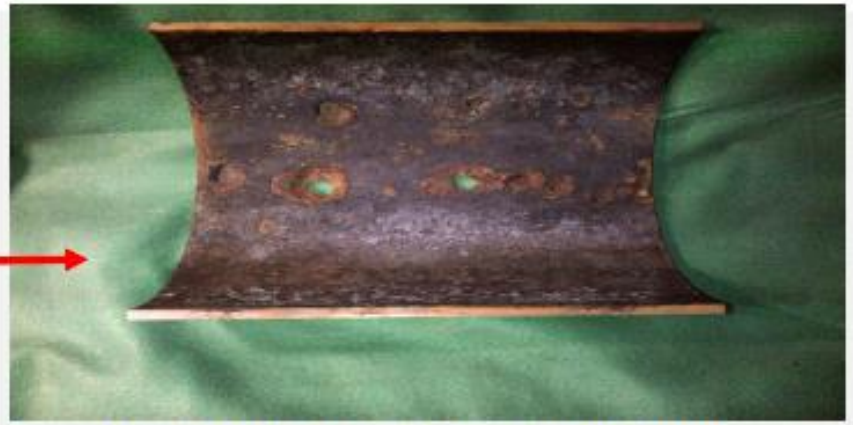
Sour Gas Leak 2011

Uniform ~ 90% corrosion of 8x bolts allowed nor. working pressure to fracture the bolts. Duct tape around Flange allowed "micro-environment" of H_2S, CO_2, heat / humidity.

BV Bolting Failure

Frequent Causes of Loss of Integrity – Oil and Gas Production

Examination after Intermittent Use



Post-Cleaning BOL – UDC / MIC

The Pipework from both First Stage Separators to the Second Stage and from Second to third was subject to severe internal pitting partly due to being shut in and not drained for quite long spells 6-12M. The failed spool had **many pits which were not reported from previous manual UT** Inspections. **Phased Array** scanning of the 3-9 o'clock parts of the horizontal pipework gave a more definitive view of the status (where accessible).

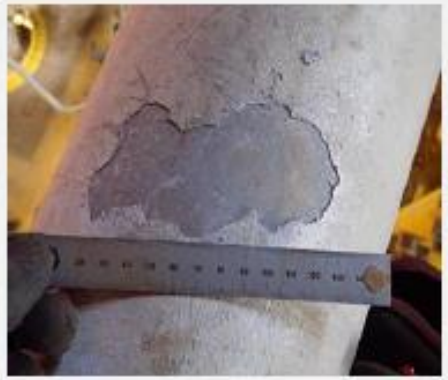
Holes – Visible Externally after Scale Rem.

Close-Up of Pitting

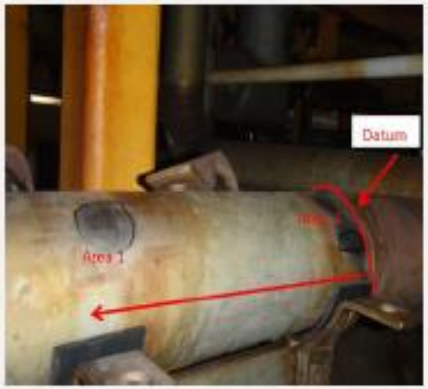
Frequent Causes of Loss of Integrity – Oil and Gas Production

Flow Erosion

Choke Failure



Salt Deposits / Dis-bonded Coatings CSCC



Pipe Supports

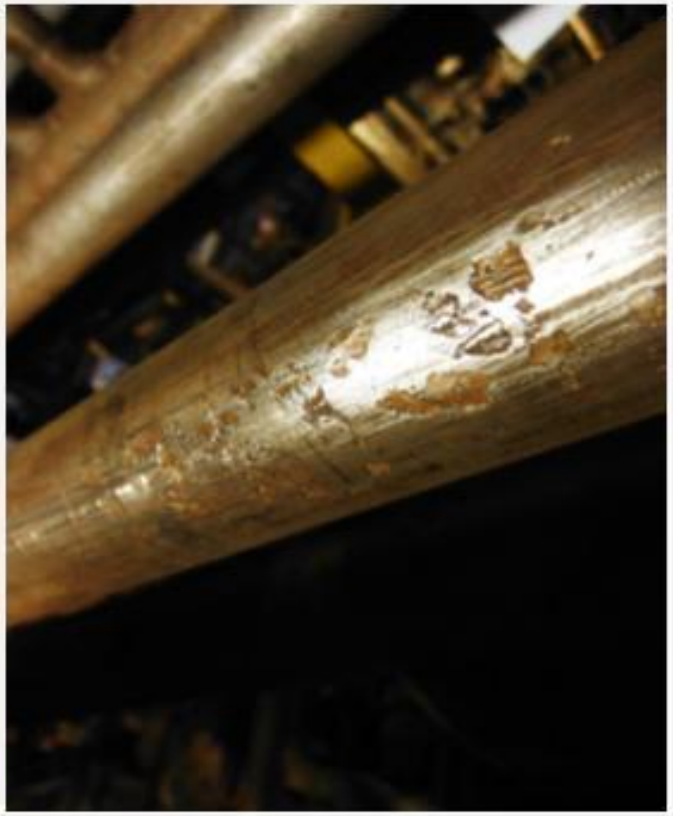
CUI

Conductors and Guides

Other Causes of Loss of Integrity – Oil and Gas Production

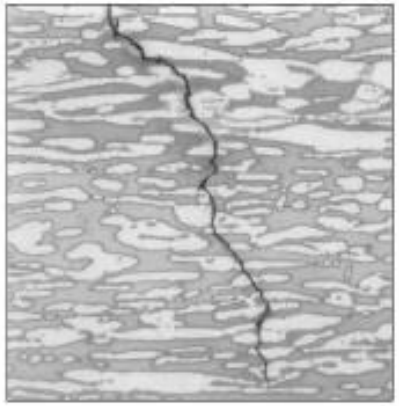
Poor Fabrication / Material Selection Practices – Uncoated 316L in Marine Environment

Other Causes of Loss of Integrity – Oil and Gas Production

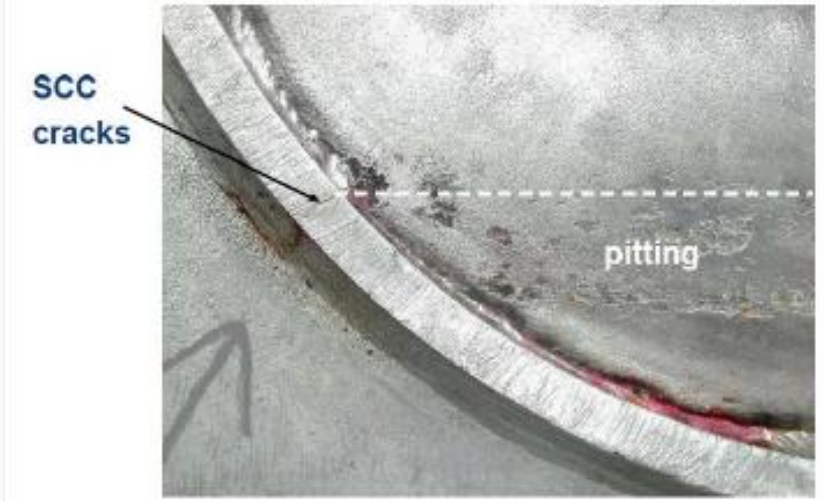


Poor Fabrication / Material Selection Practices – 316L Weeps + Pitting under ID Labels

Other Causes of Loss of Integrity – Oil and Gas Production



Category 1	Vertical trunnions were either cut open for access and subject to MPI surface defect assessment and ACFM (Alternating Field Current Measurement) defect assessment, or replaced completely.	
Category 2	These horizontal trunnions were subject to visual boroscope inspection for initial evaluation. If there were any significant findings these could be re-classified as Category 1.	
Category 3	These trunnions were all positioned on the vertical below position and were classified as requiring sample boroscope inspection only. Priority was given to any trunnion where there was evidence of Salt Deposits.	
Category 4	These trunnions were previously sealed during construction prior to phase 1 CSCC inspection. They can be any orientation.	



Pipe Trunnion Salt Water Ingress / Corrosion / Cracking Risks to HT Duplex Lines

Dead Leg Management + CUI

DL1 - Coating in good condition.

DL2 - Under insulated jackets.

DL3 - Partially under insulated jackets.

DL4 - Partially under insulated jacket.

DL5 - Under insulated jackets.

DL6 - Under insulated jackets.

10-12 Piping Deadlegs per P&ID can be expected with Internal / External Corrosion Risks

Corr. Management – Key Elements

ROLE of CMS

It is the responsibility of the Operator to ensure that the required corrosion assessments, corrosion control strategies and corrosion monitoring processes are in place **so that the risk of loss of containment and equipment/structural failure is minimized. Many are SECE's (Safety Critical Elements)**

The **CMS - Corrosion Management Strategy** is a key document that defines the overall management approach but is supported by many other documents such as:

- Facility Specific Corrosion Control Schemes (with Monthly KPIs),
- Inspection Manuals,
- Chemical Treatment Manuals,
- Site Operating Instructions.

- **CMMS** (SAP or other) – Computerized Maintenance Management System records all required Mitigations / Monitors / Inspections and their Frequency.
- **Ea. routine will be prioritized according to assessed risk.**

Corr. Management – Key Elements

Level 1 – Company Policies

Level 2 CMS - Key Elements:

- Defining Roles and Responsibilities.
- Defining Corrosion Control Strategy for ea. Facility operated.
- Defining Degradation Mechanisms.
- Defining Mitigations.
- Defining Performance Monitoring and Techniques.
- Defining Devices to be Deployed.
- Defining how Collected Data will be Measured / Stored / Interpreted.

Level 3 – Site Specific Corrosion Management Documentation.

Level 4 - Site Specific Work Instructions.

Simplified Cycle

KPI Reviews
X-Discipline
Mtgs

Corr. Management – Reading

Recommended Further Reading:

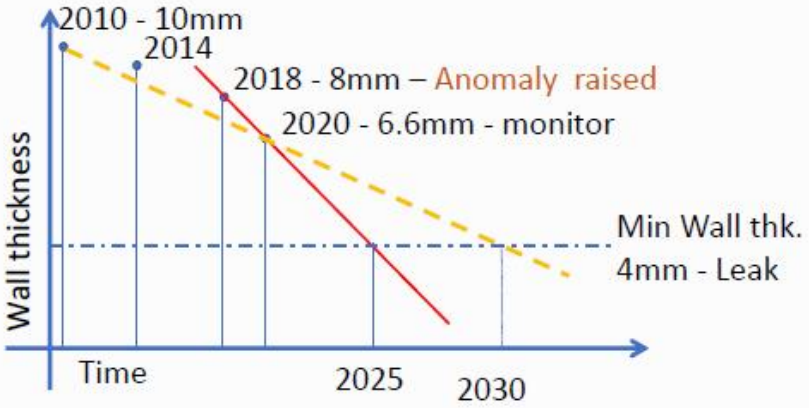
- **EI's Guidance on corrosion management in oil and gas production and processing, Mar.2019,** provides general principles and essential engineering guidance and requirements for improving corrosion management practices in oil and gas production and processing. It has been produced by an experienced oil and gas industry work group with the objectives of:

    - Reducing the number of corrosion related hydrocarbon releases and other safety related and environmentally damaging outcomes.
    - Identifying good practices for setting up an optimal corrosion management scheme.
    - Providing an overview of the top corrosion threats to production and processing facilities downstream of wellheads.
    - Improving the safety profile of hydrocarbon installations.
    - Improving equipment reliability.
    - Improving equipment availability.
    - Improving profitability.

Building on the previous edition, which was recognized in the HSE KP4: Ageing and Life Extension Programme as a major contribution to the industry's successes in addressing corrosion issues

- **Guidelines for the Management of Access Fittings for Pressurised Systems. Energy Institute, Aug.2020.**

RBA - Anomaly Management



- RBI frequency of 4 y. External corrosion found in 2018.
- Raised monitored (2 yearly) in anomaly management system.
- FM was recommended on a high priority.
- 2020 - monitored reduced to yearly. RBI inspection in 2022.

RBI Documentation / Corr. Management

Risk is a function of **combining**:

- **Probability** of an event
- **Consequence** of the event

For low risk we control: the probability of failure ***or*** the consequences

- Many aspects of risk are controlled at design stage
- Limiting risk by limiting stresses, strength and toughness of line pipe
- Limiting consequences by classification of location, and proximity controls.
- Assessing consequences, according to pipeline type and situation.
- **Qualitative, Quantitative and Semi-Quantitative Tools + PIMS + Plans**

INSTITUTE OF CORROSION

YEP ICorr
Integrity Management

AI / CONDITION MONITORING Sensors for System Health

Vibration

Temperature

Pressure

Flow

Test Coupons

Bio Probe

ER Probes

Sand Probes

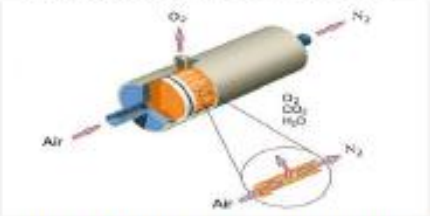
Acoustic Sensor

Wall Thickness Monitors

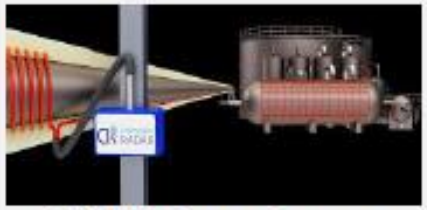
CI Tank Level Indicator

Choke Valve Actuators

Online Orbisphere



N2 Blanket Gas Analyser



CUI / Moisture Sensor

Dew Point Analyser

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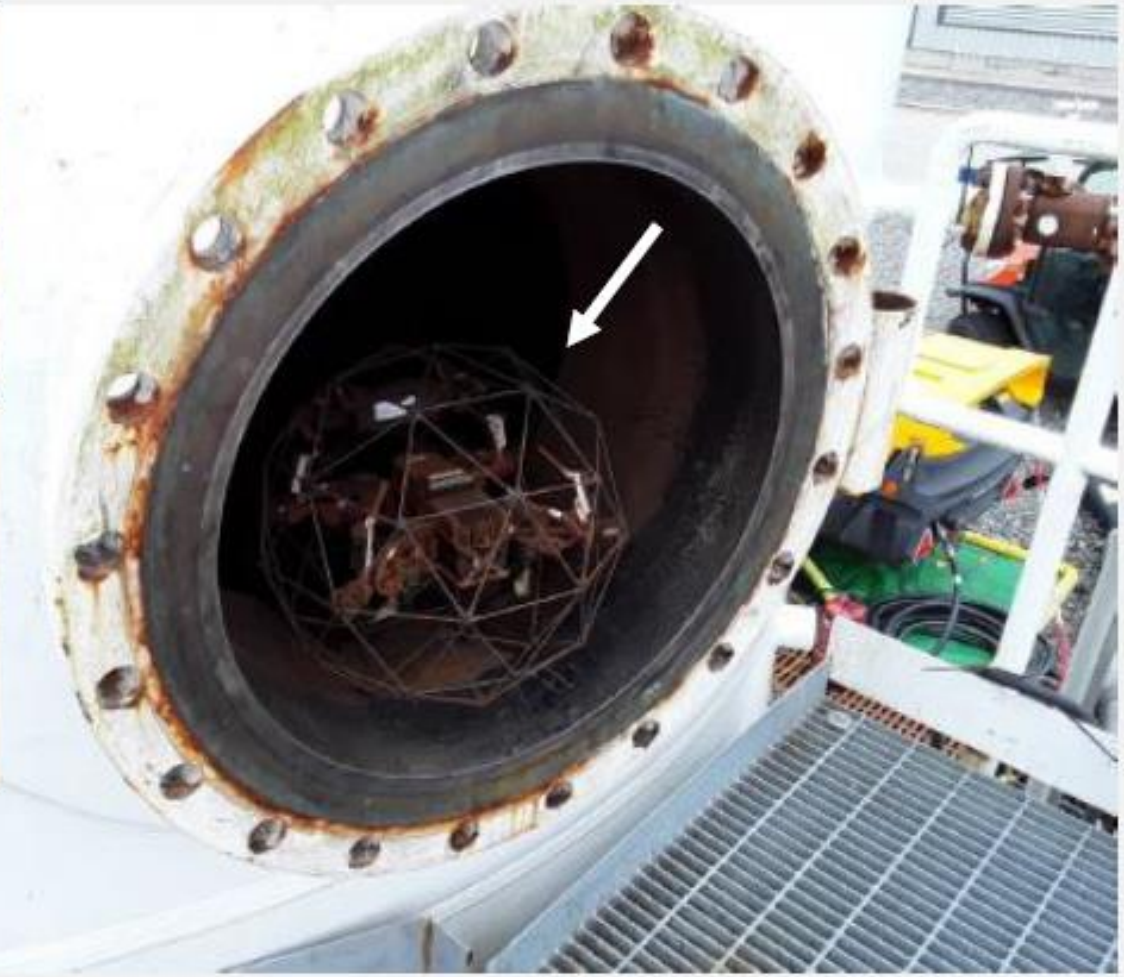
Integrity Management

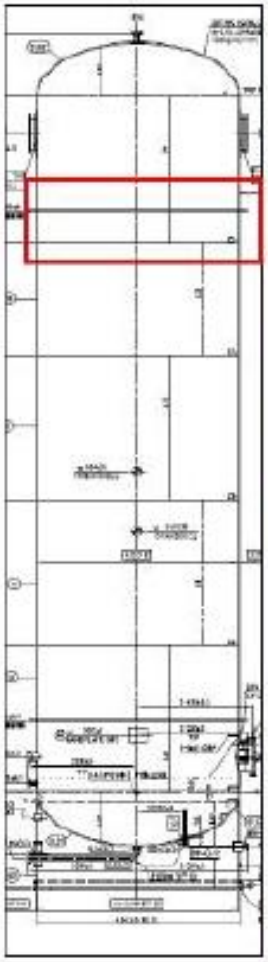
Offshore Inspection Robots

Use of DRONES for Internal / External Inspections



Hi – Resolution Drones

Use of DRONES for Internal / External Inspections



INSTITUTE OF CORROSION

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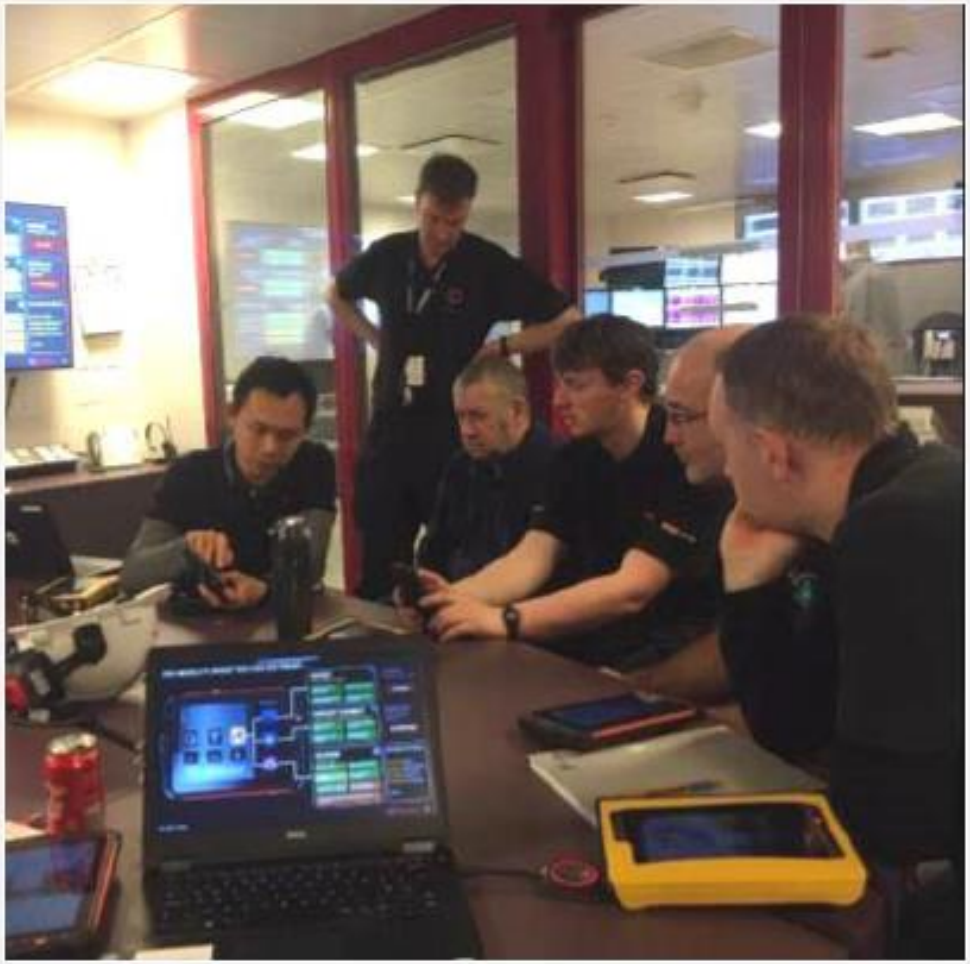
Integrity Management

Inspection of Floating Units

Maintenance Support Vessel

FPSO

REMOTE Working / Avoid Visits / AR



Shell – "Technologies like Augmented Reality (AR) and Virtual Reality (VR) can unlock business value for our operations across the entire lifecycle of a project, from initial planning through construction to operations".

Improved information Flow - SME's (Subject Matter Experts) to Field Technicians and for Training them.

Inspection - NDT

- Visual

- Ultrasonics
- Radiography

} *Wall Thickness Measurement*

- Magnetic Particle
- Dye Penetration
- Eddy Current
- Potential Drop
- Acoustic Emission

} *Flaw Detection*

} ***Non-Destructive Testing (NDT)***

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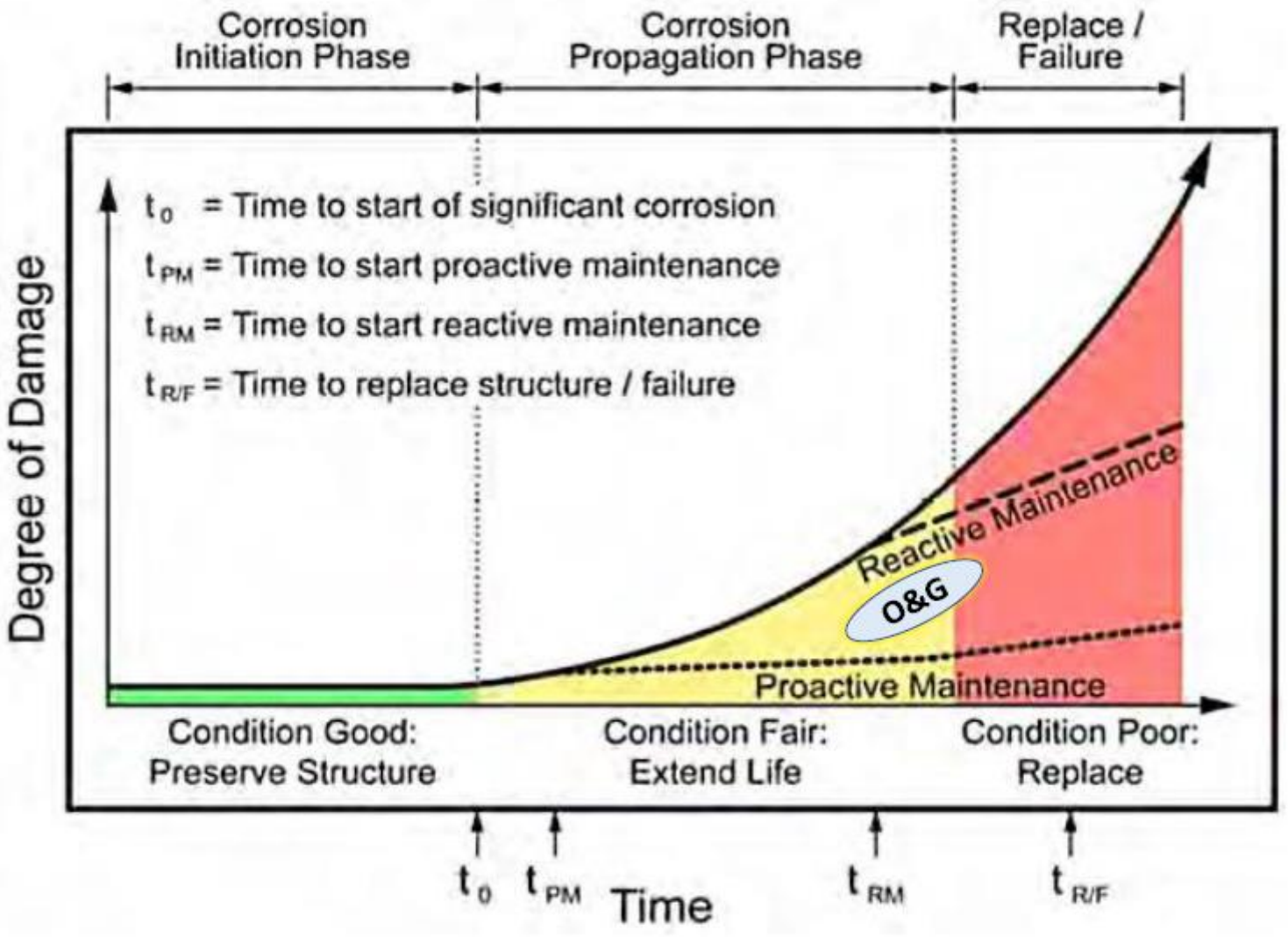
YEP ICorr
Integrity Management

Inspection of Floating Units

Often Difficult Access for FPSO / FSO Vessel Inspection

INSTITUTE OF CORROSION

YEP ICorr



Closing Remarks

Hooman Takhtechian CEng MIMMM

Principal Corrosion Engineer at Oceaneering

Vice Chair, ICorr Aberdeen Branch.

INSTITUTE OF CORROSION

Events Programme – Join our Mailing List

Date	Event Type	Speaker (s) / Company	Topic (s)	Time
Tuesday 26/01/2021	Joint Meeting with EI	**Rebecca Allison -** Asset Integrity Solutions Centre	**Prov:** New Guidelines for Integrity Management of Access Fittings utilised in Offshore Pressure Systems (1st Edition).	18:00: Finish* at 19:30
Tuesday 23/02/2021	ICorr Technical Event	**Mike Banks** - Tracero	**Delivering Real Time Condition Monitoring of Subsea Pipelines:** As assets age over time, oilfield professionals are continuously faced with the test of ensuring efficient production and pipeline integrity. Inspection of these pipelines subsea has often presented challenges where pigging is not an option or deemed too risky. **In this 3 part presentation,** Tracero will discuss the principles of collection of Integrity / Corrosion Data Subsea and various NDT principles deployed.	18:00: Finish* at 19:30
Tuesday 30/03/2021	ICorr Technical Event	**Dr George Sergi** - VECTOR. Galvanic Corrosion Control of Reinforced Concrete:	**Galvanic Corrosion / CP Control of Reinforced Concrete;** Lessons learnt from 20 years of Site Trials. Sacrificial anodes have been used in reinforced concrete structures for up to 20 years. This presentation reviews the performance of the oldest set of anodes used in enhanced patch repairs where anodes were placed at the periphery of the patch at around 600 mm spacing on centre. It demonstrates, from results of current output and steel de-polarisation levels that the repair system is still functioning adequately.	18:00: Finish* at 19:30
Tuesday 27/04/2021	Joint Meeting with MCF – All Day Event Followed by Evening ICorr Session.	**Dr. Steve McCoy** - Special Metals, PCC Metals Group (Day), **Dr Henry Tan**, Aberdeen University (Day), **Ross Hubble**, Applications Engineer, COMSOL (Day) and **Dr Nkem Nwosu** – Element (Evg.).	1. **Corrosion Resistant Nickel alloys for Sour Oil & Gas Environments** - (ICorr/MCF Day Presentation). 2. **Challenges in the estimation of the longevity of Offshore Structures.** 3. **Modelling Corrosion and Corrosion Protection.** 4. **Exploring the Phenomena of Trans and Intergranular Corrosion of Copper / Brass Alloys** - (ICorr Evening Presentation.).	09:00: Finish* at 19:30
Tuesday 25/05/2021	Industrial Visit + ICorr AGM	**Scott Gauld** Technical Sales Manager **(STORK).**	**Corrosion Monitoring:** With over 30 years' experience, Stork's Monitoring Solutions deliver a range of traditional and advanced techniques for corrosion measurement, (including corrosion under insulation), erosion, stress, temperature, strain and other impacts, for a wide variety of applications both on and offshore.	18:00: Finish* at 20:30.

Next Talk

INSTITUTE OF CORROSION

The Mining Institute of Scotland

INSTITUTE OF CORROSION (ICORR) ABERDEEN BRANCH

Joint Technical Meeting with IOM3 / MIS.

Tuesday 24th November 2020, Start Time: 18.00 (GMT).

This Event is **Free** and **Open to all** ICorr Members and Non Members.

Topic: Body Armour: Why, How and What (from)? A provocative Materials orientated presentation to get you thinking "out of the box".

Next Talk

INSTITUTE OF CORROSION

The Mining Institute of Scotland

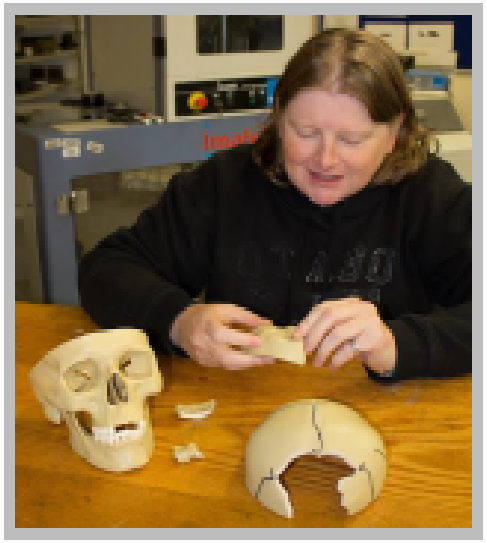
Speaker: Professor Debra Carr (CEng FIMMM FCSFS CF), Defence and Security Accelerator. DASA Scotland Innovation Partner.

Event Programme:

17:50 – 18:00 Webinar Login
18:00 – 18:10 Introductions ICorr
18:10 – 19:00 Technical Presentation
19:00 – 19.20 Q&A Session, (Questions from CHAT).
19:20 – 19.30 Closing Remarks.

Please register in advance for Event by email:

Stating Member / Non Member to: yunnan.gao@gmail.com



Q1. How can I join ICorr?
A1. The Institute is keen to encourage younger members and offers free membership for students. To apply, please download the application form or join online. Please use our Website Link - https://www.icorr.org/free-student-membership/

Q2. Why should I join ICorr?

A2. Joining ICorr has many benefits – It gives access to a huge Engineering / Scientific Community with many available Mentors. ICorr has strong links with other Technical Institutes and they participate in our programmes. Our Talks are well attended and very informative (and all free to attend) – Pls contact **ICorrABZ@gmail.com** to join our mailing list.

Q3. Are all your Meetings Virtual?

A3. For the 2020-21 Programme that runs until Aug.21, yes most Events will be Online, we remain optimistic that Q2/Q3 Events will be ‘Face to Face’ Events with a Covid Vaccine likely in place by that time.

Q4. Do I get CPD for attending?

A4. All our Technical Events offer CPD (8-10 per session) to Event Attendees.

Q5. How can I attend YEP Events?

A5. Presently, this is by Invitation only from our London Branch but an Aberdeen YEP structure is being established for the next ICorr Session. You may wish to contact David Mobbs our YEP Organiser on: David Mobbs david.mobbs@c-i-m.co.uk

Q&A Session (Questions from Chat)