

JOINT MEETING

ICORR ABERDEEN BRANCH / IOM3 : THE MINING INSTITUTE OF SCOTLAND**Tuesday 28th November 2023, Start Time: 18:00 (UK Time)****An on-line Presentation only:****For Registration :**https://us06web.zoom.us/webinar/register/WN_mxGyL7xSm2aL0HHa5Ar1w**Event is Free of Charge to attend.****Electrochemical Noise as a means of monitoring / assessing organic coatings, along with the advances made to date.****Speaker: Dr. Douglas Mills
& Tianyang Lan****Event Programme:**

17:50 – 18:00: Webinar Login. Set-up.
18:00 – 18:15: Introductions ICorr
18:15 – 18:55: Technical Presentation
18:55 – 19:05: Q&A
19:05 – 19:10: Closing Remarks ICorr.

The Talk: Electro-Chemical Noise as a means of monitoring / assessing organic coatings, along with the advances made to date.

It is generally agreed that the protection afforded by an organic coating system to a metal substrate) can be accurately assessed by measuring resistance (normally ionic, being the largest in the circuit). In sea water environments the criteria set by Bacon Smith and Rugg some seventy-five years ago that a resistance of $> 1E8$ ohms-cm² was a good coating, $1E6$ - $1E8$ was fair and $<1E6$ is still accepted. The two main methods of measuring this are by Electrochemical Impedance Spectroscopy (EIS) and by Electrochemical Noise Measurement (ENM). The authors prefer the latter for the relative simplicity of the measurement and its non-intrusive nature. Recently the assessment of protection by electrochemical noise has been made easier to carry out by the availability of a purpose-built proprietary device (ProCoMeter) designed to make measurements in the field and offering various electrode arrangements. Work at the University of Northampton and elsewhere has tested three such arrangements (Bridge, SSS, and NOCS) and each gave similar results of R_n for coatings. Bridge (or beaker) is the standard way of conducting ENM with two nominally separate but identical metal samples and a reference electrode. This could be used for coatings. But when it comes to assessment of inhibitors or monitoring of these, it has to be used. Some results obtained using the bridge arrangement in testing a number of inhibitors both green and standard will be discussed for corrosion of steel in hydrochloric acid. It will also be shown how ENM gave comparable results to the more established Linear Polarisation Resistance (LPR) method. The work with coatings will concentrate on the identified problem that in any arrangement of ENM the result comes from two separate areas and the R_n value is an amalgamation ie the two areas could have different resistances. Identifying when this is the case has been addressed by making multiple measurements and looking at other parameters apart from R_n eg Voltage and Voltage noise. These results will be shown, and the results discussed. Extending this

technique to trials in the field is the next step.



Biography: Douglas Mills : Did his PhD on anti corrosive coatings at Cambridge University and has worked on and off in this field since. After spells at the BNF Metals Technology Centre and the Nuclear Power Company, in recent times he has worked in academia and apart from teaching materials has continued to conduct and supervise research in the field of electrochemical methods for application to coatings particularly studying and developing the electrochemical noise method. He was for fifteen years the Technical Secretary of the Institute of Corrosion and is also involved in Standards development.



Tianyang Lan: Did his BSc and MSc in General Engineering at the University of Northampton. During his studies he conducted some Electrochemical Noise research projects under the supervision of Dr Douglas. For the two years prior to March this year, he worked on a research contract at University of Nottingham in the Department of Environmental Engineering applying electrochemical noise and LPR to the testing of green inhibitors. He is now working at the DCVG Company which provides various equipment for detection (using eg ENM) and prevention (using coatings and CP) of corrosion of pipelines. .

Additional Information:

- Registration for this event may close hours before the start.
- If this is an on-line event you must register and acquire the Zoom Link to attend.
- Registration information will be shared with our Branch volunteers to help facilitate the event.

For Continuing Professional Development (CPD) or to join our Mailing List,
request by email to: ICorrabz@gmail.com

Event Sponsors (ICorr):

We gratefully acknowledge all our loyal Branch and Sustaining Sponsors:



Our ICorr Sustaining Sponsors

- CAN (Offshore) Ltd
- Chemco International Ltd
- Corpro Companies Europe
- Hexigone Inhibitors Ltd
- Hodge Clemo Ltd
- ICR Integrity Ltd
- Infrastructure Analytics Limited
- Lake Chemicals & Minerals Limited
- Miller Fabrications Ltd
- Owens Corning Foamglas Industry
- Plant Integrity Management Limited
- PMAC Inspection Ltd
- Presserv Ltd
- R&R Corrosion Ltd
- Rysco International Ltd
- Sonomatic Limited