

Aberdeen Branch Failure Analysis



January 2017

Number 1

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- Joint session with IOM3
- Failure Analysis
- Managing Marine Corrosion of Offshore Wells
- Cormorant Alpha Leg C4 leaks - cause
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Winter Meetings:

January 31st 2017

Palm Court Hotel
18.00 for 18.30 start
NDT – Application of acoustic emission to detect corrosion and cracking
Dr Ghazi / Faisal Nadimul

February 28th 2017

Palm Court Hotel
18.00 for 18.30 start
Monitoring high temperature corrosion attack; correlation between Crude corrosiveness and result from online corrosion monitoring
Ruth Wardman

March 28th 2017

Industrial visit: Cosasco (BOD)
Bridge of Don, Aberdeen
Details to be advised.
Latest advances in real-time monitoring and Safe Retrieval.

The November branch meeting was a joint session with IOM3 and was held at Palm Court hotel on Tuesday the 29th of November, 2016. There were two topics presented during the meeting. The first topic was “Managing Marine Corrosion on Offshore Wells - Avoiding Structural Failure” presented by Ian Taylor of Shell and the second topic was “Cormorant Alpha Leg C4 Leaks – Cause, Response and Lessons Learned” presented Fraser Selfridge (TAQA). After a safety announcement, the branch chair Stephen Tate introduced the first guest speaker of the night, Ian Taylor.

Don't Be Let Down by Corrosion



Ian gave an explanation of surface casing corrosion, where issues have been seen in practice, what was done, how inspections are performed and examples of repairs carried out. Ian noted that many of the wells dated from mid-1970's and there was little thought at the time on how to optimise material strength and corrosion with focus on early production. Ian used photographs and diagrams to demonstrate subsea well components, how wells were built and typical corrosion issues experienced. Ian described the type of loads experienced during installation and operations noting that wells cannot be hung off the platform, but must be structurally self-sufficient. He noted that the key was to prevent

April 28th 2017

Palm Court Hotel
18.00 for 18.30 start
Cathodic Protection using
simulation technique to help
assess CP current of buried
Subsea Pipeline Anodes from
field gradient measurements

May 30th 2017

Palm Court Hotel
18.00 for 18.30 start
Inspection – A review of state
of the art measurement for
corrosion under insulation risk.

Contact Us:

For information about the
Aberdeen branch activities please
contact our branch secretary,
Frances Chalmers,
ICorrABZ@gmail.com.

Alternatively a calendar of local
events of interest to corrosion
professionals in the Aberdeen
area and the opportunity to sign
up to the branch mailing list is
available at
<https://sites.google.com/site/icorrabz/home>.

structural collapse explaining the effect of corrosion on surface casing loading. He mentioned three typical mechanisms which are oxygen corrosion, Microbiological Influenced Corrosion (MIC) and acid corrosion. He explained measurement techniques used to quantify wall thickness especially the use of Pulsed Eddy Current (PEC) with results later combined with structural modelling to improve predictions on failure. Ian discussed mitigation approaches such as loading redistribution, installation of supports, grouting and replacement. He explained on the advantages and disadvantages of these options with other operational concerns such as loading during future intervention, thermal loads, effect of well collapse, previous mitigation efforts etc. He emphasised the importance of an initially good design such as using good grade steels, appropriate centralising, and consideration of the effects of corrosion among others. For existing systems, the strategy should be to prepared for failure, know how to deal with it when it occurs, understand loadings and how to transfer them. He concluded with a project example of how corrosion was identified and how a repair was performed using collars and load transfer techniques. Questions for this part of the session covered installation of coupons, cathodic protection, use of repseed oil and casing material metallurgy. The second part of the session was delivered by Fraser Selfridge of TAQA and covered leaks experienced on leg C4 of Cormorant Alpha. He started with a point of view narrative of how he got the news of the first failure and steps taken immediately after including total shut-in on import/export and platform de-manning. He explained that the platform was similar in design to a number of North Sea concrete structures – topsides steel process area on concrete legs with vast area of concrete storage cells below the legs. He observed that there were particular problems and a high risk area below the GTF (Gas Tight Floor) of Leg C4 with limited isolation possibilities to control leak, follow-up inspections (for remaining life) are challenging, expensive and difficult to implement. Fraser discussed the root cause of the failure implicating Corrosion Under Insulation (CUI) within a Bestobel seal arrangement which was missed by the historical Risk Based Inspection (RBI) process performed. He touched on the use of pre- inspection techniques such as guided wave and digital radiography used in the aftermath of the failure to identify concerns with other lines and extent of problem with relation to this mechanism. He explained that there were limitations on the pre-inspection techniques as in some cases, pre-inspection results showed no indications even when significant degradation was present after Bestobel removal. He went on to discuss the project to implement a suitable clamping repairs which were challenging due to the location. Also surface preparation and the presence of a lot of fully welded lengths poses extra challenges. Fraser concluded his talk by explaining that RBIs may not necessarily identify issues indicating technology limitations and lack of access issues may introduce gaps in the process. Questions asked were on temperature effects on repairs, boundaries of RBI process, water source, lack of consideration of penetrations as a CUI risk, difficulties of achieving isolations, inspection after clamp installation, use of guided wave technique and difficulties of achieving LOF – life of field repairs. After the presentation, the branch chair thanked the speaker and delegates for attending.