

# Recent Developments in Design & Installation of High Temperature CRA Clad Pipelines



Report on SUT Perth Branch Evening Technical Meeting  
Wednesday, 10<sup>th</sup> April 2015

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On the 10th June 2015 a full-house gathered at the Parmelia Hilton for yet another successful SUT technical meeting. The lure for the event was a highly topical subject, which was somewhat hidden behind the rather understated title “Recent Developments in Design & Installation of High Temperature CRA Clad Pipelines”. Another lure was the quality of the speakers and their willingness to share their learnings.

Western Australia has just been through what could well be a never to be repeated surge in the development of gas-related seabed infrastructure. Many of the associated pipelines/flowlines have been designed to transport high temperature contents and the risks of corrosion have been such that the pipes have been lined with corrosion resistant alloy (CRA) materials. These factors have required developments in the method of design and also in the installation procedures, particularly in welding as part of the pipeline manufacturing. The experience gained in these projects has been that if the industry is to reduce costs of design of high temperature pipeline and particularly in the welding of CRA lined pipe we must learn from our recent experience.

The evening was kicked off by Professor David White who has deservedly received more accolades and awards than is normal for one of his age. Some say that he is to the field of seabed geotechnics what Brian Cox is to physics on the telly. In a manner that was accessible to all technical disciplines in the auditorium, David talked about how he had developed a more accurate description soil-pipe interaction for the design of high temperature pipelines. He explained that a governing parameter in the analysis of lateral buckling of high temperature pipelines is the equivalent lateral friction and how experience has shown that the determination of this parameter for a pipeline on a seabed can be very complex and may result in with a wide range of possible values. The presentation described recent work carried out to reduce that possible range of values such that the effort involved in pipeline design calculations is much reduced.

The next speaker was Alastair Walker, a Fellow of the Institution of Mechanical Engineering and also a Fellow of the Royal Academy of Engineering, and someone who knows a thing or two about pipelines and has been a very welcome addition to the capability base in Perth. Alastair presented the current practice with regard to completion of an Engineering Critical Assessment (or “ECA”) as it related to CRA, offering another TLA (three-letter-acronym) to the proceedings. Alastair described the changes that are presently occurring in the design and operation of high temperature and CRA lined pipes that are driving changes in the methodology for ECA analysis. The presentation concluded with a consideration of the changing interaction between ECA pipeline design and pipeline manufacture that are likely to require different role for ECA in future projects.

The final speaker was Matt Lancien, a Materials & Welding Engineer for SPEC a company that provides specialised engineering solutions and advice for the design, procurement, fabrication and offshore installation of subsea and pipeline projects, and the sponsor for the evening. Matt described technical (and other) challenges associated with welding and inspection of CRA pipelines. He explained how recent pipeline installation projects in WA have encountered technical issues during construction of CRA HP/HT flowlines. His presentation outlined the various challenges related to CRA welding and inspection from the early design, linepipe procurement, qualification testing and final offshore installation, and how successful pipeline production can be achieved by specifying realistic and achievable requirements. Matt stressed the importance of learning from recent project experiences and how operators and contractors can work together to 'get it right the first time'. The presentation concluded with an insight of the latest technology developments in the industry that will enable enhanced reliability and consistency in the welding and inspection for future CRA pipeline projects in Australia.

All the presentations were very well received and provoked more questions than could be fitted into the available time - but were no doubt addressed at the bar afterwards.

A large thanks to SPEC Pty. Ltd. who sponsored the evening.