

Improving the Integrity Management Process for Bonded Hoses



**PUBLISHABLE
SUMMARY**

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Background

Bonded hoses are widely used in the Oil and Gas industry. By virtue of the materials used and their construction these hoses are rendered essentially "un-inspectable" by conventional means, such as ultrasonics, due to the high attenuation of the polymer(s).

This JIP project set out to validate the use of non-destructive examination (NDE) methods based on X-ray and gamma source radiography to enhance the current (limited) inspection methodologies available to operators of bonded elastomer hoses. New NDE procedures will increase the confidence in integrity management of bonded hoses and reduce the risk of in-service failure.

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Objectives

- Validate the use of x-ray tomography/gamma source digital detection methods for inspection of bonded hoses, in the presence and absence of service fluids in the hose bore.
- Explore the use of Radiographic Modelling to allow development and optimisation of inspection regimes.
- Provide a critical assessment on potential impacts of minimum detectable flaw size on the integrity of bonded hoses.
- Enable greater confidence for asset management.
- Recommend viable in-situ inspection technique procedures and tool specifications based on proven results.

Benefits

- Reduced risk of in-service failure and associated hydrocarbon spillage.
- Eliminate the requirement to hydrotest pipes and associated reduction in remaining life.
- Enhanced inspection capability giving informed data for integrity management.
- Long term cost reductions.

Participants

The Sponsor Group comprised:

- ExxonMobil Development Company;
- Petrobras;
- ConocoPhillips Company;
- Dunlop Oil & Marine Ltd.

Scope of Work

- Using examples of new and used (damaged) hose the project developed inspection techniques, for detection of disbond (between the end fitting and intermediate elastomer layers) and other flaws based around the current TWI experience for polymeric materials.
- Limits of resolution and detection were assessed. This included different design and construction methods such as double carcass and floating hose.
- With an optimised system it was possible to estimate the minimum detectable flaw size and the significance of such to the overall system integrity was interpreted

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Project Budget

The project had a duration of two years and a budget of £320,000. There were four Sponsors each making a contribution of £80,000. The fee for additional companies buying-back into the project results is £80,000.

Further Information

For further information on how a Joint Industry Project (JIP) runs please visit:

<http://www.twi-global.com/services/research-and-consultancy/joint-industry-projects/>

JIP Co-ordinator: Tracey Stocks

Ref: 21586/5-1/14

Email: jip@twi.co.uk

Project Leader: Ian Nicholson

Email: ian.nicholson@twi.co.uk