

Industrial Applications of Ultrasonic Testing of Materials

Background

The integrity of offshore structures used in the oil & gas industry is ensured and monitored by application of non-destructive testing during production and operation phase. Examples of such structures can be offshore pipelines and subsea platform structures. Non-destructive testing is the term used for all kind of material or component inspection that doesn't cause any damage to the object. Non-destructive testing is the main source of data on the actual condition of structures. It is therefore closely related to calculations of structural integrity; either to provide relevant input data to theoretical models or to practically implement the follow-up on the output of the same models. Non-destructive testing is of critical importance to safeguard life, environment and properties offshore and onshore within the oil & gas industry.

Inspection of materials with ultrasound is a widely used non-destructive testing method with capability to detect detrimental planar flaws and cracks embedded in the materials. With an increasing need to improve utilization of materials of new builds and operating structures within the oil & gas industry, there is an increasing focus on the reliability of ultrasonic testing for weld and component testing. Present experience shows that the reliability of the testing can be hard to predict and control.

Project and Master Thesis Work

DNV GL Stavanger would appreciate to support and supervise one MSc student for the following:

- Look into the fundamentals of ultrasonic testing in elastic solids, and for welds in carbon steel in particular.
- Point out the most relevant theoretical considerations for the ultrasonic testing in a set of presented cases. Develop models to assess the impact and criticality of different mechanisms of ultrasonic interaction with weld imperfections.
- Evaluate the model results by comparison with samples of real inspection data from Oil & Gas applications.

The good candidate will find interest in the practical aspects of inspection in addition to the fundamentals.

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