

Case Study

22 March 2013

Project: Technical justification for the proposed inspection of structural welds.

Problem: Inspection was required on selected structural welds on an aging asset in the North Sea. It was required that the inspection strategy employed would be able to identify small crack like defects arising from in service fatigue loading. Sonomatic were approached in order to provide qualification of the inspection approach employed.

Solution: In order to justify the proposed inspection strategy, a Technical Justification (TJ) was created. The TJ was based on the European Network for Inspection Qualification (ENIQ) approach and was used to assemble evidence on the effectiveness of the proposed inspection techniques.

As part of the qualification of the inspection strategies, laboratory studies, mathematical modelling and physical reasoning were employed. The Civa NDE numerical modelling software was utilised in order to create models of the welds under consideration (an example is shown in Figure 1); responses obtained by the proposed inspection methods were then obtained from crack like defects at the weld toes.

The modelling was used together with trials on test pieces to create a probability of detection curve for the proposed inspection strategy (as shown in Figure 2). This demonstrated that the proposed inspection techniques exceeded the required performance.

Benefits: The TJ demonstrated that the proposed inspection strategy would provide the required level of assurance. The benefits of the inspection qualification approach are:

- **Confidence in capability of the proposed inspection techniques for specified types of degradation.**
- **The use of the Civa NDE software allows a wide range of scenarios to be considered. This reduces the cost, with fewer physical sample tests being needed.**
- **Sonomatic have experience with a variety of inspection methods and are able to advise on the combinations of techniques best suited for specific applications.**

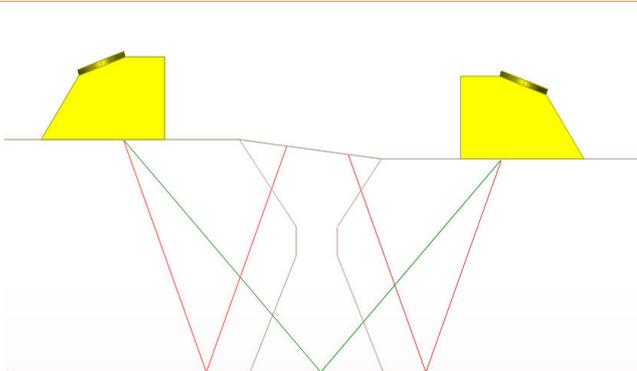


Figure 1: An example of one of the models created in the Civa NDE software.

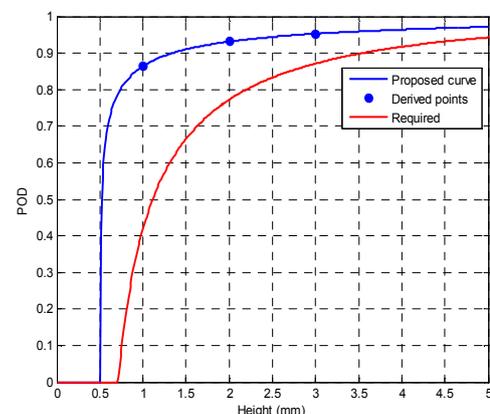


Figure 2: Probability of detection curve for the proposed inspection strategy.