Reinforced Thermoplastic Pipe (RTP) Installation for Offshore Pipeline Application Via Insertion Method

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Abstract

Objectives/Scope: Reinforced Thermoplastic Pipe (RTP) design has been improved to meet the very specific requirement of handling corrosive fluids such as crude oil and sour gas up to certain pressure. RTP might have been widely used for onshore application. However, its application as offshore pipeline is not common compared to carbon steel or flexible steel pipeline due to some limitations. PETRONAS Carigali Sdn. Bhd (PCSB) undertook a pipeline replacement project at offshore Peninsular Malaysia to reverse flow 17km of existing 12” carbon steel pipeline with 3” Reinforced Thermoplastic Pipe (RTP) pipeline from Platform-A to Platform-B for crude and condensate services. This technology was the first being implemented by PETRONAS and in Asia Pacific region for offshore application.

Methods, Procedures, Process: RTP pipeline was installed from the Shut Down Valve (SDV) of Platform A to SDV of Platform B by insertion methodology into existing 12” carbon steel pipeline. Special inline connectors were used to connect different sections of RTP pipeline, which came in several reels. Specific inspection to be performed at the connection considering the swaging method used and its effect. RTP hang-off and end termination was conducted upon completion of RTP insertion. Specific RTP pre-commissioning and hydrotest procedure was developed and executed with certain acceptance criteria. The pipeline was then commissioned smoothly indicating the successful completion of the project.

Results, Observations, Conclusions: It has proven that RTP pipeline insertion for offshore application was technically feasible for a long pipeline. This technology of offshore RTP pipeline provides alternative to the conventional carbon steel pipeline with the advantages of anti-corrosion, high flexibility and low total lifecycle cost.

Novel/Additive Information: The aim of this paper is to highlight the analysis and methodology for RTP Pipeline Insertion for offshore application as well as the technical challenges during offshore execution.