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Using Platelet Technology To Seal and Locate Leaks in Subsea Umbilical Lines

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Abstract

Platelet Technology is a new and novel method of sealing and locating leaks in pressurised pipelines. It is based on the remote injection of discrete particles known as "Platelets." into a pipeline which are carried to the leak site due to the flow. When they reach the vicinity of the leak fluid forces entrain them into the leak and hold them against the pipe wall thus facilitating sealing. The technology was first deployed in a 10" water injection line in BP's Foinaven Field in the UKCS during the autumn of 2004.

This paper describes the work which has been undertaken to extend Platelet Technology to seal and locate leaks in small bore subsea umbilical lines. Leaks in these systems are particularly problematic because they are difficult to locate and the eventual external egress of fluid may be some distance from the actual line failure due to the presence of additional outer sheath(s). In addition as subsea developments are increasingly involving longer and deeper tie-backs, methods of remote intervention, like this technology, will become more and more important.

The fundamental principle behind leak location in these lines is that the creation of a Platelet seal, which is usually an almost instantaneous event, modifies the pressure and flow properties in the line. Through the use of remote pressure and flow monitoring techniques these changes can be detected and used to calculate the location of the leak to a considerable degree of accuracy (within 1% of the line length).

This paper will present the theoretical background to the approach taken and describe the outcome of a number of tests and applications of Platelet Technology™ on long umbilical lines. This includes a successful "leak" location on an 80km

long umbilical which was achieved prior to its proposed sub-sea installation. In addition to the technology development itself the crucial issues of risk to infrastructure, hazard analysis and the establishment of the limits of the approach with regard to existing infrastructure and systems will each be considered.

Platelet Technology™

Platelet Technology™ is a novel approach to remote leak sealing and location. It utilises the fluid flow inside the pipeline to deliver specially designed "Platelets®" to the leak. When the Platelets® reach the vicinity of a leak, fluid forces entrain them into the leak and hold them against the pipe wall, thus creating a seal.

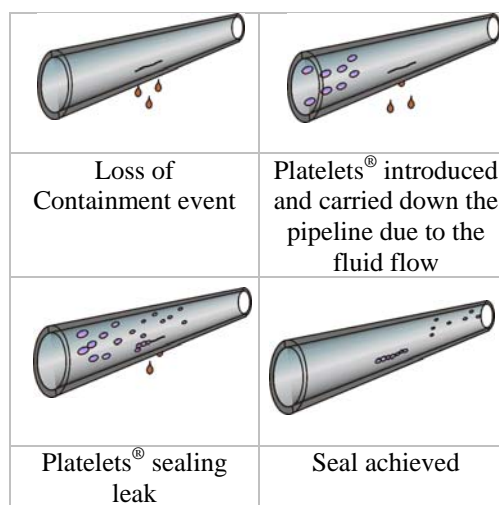


Figure 1: Platelets® in Action

There are numerous possible applications for Platelet Technology™; generally speaking Platelet Technology™ can be used in any application where there is flow to a leak and a positive pressure differential acting across the leak. Today the technology is being optimised for use in water injection lines, hydrocarbon lines, gas lines, water industry lines, and downhole applications. In addition, over the past 3 years, Brinker Technology has been carrying out a comprehensive development programme to adapt Platelet Technology™ for use in umbilical systems. The result of this programme is a range of products which are remotely deployed at the surface and are capable of sealing and detecting leaks at any point