integrated solutions

Case study on cable testing

Providing expertise on offshore oil platforms

In August 1998, a team of engineers from ERA Technology was called to the Scott oil platform 115 miles out in the North Sea, to carry out very low frequency (vlf) tan-delta tests on suspect 15 kV power cables.

The cables supplied power to a motor that pumped the produced oil from the platform to the shore. The cables had been subjected to fault currents when a short circuit fault occurred at the motor terminals: this caused over-bending and localised damage to the cable sheath.

In an industry where safety is an absolute key priority, the platform's operator, Amerada Hess, wanted to know whether the motor and cables could continue to operate without risk of any further failure. The purpose of ERA's tests was to provide information on the condition of the cables and subject to satisfactory findings, endorse confidence in their long-term performance. Prior to commencement, the team needed to comply with the stringent and essential safety procedures laid down by the oil company.

ERA's engineers flew out from Aberdeen to the platform by helicopter, whilst the company's vlf test trailer was taken out on a support vessel and lifted onto the platform.

The vlf trailer used by ERA energises the cables at 0.1 Hz. As the losses from a cable are proportional to the frequency, the application of 0.1 Hz instead of the normal power frequency makes it possible to test much longer lengths of cable. The cables on the platform were 220 metres long. They ran from the switch-room on an accommodation and generation platform, across a connecting bridge to the production platform where the motors were situated.

ERA's tests compared tan-delta values at different voltages - providing information on the condition of the cable, which in this case proved satisfactory.

Tan-delta measurements on cables can be affected by environmental conditions. For measurements in an exposed situation, such as an oil platform, it is particularly important to make sure that conditions such as heavy rain are not having an adverse effect on the measurements. Research at ERA and elsewhere, has shown that a better indication of a cable's condition can be obtained by a series of readings over a period of time. These results can then be compared to see if there is any evidence that degradation is taking place.

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