

Geofabrica's Rapid Sealing Technology for Undersea Cable Joints



Introduction

Geofabrica's team has achieved success in joining and sealing thermoplastic components for full ocean depth applications. The company developed susceptor-assisted induction heating technology that enables very fast, high-performance fusion bonding of thermoplastic components during assembly.

Problem

A customer needed substantial improvement in the speed of deploying undersea cables for communication, surveillance, and control systems. Particularly, a need to develop a new cable joint protection and pressure housing solution to substantially reduce deployment cycle times. A critical component of the cable joint protection was the polyethylene (PE) covering. This covering is assembled in parts and must be fused to form a long-lasting watertight seal. However, previous technologies did not adequately protect the cable joint componentry or provide the quality needed for the application.

Former encapsulation process took two hours. The objective was to greatly reduce that time.

Inspection technologies at the time were expensive, cumbersome, sensitive to temperatures of the test parts. These include x-ray and ultrasound/PAUT.

Solution

Geofabrica's solution was to develop a technology for SEPE components that permitted heating of small amounts of PE at the joint interface using a modified induction heating technology.

Geofabrica built a rapid non-contact welding system that would not harm the metal pressure vessel or the cable joint electronics. A device to fuse PE components thru heating created a continuous polymer structure that remain stable for the life of the PE, a seal that would last over a 20-year period.

A new test capability was successfully commissioned, permitting hydrostatic pressure tests of test articles, with unscaled diameters, to be exposed to pressures up to 20,000 psi, twice the level required for the final application.

Outcome

Geofabrica's thermoplastic welding technology was successfully used for quickly forming high-performance undersea cable joints during assembly on a shipboard. Geofabrica reduced the 2-hour PE encapsulation process to 20 minutes or less.