

Underwater Pipeline Repair

UNDERWATER WET WELDING

Improved technologies and enhanced qualification and training have made it possible to provide high-quality performance in underwater welding today.

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IMPac Offshore Engineering GmbH, Hamburg, and Nordseetaucher GmbH, Ammersbek, two companies based in the North of Germany, have successfully applied their experience and know-how in underwater welding to the repair of an underwater pipeline at the world's largest LNG plant in South Africa's Mossel Bay. Contractor for the repair works of the underwater pipeline, which runs at a depth of 20 m, was the South African oil and gas company PetroSA.

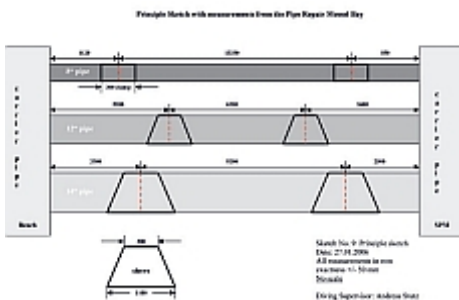


The products from the LNG plant are supplied via underwater pipelines to loading buoys off the coast, where they are loaded on tankers for export. One of the loading buoys moored 2.5 km off the coast is connected to three product pipelines (8", 12", and 14"), which are protected by a 36" carrier pipe. During an anchoring maneuver the complete pipe bundle was damaged. The damage was located at a depth of approximately 20 m below water.

While IMPac Offshore Engineering were responsible for the project management and the design, Nordseetaucher GmbH were in charge of the repairs on-site. There were two repair method options available: "Hyperbaric Welding" and "Hyperbaric Wet Welding".



In "Hyperbaric Welding", the welding is carried out in a sealed, dry habitat underwater, whereas in "Hyperbaric Wet Welding" the welding is performed with the welder being exposed directly to the water. With the enormous developments achieved in underwater welding in recent years, especially with regard to welding electrodes, welding techniques, and welder qualification and training, it is now possible to perform high-quality wet welding works. This, together with the method's high potential for saving both time and costs, has been the determining factor for choosing the hyperbaric wet welding repair method. By employing this method, Nordseetaucher GmbH was able to carry out the repair works at the three product pipelines and the carrier pipe in less than six months.



divers performing the underwater welding were certified by Germanischer Lloyd. The electrodes used were Thyssen Nautica 20 / 3.2 mm. Welding inspections (MPI) that were carried out after completion of the repairs proved the high quality of the welded joints.

Prior to the commencement of the repairs, Nordseetaucher GmbH carried out comprehensive welding tests including underwater test welding. As there was not enough space between the non-gas-carrying 8" pipe and the other two gas-carrying pipes, the 8" pipe was fixed with screwed-on clamps instead of being welded. The 12" and 14" pipes were repaired using the Hyperbaric Wet Welding method. For the repair of the carrier pipe, two half shells were bolted together. The welding was carried out according to EN ISO 15681-1 / EN 287-1 in welding positions PD, PB, and PG; the

