

Underwater Hot Tapping & Plugging





The Choice Hot Tapping

With over 50 years' experience in pipeline engineering, TDW Services, Inc., is the leading international company for underwater operations. TDW Services' package of operations utilises the very latest in the company's pioneering pipeline hot tapping and plugging technology to provide a complete solution to routine pipeline maintenance and emergency repairs.

TDW Services' underwater applications include:

- ◆ Valve installations
- ◆ Valve change-outs
- ◆ Replacement of pipe sections
- ◆ Tying in new pipelines
- ◆ Relocation of lines
- ◆ Recovery of products from sunken vessels
- ◆ General maintenance

TDW's unique STOPPLE® Plugging and bypass line technique ensures all these operations can be carried out without disruptive interruptions in the pipeline flow.

TDW's innovative technology is equally applicable on natural gas and oil pipelines. TDW Services has been at the forefront, taking these pioneering techniques offshore.

Major oil and gas production companies have used TDW Services across the world, from the heat of the Gulf Coast to the cold waters of the North Sea. Operations have been successfully performed in waters to depths of over 600 feet (150m), on pipelines from 2 inches (50mm) to 36 inches (900mm) in diameter, and operating at pressures up to 2,200 psi (150 bar). The work has ranged from simple taps, to intricate two-position plugging with the installation of a bypass pipe.

All the TDW equipment used in the installations have been precision engineered by the company's factories in Europe and the U.S. Each component has been designed for ease of operation and flexibility. TDW Services will design and professionally manage the complete undersea repair process, working with the customer's own diving teams to tailor a cost-effective and efficient solution. The service is backed up with TDW Services technicians and engineers on hand

to quickly resolve any difficulties encountered.

TDW has developed a range of specialised underwater equipment to ensure reliable operation. TDW equipment remains fully functional with the use of underwater power units and pressure-balanced tapping equipment.

TDW equipment and installations are designed, engineered and tested to exacting international maritime standards.

The TDW Services package is based on years of experience and an in-depth knowledge of the oil and gas supply industry. All installations are designed, supervised and tested to exacting international maritime standards to ensure years of trouble-free operation.



ce for Underwater apping & Plugging

TDW's hot tapping and plugging process allows for the cost-effective, rapid and reliable repair or replacement of pipeline, without interruption in the oil or gas flow.



The **STOPPLE**® plugging technique, developed by TDW in the 1950s, enables TDW Services' engineers to design innovative solutions to individual situations.

On a typical **STOPPLE**® Plugging Installation, for example, TDW-engineered **LOCK-O-RING**® Flanged **STOPPLE** Fittings are attached to the pipeline at each end of the section to be replaced. To allow the continued use of the pipeline, a bypass pipe can be fitted. To enable this, spools are bolted

onto the fittings, and then **SANDWICH**® Valves are fitted. Taps can then be safely made into the pipeline.

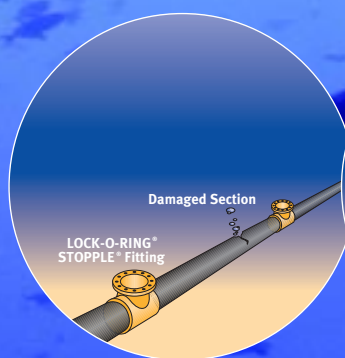
Once both taps are made, **STOPPLE** Plugging Machines are installed on top of the **SANDWICH** Valves. The plugging heads are lowered into position with hydraulic power, to completely seal the existing pipeline. The product continues to flow through the bypass pipeline.

TDW Services can tailor the STOPPLE technique to meet a wide variety of installations.

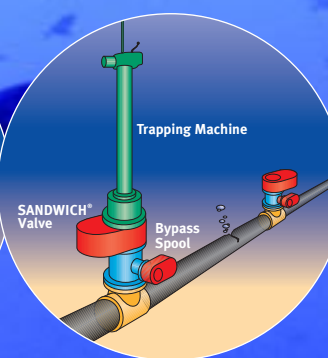
Product in the sealed section of pipe is

pumped to a surface holding tank. The damaged section of pipeline can then be cut out and a new section tied into place. The **STOPPLE** Plugging Heads are retracted, and product flow is fully restored to the repaired main line.

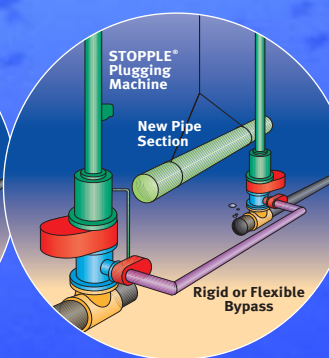
The **STOPPLE** Plugging Machines and bypass line are removed and **LOCK-O-RING** Plugs installed inside the fitting flanges, using a tapping machine. The tapping valves are recovered and blind flanges installed, completing the job.



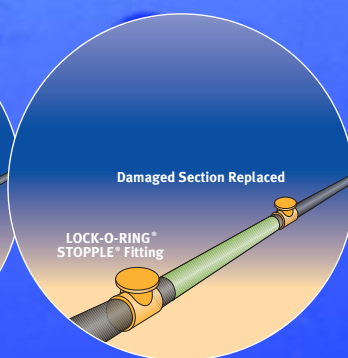
LOCK-O-RING® Flanged **STOPPLE**® fittings are fitted either side of the damage.



SANDWICH® Valves are fitted and taps made in the line.



The **STOPPLE**® Plugging Machine seals the line, diverts the product, and allows the damage to be repaired.



The equipment is removed and blind flanges installed, completing the job.

TDW - Technology into Practice

TDW uses the latest technology to work at depths down to 1,500 feet (450m) and pressures of 2,200 psi (150 bar). TDW Hot Tapping and **STOPPLE** Plugging Machines are manufactured and tested to work efficiently under extreme conditions. Research is constantly ongoing to increase depths and pressures. Consult your TDW Service Centre for your special requirements.

High-Pressure Hot Tapping

The long list of TDW Services' pioneering pipeline maintenance work includes working at a depth of 120 feet (35m) beneath the Adriatic Sea to install hot taps on crude oil and natural gas pipelines operating at 1,440 psi (100 bar). Using TDW's clamp-on fittings, a number of hot taps were carried out on pipelines between 6 inches (150mm) and 16 inches (400mm) in diameter.

Deep Sea Installation

In the Gulf of Mexico, diving contractors successfully hot tapped a 10-inch (250mm) crude oil pipeline, installing an 8-inch (200mm) tap, at a depth of 630 feet (200m). Large hot taps, on pipes of up to 36 inches (900mm), have been undertaken in the North Sea.

TDW tapping and plugging equipment is available to work on a wide range of pipelines and in a variety of different applications. Hot tapping equipment is available as standard for work on lines from 1/4 inch (8 mm) to 60 inches (1,500 mm) and at pressures of up to 1,440 psi (100 bar). STOPPLE Plugging Machines have been engineered for lines between 1 1/4 inches (32 mm) and 56 inches (1400 mm), at pressures of up to 1,000 psi (70 bar).

Hot Tapping Standard Equipment

Pipeline sizes		Max. operating pressure		Max. operating temperature range	
Inches	mm	psi	bar	°F	°C
1/4 - 36	8 - 900	1440	100	-20 - 100	-29 - 38
1/4 - 36	8 - 900	700	48	700	371
30 - 60	750 - 1500	1200	83	-20 - 200	-29 - 93

STOPPLE® Plugging Machine Standard Equipment

Pipeline sizes		Max. operating pressure		Max. operating temperature range	
Inches	mm	psi	bar	°F	°C
4 - 56	100 - 1544	1400	70	-20 - 180	-29 - 82

The versatile TDW Hot Tapping and STOPPLE Plugging Machines can be used for a wide range of additional piping solutions, including changing the direction of an existing pipeline, or the introduction of new pipelines,

without interruption to the main line. TDW Services' specialised engineers can adapt or tailor the STOPPLE technique to meet a wide variety of individual installations.

TDW - A History of Service

T.D. Williamson, Inc. was established in 1920 and has been responsible for many breakthroughs in the field of pipeline technology. In the 1950s, the company launched its range of pioneering hot tapping and STOPPLE Plugging Machines. This paved the way for the historic underwater tap at 130 feet (40m) in the Gulf of Mexico, followed by the first underwater STOPPLE Plugging

job in the Louisiana Gulf in the 1970s. The first sub-sea hot tap was performed in 1963. TDW Services, Inc., was established in 1969.

Research and Development

The company has continued to develop and improve its range of equipment, introducing technology that has revolutionised safe pipeline repairs under extreme conditions in the North Sea.

Meeting Customer Demands

TDW invests heavily in the research and development of pipeline technology and pipeline services. The company has grown into a worldwide business, with Service Centres across Europe, the Americas (North, Latin and South), Singapore and Australia, ensuring it meets the appropriate demands of its local customers.

ISO Certified 9002



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