

# Hot Tap & Folding Plugging Operation



This temporary bypass was installed to divert water supply to Ho Chi Minh City while the permanent water main was relocated and the new permanent water main was commissioned.

By George Easo

When T.D. Williamson Asia Pacific Pte. Ltd. (TDW) was approached in 2010 by engineering design, construction and supervision consultants CDM Intl.

to discuss carrying out a hot tap and folding plugging operation on a critical potable water main in Ho Chi Minh City, Vietnam, the firm was faced with a real challenge.

## Service disruption-free water main removal in Vietnam



The TDW team installed the fittings on the PCCP and tested them to ensure proper sealing before completing concrete encasing.



Prior to insertion of the plugging heads, the temporary bypass for the 60- and 48-in. lines was fabricated.

The Stoppie plugging operation was to be carried out on behalf of Saigon Water Corp. (SAWACO) as part of the Ho Chi Minh Environmental Sanitation Project (Nhieu Loc – Thi Nghe Basin), a comprehensive improvement initiative launched by the city in 2003. The primary objective of the project is to install a storm water and sewage collection system to alleviate flooding and correspondingly to improve the water quality of one of the city's primary canals by diverting sewage flows to a pumped collection system and dredging the canal to promote natural tidal flushing.

To achieve this, 1 million cu meters of material will be removed from the canal. Crossing the canal, and laid within the canal bed some 50 years ago, is a primary water pipeline that supplies a daily average of 160 million gal (610,000 cu meters) to 5 million residents. This pipeline was, however, located within the dredging zone and had to be removed and replaced without interrupting supply.

North of the canal, the main is a 2-meter-diameter prestressed concrete cylinder pipe (PCCP). To the south, it divides into two 1.5- and 1.2-meter PCCP pipes. CDM proposed sinking two shafts on either side of the canal to install a carrier pipe by pipe-jacking it between the shafts. A permanent diversion then could be installed, allowing removal of the existing main so that the canal could be dredged.

### Sole Water Source

The challenge was to maintain water supply while works were carried out.

"It was the only source of water to the city, so it was crucial that we relocate the main without disrupting water supply," said Vo Quang Chau, technical deputy general director for SAWACO. "There was much at stake. It was one of the greatest hurdles we faced throughout the program, if not the greatest."

### Maintaining Water Supply

Because the main could not be shut down while new connections were made, CDM recommended to SAWACO that TDW isolate the main and diverts the flows to a temporary bypass in order to maintain supply. The procedure involved inserting folding Stoppie plugging heads into the three lines to stop the flow through the canal section and divert it to a temporary bypass pipe on the bridge. The 2-meter pipeline across the canal then could be isolated for cutting and new connections made, facilitating the new permanent diversion. Supply thus could flow while the permanent main was brought on-stream.

To achieve this, TDW agreed to provide full turnkey project management for supply of fittings, equipment and trained staff to execute a predictably complex plan.

### Preparing the Way

To ensure that the existing water main operated during tapping, plugging and connection works, CDM sank shafts on each side of the canal and jacked a carrier pipe between them. A permanent water main was placed in the carrier pipe, and steel pipes were laid in the shafts and trenches on each side of the canal to connection points on the existing main.

At the tapping and plugging points, the existing main was exposed. At these points, concrete piles were constructed to support the concrete-encased main, providing a platform for the 15-ton tapping and Stoppie equipment. It was vital that the water main remain perfectly stationary despite the heavy loads of equipment and diverted water flow; otherwise it might have leaked or failed, interrupting water supply.

Before tapping commenced, water supply to the city was adjusted by re-zoning and boosting output from other plants, thereby reducing reliance on the existing water main. The effect on the existing supply

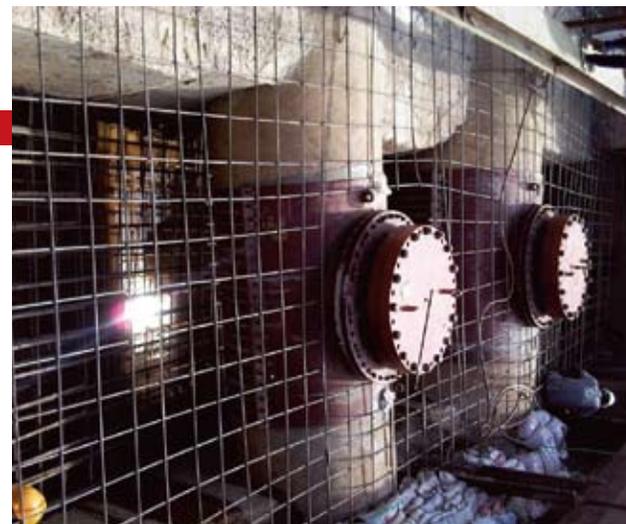
was reduced considerably when the temporary bypass pipe began operating.

## Hot Tapping

TDW carried out hot tapping procedures on the three live mains using a sterilized cutting head. TDW completed three small taps for equalization and three large taps for insertion of the folding plugging heads. By working at night, when water demand was low, engineers reduced the water flow so that the plugging heads could be inserted.



In preparation for the hot tapping procedure, TDW fixed fittings on the PCCP that are partially cast in the concrete thrust block.



The final phase of concrete thrust block rebar work.

TDW inserted three folding plugging heads in two hours. After the flow was directed to the temporary bypass, pumping operations resumed. SAWACO then cut the existing pipe to remove sections to allow for the new connections. The new pipeline was connected to the existing pipeline, completing the permanent diversion.

Overall, TDW completed six hot tap operations and installed three folding plugging heads in sizes ranging from 36-by-48-in. to 48-by-78-in. The folding Stoppie plugging method was used for several reasons: The smaller size of the hot tapping equipment makes it easier to operate, the equipment weighs less and it reduces intervention time.

## Reliable Flows

Following testing and sterilization, TDW removed the plugging heads, allowing flow to be diverted into the new pipeline. Finally, SAWACO drained, disconnected and removed the temporary bypass, thus completing the operation. As a result of planning and innovative engineering, the city was never without water.

“This project illustrates how employing the hot tap and folding Stoppie plugging method provides essential isolation services, making it possible to successfully relocate a large 2-meter concrete pipe and commission the new permanent water main,” said Gunavel Rathinam, general manager, Asia Pacific, for TDW. “As a result, SAWACO was able to achieve this seemingly monumental task while supplying seamless water service.”

The recent operation represents a historic first for TDW. Although the group has carried out many operations of this nature, the Ho Chi Minh operation is the largest hot tap and folding Stoppie operation that the company has completed in the Far East/Asia Pacific region. TDW also has provided isolation services to facilitate water and wastewater main relocations at Chicago’s O’Hare International Airport and the city of Baltimore’s wastewater treatment system, among others.

“Put simply, the hot tap-folding Stoppie plugging method saves customers time and money while creating a safe environment in which to work,” Rathinam said. “It is clearly the way forward for the global water and wastewater industry.” **WWD**

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