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## PROBLEMSOLVER

# The Basics of Line Stopping

By Brett Hanes



*This method provided an alternative to shutting down a city's water supply*

The water supply for the city of Salem, Ore., was at great risk due to an aging transmission main that required section replacements. The project required the temporary isolation of a 48-in. line from the city's water system. There were significant concerns about the integrity of the pipe and potential risk for the entire water system if a problem occurred during replacement.

"The city had only two water lines serving it," said Brett Jennings, project manager for Natt McDougall Co. "This made the project even more risky, as we could not allow any backflow to occur during the replacement."

Control line stopping was specified in the scope of work. It was essential to keep the city side pressurized and isolate the transmission main. Past vendor disappointments led the project manager team to select Hydra-Stop for this project. The crew was able to successfully isolate and stop the line to conduct the repairs. The head used for the stop was critical in preventing backflow, and it successfully sealed any "out-of-roundness" in the interior of the pipe.

"Hydra-Stop [has] the engineering expertise and customer relations that we need. The equipment was delivered in a short time frame and everything went according to plan. No unexpected issues arose that couldn't be easily overcome," Jennings said.

### Line-stopper installation

Many municipalities and pipeline contractors only use two means of conducting maintenance and repairs to their pipeline: either shut the system down or perform the repairs live. By attempting to perform these repairs live, a number of potential liabilities can occur due to unsafe operator working conditions. There are also many inherent risks associated with system shutdown, including backflow, boil orders, plugged water meters, fouled back-flow devices, customer complaints, additional lab costs, possible contamination, turbidity, water hammer and loss of fire protection.

Fortunately, there is a more cost-effective way to perform maintenance and repairs to pipelines without the hazards of shutdown or live maintenance work. Control line stopping isolates only the section of pipe in need of repair while keeping the rest of the system hot. This results in the ability to do the required repair or maintenance with substantially reduced risk and gives the owner or operator total control of the piping network. For the city of Salem, line stopping greatly reduced the risk associated with the repair of aging and installation of new water systems.

### Considering shutdown costs

How much does it cost to shut down a system? From a financial perspective, cities should consider all of the costs associated with shutting down a system: coordinating meetings with the utility, large water users and construction crew;

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FIGURE 1: Control stopper options: (from left to right) cylinder rubber, bypass bullet, bullet head and pivot head.



putting fire trucks on standby; installing temporary above-ground water services; advertising the shutdown; dechlorinating the water; locating and turning control valves; returning to the maps to find back-up valves to shut down because some do not work or cannot be located; returning to the streets to find and operate those valves; advertising a larger shutdown area; losing water revenue; refilling pipes with treated water; purging and flushing; gaining entry to clean plugged water meters; dealing with backflow; handling air trapped in old pipe joints that can cause future main breaks; answering complaints of ruined laundry; turbidity; consumer confidence fallout; and compliance with rules and regulations.

### The basic process

A line-stopping operation includes the following steps: 1) attach a line stop fitting and a temporary valve to the pipe on which the line stop will be inserted; 2) tap the pipe and remove the tapping machine; 3) position the flow-control equipment (a solid plug, not an inflatable plug) while the fluid is controlled—the contractor or utility can perform necessary expansion, repair or replacement operation(s); and 4) remove the line-stop machine and attach a completion plug under pressure. At no time is the

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system shut down during these processes.

Line stopping does not necessarily mean stopping the flow. Flow can be controlled while isolating a small section for repair. How can this be achieved? Sometimes more than one line stop is needed. When performing a double line stop, different methods of isolation can be used while keeping the pipeline in service. Within a looped distribution system, two line stops are performed. As a result, the pipeline in need of repair or maintenance is isolated without service disruption. Bypass stopping is used when pipeline maintenance is desired on a transmission main or force main (see Figure 1).

#### Benefits and applications

Many types of pipe can be used when line stopping. These include steel, cast iron, reinforced concrete (noncylinder), reinforced concrete cylinder, plastic, AC and nonferrous metals.

Applications for line stopping include: replacement of fire hydrants, lowering or rerouting pipe, repair or replacement of valves, strategic installation of control valves, isolation of pipe or tunnel sections for cure-in-place pipe relining with bypass capabilities and other trenchless technologies.

As planners, designers, owners and operators of water and wastewater facilities become aware of these under-pressure control machines and line-stopping methods, they can assist their communities with shutdown and live repair options.

Control line stopping offers many benefits to all system contributors: repairing aging infrastructure; providing safe working conditions; abiding by the regulatory guidelines; and working within the financial scope of the budget. With implementation of these processes, the utility can take control of the system. Line stopping has tremendous potential and offers engineers and utilities alternatives for staying in full control of the sewage/water while maintaining and repairing infrastructure assets. WWD

Brett Hanes is general manager for Hydra-Stop. He can be reached at 800/538-7867.

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