

OPERATIONAL PIGGING - WATER PIPELINES

Water pipelines may need pigging to increase efficiency of the flow through the pipeline. The flow area may be restricted by either of two main conditions. There may be a soft sediment in the bottom of the pipeline consisting of solids that settled from the water stream or there may be a chemical deposit on the pipe wall, usually calcium based, which may be on the entire inside circumference. This chemical deposit may vary from being soft and therefore easily removed, to being rock hard and so requiring an entirely different and highly aggressive cleaning process to remove it.

Some of the soft sediment may be removed by simply increasing the flow rate by perhaps opening fire hydrants. Pigs are a better way to remove this sediment but many water pipelines do not have a provision for installing and removing pigs. Pigging services are available that can install foam pigs at or near fire hydrants and remove them at another hydrant further downstream. Most other pig designs are not adaptable to this type of pigging operation.

By contrast, the hard chemical deposit requires a different type of pigging program for its removal. This deposit may be several inches (centimeters) thick and therefore the effective inside diameter of the pipeline is much smaller than the inside diameter of the pipe. Whenever possible, this pigging is done onstream (i.e. while the pipeline is in operation) so it is critical that the flow is not blocked. In this case the first step is to get some type of a pig through the pipeline and then with repeated pigging runs increase the size and aggressiveness of the pig until the pipe is clean or acceptably improved. This procedure is often referred to as 'progressive pigging'.

To remove heavy, hard deposits in a water pipeline it is desirable to have pig traps for the installation and removal of the pigs since several pigging runs will be required. To help determine the severity of the deposit the first pig through can be a foam pig which will distort and pass obstructions that other types of pigs might not pass. The general procedure is to run a pig and monitor the amount of material received at the receiving trap. It is assumed that the maximum and minimum inside diameters are not known at this point so it is necessary to use a pig that will traverse the pipeline, and then to make gradual changes in the type and size of the pig as the cleaning process continues. The same pig or type of pig should be run as long as it is producing results as monitored at the downstream trap.

When a particular type and size of pig has ceased being effective, the next pig might be a larger foam pig or it may be time to use a mandrel type of pig. This could be a batching pig with flexible seals that would conform to the inside of the pipeline. Another choice could be to use a cleaning pig that is designed for dual sizes and therefore has the flexibility to pass the various inside diameters.

The first run with the mandrel cleaning pig should be made without cleaning elements to reduce the possibility of too much material being scraped from the pipe wall and creating a blockage. This pig should continue to be run until it ceases being effective as monitored at the downstream trap.

The next step would be to add all or perhaps only some of the cleaning elements to the pig and run again. Blade type cleaning devices will usually be more effective for the removal of the deposit than brushes. Brushes may be filled with the removed deposit and become ineffective while blades are self cleaning. Both elastomer and metallic blades are offered and the hardness of the deposit will determine which will be the most effective. When the dual size cleaning pig has become ineffective, the next step would be to run a pig designed for that particular pipe size. Only monitoring of the specific pipe conditions will determine whether blades or brushes will be most effective for the final cleaning.

After the pipeline is cleaned, it is important that a regularly scheduled cleaning program be conducted to prevent a recurrence of the problem that has been resolved.

