TOOL TALK

MAXIMIZE YOUR PUMP'S POWER

PRESERVING JET QUALITY

The first prerequisite for a successful job is excellent quality jets. A jet is the stream of water after it has been forced through an orifice via high pressure. The orifice is nothing more than a shaped restriction in the flow channel that forces the water to accelerate, converting potential energy (pressure) into kinetic energy (velocity). The orifice shape, materials and upstream flow turbulence are all important to delivering maximum energy to the work. The powerful, cohesive, high-velocity jet is established in the first 8 to 25 orifice diameters downstream from the orifice. Farther away, the outside surface of the jet is slowed by drag through the air. Even the best jet deteriorates with air drag. It is possible, though, to lose as much as half the jet's power at the start due to excessively turbulent flow upstream of the nozzle tip.

MANAGING THE NUMBERS

The second important principle is to use the fewest jets possible. If one good jet doesn't cut through the deposits, then more of them will not do better. Greater power is delivered to the surface with fewer, more powerful jets, rotated to cover the entire surface in a helical jet path. For example, in a nozzle using three or five jets, each jet is 2 to 2.5 times as powerful as the non-rotating alternative.

CONTROLLED ROTATION

Thirdly, the bigger the diameter of pipe, the slower the rotation required. Large pipes or vessels may require air-motor-powered gearboxes to keep rotation slow enough to maintain the necessary transverse velocity at the wall. A good rule of thumb is to provide about 15 mph transverse jet velocity along the surface being cleaned. This rule works whether the tool is cleaning a one-inch diameter heat exchanger tube, a 12 in. sewer pipe or a 40-foot-diameter crude oil storage facility.

Photo Credit: 502 Equipment

HOSE PRESSURE DROP

A fourth important factor is to balance hose pressure drop for the pump being used. Hose pressure drop is a direct, proportional loss in power caused by friction as water molecules slide across the wall of the hose and against other water molecules in the hose. The only way to reduce pressure drop is to use a shorter or a larger-diameter hose. Sewer cleaning requires relatively long hoses and large-diameter hose is heavier and therefore more difficult to pull through the pipe. So even in the best case, 20 to 25 percent of a jetter's power is lost to hose pressure drop. If you notice more powerful jetting with a shorter hose, that's because there is less pressure drop. It can make sense to buy shorter lengths as replacements.

SAFETY

Finally, safety should always be a top priority on the job and that's especially true when working with high pressure jetting nozzles. To prevent a tool from "backing out" and turning toward the operator, we recommend using a rigid pipe "stinger". Centralizers can also eliminate the possibility of tool turn around, as well as improving performance by allowing for nipple extensions to deliver the jet power closer to the pipe wall, and protecting the head of the tool from hitting the side walls.