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The Turbo III chain cutter helps clear roots from pipes such as this 30-inch sanitary sewer. (Photos courtesy of Ypsilanti Community Utilities Authority)

### BETTER MOUSETRAPS

**PRODUCT:**

Turbo III chain cutter

**APPLICATION:**

Clearing roots from 30-inch sewer main

**BENEFITS:**

Powerful enough to remove dense blockages

**USER:**

Ypsilanti Community Utilities Authority, Ypsilanti, Mich.

**MANUFACTURER:**

USB Sewer Equipment Corp., Marietta, Ga.  
866/408-2814  
www.usbsec.com

# NOBLE SAVAGE

A heavy-duty chain cutter helps a Michigan authority clear a severe root blockage from a 30-inch main and restore normal flow

By *Scottie Dayton*

**“The difference it made in the performance of our sewer system was phenomenal. The Turbo III has opened other avenues, too, which will enable us to better maintain our lines and serve our customers.”**

Mike Shaffer

Heavy rains were causing infiltration at the Factory Street Pump Station in Ypsilanti, Mich., which receives all the city’s sewage flows.

The Ypsilanti Community Utilities Authority (YCUA), an independent agency that owns the water and sewer mains, began a systematic inspection of the city’s 800 manholes. Inspections included documenting flows on dry and wet days to pinpoint infiltration sources, then televising four areas where the mains ran under the Huron River.

“One river crossing in particular seemed to be the culprit,” says Mike Shaffer, transmission and distribution foreman for the YCUA service

department. “When we inspected the line, we found four root masses within 130 feet, each 8 to 12 feet long and each blocking 90 percent of the 30-inch concrete pipe.”

The service department didn’t have a tool to remove such a dense mass, so Shaffer called Gary Guilliam of Great Lakes Service and Supplies Inc., a distributor in Petersburg. He brought the Turbo III chain cutter, made by USB Sewer Equipment Corp. in Marietta, Ga. After learning how to launch and handle the tool, Shaffer and his crew worked 60 hours to clear the roots.

“The difference it made in the performance of our sewer system was phenomenal,” says Shaffer. “The Turbo III has opened other

avenues, too, which will enable us to better maintain our lines and serve our customers.”

#### Alarming situation

The average daily flow through the 30-inch main is 1 mgd with a velocity of 2.2 feet per second. The 90-year-old sewer had never been video inspected. In 2007, YCUA purchased a PE 2000 pan-and-tilt Illuminator camera on a TR 3000 tractor, and a CCTV van from Aries Industries Inc.

Upon inspecting the suspect sewer, Shaffer’s team was alarmed to find the root masses and an ancient bypass handling much of the flow. One root had entered through an abandoned 4-inch lateral. The

other roots had slipped through joints that shifted with the ground. The root masses were confined between the upstream and downstream manholes 130 feet apart.

"The bypass really helped us," says Shaffer. "We plugged the main upstream and diverted all the flow into it." Shaffer and line service technicians Tom Everard and Ryan Stetler couldn't lower a 30-inch Turbo III into the downstream manhole because the chimney was too small, so they launched from the vault upstream and adjusted the sliding rails to the pipe diame-

**The Turbo III chain cutter is lowered into a sanitary sewer vault. The tool was powered by a Vactor 2100 Series hydroexcavator supplying water at 70 to 80 gpm.**



**Line service technicians Tom Everard (left) and Ryan Stetler adjust the expandable frame on the cutter.**

ter. The rails adjust in 1/16-inch increments.

"Adjusting the rails was the biggest thing," says Shaffer. "We made two confined-space entries to test-fit the cutter to the main." Once they locked the rails to the proper distances, Everard and Stetler launched the tool from the top of the vault.

"The cutter weighs 49 pounds before attaching the hoses and chains, so it was heavy and cumbersome for my two guys to wrestle down the hole," says Shaffer. "Our cutter also has the larger, 4-inch wheels and adapters for them, adding more weight." Although the Turbo III looked complicated, the team found it simple to operate.

At first, the men shuttled 5,000 gallons of water a day to fill the 1,000-gallon freshwater tank on the Vactor 2100 Series hydroexcavator powering the cutter. "Then we wised up and hooked to a hydrant 350 feet away," says Shaffer. "The continuous flow enabled us to work nonstop for six hours." They used 7,000 to 8,000 gallons per day.

### Angle of attack

Two men at the upstream manhole operated the cutter and Vactor supplying water to the tool through a 1-inch hose. The water shoots onto the cutter's angled fan blades at 70 to 80 gpm, spinning the turbine at 6,000 to 10,000 rpm. The water is channeled separately and has no contact with the cutter's internal bearings. Waterjets at the back of the tool propel it forward.

Two men downstream vacuumed debris at 2,500 psi using another Vactor 2100, and monitored the cutter's progress in the CCTV van. "The camera technician is the eyes for the man running the cutter," says Shaffer. "They communicate on two-way radios."

When approaching a root mass, the tool's tapered cross-cutter (nose) makes the first penetration. Behind the cross-cutter is a 10-inch single-riveted roller chain (2.5 inches on either side of the shaft) with bits on both ends, followed by 20-inch and 30-inch chains. The last

chain is mounted on the turbine. The penetration is cone-shaped.

"Seeing the Turbo III work is incredible," says Shaffer. "It's so savage. People watching the video are really impressed." Nevertheless, it took 10 days to remove the roots. At the end of each day, the men sprayed the tool with a commercial cleaner, then hosed it off with water. It does not require lubrication.

### Versatile difference

The Turbo III works in 8- to 36-inch lines and removes protruding laterals in 8- to 15-inch mains. "Such versatility is really helpful and cost effective, and we have a slew of projects waiting for this tool," says Shaffer. Next on his list is cutting laterals flush with the host pipes, because the protrusions obstruct the camera's forward progress. For that job, the root-cutting head on the Turbo III is replaced with USB's barrel cutter.

"We're also removing calcium buildups in mains using a diamond face cutter or a chain with fixed bolts on the Turbo III," says Shaffer. "Both are much more powerful than the soap nozzle we have, yet won't damage the walls."

This year, YCUA will hire a contractor to install a CIPP liner in the 30-inch main to keep out roots and stop infiltration from bad joints. ♦

### MORE INFO:

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