Fine-Screen Savers

By Alec Mackie

To screen wastewater with ¼-in. perforated plate panels means the ability to capture a lot of material. The result? Mounds of trash and debris—of all sizes and odor types—are pulled from the wastewater channel along with plenty of fecal matter. That is where one may find value in JWC Environmental's Screenings Washer Monster (SWM), a compactor incorporating a grinder, wash zones and a compactor to clean debris and fecal matter and produce a cleaner, drier screenings discharge.

Screenings washers make fine-screening possible at Ontario treatment plants

Two large pollution control plants in Mississauga, Ontario, Canada, have installed 12 SWMs behind their fine screens. The headworks system screens out all debris and also cleans organics so that it does not cause major odor problems.

"We picked JWC's screenings washers for a few reasons," said William Fernandez, manager of capital projects for the Region of Peel government agency. "We are considering integrated fixed-film/activated sludge systems treatment for the future, and that requires fine screening down to ¼ in. Since we were in the process of redesigning the headworks at both plants, we decided to go for it and install ¼-in. perforated plate fine screens."

North American Upgrade

In the early 2000s, few large treatment plants in North America were using fine screens. England and Europe were home to the largest fine screen installations; North American plants still used old bar screen technology, which lets a significant amount of small trash pass through. Region of Peel officials traveled to several European treatment plants to see what worked and what did not with the fine screens.

"It was obvious right away the handling of screenings from the fine screens was critical," Fernandez said. "We saw compacting as a bottleneck or a pinch point in the process. Facilities used sluices, pumps or elaborate systems to get fecal matter out of screenings, and some systems created a lot of mess, in my opinion."

To the design team, the fine screen was the easy part. It was the next step—the washer compactor—that would make or break the headworks. So engineers looked at several configurations and included grinders in order to break up clumps of soft organics wrapped in rags to be cleaned and compacted. The team sketched one design in which three screens feed a sluice into one grinder. If the grinder went down, however, then three screens would go offline.

"We finally concluded we needed one grinder-compactor per screen—a reliable operation," Fernandez said. "The screen takes out all the stuff and a lot of fecal matter. If you don't grind it, you are going to have horrendous odor problems."

The 120-million-gal-per-day (mgd) Lakeview and 50-mgd Clarkson treatment plants in Mississauga underwent expansions in the mid 2000s to enhance their treatment processes. Black & Veatch and other firms assisted with the redesign and expansion. The facilities are owned by the Region of Peel and operated by the Ontario Clean Water Agency (OCWA), which provides water and wastewater services for 180 municipalities in the province.

Fine screens—virutally nonexistent in North America as recently as the early 2000s—are being dubbed "the future" vs. bar screens.

Plant Benefits

Fine screening removes nearly all inorganic debris at the headworks, and the benefits for the facility are tremendous but sometimes hard to see. Fernandez pointed to long-term savings (e.g., not having to muck out the inside of digesters, suck grit and trash out of the aeration basins or constantly unclog pumps full of rags). Using fine screens allows the facility to run longer and more efficiently. The savings are not immediately obvious, but over time they add up.

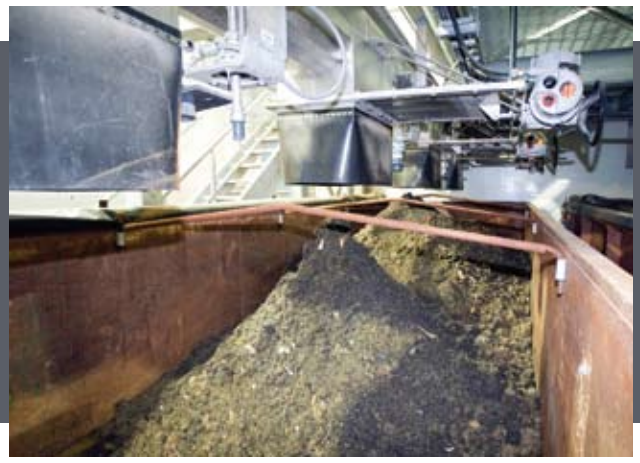
"They are working beautifully. This is the future," Fernandez said of the new headworks. "It's a lot better than the old bar screens."

One visible sign of the fine screens' success is the increased tonnage of screenings hauled to the landfill. Each week the two facilities send three to four times the metric tonnage they did when the bar screens were in use. Tonnage is up, according to Fernandez, but the cubic volume is down. The grinder cuts up debris and compacts it more tightly, saving dumpster space.

Plant operators also enjoy the benefits of fine screening. "I think the fine screens helped the plant a lot. We have fewer blockages in the raw sludge pumps," said Nevin McKeown of OCWA. "In the aeration basins, we were getting rags and stuff building up on top of diffusers. Then when activated, it would cause pressure to increase on other diffusers and the heads just pop out. Most of the air leaks out. We've approximately doubled the removal of screenings—an indicator of how much stuff we were letting by with the old bar screens."

McKeown also reported that the facility has banished an odorous problem caused by the old headworks: leaky dumpsters. Screenings would form a wet pool inside dumpsters that would then leak onto the ground. The SWM produces drier material that does not form a pool of smelly water, thus no more leaky dumpsters.

"The output is good, clean. That's good for the



Plant operators enjoy the fact that fine screens yield fewer blockages in the raw sludge pumps.

amount of material those screens haul out," said Mike Nelson, P.E., of Envirocan Wastewater Treatment Equipment Co., the machinery integrator on the project. "It is a showcase site, just beautiful. And the customer seems pleased: They just bought two more SWMs." WWD

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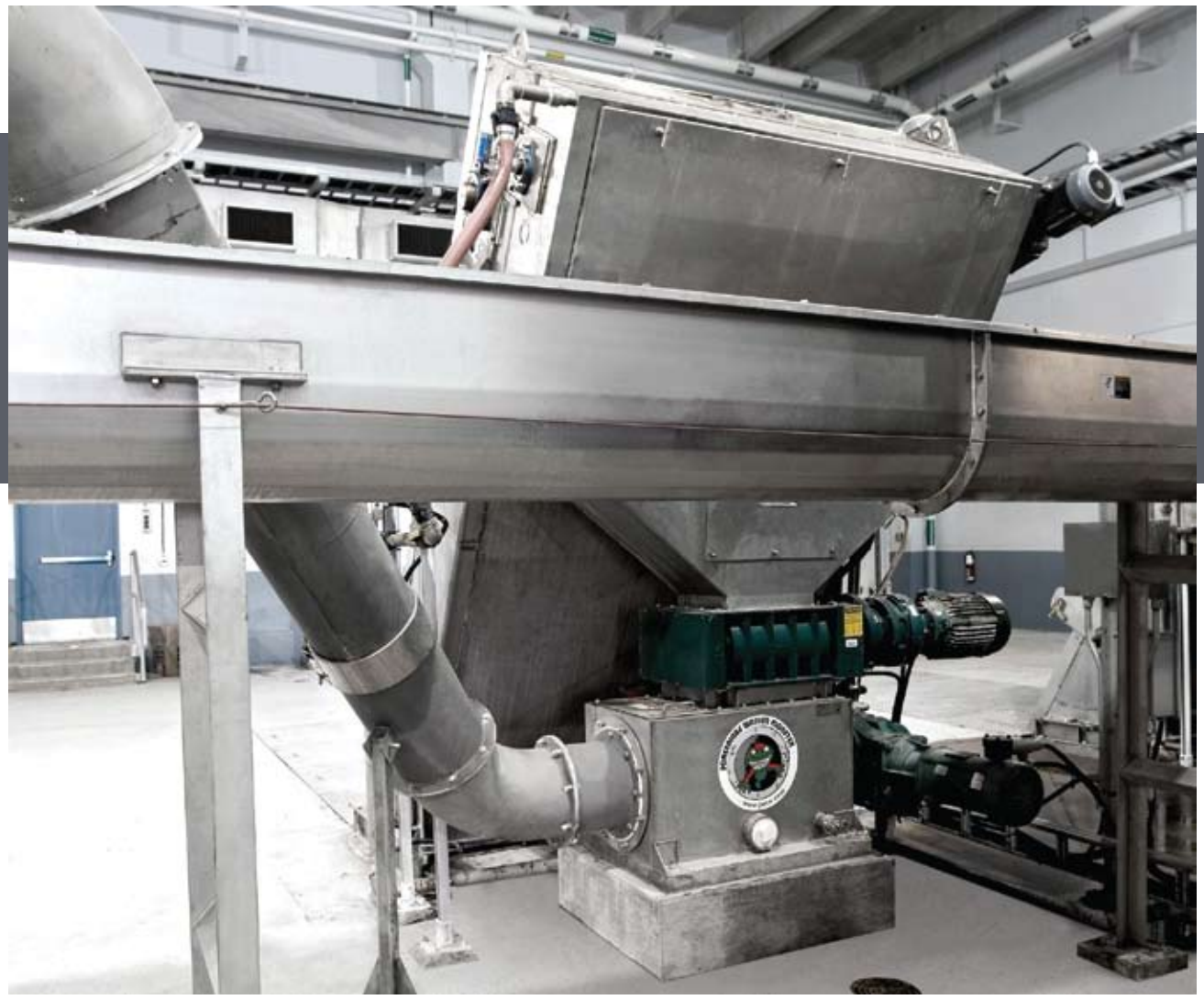

The new technology also produces drier material, which prevents leaky dumpsters.