

Streamlining wastewater treatment in processing



Despite mechanical improvements in wastewater treatment, many processors continue to pay unnecessarily high fees for municipal water discharges. However, new treatment systems can help reduce these costs.

By Jim McMahon

to discharge.

However, MTP operates quite differently. A unique double screening system places little limits on the volume of particulate organic matter allowed to be put through their wastewater. The system, built by Lyco Manufacturing (www.lycomfg.com), effectively removes sufficient load before discharge to leave levels of BOD and TSS well within municipal standards.

More load coming down

Mike DeVries, MTP Plant Manager says, “We purposely set up our wastewater system to handle anything that comes down it, any volume and concentration of particulate matter. Consequently, we have a lot more load coming down our drains that we have to get out than other processors. This is different from how most operations function, where usually they are trying to keep the load in their wastewater at a continually lower concentration throughout processing, but this is because their screening system can’t handle it. We are moving 700,000 to 800,000 gallons of wastewater a day through our system without any jam ups at the screening, and we are ending up with BOD and TSS ratings well within municipal standards.”

High water usage

Typical of many food processing industries, poultry processing is a relatively high water usage activity. For broilers, five to ten gallons are used to process one five-pound, average-sized bird. For turkey processors the volume of water used is considerably higher, the average live weight of slaughtered turkeys exceeds 27 pounds. In some cases, such as the processing of large toms, as done by MTP, bird weights can reach up to 40 pounds, with water consumption for processing in the range of 35 to 40 gallons per bird. It is not unusual for a processor to generate 750,000 to 1,500,000 gallons of wastewater daily.

Organic and inorganic matter

This water is laden with proteins, fats and carbohydrates from meat, fat, blood, skin. The water is also polluted with a fair amount of grit and other inorganic matter. Waste load can be determined by a number of different measurements, including BOD (biochemical oxygen demand), TSS (total suspended solids concentration), COD (the chemical oxygen demand), and FOG (fats, oil and grease), but plant wastewater is most often tested for BOD—a measure of the amount of oxygen needed to degrade the

Like many poultry processors, Michigan Turkey Producers (MTP), a medium-sized poultry processor of live tom turkeys handling 4.5 million birds annually, keeps a tight rein on their BOD (biochemical oxygen demand) and TSS (total suspended solids) levels in their discharged wastewater. Most processors are careful to limit poultry processing by-products from entering and contaminating their wastewater stream because of the difficulty in removing them prior



Lyco wastewater double screening system

organic matter in the wastewater.

Removing material

Processors are required to remove the majority of the soluble and particulate organic material in their wastewater prior to discharge from the plant in order to achieve compliance with local, state and federal environmental regulations. The problem is that few screening systems are really capable of continuously cleaning out all of this material to a level within the standards of municipalities, and municipalities use BOD loads to determine charges and surcharges for wastewater dischargers.

“We discharge ultimately to a city municipal system and they charge us for anything that we put into the water,” says DeVries. “We have to control our loading costs to avoid additional surcharges. With the Lyco double drum screens we are able to load up as we process, and then pull everything out of the wastewater before we discharge. It is a very efficient system.”

Separating liquids and solids

Lyco's Double Drum screen uses rotary action to separate waste solids from liquids in one step, eliminating the need for

two sequential, single-stage screens (See photo 1). Primary screening takes place when the wastewater enters the inner drum from the inside and screens out solids within the range of 0.06 inches to 0.02 inches. Secondary screening follows as the wastewater passes through the outer drum, screening particles as small as 0.02 inches. The net result is that more solids are screened out of the wastewater.

“The Double Drum screen, which can handle up to 3,000 gallons per minute (GPM), was designed to eliminate the need for primary and secondary screening,” says Terry Brady with Lyco. “Our research shows that in the majority of screening applications processors used a perforated primary screen then pumped the water to a secondary screen. Lyco designed a way to do the primary screening with the inner drum screen first, and then the secondary screening done with the outer screen, which is the finer screen.”

Blinding

There is also the issue of blinding; meat is laden with fats and other slimy-type particulates that clog the screen openings. This is a common problem with traditional screening equipment, limiting

the volume of wastewater and load that can be moved through a screen, which causes water and particulate to “spill” over the end of it. The Lyco double-drum uses a self-cleaning wedge-wire screen material, and a patented traveling spray system which can use as little as 10 GPM of fresh water to keep the screen open, compared to typical rotary screens that consume 36 GPM. These features drastically minimize screen blinding.

“A lot of other screen designs let material go through because they don't have the ability to manage it,” says DeVries. “Particularly when it gets into high volume quantities of material going through. This is not the case with the Lyco double drum. It can handle anything we put through it, regardless of the gallons per minute or particulate load.”

Return on investment

“I have been around a lot of screens used in the industry, and have experienced their external and internal problems firsthand,” continues DeVries. “I look for screening equipment that is heavy duty, durable, engineered to be user friendly, tool friendly and mechanic friendly. I want to be able to set it up and have it run with minimal maintenance. We have literally loaded the Lyco double drum with thousands of pounds of product at different times and it has performed without any problems. Our need has been to get our heavily laden particulate out of the wastewater before we discharge it to the municipal system. The Lyco screen manages that for us, particularly with TSS, which ultimately returns thousands of dollars back to us each month.”

Processors can have their rates reduced by a large portion using the double drum, such as a 40 percent charge reduction from municipalities, which could equal US\$50,000 to well over US\$100,000 in saving a year. **MI**