Self-Cleaning Trashracks Offer Flow Protection For High Volumes And A Wide Variety Of Debris

Trashracks serve the simple but critical purpose of keeping large debris out of a water system. They are often placed in high-volume channels, drainage canals, pump stations, or flood control systems. Whether the goal is to pull water out of a residential area or supply water to a hydroelectric plant or a nuclear facility, it is critical to ensure that the water doesn't carry potentially damaging debris into the system beyond the screen.

In areas with harsh environments, such as those prone to heavy rainfalls or hurricanes, or even just those with a lot of vegetation, a trashrack can become clogged, causing potential flooding or preventing flow when it is needed. There are a variety of ways to handle this — trashracks can be cleaned manually or with an external mechanical cleaning system. For many applications, a self-cleaning trashrack (SCT) can be an ideal solution. SCT systems offer key benefits that can save money while ensuring a continuous flow of water with minimal debris, protecting downstream equipment.

Photo courtesy of Duperon

Less Human Intervention

An SCT saves a significant amount of labor versus other options. In addition to being dangerous work, manual cleaning is time-consuming and costly. Even an add-on trashrack cleaner often requires some human intervention to run the machine or, in the best-case scenario, to at least activate and deactivate the machine as needed.

SCT technology does away with this entirely. Lifting cars with specially designed fingers for removing debris are mounted along the front of the screen. Sensors detect water levels and flow rate. As flow rates increase and the debris blinds the screen, the water level in the front of the screen will rise. When the water level reaches a predetermined point, the lifting cars will activate, pulling the debris up the front of the screen and depositing it in a trough. Once the flow returns to normal, the system will enter the idle position.

Reduced Maintenance

Trashracks don't need to be cleaned every day. In fact, in many cases they only need it a few times per month or even per year. In order to function properly when needed, an SCT must be engineered to be idle for long periods of time.

This is accomplished through the use of a number of features:

- **Self-lubricating bearings.** Advanced polymer materials do not require greasing.
- **Weather-resistant coatings.** This prevents rust from building while idle.
- **Fewer moving parts.** The system is designed without pins, brakes, clutches, or other components that can wear, warp, or catch during idle moments.
- **No close tolerances.** This prevents binding or jamming when starting up from a prolonged period of idleness.

These features have the added benefit of reducing the overall maintenance of the system. To enhance the low-maintenance dynamic of the system, the sprockets are all located above the water line. This reduces the chance of rust while also making them easier to replace.

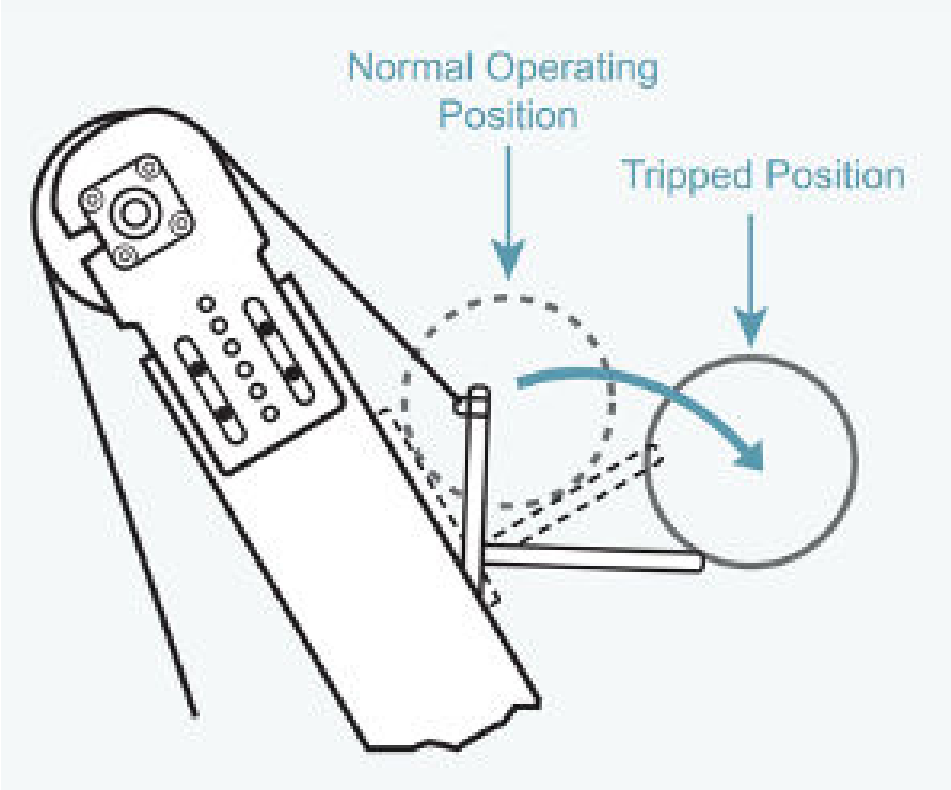

Photo courtesy of Duperon

In addition, multiple chain strands are pulled by a single drive shaft with built-in redundancy. If an individual chain strand gets snagged or pulls a load that is too heavy, it can rock through an arc sufficient to disengage from the challenging debris (Figure 1). This prevents the trashrack from becoming misaligned, which would allow excess debris to flow through and require significant maintenance to repair. It also prevents lifting fingers from bending or snapping.

That said, the lifting fingers of the SCT are built to carry up to 3,000 lbs. This allows them to handle even the most extreme debris that can end up in the waterway, including logs and timber, tires, and more.

Less Energy Consumption

Many trashrack cleaners use large motors — sometimes as large as 75 hp. These powerful motors consume tremendous amounts of energy. SCTs are designed to work effectively with just a 1.5-hp motor. This represents significant energy savings, which also translates into low operational costs.

Uninterrupted Flow

To minimize blinding and ensure a continuous flow of water through the screen, the SCT is designed with a front-clean, rear-return design. This allows the cars to move along the front of the screen, pulling debris up and out of the water. Debris is then deposited in a trough behind the screen and the cars return to the water free of debris. By comparison, a front-return design pulls debris down under the water's surface. This works well for many applications, but in environments prone to dense vegetation and heavy, matted debris, this can increase blinding underneath and disrupt flow.

Regardless of where it is located, a trashrack serves the critical purpose of preventing debris from damaging downstream equipment or infrastructure. An SCT can help protect downstream processes while also reducing costs associated with labor, maintenance, and energy consumption. ■