

Screen Maintenance Improves Water and Wastewater Treatment Plant Performance

Advances in screening technologies have been driven by the need to protect increasingly sophisticated downstream equipment by capturing and removing floating debris. Routine maintenance can dramatically improve water and wastewater treatment plant system processes. **BY WALT SHELMET**

WATER AND WASTEWATER treatment plants worldwide are being asked to do more with less these days. This increased pressure creates many challenges for operators, as they're tasked with maintaining customer satisfaction and keeping facilities with sophisticated processes running optimally day and night. The ability to screen large debris and fine particulates is vital to protecting a municipality's downstream water and wastewater treatment equipment.

Modern screening technologies have made significant advancements during the last 50 years. For water treatment, coarse and fine screening helps to protect pumps, filters, membranes, and other equipment. Similarly, a wastewater plant's headworks system is vital to treatment processes and the first line of defense for reducing maintenance throughout the system.

SCREEN MAINTENANCE NOW SAVES TIME LATER

All screen types (step, bar, spiral, drum, and traveling band screens) need to be properly maintained. For plants with reduced staff, it's easy to reduce the time spent on equipment maintenance to focus on other priorities. However, this approach often leads to bigger headaches and even more time spent on maintenance and repair later because of inefficient equipment operation—or worse, equipment failure.

The benefits of routine equipment maintenance can't be overstated. With a regular maintenance plan, treatment plants can keep their processes operating at optimal levels and often reduce the total time spent on maintenance. Routine screen maintenance improves the performance and life span of the screening systems as well as the entire treatment plant system through improved operational efficiencies, lower energy and maintenance costs, and reduced maintenance or replacement of downstream processes.

Clarifiers, digesters, aerators, ultraviolet light disinfection units, membrane technologies, and other systems maintain optimal performance with a properly maintained screening system in front of them. Regardless of the manufacturer or type of screen being implemented in the process, extending the life of that equipment through regular maintenance will yield major dividends.

Fortunately, regular maintenance doesn't have to be a hassle. Operators should always follow the manufacturer's recommended maintenance schedule for any piece of equipment. Also, consider the routine wear and maintenance items in the Best Practices box on pages 17 and 18 to ensure optimal performance throughout the service life of each of the treatment components.

TOUCH BASE WITH THE MANUFACTURER

It's a good idea to have a ready supply of commonly used replacement parts to efficiently maintain equipment. Parts to consider keeping on hand could include brushes, wiper blades, grid panels, and spray nozzles. Contact your equipment's manufacturer for a list of recommended spare parts and understand lead times necessary to fulfill orders if the manufacturer doesn't stock spare parts. Local distributors may also stock common replacement parts.

Many manufacturers of headworks equipment offer service plans that allow for routine maintenance to be done by a factory-trained service technician. Understanding that many municipalities are struggling with tight budgets, these service plans should be considered at the time of purchase. The value added by service via the manufacturer is well worth the investment to maximize the life of the purchase.

Routine maintenance is like working out or any other good habit. Once you start to see results, you'll wonder why you didn't start sooner. With small investments of time on a regular basis, the payoff in improved operational efficiencies and cost savings will be dramatic!

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The first pretreatment provided in most surface water treatment systems and wastewater treatment plants is screening. If floating debris and gravel, sand, and other gritty substances aren't removed, this material can jam equipment, damage pumps and piping, and greatly add to the loading on the normal treatment processes.

Clogging and corrosion are the principal problems associated with screening. Preventing these problems requires routine cleaning and inspection. Consider the following guidelines:

All screens



Visually inspect equipment regularly to catch potential problems early.

- Grease all bearings with the manufacturer's recommended lubricant.

- Inspect drive motor and gear reducers to make sure they're venting properly and don't leak fluids. Regularly lubricate.
- Inspect control equipment on all local stations and the main control panel for corrosion and loose wires.
- Test and record all voltage and amp draws from each motor. Record all readings and review against previous recordings.
- Check timers, variable speeds, differential level sensors, and other programs to ensure they're functioning properly.
- Replace submerged sprockets and bearings (if applicable) as needed over time. Submerged components should be inspected and cleaned any time the channel is drained.
- Inspect level sensing systems regularly. Transducers and floats need to be cleared of any debris that would negatively affect performance.

Bar screens (single bar and multiple rake)



Inspect and clean rake teeth to help minimize bent or broken teeth.

- Lubricate the rack-and-pinion gear on single-arm bar screens.
- Inspect and clean the chain on multirake screens, which tends to easily foul with rags and debris.
- Inspect and clean rake teeth, a common maintenance item. Bent or broken teeth will prevent the rake from properly engaging

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Preliminary Treatment

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with the rack and potentially damage the screen.

- Inspect wiper blades regularly for significant fouling and damage. Lubricate and replace as necessary.
- Inspect lower and upper tracks to identify issues that may cause wear to the tracks before a significant problem develops.
- Ensure drives with chains are kept tensioned and lubricated.
- Inspect stationary bar racks for heavy debris that's not being cleared with the unloading mechanism.

Traveling band screens (center and through flow)

Ensure spray wash systems aren't clogged and spray evenly.



- Ensure traveling screening media is rotating and moving properly.
- Ensure spray wash systems cycle on and off properly and wash water pressure is at the required level.
- Inspect rotating/fixed brushes for significant fouling and damage and clean as necessary. All bearings should be regularly lubricated.
- Inspect plastic grids for damage and broken teeth. Replace as necessary.
- Inspect perforated panel grids regularly, as they're susceptible to being blown out and bent because of large debris or high differential. Replace panels as necessary.
- Ensure drives with chains are kept tensioned and lubricated.

Spiral screens

Clear the screw shaft of any large debris that could disable it.



- Ensure the screw shaft is kept clear of any large debris or damage that could disable it.
- Replace the brush around the screw as needed, as it's one of the most common wear items on this style screen.
- Inspect wedgewire and perforated troughs for wear and replace as necessary.
- Ensure strainer solenoid valves operate properly.

Step screens

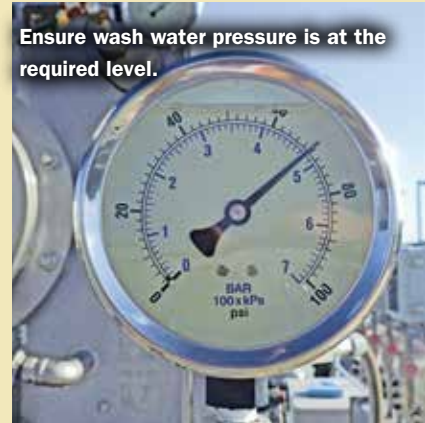
The filter grid on step screens can be easily bent and damaged, so regularly inspect the lamella.



- Inspect the lamella for signs of wear and damage.
- Ensure the bottom of the grid is free of rocks or other debris, as this can cause significant damage to the moving lamella.
- Inspect and clean the top of the screen, as ragging in the unloading area is common.

Incline drum screens

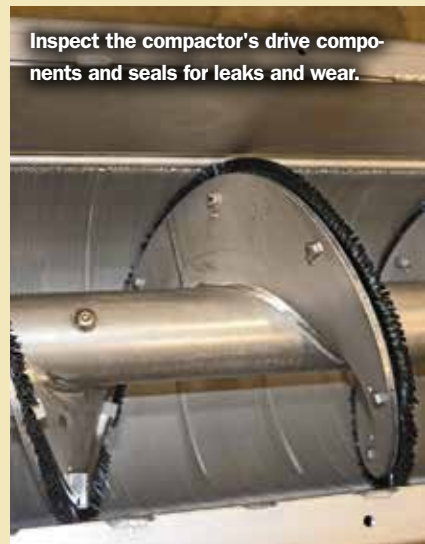
Ensure wash water pressure is at the required level.



- Inspect drum seal to frame for signs of wear and leakage. Replace as necessary.
- Inspect the receiving hopper for ragging and clean as necessary.

Screenings handling compactor and conveyor systems

Inspect the compactor's drive components and seals for leaks and wear.



- Inspect for buildup of screenings and large solids on auger and drive shaft sprockets. Clear out and spray off components as necessary.
- Cycle the equipment to check spray wash nozzles. Clean as needed.
- Inspect the compactor's drive components and seals for leaks and wear. Repair or replace as necessary.