

A New Platform For Safer Surface-Aerator Maintenance

With so many different safety concerns — government-mandated or self-imposed — municipal and industrial wastewater treatment operators have a lot on their plates. Maintaining aerators used in open-basin treatment applications is just one source of those safety concerns. That is why a new approach to safeguarding worker well-being in the process of aerator maintenance activities is worth a closer look.

A Look At Safety By The Numbers

Threats to worker safety in water and wastewater treatment operations span a variety of risks — including fatal and non-fatal injuries related to slips, falls, equipment accidents, chemical exposure, drowning, and more. A 2012 industry study based on U.S. Occupational Safety and Health Administration (OSHA) information noted that the industry averaged three fatalities per year over an 18-year span leading up to that study.

Even in seemingly simple operations, such as equipment maintenance and bearing lubrication, the location and accessibility of the work can raise safety issues, especially where risky shortcuts are attempted. This article outlines a novel approach to minimizing one of those risks — aerator maintenance in open aeration basins.

Risk vs. Reward In Aeration Maintenance Operations

Each of these three major options for surface-aerator maintenance in wastewater treatment operations comes with different cost and safety concerns:

- **Benign Neglect.** Some wastewater treatment operations consciously choose this approach to avoid the rigging, labor, and safety issues



(Photo courtesy of Aqua Aerobic Systems, Inc.)

of routine aerator maintenance, simply foregoing all maintenance and running the aerators to failure. While this approach can save time and minimize accidents in the short term, it is not the most cost-effective or farsighted approach to maximizing equipment lifecycle value — especially if the failure occurs in the first five to 10 years.

- **Aerator Removal.** Whether aerators are simply moved to the side of an aeration basin for mooring during maintenance or are fully removed from the water with a crane, the process can be time-consuming. Untethering an aerator float's mooring lines, moving the aerator through water crisscrossed with other cables and hoses, performing the maintenance, then reversing
- **Maintain In Place.** Maintaining surface-aeration equipment in place is arguably the most cost-effective of these three major approaches, delivering the lowest total lifecycle cost over a period of 20 years or more. Doing it safely, however, requires more than simply loading a small boat with a grease gun and paddling out to each aerator float. A new handrail design option enables workers to service surface aerators

in place — safely — in less than 20 percent of the time required to bring each aerator to the shore for maintenance.

Necessity Is The Mother Of Invention

Spurred by a request from a wastewater treatment customer, Aqua Aerobic has developed a safe and simple time-saving solution for maintaining float-mounted aerators “in place.” The approach involved satisfying a variety of customer goals:

- **Better Access.** While surface aerators operate out in open space, there are many ways they can be tethered in position. Any handrail safety feature needs to be highly functional and readily accessible without conflicting with any other facet of the aerator’s installation or operation.
 - **Utmost Worker Safety.** The design needs to address the work requirements and real-world conditions — including the potential buildup of slippery growth on a wet float surface where maintenance workers must stand and work.
 - **Multifaceted, OSHA-Compatible Security.** Any handrail design used to assist worker access from a small boat and provide leverage and protection during maintenance tasks needs to function dependably. It should also accommodate OSHA handrail guidelines and include features to prevent accidental disengagement.
 - **Noncompromising Performance.** Any handrails used on aerator floats should be removable in order to avoid disrupting the aerator’s spray pattern. The layout should also accommodate the location of existing mooring cables and the motor junction box.
- goals involved a thoughtful design approach with trial-and-error testing. The result was a new float platform design with purpose-specific removable handrails, a slip-resistant surface, and built-in security features to minimize the risk of installation errors or mishandling.
- **Removable Design.** To allow for an unrestricted spray pattern and good oxygen transfer during aerator operation, the handrail system needed to be removable.
 - **Light Weight.** Because the rails needed to be installed and removed for each maintenance visit, often by a maintenance worker in a small boat, they needed to be constructed of lightweight, yet durable, material.
 - **Easy Installation.** The aluminum handrail posts fit into a plastic-lined socket permanently attached to the base of the float. That smooth plastic liner serves as a slick bearing surface to aid in easy insertion and removal.
 - **Positive Engagement.** A machined indexing slot (Figure 1A) aligns the handrails in the proper orientation using a three-step insertion technique — drop, twist, drop again — to assure positive engagement (Figure 1B). The interface between the mounting socket and the removable handrail features a close fit to minimize wobble while ensuring ease of installation.
 - **Locking Design.** A locking pin in the socket keeps the installed railing from being accidentally dislodged once it is anchored in place. Stainless-steel clip-on lanyards are included to prevent loss of the railings during the manual installation process (Figure 2).
 - **Nonskid Surface.** The installed handrails provide good support on both sides of a direct access path

A Safer Approach To Aerator Equipment Maintenance

Meeting the previously outlined customer



(Photo courtesy of Aqua Aerobic Systems, Inc.)

Figure 1A and 1B. An indexing slot (left) and a three-click engagement process (right) lets maintenance personnel know that handrails are properly installed and protected against being disengaged accidentally.



(Photo courtesy of Aqua Aerobic Systems, Inc.)

Figure 2. Stainless-steel lanyards protect accidentally dropped handrails from sinking into the water during installation or removal.

to the bearing grease fittings and junction box on the aerator motor. A slip-resistant surface on the deck between those railings provides sure footing for the maintenance worker standing on the float.

One Size Fits Multiple Surface Aerators

The safety float system was designed primarily for new aerator purchases, but bolt-hole compatibility does make the new handrail-equipped float an instantly compatible alternative for supporting existing aerator equipment from several manufacturers. Retrofitting the handrail mounting system onto a currently installed float from any manufacturer is also possible, but only if the float is shipped to the factory for welding of the handrail mounting brackets in the proper alignment. ■