

# Pump Protection

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For water companies faced with the need to cut costs while maintaining high levels of service providing protection for vital pumps is a key issue. An effective solution to this problem is Jacopa's trash rake technology from renowned manufacturer Bosker® which has been adopted at a number of water and wastewater treatment plants and other installations across the country to provide a first line of defence against such damage.

Debris, either from storms or from material that has been inconsiderately dumped can cause significant damage and blockage, leading to long periods of down time while repairs are carried out. And as pumps at water and wastewater treatment works can cost upwards of £200,000 protecting them is critical.

In high capacity intakes it is not unheard of for oversized and awkward debris such as concrete blocks, bricks, timber, metalwork, car tyres, rodents and other challenging material to be found and every treatment works has its own horror stories.

All works therefore routinely employ a range of both coarse and fine screening to ensure that key downstream pumps and processes are well protected. Bar screens are common primary protection solutions, with bar spacing's of 100mm or more, but as the first line of defence they frequently clog and require regular cleaning. In the past, this meant operators had to intervene manually to remove debris, but increasingly automation has overtaken manual labour, being safer and more efficient.

An increasingly popular way to ensure that coarse screens function well is to use trash rakes, which are normally installed at a water treatment works' river intake or wastewater treatment works' deep intake. However, conventional equipment demands complex civil works with considerable space for installation and operation. Also, in operation such equipment is frequently challenged when presented with large items such as tree trunks, tyres and awkward debris such as fibrous plant material that can wrap itself round coarse screen bars.

The Bosker system combines a trash rake, overhead conveyor and debris loading



Bosker 'Bandit'

system in one. This helps to cut costs and provides a turnkey solution that works together to collect, transit and dispose of all debris. The system is designed for situations where highly effective bar screen cleaning is essential and can cope efficiently with even the most challenging material.



Bosker Grab deals with difficult material

One of Jacopa's latest contracts was for an advanced water treatment plant supplying a key major urban main. Here, the Bosker system is protecting the 525 MLD centrifugal pumps that abstract water from the river and take it to a large reservoir. Like most large rivers, the urban watercourse contains significant amounts of floating detritus, so the pumps need robust and effective protection to ensure they remain operational.

The water treatment works had been using labour-intensive coarse screening methods that involved a certain amount of manual handling, and were seeking reliable, more automated protection for the vital pumps.

The project involved removing the existing platform and coarse screen in the main inlet channel, which feeds the centrifugal pumps, and replacing them with a Bosker system, a new maintenance platform, and a new bar screen.

The new solution provides the works with a fully automated cleaning system that provides protection to the expensive and critical pumps beyond, and also removes the need for manual intervention.

By installing this particular piece of machinery, the water company will be able to protect its vital pumps from damage for many years to come and will also benefit from the low running and maintenance costs.



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Boskers have proved to be robust, effective tools that are simple to use and install. They reduce maintenance and operational costs as well as minimising the risk to downstream pumps and other vital equipment. The system is pre-programmed with differential level settings, so it can be used in any channel, whatever the depth, and can also be retrofitted into existing channels with very little modification.

The overhead monorail supports a fully automated grab unit, whose tough grippers are designed to grasp onto heavy and awkward items including the most awkward items such as balls of condensed fat and rags, which are arriving with increasing frequency at wastewater treatment works across the UK.

In action, the open grab lowers onto the bar screen, pushing debris into the gripper's jaws as it moves downwards to the bottom of the screen, where the robust jaws close. A hoist returns the grab to an overhead trolley, pausing for an optional washing cycle. The trolley and gripper then move along a monorail track that runs directly between the intake and dump areas. The Bosker can collect debris from several pick-up points along its track, and continues its cycle until the entire screening area is cleared.

As well as the popular overhead Bosker, Jacopa manufactures the mobile Bosker 'Bandit'. This low-profile unit is designed for smaller pumping stations and inlets, and is ideally suited to wider inlets as it is set on a deck-mounted travel carriage. The Bandit can rotate through 270 degrees to provide access to dumping sites in awkward locations, and like their bigger brothers, the mobile Bandits are fast and easy to install, needing very little construction work.

One high-profile example is the Bosker overhead trash raking system at Thames's Deephams wastewater treatment works in Enfield. Here, two grab units on a duty/standby basis were installed on the works' high-level inlet. This Bosker is cleaning five 11m deep by 2m wide inlets, each of which has bar screens with 100mm bar spacing's. Here, the trash rakes remove at least 8 tonnes of debris per hour and can cope with storm flows of over 7000 litres/sec.

Over 1100 of the classic Bosker trash rakes have now been installed at power stations, large pumping stations and cooling water intakes around the world.

Ofwat's change of emphasis to TOTEX means that the industry is looking for robust and effective assets that are easy to refurbish and repair, with an emphasis on 'outcomes' rather than 'outputs' that will fuel interest in equipment like the Bosker that can help meet this aim.

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The Bosker installation at Thames Water's Deephams WWT works serves several inlets