

# Pumps: Upstream Investment = Downstream Saving

*Jacopa MD Alex Lloyd argues that a defensible Totex strategy must include protecting pumps ahead of and throughout the treatment train*

*Bosker unit can deal with difficult material*

The change to Totex has caused a seismic shift in strategy for the water sector one that has put the onus of responsibility on suppliers to demonstrate that their products and services deliver on outcomes for water companies.

The previous focus on Capex put the emphasis on short term cost reduction. With the move from 'outputs' to 'outcomes' capital expenditure and operational cost are now part of a greater whole. The healthy outcome of this is that the life cycle cost impact of procurement decisions are under scrutiny putting greater emphasis on innovation-driven cost-efficiencies.

Achieving this starts with effective inlet works solutions which can provide significant benefits that improve the efficiency and lifespan of pumping equipment at wastewater treatment works. There are a variety of upstream services where the Totex focus can be brought to bear to preserve downstream assets.

A comprehensive inlet works Totex strategy can then provide vital answers for protecting pumps ahead of and throughout the treatment train and our extensive range of inlet works solutions means we can offer a 'one stop shop' for our customers, including Coarse Screens, Fine Screens, Screenings Handling, Packaged Inlet Works, Packaged Grit Removal & Treatment Systems.

## Grit matters

It's hard to overstate the importance of grit removal at a wastewater treatment works. Effective grit removal at the preliminary treatment stage prevents the accumulation of grit in tanks and chambers, and helps to reduce wear on vulnerable equipment such as pumps by shielding them from abrasive detritus.

We've developed a comprehensive portfolio of products for grit removal, plus Classifier systems and Grit Pumps to tackle varying site configurations and requirements. For example, our rugged J+A Crossflow Detritor grit trap is designed to remove 95% of 0.2mm grit to produce a largely grit-free effluent that's cleaned, well-washed and drained.

When space is at a premium our J+A Jeta® grit trap provides a high level of



Jacopa MD Alex Lloyd

grit removal within a minimal footprint. Its simple, slow-rotating mechanism is highly efficient and uses minimal energy. And if you need to handle a mixture of solids from unscreened sewage sources to produce a cleaner grit than a standard classifier, our J+A Bache Classifier grit washer gets the job done. Made from either stainless or mild steel with few moving parts, it is easy to maintain for maximum design life and durability.

## Screen it

Effective screening removes debris that can affect the efficiency of downstream equipment and processes and ensures downstream operational and maintenance costs are minimised. It's well recognised that debris, either from storms or dumped material, can cause damage and blockage to critical pumps, leading to long periods of down time for repairs. And, as pumps are often very significant in terms of capital and operational investment costs, protecting them is hugely important to utilities.

Jacopa has therefore developed a very wide range of screens and screenings handling equipment. For example on sewage inflow to the inlet works choosing the right screen for the job is vital, it's important to consider the blinding ratio and head loss during normal and peak flow operations. The screen must be capable of handling the flow that is pumped in order to achieve self-cleansing velocities in the rising main, which is sometimes greater than the design peak flow Jacopa allows varying blinding factors for their screen apertures, typically for gravity flow this is 50% but for pumped flows a 70% factor is applied. This is equivalent to almost doubling the head loss associated with the screen apertures. This is done because the consistency and size of the screenings change after pumping.

We have recently launched an innovative new straight through screen (STS), a classic escalator-type fine screen specifically to provide effective inlet works protection for assets further into the treatment train. With the increased emphasis on efficiency and customer service in mind, the screen is very competitively priced and has easily replaceable screen panels and low cost replacement parts.

The lightweight screen is a significant departure from previous models, with an impressive screenings capture ratio similar to that of band screens, and a much-reduced risk of screenings carry-over

It is easy to retrofit the STS screens into existing inlet channels as well as new works, and even in tanks if flow can be pumped to them or fed by gravity. A mobile, tank-based solution for rental, which is seen as a potential opportunity where an urgent solution is required can be considered.

The screens were rigorously tested at the independently-run national test centre in Chester-le-Street, which highlighted a remarkable 81% capture ratio that



Jacopa Straight Through Screen

makes the STS screen comparable to the very best of its competitors.

These screens have a unique modular design, and are fabricated in 9mm thick moulded plastic set in stainless or carbon steel frames. The panels can be provided with perforations of 3, 5, 8 or 10mm, giving options from very fine to coarse screening and at the finer end helping with the perennial problem of excluding cotton bud sticks.

Feedback already suggests that the ease of cleaning has impressed potential customers. There is no cleaning brush to adjust or replace, as the system uses a washwater spray cleaning system that provides both energy and maintenance cost saving benefits. To guarantee simple operations and reduced maintenance, the screens have also been engineered to eliminate the use of chains. Another maintenance bonus is that only the screen curtain and its guide track are below coping level.

The modular construction chimes with our focus on modularity and standardisation, and significantly reduces downtime. Normally, if a screen is damaged the whole panel length has to be replaced, but with the STS screen a single panel can be quickly and easily slotted in, giving savings on components, labour and downtime.



Jacopa 'Jeta' grit removal system with classifier

The new emphasis on 'outcomes' rather than 'outputs' is also fuelling interest in our Bosker trashrakes. These well-regarded trashrakes are increasingly becoming a product of choice to protect pump stations and all pumping installations, particularly those that have a strategic importance. The range of floating debris that enters treatment works intakes is extremely varied, so all treatment works routinely employ a range of coarse and finer screening to ensure that the key downstream pumps and processes are well protected.

The Bosker cuts costs by combining a trashrake, overhead conveyor and debris loading equipment into one system that provides an effective turnkey solution to dispose of debris. The overhead conveyor has a fully automated grab unit with robust grippers that descend to grasp heavy and awkward items such as plastics, grasses, glass bottles, timber and concrete, as well as balls of condensed rags.

The solution is typically used to protect very large, system-critical pumps at water and wastewater treatment works, used for either abstracting raw water at water treatment works or raw wastewater from wastewater treatment works' deep intakes.

One high-profile example of its use is the Bosker overhead trash raking system at Thames's Deepphams 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 spacings.

As well as the popular larger overhead Bosker there is a 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.

## Storm Support

It's also critically important to provide support to customers in assessing hydraulic conditions within storm systems and any impact on the design characteristics of associated pump installations to reduce the risk of overspill when flow control equipment is fitted to attenuate downstream flows.

We recently teamed with Biogest AG, adding the company's highly regarded and competitive stainless steel stormwater products to its portfolio of screens and flushing systems. The move is part of a drive to further develop our storm products division to offer a comprehensive service and product range.

Flow control is, of course, a key issue in relation to protecting vital pumps in wastewater treatment systems, and solutions such as Biogest's flow regulators are key. These are a range of innovative electrical, or hydraulic-mechanical regulators that help utilities to avoid hydraulic overloads at wastewater treatment plants.

Storing excess flows during heavy rainfall and regulating the onward flow for treatment is integral to the modern utility approach to storm flows, driven by increasingly stringent legislation. Biogest regulators ensure that the pass-forward flow remains constant irrespective of the operating head, which is a critical factor in ensuring treatment plants are able to continue effectively treating the wastewater that they receive.

A defensible Totex strategy must then include protecting pumps ahead of and throughout the treatment train. However, cutting operational expenditure (Opex) is also vital and here we have seen an intensified focus on maintenance and a move away from previous capital-intensive solutions. The new imperative for utilities is to get more out of existing assets by keeping them operating at optimum performance levels. We must also look to deliver reductions in energy use and drive ever improving efficiencies.

The increased emphasis on extending asset life and maintaining performance in AMP 6 is also reflected in our business relationships. Here it's important to look beyond the equipment to assist customers and project management teams in both long-term decision-making and short-term judgements on individual assets.

[www.jacopa.com](http://www.jacopa.com)