A Wastewater Screening and Screenings Processing Case Study at WWTP Hull (Saltend)

HUBER Technology recently supplied, installed and commissioned coarse and fine inlet screens, launder systems and screenings handling plant for both sets of screens at one of Yorkshire Water's largest wastewater treatment, Hull (Saltend). The new elevated inlet works that houses the HUBER equipment is designed to treat the flow to full treatment of 2140 l/s and a population equivalent approaching 450,000. In addition to the construction of a new inlet works, HUBER were successful in securing the subcontract to supply 2 No. Ro3 sludge screens as part of the upgrade of the sludge treatment facility.

Coarse screening plant

HUBER Multi-Rake Bar Screens RakeMax®

For this section of the works, HUBER designed, manufactured, installed and commissioned 3 No. 75° **RakeMax®** Multi-Rake Bar screens with 25 mm bar spacings.

These screens operate on a duty, assist, and standby basis and were selected and designed to ensure that the velocity through the bars does not exceed 1.2 m/s whilst maintaining good channel velocities at peak flows.

Coarse screens screenings handling system

Each RakeMax® screen discharges into a stainless steel common launder designed and installed by HUBER. Because of the elevated position of the screens and common launder, a drop pipe was required to deliver the launder water and screenings to 3 No. twin-screw WAP® SL 12v wash presses. Each of the wash presses is designed to process 12 m3/hour of wet screenings at a fixed speed, which can then be increased to 18.5 m3/hour via frequency inverters if it becomes necessary. The site P.E. and appropriate peak factor meant that a predicted peak volume of 26.42 m3/hour might arrive at the works so it was necessary to 'sequence' the operation of the WAP® SL wash presses to facilitate duty, assist and standby operation.

Coarse screens low level launder and WAP® SL 12v wash presses

The reception hoppers of the **WAP® SL** wash presses are fitted with vortex impellors that create significant agitation of the screenings and launder water within them. This method of screenings washing means that a permanent pressurised washwater system is not required. By knowing the volume of the reception hoppers and the amount of launder water present, we calculated the level within them that when reached initiates the closing of the knife gate valve within the launder. This means that the next WAP® SL in the sequence starts to fill whilst the 'duty' unit processes the screenings and launder water. However, we expect that this sequencing will only be required in exceptional circumstances.

All three WAP® SL wash presses discharge washed and cleaned screenings into specially designed compactor skips to optimise all the space within them and reduce the number of overall skip movements. Filtrate from the WAP® SL Wash Presses is discharged to local drains.

Fine screening plant

For this section of the works HUBER designed, manufactured, installed and commissioned 4 No. 45° **HUBER Belt Screen EscaMax®** 6 mm perforated plate screens.

These screens operate on a duty, assist, assist, standby basis and were selected and designed to ensure that the velocity through the perforations does not exceed 1.2 m/s whilst maintaining good channel velocity at peak flows.

One of the major challenges was around the angle at which the screens should be installed. However, we were able to convince the client and the contractor that installing the screens at 45° would provide them with far more benefits than if installed at the standard angle of 60°. In our opinion, it would have been unwise to compromise on the screens being able to remove the predicted peak screenings loading of 26.42 m3/hour, and installing them at 45°was absolutely necessary to achieve this. Both the client and main contractor showed a real level of maturity during discussions about this and the hydraulics relative to both sets of screens and the loadings associated with the screenings handling plant.

Fine screens screenings handling system

HUBER Belt Screen EscaMax®, 6 mm perforated plate screens

Each **EscaMax®** screen discharges into a stainless steel common launder designed and installed by HUBER. The launder and each of the **WAP® SL** 12v wash presses are designed the same as the plant serving the **RakeMax®** coarse screens and operates in the same manner.

Sludge treatment facility upgrade

HUBER also supplied, installed and commissioned 2 No. of the well-established **Ro3 sludge acceptance screens** on this project.

The ROTAMAT® Ro3 sludge acceptance plants are designed and built as a packaged item of plant, but at the heart of every solution is the **ROTAMAT® Ro1 fine screen.** Manufactured completely in stainless steel, it provides high removal efficiency, low head loss as well as longevity of service.

The ROTAMAT® Ro1 fine screen, with its rugged construction is cleaned by fully engaged rake tines passing through the bars of the screen that capture the solids. The integrated screenings press transports the screenings out of the tank, dewaters, reduces volume and finally discharges the treated screenings into a skip. In addition, the screenings are washed and the press water is returned downstream of the screen. As a result, the screenings are clean and can be disposed of safely.

Fine screens low level launder and WAP® SL 12v wash presses

The entire screening process takes place in a closed system avoiding odour annoyance, but the machines can be connected to odour control systems when required. The efficiency and rugged construction is able to cope with throughputs up to 230 m3/h. The **ROTAMAT® Ro3 sludge acceptance plant** is the best-selling machine of its type in the UK. Compact construction, together with intelligent technology ensure reliable and continuous operation day after day, year after year.

Dale Foster - Area Manager for HUBER Technology:

"Prior to receiving the contract from the main contractor there were many hurdles to jump. Some of these were around challenges to the then current Yorkshire Water asset standards. As anyone who has had to do this will attest, this is never the easiest or quickest thing to do. However, once alternatives that deviated from current standards were appraised, having been backed up by compelling evidence, the decision relayed by the contractor via the client was swift, clear and decisive. As stated previously, the client and MMB, the main contractor, should be congratulated for the maturity shown throughout the process of delivering this project.
We are confident that the equipment supplied will provide the end user with a significantly improved and reliable inlet works that will benefit the downstream processes and the Ro3 sludge screens will work tirelessly, but reliably in a very harsh environment. This is a flagship site for Yorkshire Water and we are proud of our contribution towards the significant upgrade of the works"

ROTAMAT® Ro3 sludge acceptance plant installation

Productos afín:

- HUBER Reja de gruesos RakeMax®
- HUBER Prensa con lavado de residuo WAP® SL
- HUBER Tamiz de banda EscaMax®

Soluciones afín:

- Soluciones HUBER para el pretratamiento mecánico

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