



## CASE STUDY

### SinkabergHansen Salmon Factory installs Best Available Technology

Stricter environmental requirements require SinkabergHansen to install Best Available Technology in 2022

When manufacturers and technology suppliers join forces magical things happen. SinkabergHansen was to build their new salmon factory on Marøya in Nærøysund, Norway. The municipality contacted HUBER to look at solutions threatening the effluent from the new factory with a focus on the new Best Available Technology (BAT) requirements that were to come. Working together, water and sludge samples were analyzed to determine which technology would achieve the highest treatment levels.

#### The Existing Facility

SinkabergHansen had a single fully functional factory for slaughtering salmon, but on a smaller scale and with limited cleaning of the processing effluent. The existing pre-treatment consisted of a belt screen that removed particles bigger than 350 µm followed by a "grease separator". The grease separator involved only a holding tank where fat and liquid were separated based on residence time. In practice, the belt sieve and the grease separator removed very little from the effluent stream. The poor removal rates impacted the following treatment stage and unacceptable amounts of blood and particles were discharged.



#### Finding a Solution

Before HUBER presented a solution, it was critical to understand the characteristics, qualities and quantities of the wastewater. The characterization was made by discussion with the processing equipment suppliers for the processing upgrade together with data from the existing slaughterhouse, washing cycles, chemical use

etc. Combining the values for the

load distributed over hours, day and weeks and processing seasons, HUBER was able to provide solution based on the best possible information.

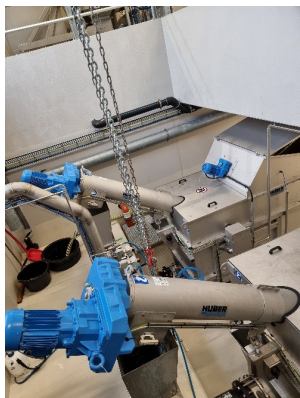
#### Step 1: Coarse Screening

The factory collects all processing, wash-down and other streams into a single gravity discharge. This discharge is strained with 3mm perforated plate screen to protect pumps and reduce the solids load for following treatment steps. Screening is achieved by two HUBER RPPS screens. The RPPS screens are tank mounted allowing gravity flow through the units. Particles larger than 3mm are removed, dewatered and pumped to a silage tank.

The HUBER RPPS is a drum screen with a 3mm perforated steel plate, the waste stream flows from the inside and out, removing all particles larger than the screen opening. The HUBER RPPS is equipped with automatic high pressure cleaning. The high pressure cleaning is achieved at 120 bar and minimizes manual cleaning. The sludge that is taken is thickened to approximately 4-6% TS before it is discharge into a sump and pumped to a sludge holding tank. The screened water is pumped to a larger buffer tank with mechanical stirring so that it is as homogeneous as possible for the next stage of treatment. At SinkabergHansen's new factory, they are equipped with two HUBER RPPS screens for 100% redundancy. This ensures the factory can maintain operations and decrease processing downtime.

#### Step 2: Flotation with Chemical Addition

The screened effluent is retained in the buffer tank and continuously mixed to equalize the wastewater quality. Once the buffer tank reaches a certain level, the waste is sent to the HUBER HDF – dissolved air flotation system (DAF). The effluent is pumped through a pipe flocculator. Wastewater parameters including pH are measured in the pipe flocculator. The DAF is equipped with a HUBER DigiDose automated chemical dosing system. The DigiDose analyses multiple wastewater parameters in real-time and adjusts the chemical and polymer addition accordingly. By adjusting the precipitant and polymer addition in real time chemical consumption is reduced to the minimum required for



optimal performance. This optimizes the removal rates and produces clean and clear water that is sent to final polishing. The clear water is easily disinfected and ensures that no harmful particles are discharged into the sensitive marine environment.

Huber HDF Flotation User dispersion water in the cleaning process together with unique design details, we ensure a stable operation and degree of purification. A partial current is taken from that already cleaned the water that is pumped via a dispersion pump and is saturated with microbubbles of air before this the dispersion water is carried in and mix together with the inlet water that is flocculated in the tube flocculator. The microbubbles are oppositely charged than the herds and sticks to these and lift them up to the surface. On top of the entire Huber HDF there is a creator who continuously scrapes this slammed away and this is then pumped to a mud storage with agitation to hold this as homogeneously as possible within the dewatering. It cleansed the drain is now clear water that can be disinfected more easily with significantly fewer resources.

The previous treatment process in the existing facility used only a single strainer and the result was that all the blood passed to the facility outlet. The existing strainer removed approximately 0.5-1 m<sup>3</sup>/d of screenings. With the new DAF system 30m<sup>3</sup>/day of flotatae sludge is produced. This sludge is the result of precipitated phosphorus, protein, blood and solids. The flotatae sludge has a thickness of 5-7% TS and is well suited for the further dewatering step. The additional benefit of the DAF system is the site reduction in phosphorus of >90%.



### Step 3: Flotatae Sludge Dewatering

Once the new treatment process had been in stable operation the facility chose to investigate sludge dewatering. Sludge dewatering reduces hauling cost and sludge volume created from the high DAF removal rates. Flotatae sludge samples from the DAF were analyzed to find the optimum polymer and correct polymer dosing rates to produce the desired dry TS performance. HUBER provided a pilot Q-Press unit to demonstrate the dewatering performance. The containerized pilot allowed the facility to see the equipment in operation and see the dry sludge cake for themselves. It is likely that this sludge will form part of a larger one process

and be dried to >90% TS and further processed by pyrolysis and end up as Biofuel.

The HUBER Q-Press is a dewatering screw press that dewateres the flotatae sludge from 5% TS up to approx. 25% TS in one step. The Q-Press's 5HP motor is energy efficient and gently dewateres the sludge



while maintaining excellent filtrate quality. The DAF sludge is pumped from sludge storage using eccentric screw pumps and polymer is added to our IPM, a VFD driven mixer. The IPM Mixer blends the polymer into the sludge in a way that reduces polymer consumption and ensures the highest %TS Cake is produced. After the sludge has been mixed with polymer, it is fed into a pipe reactor where the correct residence time is obtained before entering the Q-Press. The free water is pressed from the sludge and exits the wedgewire basket and out of the Q-Press via gravity. The retained sludge is transported by an internal auger that applies mechanical forces to the sludge, achieving the desired %TS output. The HUBER Q-Press is unique in that the auger and wedgewire basket are inclined, not horizontal. This allows the press to utilize gravity in the first phase of thickening and also ensured that wet sludge is never discharged out of the screw before the sludge is fully dewatered. HUBER has delivered the Q-Press to SinkabergHansen and they are now in the process of constructing a new dewatering building. It is expected that the complete facility will be in operation by summer 2023.

### From SinkabergHansen

"SinkabergHansen has designed this ourselves together with HUBER and has had a good experience with the collaboration. HUBER has been professional throughout the project and helped us find the best solution based on onsite testing and laboratory tests carried out in their own lab and externally. Together we have created a treatment plant that we are very proud of and we see that we are getting a lot of attention from authorities and others in the industry. Our experience indicates that HUBER can do this well and has a long experience with wastewater treatment from industrial wastewater. It is important to form a good picture of the total need as early as possible and ensure that you dimension the plant by a good margin and possibilities for expansion if production were to increase."

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For more information on this HUBER industrial solution, please complete the inquiry form and tell us about your project at [www.AskHUBER.com](http://www.AskHUBER.com).