

New plant for sewer grit treatment with process water recycling

In 2001, the company Bolliger & Co. started to operate at Grenchen in Switzerland a plant for the treatment of sink pit contents that processes about 5,000 t of raw material per year. Some of the treated material is reused as secondary building material. Due to the good experience they have gained with this plant and in view of the huge market potential in the field of sink pit content treatment the company decided to invest into another plant. On 1st May 2010, the first recycling plant for sink pit contents in the Swiss canton Bern was opened at Aarberg. An innovative treatment concept with an optimised use of energy was developed in cooperation with Bolliger. This concept included the same HUBER machine types that have proven their efficiency in the Grenchen project. The new recycling plant at Aarberg is designed for the acceptance and processing of liquid and predewatered sludge from sink pits and road sweepings.

Layout data (raw material in tons):

1.000 t/a road sweepings
7.000 t/a predewatered sink pit contents
1.500 t/a liquid sink pit contents

The aim of the collected material treatment is its separation into the following fractions:

- Gravel / stones / material > 25 mm (washed)
- Gravel / grit 0.2 - 25 mm (washed for reuse)
- Organic / plastic materials
- Sludge

The materials resulting from separation into fractions can be recycled or reused but, most of all, the material volume for disposal is reduced.

- Material acceptance
- Grit treatment / fractionation
- Process water treatment
- Sludge treatment



Smart pump technology arrangement to ensure easy access for maintenance



HUBER Wash Drum RoSF 9 with two subsequent HUBER Grit Washer RoSF 4 units, coarse material washer, ROTAMAT® Rotary Mesh Screen RoMesh® for organics removal and compaction

Material acceptance

The input material, consisting of road sweepings and predewatered sink pit contents, is fed into the system's acceptance and feed tank and mixed by a bucket loader. Due to seasonal variations and different catchment areas also the composition of the delivered raw material can vary greatly. That is why the mixing of material is necessary to ensure a constant plant operation. The liquid materials are at first passed through a 60 mm bar screen to remove coarse matter.

The liquid phase flows then through a HUBER ROTAMAT® Micro Strainer Ro 9 with 6 mm holes from where it is discharged to one of the two acceptance tanks equipped with stirrers. The separated solids are discharged to the acceptance tank with the rest of the material. Also the drainage water from the acceptance point for the liquid raw materials is pumped into one of the two acceptance tanks.

Grit treatment / fractionation

The special feature of this installation is that a fully automatic crane feeds the material to be treated into a dosing station, the HUBER ROTAMAT® Grit Treatment System RoSF 7, from where the material flows by gravity

without the need for any additional conveyors or pumps. This significantly reduces the energy demand and wear of conveying units during the process.

The equalised mixed fraction (4-6 t/h) is passed into the HUBER ROTAMAT® Wash Drum RoSF 9 where 25 mm screening takes place and material < 25 mm is washed out of the coarse material fraction. The grit-water mix from the underflow of the Wash Drum flows by gravity via a chute into the two subsequent HUBER ROTAMAT® Grit Washer RoSF 4 units. A static magnet removes metal parts while the mix is flowing through the chute to protect downstream equipment.

The capacity of the two grit washers is approx. 3 t grit / solids per hour. They wash the grit, remove organics, classify and dewater it. Grit washing takes place in a fluidised sand bed that is stirred and kept in suspension by a rabble rake device. Upflowing washwater lifts the separated fine fraction and lighter organic material beyond the sand bed from where these are discharged via the organics outlet and overflow.

The separation grain size is 0.2 mm with a separation efficiency of > 95%. The aim of < 5 % loss on ignition in the washed grit is reliably achieved by the HUBER ROTAMAT® Grit Washer RoSF 4. The 0.2-25 mm grit/gravel mix is discharged at intervals, dewatered statically and

discharged into a tank. The floating organics and fine fraction are discharged along with the water flow. Along with the oversized grain (material > 25 mm), the overflow from the grit washer flows into a coarse material washer where high-intensity washing with wash water takes place and powerful turbulences are generated by means of compressed air. The result from this process is a washed coarse material fraction > 25 mm and a wash water phase with a high organic load. The wash water flows into the subsequent 2 mm HUBER ROTAMAT® Rotary Drum Screen RoMesh® that separates the organics and discharges them to a press that dewateres the material to approx. 35 % DR.

The filtrate is added to the rest of the screened wash water flow and flows along with the wash water into circulation water tank, which serves as water storage tank but also as settling tank for the removal of most of the fine minerals. A pump delivers the sediments from the circulation water tank into a separate tank where they are thickened by adding flocculants.

The wash water required for preliminary washing in the HUBER ROTAMAT® Wash Drum RoSF 9 at the beginning of the treatment process is taken from the clear phase in the circulation water tank. Due to the use of circulation water after the removal of most of the mineral material the wear of pumps and spray nozzles is significantly reduced in contrast to previous process variants that used the water directly after screening.

Process water treatment

The overflows of wash water from the sedimentation tank and the excess of clear water from the circulation tank flow by gravity into the HUBER Dissolved Air Flotation Plant HDF where the rest of the flocs and suspended particles are removed from the wash water through the generation of micro bubbles.

The wash water is collected in a tank; it has now the quality required for the washing process in the HUBER ROTAMAT® Grit Washer RoSF 4. This quality of water is further intended to be used to wash trucks, as wash water for the spray nozzle bar of the HUBER ROTAMAT® Rotary Drum Screen RoMesh® and as service and wash water in the plant area. The generated flotote and sediment sludge is passed on to the subsequent sludge treatment line while the excess of water from the complete system is discharged to the public sewer system.

Sludge treatment

All sludges generated in the different process stages (thin sludge acceptance tank, sedimentation tank, flotation plant) are collected in two storage tanks that serve as

buffer and mixing tanks in which the collected sludges are mixed and dewatered via a decanter to > 60 % DR. A screw conveyer delivers the dewatered sludge to a storage bunker from where the sludge is loaded onto trucks by wheel loaders and transported to a landfill.

Electrical control

The electrical control system for the entire plant is designed for fully automatic plant operation. Operating staff is only required for raw material feeding and disposal of treated materials. In contrast to conventional plants the electrical control system could considerably be simplified as a large part of the control equipment for pumps could be omitted and due to the smart spatial arrangement of all plant components.

Bernhard Ortwein Business Unit Industry



HUBER Dissolved Air Flotation Plant for process water treatment