



MILK OF LIME INSTALLATION

Slurry Solution for the Port of Antwerp

In the Port of Antwerp, dredging mountains of slurry is required to ensure sufficient depth and space for shipping. A mechanical dewatering facility helps. With the design and manufacture of a milk of lime production and metering installation, RIJKERS Process Technology made an important contribution to the successful slurry conditioning process.

The Flemish government and the Antwerp Port Authority invested in the AMORAS installation, which is a sustainable solution for the storage and processing of maintenance slurry dredged from the harbour. The acronym AMORAS stands for 'Antwerpse Mechanische Ontwatering, Recyclage en Applicatie van Slib' (In English - the Antwerp Mechanical Dewatering, Recycling and Application of Slurry). The total project is worth 482 million Euros.

Before the slurry is dewatered by pressure filters, milk of lime is added to the dredged material. This results in flocculation, meaning the dry components are easier to separate from the water-rich mixture. This process is called slurry conditioning. This is necessary in order to make the filter cakes stackable. To ensure the conditioning process is reliable the client called on the expertise of RIJKERS. This was based on recommendations from the two largest suppliers of lime: Carmeuse & Lhoist.



Excellent knowledge of the process

Conditioning

RIJKERS designed and delivered a milk of lime production and metering installation with the desired dosing rate of 50m³ per hour, plus a water storage tank. Thanks to our extensive knowledge of the process, we were able to calculate the whole concept and demonstrate its feasibility in advance. This is also true for the peak load of 200m³ per hour when all twelve filter presses start up simultaneously. The installation is fully redundant to ensure maximum reliability.



The installation

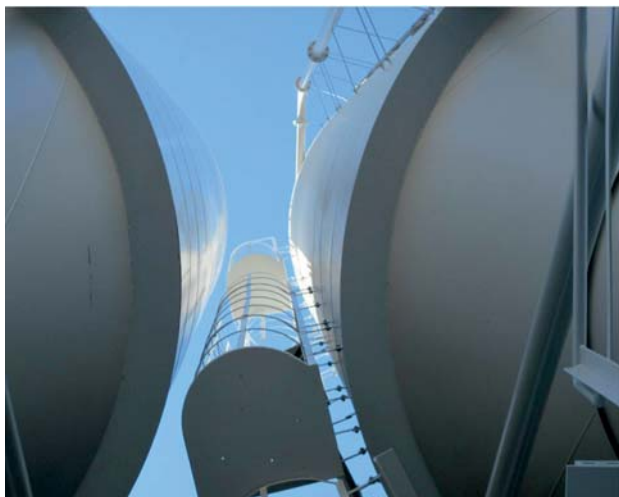
The unslaked lime is stored in two large silos, each with a capacity of 250m³. From here, the lime is fed into the two reactors at the AMORAS installation via two metering screws. Both have a capacity of 15m³. Therein, batches of unslaked lime are suspended in water to about 25% solids. This results in an exothermic reaction. The vapours are purified through a scrubber. The suspension is then pumped into the 200m³ buffer tank, where the solution is diluted to 15%. From here, the diluted milk of lime travels through two, 275m long circulation pipelines to the correct metering points. This is followed by injection into the slurry pump suction pipe, which transports the milk of lime to the filter presses.

AIRSWEEP®

In order to ensure a reliable lime outflow, the two large storage silos are equipped with the AIRSWEEP® aeration system. This is a cost effective way to resolve flow problems caused by rat holes, bridging or product fouling. The AIRSWEEP® has only one moving part: the piston with a dust-proof nozzle. This is opened rapidly by a powerful blast of air and is quickly closed again with a very strong spring. As a result, no material can be fed back into the piston. The AIRSWEEP® ensures unobstructed outflow and prevents both production waste and labour-intensive unblocking, knocking or blowing. For more information: www.airweep.nl.



Excellent operation



Maintenance contract

Since delivery, RIJKERS have also been responsible for the maintenance. Once a month, our service technicians carry out inspections and preventative maintenance on the AMORAS installation. The client will then receive an inspection report. Additionally, our emergency service is available 24 hours a day, 7 days a week. In case of breakdown or emergency, we can be on location within 24 hours to solve the problem. Fortunately, this is rarely required. In the first years after the handover there were a few faults and they were quickly resolved. Meanwhile, the AMORAS installation has now been running for several years without failure. The client is pleased with RIJKERS and has decided to extend the initial period of the maintenance contract.

Filter cakes

The thickened slurry is pumped from the consolidation ponds, with as little water as possible, into the mechanical dewatering system. At that time, the RIJKERS milk of lime production and metering installation comes into action. Our installation takes care of the slurry conditioning. The end-result is stackable filter cakes.

Pumps deliver the conditioned slurry to the filter presses. More excess water is squeezed out under enormous pressure. The filter cakes, with a dry matter content of more than 60%, are sent to the adjacent disposal facility via conveyors. The filtrate is discharged back into the pond, before undergoing further treatment in the water treatment plant.

Biological water treatment

The biological water treatment plant processes up to 250m³ of water per hour. Once the water is purified, part of it returns as process water to the AMORAS installation. The rest ends up in the canal dock. Therefore, the AMORAS installation provides an innovative and sustainable answer to the slurry problem in the Antwerp port area.



The facts

- Commissioned by: Flemish government
- Main contractors: Jan De Nul NV, Dredging International NV, Envisan NV & DEC NV
- Design, engineering and supply
- Average metering capacity: 50m³/h
- Surge capacity: 200m³/h
- Reliable lime outflow thanks to the Airsweep® aeration system
- Two silos of 250m³
- Two reactors of 15m³
- Buffer tank of 200m³
- Complete loop with metering points
- Installation runs 24/7
- Project value: 1.5 million Euro (total project costs for AMORAS: 482 million euro)
- Maintenance contract since completion



Speciality

Four large dredgers together represent about 90% of the world market. It is rare for them to purchase equipment, more often they develop and build it themselves. Only if the installation is highly specialised and there is sufficient confidence in the supplier, is a decision to purchase made. For the entire AMORAS installation, only the milk of lime installation and filter presses were purchased from external suppliers. The main design of the milk of lime installation was provided by the client and then adapted by RIJKERS to ensure optimum performance.

Backup installation

In order to run no risks with respect to the continuity, the main four contractors developed and built themselves a backup installation for the dewatering of slurry. This works on the basis of polyelectrolytes. Due to the excellent operation of the milk of lime installation that was built by RIJKERS, the polyelectrolyte installation has remained unused for a long time.

RIJKERS

It's all about details. 

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