SEEPEX.
An Ingersoll Rand Business

LONG DISTANCE PUMPING AT MINIMUM COSTS

APPLICATION DETAILS

- Dewatered sludge, 29 % dry solids content
- Long distance pumping (250 m)
- Conveying capacity: 1.5-2.5 m³/h

KEY SPECIFICATIONS

- Maintain in Place
- Low energy consumption
- Long service life of all pump components

BACKGROUND

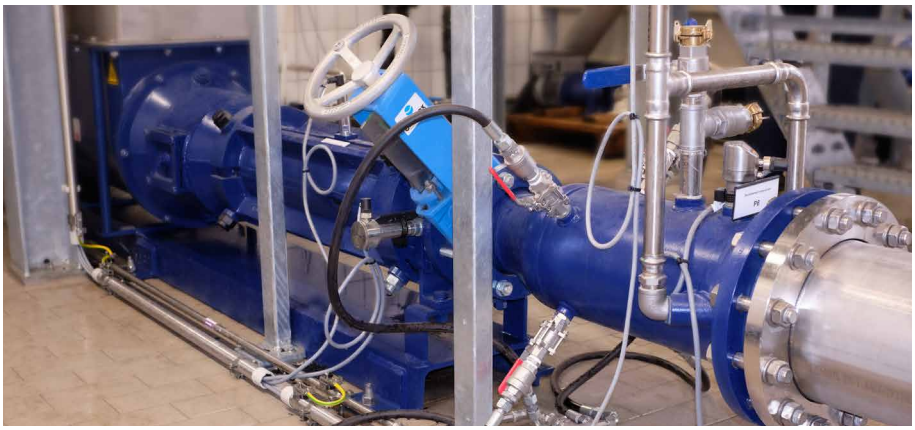
Located near Hanover, the Stadtwerke Sehnde treatment plant processes wastewater for around 65,000 residents in the area. They are responsible for 274 km of sewage system, 34 pumping stations, 57,000 square meters of rainwater retention basins and 10,700 m of trenches.

Due to a new sewage sludge regulation from 2017, the sludge had to be treated before it could be spread onto the fields. At Sehnde, a decanter centrifuge was installed to dewater the sludge before it was trucked to an incineration plant. However, the concrete sludge silos were 250 m away from the dewatering station. Stadtwerke Sehnde initially used a piston pump to convey the highly viscous dewatered sludge over the long distance.

TASK AND TARGET

The piston pump needed very high pressures of around 70-80 bar, which in turn required a high motor power input of 25 kW leading to high energy and spare parts costs. Despite the high conveying pressure, large amounts of lubricant (ca. 12%) had to be added to enable sludge transport. This further increased costs, both for the lubricant and its disposal. Simultaneously, maintenance was difficult and time-consuming and could only be completed by external service providers.

This resulted in high maintenance costs for the piston pump of around € 15,000 per year, and longer downtime due to the external support required. Sehnde plant operators contacted SEEPEX with the request to simplify maintenance and save costs in the long term – on energy and lubricant consumption as well as on maintenance.



SEEPEX solution for Sehnde: Smart Air Injection

AN INNOVATIVE PACKAGE

COST SAVINGS

TOTAL OPERATING EXPENSES REDUCED UP TO 60 %

SEEPEX PRODUCTS

Smart Air Injection system:

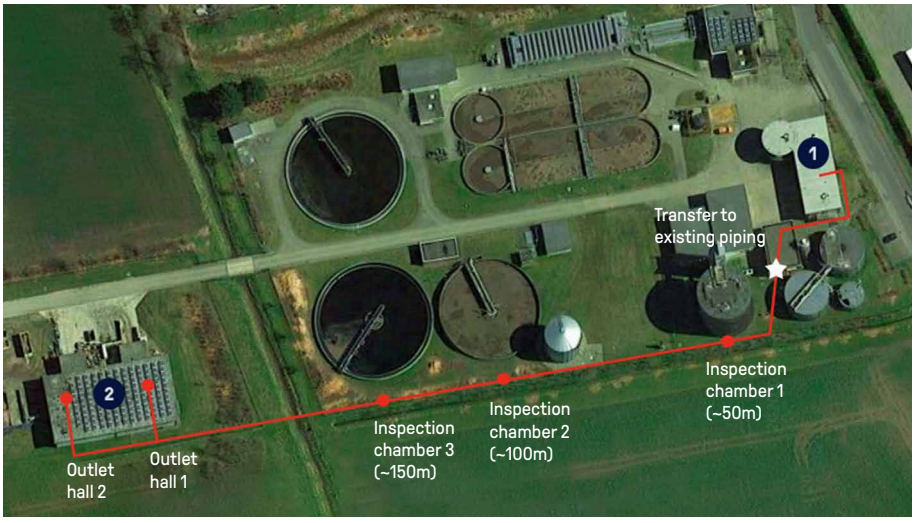
- BTHE 70-6LS (7.5 kW)
- two dosing pumps (0.55 kW)
- SAI control unit
- 4 m³ compressed air tank
- 22 kW compressor

SOLUTION

Our experts discussed particular site conditions with the operators and conducted additional tests (camera inspection) in order to better understand their needs. Tests were necessary since the existing old pipework, with 250 m between dewatering station and silo, had to be re-used. Finally, we offered our customized Smart Air Injection (SAI) system, an innovative technology that combines the outstanding features of progressive cavity pumps with a pneumatic conveying system.

The customized system for Sehnde was equipped with an open hopper pump with Smart Conveying Technology (SCT), two lubricant injection pumps, an air injection unit and the SAI control unit. On the one hand, SCT simiplifies maintenance, enabling one local service technician to perform full pump maintenance in less than one hour. Its two-piece Smart Stator and quick release Smart Rotor leave the joint in place, eliminating the need to remove the pipework.

On the other hand, the innovative technology of pneumatic dense phase conveying, including the supportive lubrication, significantly reduces frictional losses inside the pipework, thus enabling a pipeline pressure of only 2-3 bar. As a result, the service life of all pump and pipe components is extended and energy costs, including those for compressed air, are reduced. Furthermore, it was possible to reduce the lubricant consumption compared to the initial piston pump solution although the old pipe work remained in place. This reduced operating costs for lubricant and its disposal. In fact, our SAI system generated savings of 88 % in maintenance costs, 54 % in energy costs and approx. 50 % in lubricant costs in one year of operation. Accumulating annual savings, it was possible to achieve a total reduction of approx. 60 % in operating expenses (OpEx). After two years of continuous operation of the SAI systen, no pump spare parts were needed.



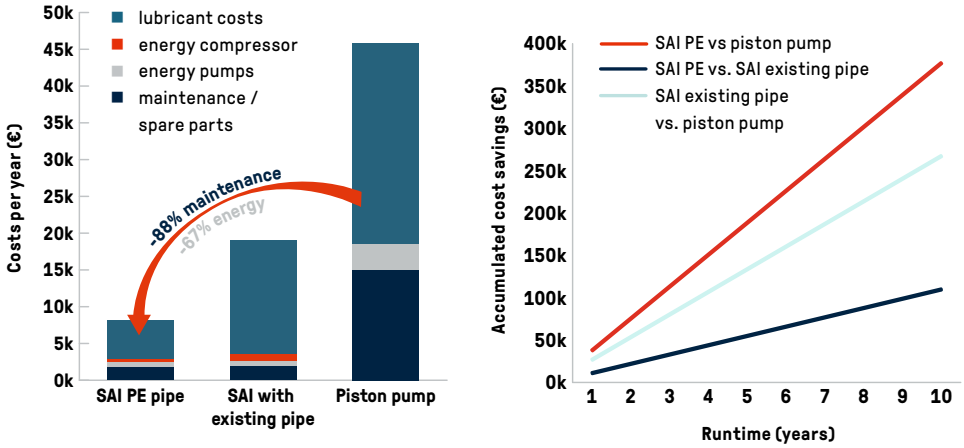
Long distance pumping at Sehnde

ADDITIONAL SAVINGS

The above-mentioned savings were achieved even though the old steel piping had to be reused. This caused the SAI system to run in single-plug operation instead of multi-plug operation with up to four in a series conveyed plugs, which is slightly less energy efficient. Exchanging the old steel piping for a new plastic pipe (PE) would additionally increase the energy savings from 54 % to 67 % and lubricant savings from 50 % to 80%, which would result in a total reduction in OpEx of up to 80 %.

BENEFITS

- Less energy consumption
- Reduced maintenance costs
- Reduced downtimes
- Reduced lubricant consumption and disposal costs



Graphs showing overall cost savings between SAI and the piston pump.