47th year
No. 4 - October 2017

zukunft seit 1909 denken

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Company info

04|17

Information for the operating personnel of wastewater treatment plants

Cleaning wastewater pressure pipes pays off

The Pforzheim municipal sewage company has a catchment area of 2400 ha with 122,000 inhabitants. It operates 520 km of public sewers and 2.7 km of wastewater pressure pipes. While the gravity sewers are cleaned regularly, our wastewater pressure systems have been less in focus. One occasion to change this was the DEC 2016 pressure drainage congress in Weimar on April 13 and 14, 2016. The IKT (Gelsenkirchen) organized this specialist conference to provide orientation in dealing with wastewater pressure pipes. Various cleaning methods were discussed here. Among others, Hammann GmbH had the opportunity to present its patented "Comprex" impulse flushing process.

The Pforzheim municipal drainage system was very interested in testing this cleaning process and there was also a need to clean a wastewater pressure pipe. The time had come in August 2016. We had chosen the 450 m long and 35-year-old cast iron pipeline from the Enzstraße wastewater pumping station to the gravity sewer in Fritz-Neu- ert-Straße as the cleaning object. The technical cleaning unit from Hammannn was located on a forecourt near the pumping station for the cleaning (Figure 1). A pressure hose is the connecting piece between the technical cleaning unit and the wastewater pumping station. The pressure hose is connected to the wastewater pressure pipe above the wastewater pump (Figure 2).

Cleaning is carried out with accumulated wastewater, to which compressed air is added in pulses. This causes air and water blocks to form in the wastewater pressure pipe. They flow through the pipe at high speed and tear off deposits from the pipe wall. Figure 3 shows these processes schematically. In the impulse flushing process, the compressed air pulses are generated in such a way that the forces for detaching the deposits are optimal for the wastewater pressure pipe to be cleaned.

Fig. 1: The technical cleaning unit at the pumping station

Fig. 2: Feed point via pump

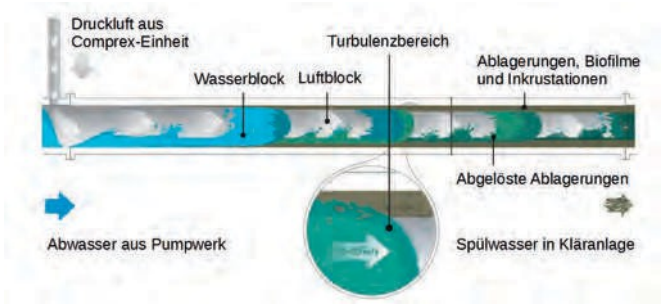

Fig. 3: Schematic representation of the cleaning process [1]

The detached, mobilized particles are discharged by the waste water flow at the expansion point and transferred to the gravity sewer (Figure 4).

Fig. 4: Discharge into a gravity sewer

The initial aim of the cleaning was to clear the wastewater pressure line completely, i.e. to restore it to the condition it was in when it was commissioned. It was therefore intended to ensure operational safety. The pumping station in Enzstraße is equipped with the latest EMSR technology. All the information collected is collected at the Pforzheim sewage treatment plant, where it can be documented and evaluated.

The idea was to make a comparison with the collected data: How have the operating conditions of the pump changed as a result of cleaning the wastewater pressure pipe? Are there cost savings in the operation of the pump? Do the cost savings possibly amortize with the costs for cleaning?

We recorded the following data on the day of cleaning: Flow rate before cleaning: Q = 43 l/s Flow rate after cleaning: Q = 50 l/s Current consumption before cleaning: I = 61.5 A Current consumption after cleaning: I = 68.0 A

Around 588,000 m³ of water is pumped into our Enzstraße wastewater pumping station every year.

If the respective pump running times, electricity consumption and electricity costs are set in relation to each other, the following annual operating costs result:
before cleaning: 34 796 €/a
after cleaning: 33 056 €/a

The savings as a result of cleaning amount to € 1740 per year. We had not expected this positive result. The cleaning costs have paid for themselves after just over a year.

Conclusion

The cleaning carried out has not only improved operational safety, it also pays off. The measure is in line with the central concern of our own municipal

Pforzheim - low operating costs with maximum efficiency in order to keep wastewater charges at a stable level.

Cleaning as part of maintenance is described in the draft of worksheet DWA-A 113 [2].

In addition to pigging, the flushing process was of interest to us. In contrast to pigging, the "Comprex" impulse flushing process does not require a pig sluice. A feed option after the pump is sufficient (Figure 2). As only compressed air and waste water are used for cleaning, no pig can get stuck and cause additional problems.

The cleaning method is also very gentle on pipes, which is a great advantage, especially for older pipes.

In the case of very thick deposits, the intensity of cleaning can be controlled so that the sewer or sewage treatment plant is not overloaded after the discharge point.

Another major advantage for us was the fact that this cleaning process does not require any system downtime. The disposal reliability of the connected properties is not interrupted at any time.

To summarize, we can say that the "Comprex" rehabilitation of our wastewater pressure pipe was the right decision.

We intend to clean more pressure lines with the system.

Literature

[1] http://comprex.de/kommunal/comprex-reinigung-von-ab-water pressure pipes

[2] Worksheet DWA-A 113: Hydraulic dimensioning and performance verification of wastewater pressure systems, draft, Hennef, 2016

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BI

Renewal of a section of the lake pressure pipe in Lake Traunsee

Lake Traunsee, with an area of 24.5 km, is located in Upper Austria and at 191 m is the deepest lake in Austria. The municipality of Traunkirchen and the market town of Altmünster discharge their wastewater via a joint lake pressure pipeline through the Traunsee to the wastewater treatment plant of the Traunsee Nord clean water association. As this involves a wastewater volume of around 1500 m³ per day, two DN 300 wastewater pipes were laid next to each other in the lake over a length of 2.5 km when it was built in 1970. This was so that at least one pipe could be used to maintain operations in the event of an emergency.

Of course, nobody could have expected that it was not an operational fault that was responsible for the replacement of a section of the pressure pipe. But in connection with the ambitious "Stadt Regio Tram" project, there are plans to rebuild the Traun Bridge in Gmunden. The bridge crosses the River Traun, which flows out of the Traunsee. The bridge piers of the new bridge are to be erected near the point where the old lake pressure pipes exit, which is located on the banks of the Traun. The operators of the lake pressure pipeline were therefore forced to reroute the two strands of the sewage pipeline in an initial section and allow them to discharge into the sewer system at another point.

Operating experience over the last few decades has shown that the one or other air cushion (fermentation gases) in obvious high points has repeatedly caused the old pipes in Lake Traunsee to float. To prevent this from happening again in future, the new pipes were laid from the deepest point in the lake at a steady incline to the new outlet shaft on the banks of the Traun. This required, among other things, the installation of a controlled