Condition assessment for flushing and cleaning pipes

By Norbert Klein and Sebastian Immel

Knowledge of the condition of pipelines and systems is of great importance. The new edition of DVGW Code of Practice W 291 describes the condition assessment of drinking water distribution networks as part of flushing measures. The turbidity in the rinsed water serves as a parameter for deposits in sections of the distribution networks. Deposits and in particular loose deposits can impair the quality of drinking water. In addition, solid deposits can constrict pipe cross-sections. As a result, the reduced hydrau- lik caused by deposits impairs the security of supply, especially when increased demand for water is required.

No drinking water is available to consumers while the relevant pipe network sections are being flushed. This is the ideal opportunity to check both the pipes for deposits and the fittings.

with regard to function and cleanliness. The DVGW Code of Practice W 263, which is currently in draft form, provides information on the assessment of hydrants. Faultless hydrants are essential for both hygiene and supply safety.

Two complementary flushing processes

Hammann GmbH wants to face up to the new challenges and is focusing its activities in the municipal sector accordingly. The two flushing methods used complement each other perfectly (***Fig. 1***). In addition to the flushing itself, water suction flushing also enables the condition of pipe sections in the drinking water distribution system to be assessed. Critical network areas can be identified using hot spot analysis and then thoroughly cleaned using the impulse flushing process. With regard to preventive network maintenance, the two flushing methods with their different

***Figure 1**: Units for the condition assessment and cleaning of pipes*

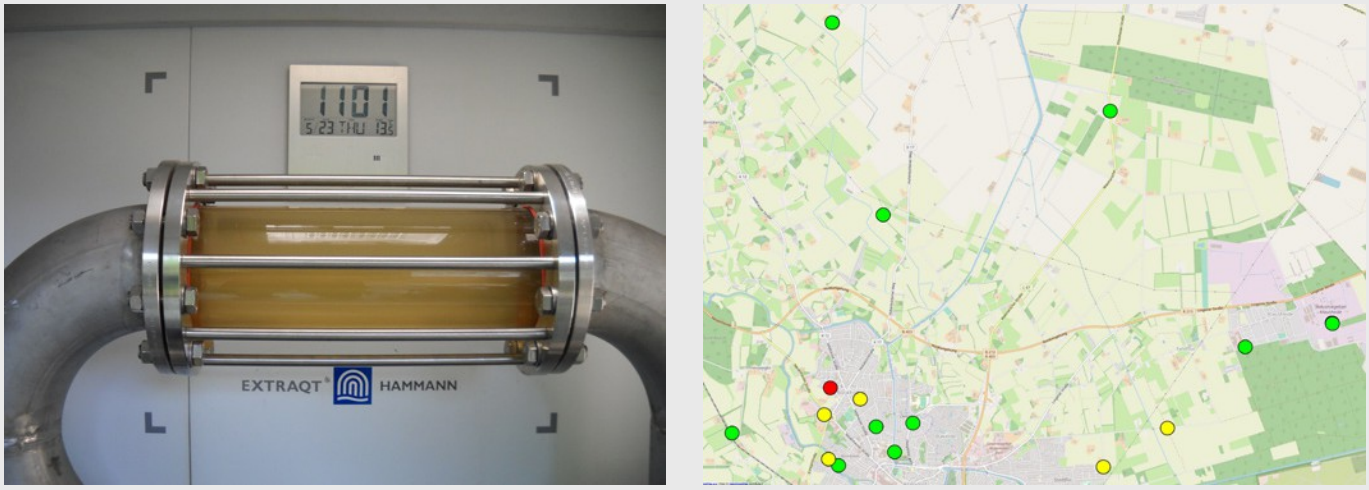

***Figure 2**: Turbidity in sight glass and overview map with hot spot evaluation*

application areas are described in detail in [1], and the combination of pipe network cleaning and valve inspection is also discussed.

Figure 2 shows the turbidity in the sight glass of the water suction unit during flushing at a hot spot in the drinking water network. The software calculates a status value for each section based on the turbidity curve and the required withdrawal quantity during flushing. A traffic light system provides information about necessary follow-up measures and displays these for the operator on an overview map.

In recent years, it has been shown time and again how useful it is for operators and service providers to carry out maintenance measures together. Different variants are possible. The service provider can also take on different tasks depending on the operator's staff availability. The work is thus spread over several shoulders. In this day and age of This is helpful in view of the shortage of skilled workers in order to maintain distribution networks properly and economically. Practical examples with characteristics of the relevant pipe network, a brief description of the measure including personnel costs and recommendations for action based on the measure are described in [1].

Support for network operators

Developments at Hammann GmbH are aimed at providing optimal support to operators of drinking water distribution networks and delivering meaningful information about the measures taken and, above all, the condition of the pipes. The cooperation between the service provider and its subsidiaries Hammann Engineering and Sycotech is setting new standards. Sycotech supplies software for the new tasks, optimizes the operating concepts and portability and takes care of connecting the service provider's and operator's systems. Hammann Engineering integrates these concepts into new and existing ExtraQt and Com

***Figure 3**: Deposits in the sludge pipe of a wastewater treatment plant and stationary Comprex system*

prex units. Hammann Engineering also offers stationary automated cleaning systems for cleaning sludge pipes in sewage treatment plants, for example. ***Figure 3*** shows typical deposits in a sludge pipe that can be avoided with regular cleaning at short intervals. Ideally, this is done automatically with a stationary cleaning system that is integrated into the operator's system control.

New concepts are protected by patents or patent applications. These aim to increase the effectiveness of Comprex cleaning in particular with the help of control systems. This should make it possible to better clean critical, poorly flowing areas in pipelines. These include, for example, upper parts of gate valves, socket areas or branches. Another aspect is to carry out cleaning as efficiently as possible with low water consumption. This requirement is becoming increasingly important in the face of climate change. Efficient cleaning also means conserving resources.

In contrast to drinking water distribution networks, hydraulics have priority for raw water, service water and wastewater pressure pipes. Intensive cleaning procedures are required to maintain these pipelines. Pipe characteristic curves or data on pump running times in relation to the volume of water pumped are used to verify the condition. The hydraulics in wastewater pressure pipes and corresponding measures are described in DWA worksheet A 113. As an alternative to pigging technology, the impulse flushing method helps to maintain raw, service and wastewater pressure pipes. It adapts to any pipeline geometry and does not require any additional equipment such as pigging sluices. Wastewater pressure pipes can also be cleaned during operation with wastewater and Comprex pulses because the treatment plant can dispose of the mobilized deposits [2]. In some well galleries, it is also possible to clean short well pipes during operation if the turbidity produced does not cause any problems during water treatment [3]. New sensors and software are intended to further improve the well-known Comprex technology. Here too, the aim is to carry out cleaning as efficiently as possible.

Literature

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Regulations

- DWA-A 113 "Hydraulic dimensioning and performance verification of wastewater pressure systems" (2020-01)
- DVGW W 291 (A) "Cleaning and disinfection of water supply systems" (2021-12)
- DVGW W 263 (A) Draft "Hygiene in the water supply up to the transfer point to the drinking water installation" (2021-12)

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