CONDITION ASSESSMENT FOR FLUSHING AND CLEANING PIPES

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 restrict pipe cross-sections. As a result, the reduced hydraulics caused by deposits impair the security of supply, especially when increased water demand is required.

During the flushing of the relevant pipe network sections, consumers do not have access to drinking water. This is the ideal opportunity to assess both the pipes for deposits and the fittings for function and cleanliness. 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.

Hammann GmbH wants to face up to the new challenges and is gearing its activities in the municipal sector towards this. 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 method. With regard to preventive network maintenance, the two flushing methods and their different areas of application are described in detail in [1]; the combination of pipe network cleaning and armature inspection is also discussed.

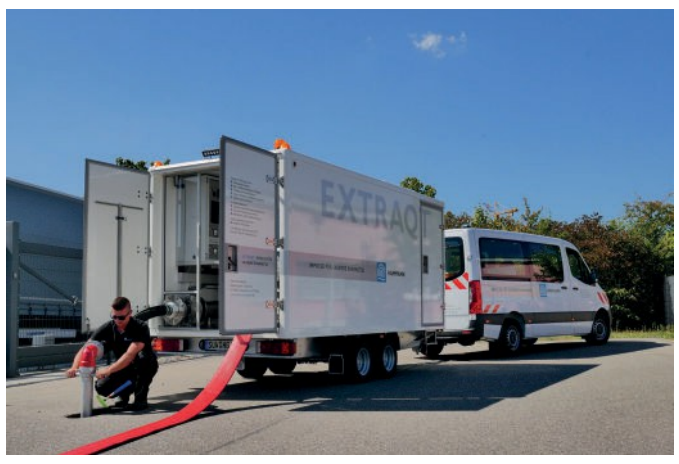

Figure 1: Units for the condition assessment and cleaning of pipes

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 extraction volume during flushing. A traffic light system provides information about necessary follow-up measures and displays them on an overview map for the operator.

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 today's world of skills shortages, this is helpful for maintaining distribution networks properly and economically. Practical examples with features of the corresponding pipe network, brief description of the measure including

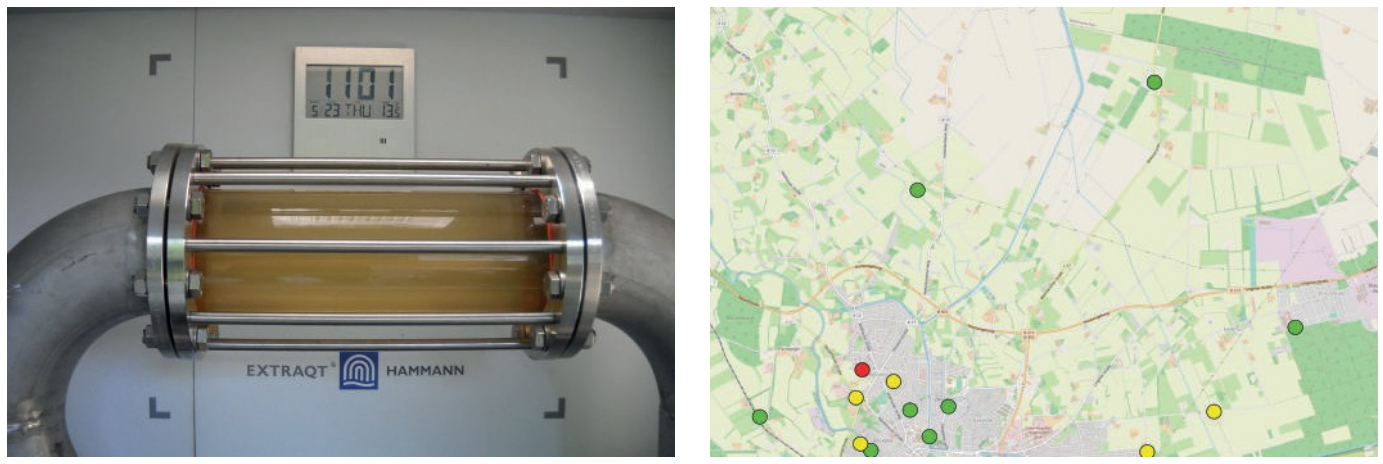

Figure 2: Turbidity in sight glass and overview map with hot spot evaluation

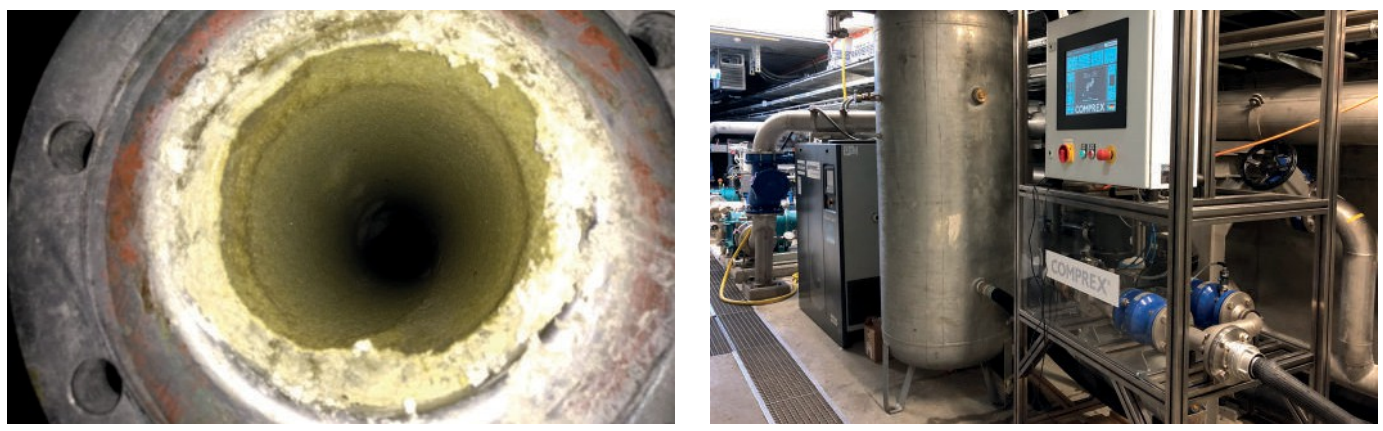

Figure 3: Deposits in the sludge pipe of a wastewater treatment plant and stationary Comprex system

Personnel costs and recommendations for action based on the measure are described in [1].

Developments at Hammann GmbH are moving in the direction of 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 Enginee- ring and Sycotech sets new standards. Sycotech supplies software for the new tasks, optimizes the operating concepts and portability and takes care of connecting the systems of the service provider and operator. Hammann Engineering integrates these concepts into new and existing ExtraQt and Comprex units. Hammann Engineering also offers stationary automated cleaning systems, for example for cleaning sludge pipes in sewage treatment plants. **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 plant control system.

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 pipes. 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 in 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. The impulse flushing process helps to maintain raw, service and wastewater pressure pipes as an alternative to pigging technology. 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 familiar Comprex technology. Here too, the aim is to carry out cleaning as efficiently as possible.

Literature

[1] Klein, N.; Immel, S.; Bröde, Th. (2021): Preventive network maintenance - Two methods for different application areas. In: bbr annual magazine 2021/2022, p. 32-37

[2] Klein, N.: Cleaning wastewater pressure pipes during operation (2016). In: 3R (2016) No. 12, p. 41-47

[3] Immel, S.; Schimmelpfennig, S.; Klein, N.; Utke, C.; Gnirss, R. (2014): Cleaning well galleries and raw water pipes online. In: wwt - Wasserwirtschaft Wassertechnik (2014), No. 1-2, pp. 15-19

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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