Directory

Rolling Stock

Roediger Vacuum GmbH

The Next Generation: Roediger Supply & Disposal Systems with Integrated IoT Monitoring System

High-tech sensors, wireless messaging and signal processing are improving the quality and reliability of train toilet systems.

Whether you're on a short commute or a long journey, the condition of train toilets can make or break your travel experience. If the wastewater tanks in train toilets are not emptied, or if defects are discovered too late, the toilets can become unusable. In the worst case, if several tanks are not properly maintained, the entire train may have to be taken out of service temporarily. Now, a solution is available.

The sensor system used at the pilot project in Berlin

The Train Wastewater Disposal System

Vacuum toilets on trains dispose of their wastewater in on-board tanks that need to be emptied regularly. Trains call at service stations almost every day, fresh water is refilled and wastewater tanks are emptied. However, if a train misses its scheduled service or the pumping process is interrupted, the tanks can fill up during a long journey. In this case, the toilets are out of service during the journey and are shut down. This is an annoying experience for passengers who expect a fully functional toilet service. In Germany, this problem is significant enough that even members of parliament have called for better solutions.

Why is it so difficult to ensure that train waste tanks are reliably emptied? First, it is difficult to ensure that each tank is properly serviced. The train may arrive late at the service station, or staff may not be available at the right time. Another issue is that the wastewater extraction process is difficult to monitor.

Unlike conventional liquids such as fresh water or fuel, wastewater also contains solids and gases. This leads to an uneven extraction process and it does not help that some passengers lose items like glasses, pocket knives or children's shoes in the toilet. Such items end up in the tank and the toilet unit or wastewater tank may need to be repaired in the maintenance depot.

Monitoring of the Emptying Process of Wastewater Tanks

Often the maintenance process in depots is not monitored and recorded at all. If it is, it is done manually with pen and paper or manually entered into an app. Hard-working personnel lifting heavy, wet pipes with gloves have to stop what they are doing to use a piece of paper or a touch screen. Clearly, this process is unsatisfactory, slow and error-prone.

To find a better solution, Deutsche Bahn selected BeST Berliner Sensortechnik GmbH to design an autonomously working sensor system that monitors and evaluates the emptying process of wastewater tanks.

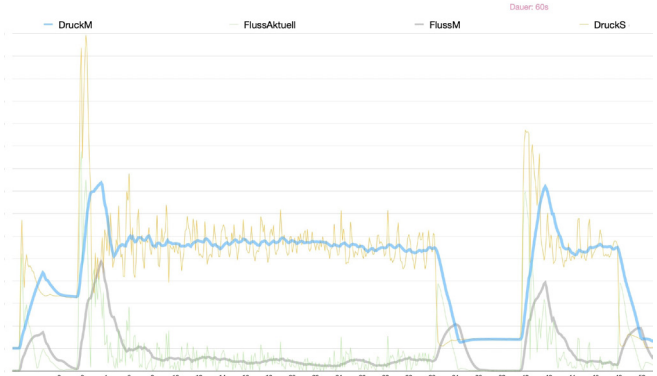
Pilot Project with Deutsche Bahn

In 2021, Deutsche Bahn started a pilot project with BeST. The pilot project involved the development of a complete sensor system that monitors and evaluates every pumping process over a period of several minutes. The wagon and tank are automatically identified by an electronic NFC tag, similar to the touch-to-pay process used with modern bank cards and smartphones. The tank ID is combined with a short report of each pumping operation, which is then sent wirelessly to the train operator within seconds.

After over two years of continuous operation, the pilot project with BeST technology has shown that the wastewater extraction process can be reliably monitored. Tens of thousands of data records have been processed and stored in a database. Any issues during tank maintenance are identified and reported immediately.

Integration into a Fully-Digital Supply and Disposal System

Roediger Vacuum GmbH is an established supplier of vacuum drainage and sanitation systems to the railway industry. The company is known in the industry for its patented Roediger valves and extraction pistols. Roediger supplies sophisticated vacuum systems that transport wastewater around a train service and maintenance depots as required. This requires in-depth knowledge of pressure, water flow and mechanical design.



Recording the parameters of the disposal process using new sensor technology

The new sensor technology can be integrated into Roediger's extraction pistol

With the development of a new generation of extraction fittings in which the sensor technology is already integrated, Roediger is able to supply a wastewater system that combines a state-of-the-art vacuum disposal system with IoT (Internet of Things) sensors and signal processing.

Each wastewater extraction operation is evaluated according to the customer's requirements and quality standards. Train and tank numbers are automatically identified by RFID and the results are delivered wirelessly to the customer's software system.

This ensures that each individual tank is emptied and that each waste water extraction operation is satisfactory, with any problems identified and reported. The whole system is fully transparent and automatic.

With the introduction of this system, trains that are taken out of service due to non-serviced or blocked toilet facilities should be a thing of the past and railway operators can take another big step towards predictive maintenance.

Roediger

For more information contact

Andreas Bayerlein, Roediger Vacuum GmbH
andreas.bayerlein@roediger-vacuum.com

Oliver Völckers, BeST Berliner Sensortechnik GmbH
ov@bestsensor.de

Reliable service at pit stop speed.

Roediger® water & wastewater systems for rail depots and workshops

Freshwater and wastewater management with incredibly short downtimes: This is what we are already providing with the latest vacuum technology for large and demanding train operators worldwide. You too can rely on the perfect combination of service quality and high speed:

- **Potable / freshwater treatment and supply**
- **Preparation and supply of flushing water**
- **Service stations for indoor and outdoor areas**
- **Cleaning service cabinets for interior cleaning of trains**

Roediger® Vacuum Supply & Disposal System. Ultra fast. Outstandingly efficient. Extremely reliable.

Visit us at InnoTrans
CITYCUBE – HALL B 220

Roediger

A brand of
Aqseptence Group

www.roediger-vacuum.com

Roediger Vacuum GmbH
Kinzigheimer Weg 104
63450 Hanau Germany
Phone +49 6181 309-275
E-Mail: info@roediger-vacuum.com