

PipeLine

Rehabilitation with Circular and Non-circular HOBAS® Pipes

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Midnight Relining in Zürich Renovation of Stormwater Sewer with HOBAS® Pipes beneath Zürich Airport, CH

Rehabilitation works at airports count among the technically most challenging renovation projects – especially if they concern pipelines. In late 2013, one of the stormwater sewers DN 2200 at the international Zürich Airport has been relined with HOBAS GRP Pipes over a length of 170 meters.

Serving 196 destinations, the Zürich Airport is Switzerland's "gateway to the world". Each month, around 1.5 million travelers pass through the airport and a five-digit number of freight tons is transported. This performance requires perfect logistics and absolute safety – both on and below the airport premises. "Below" particularly refers to the large dimension sewer mains which ensure a safe discharge of rainwater. Once their condition deteriorates, they are difficult to repair: A new construction in open trench is impossible at airports and the system needs to be ready for operation practically without interruptions. Furthermore, works on runways and the rest of the airfield can only be conducted outside of the airport's flight schedule – thus at night, within a narrow time frame between one day's last and the next day's first flight.

These were the challenges that also had to be faced at the Zürich Airport end of 2013, when a cast-in-situ concrete stormwater sewer DN 2200 had to be rehabilitated due to leakage. The Swiss engineering office SBU sought a minimally invasive and sustainable rehabilitation possibility, which could be realized in short periods of work overnight between 11:15 p.m. and 5:30 a.m. and allowed for an uncomplicated interruption of works in case of rain. Moreover, the loss of cross-section was to be kept to an absolute minimum.



Year of Construction

2013/2014

Construction Time

2 months

Total Length of Pipe

170 m

Product Range

Relining pipes

Diameter

DN 1900

Pressure Class

PN 1

Stiffness Class

SN 5000

Application

Sewer system

Client

Zürich Airport

Contractor

Aarsleff Rohrsanierung**GmbH**

Advantages

Minimally invasive solution, quick and easy installation, safe and sustainable operation in challenging surroundings (airfields)

Hose lining was quickly dismissed as an option. According to the state of the art, the necessary pipe dimension would have required thermal-hardening liner systems; however, the thermal hardening process could not be performed in the short nocturnal time periods. Coating the old sewer with mineral mortar would have been a technically feasible option, but not as effective and high-quality as the alternative which was eventually chosen by the designing engineers and the contractor: the sewer's trenchless rehabilitation with HOBAS GRP Pipes. In the original plan, pipes DN 2000 were to be inserted into the old structure DN 2200. However, a calibration measurement which was carried out in the course of the first inspection of the old pipe showed significant variations in the pipe geometry. The old pipe had a consistent height of 2.20 m, but parts of it were only 2.05 m wide.

The solution was a combination of manually removing the concrete wall's structure in some areas and adapting the GRP pipes. Short GRP pipes DN 1900 in lengths between one and three meters were used. Thanks to the variable pipe lengths, the installation plan could be designed in a way that the pipe joints did not overlap with the existing connections. The pipes were installed via a 3.3 x 4.5 m construction pit on the edge of the runway. During the daily flight operations, the pit was covered with heavy and highly load-bearing steel plates.

As soon as the last flight had started in the late evening, the construction company in charge, Aarsleff Rohrsanierung GmbH, was given the go-ahead. The GRP pipes, each of them weighing up to 1300 kg, were lowered into the construction pit by means of a crane boom. Inside the pit, they were placed onto a shuttle construction and drawn inside the old pipe structure. The shuttle was vertically adjustable and allowed for the pipes to be aligned in a way to make the bushing fit exactly onto the spigot of the already installed pipes. This way, the length of the rehabilitated pipeline grew night by night.

In parallel with the installation works, 20 side branches were opened and laminated by hand to the new pipeline. In a last step, the GRP pipes were secured against buoyancy with the help of spacers and the annular gap between the old and the new pipeline was grouted with a special insulation.

The smooth cooperation of Zürich Airport, engineering office and contractor enabled a successful completion of the 170 m long relining project within merely two months according to schedule.

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