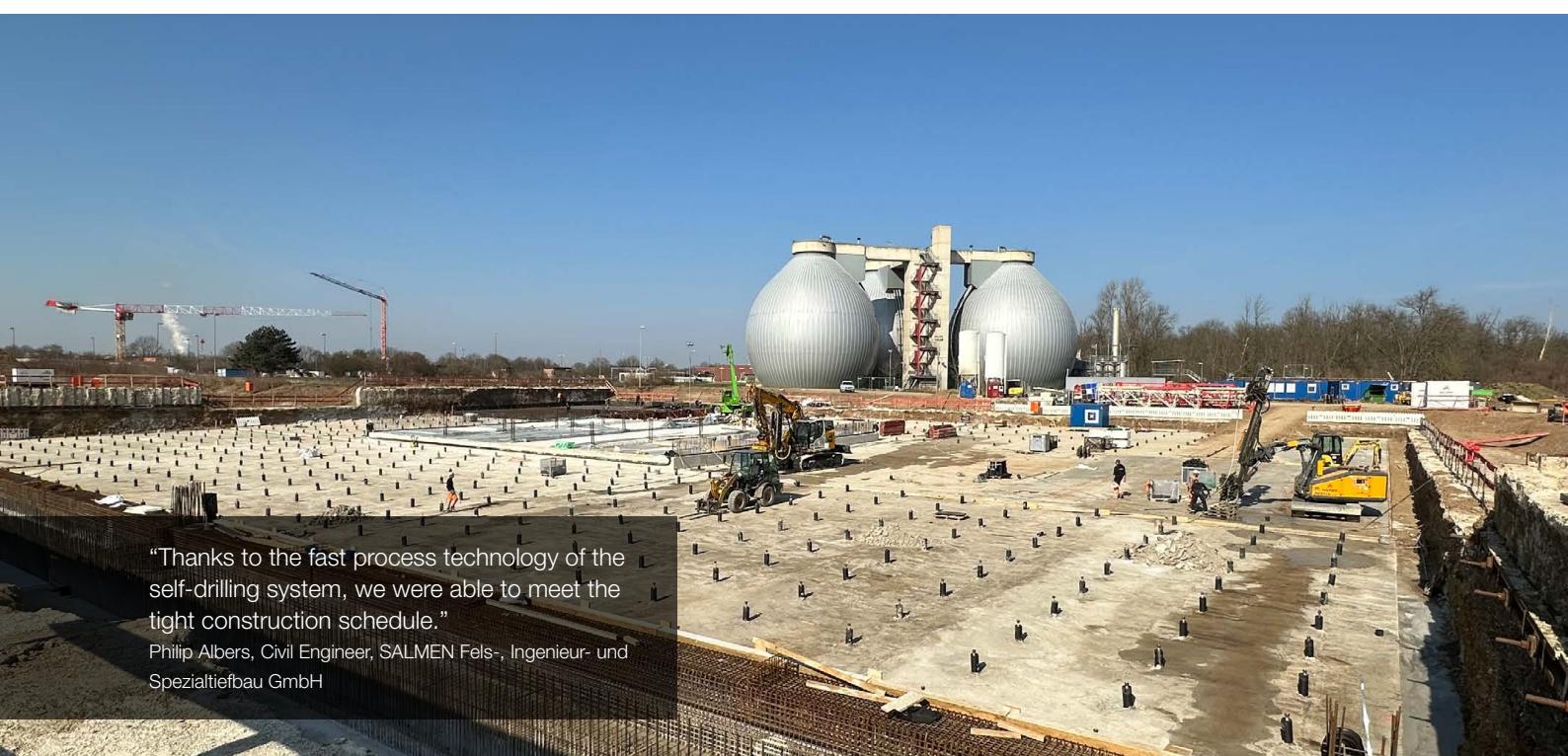


Secure Foundation Despite Uplift: Düren Group Sewage Treatment Plant

Uplift control of a combined wastewater extension basin with TITAN micropiles



"Thanks to the fast process technology of the self-drilling system, we were able to meet the tight construction schedule."

Philip Albers, Civil Engineer, SALMEN Fels-, Ingenieur- und Spezialtiefbau GmbH

The Düren group sewage treatment plant, operated by the Eifel-Rur Water Board, treats both municipal and industrial wastewater. As part of a comprehensive renovation and expansion project, various parts of the plant are being modernised and expanded, including the combined wastewater extension basins. These are used to temporarily store combined water during rainfall events and contribute significantly to the hydraulic relief of the sewage treatment plant.

The challenge

The combined wastewater extension basin will be mostly empty during normal operation. Therefore, uplift control is required to permanently counteract the pressure of groundwater on the foundation slab. The challenge was to decouple the compressive loads of the foundation slab and the tensile loads of the uplift forces in order to reduce the pile lengths. This meant that the micropiles were only allowed to absorb the tensile forces, but not the compressive forces of the foundation slab.

The solution

To absorb the uplift forces, a deep foundation with around 900 TITAN

40/16 micropiles was implemented. The micropiles were installed as tension piles in a regular grid of 3 x 3 metres and reach depths of 7, 10 and 11.50 metres respectively.

In order to decouple the tensile and compressive forces, a special head construction was developed that introduced only the uplift forces into the micropiles. Due to the soil conditions, cross drill bits (175 mm, TITAN 52 with adapter) were used to ensure efficiency and quality throughout the entire drilling process.

Alongside the installation of the micropiles, a total of 27 acceptance tests were carried out to demonstrate and document the load-bearing capacity of the TITAN micropiles.

The calculated installation capacity of the micropiles was easily achieved thanks to the self-drilling system, so that the construction project was able to be completed on time.

Project:

Uplift control of a combined wastewater extension basin, Düren, Germany

Construction period:

January 2025 - March 2025

Client:

Eifel-Rur Water Board (WVER)

Main contractor:

SALMEN Fels-, Ingenieur- und Spezialtiefbau GmbH

Products used:

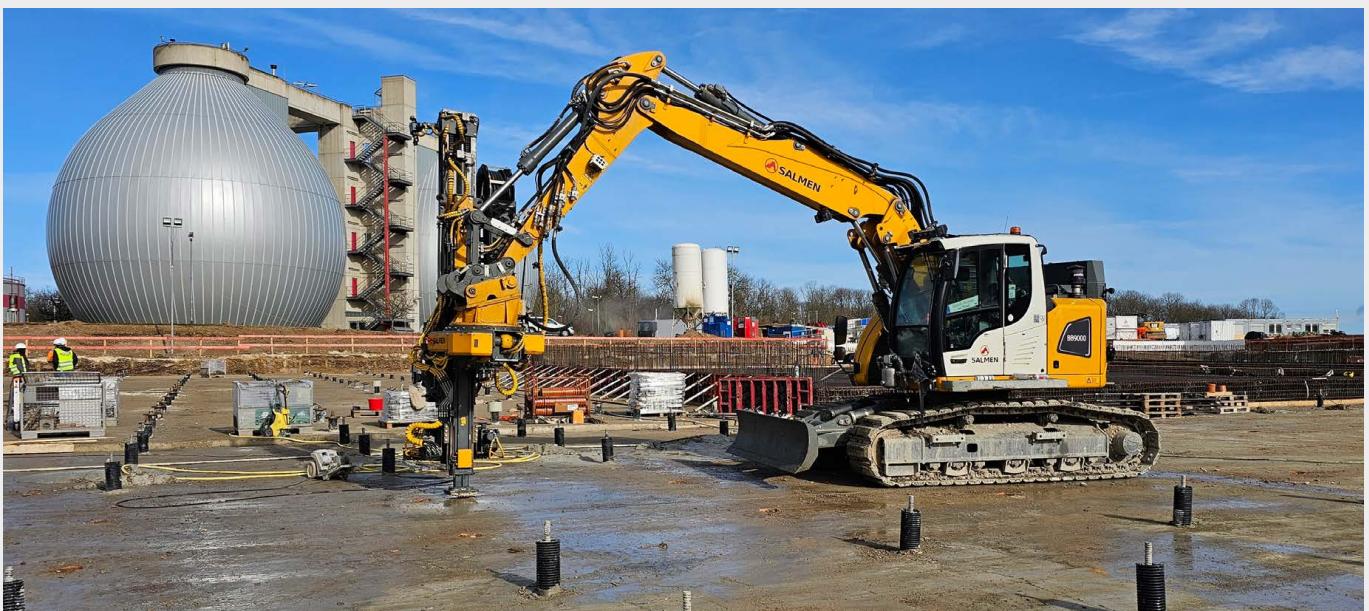
- Approx. 900 micropiles
- TITAN 40/16 as tension piles
- Grid: 3 x 3 m
- Pile length: 7, 10 and 11.50 m
- Cross drill bit 175 mm
- Adapter piece



The inner pipe was used according to approvals, whilst the outer served as a decoupling pipe to the foundation slab



A polystyrene cap enabled the settlement of the foundation slab without transferring the compressive forces to the micropiles



Drilling the micropile using small equipment technology

Would you like to find out more about TITAN micropiles?

We would be happy to advise you about your project. Simply get in touch with us. We look forward to hearing from you.