MASTERING LARGE-SCALE GEOTECHNICAL CHALLENGES – EXAMPLES FROM U5 IN HAMBURG AND BRUNSBÜTTEL SEA LOCK

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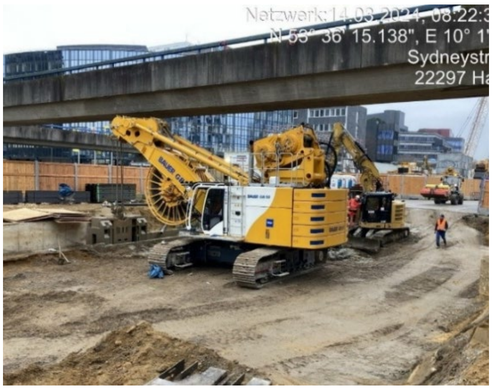
Abstract

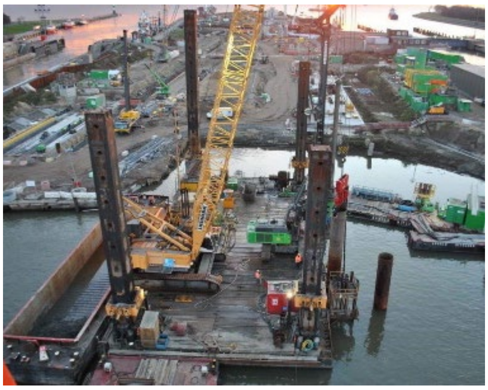
Large-scale infrastructure projects demand reliable geotechnical solutions, especially when ground conditions and construction constraints push technical limits. This presentation highlights two major projects Hamburg’s U5 metro line and the Brunsbüttel Sea Lock showing how geotechnical engineering and special foundation works combined with sustainability shaped their success.

For the Hamburg U5 project, complex urban and complex hydraulic conditions demanded innovative construction pit walls and underwater concrete slabs. Hydraulic windows installed in diaphragm walls to recover ground water flow were executed.. Uplift control of underwater concrete slabs was achieved through the use of diaphragm wall panels, providing a durable and low-maintenance alternative to micropile systems. Sustainability objectives further influenced material selection and resource efficiency.

At the Brunsbüttel Sea Lock on the Kiel Canal, the geotechnical concept centered on deep bored piles reaching depths of approximately 50 meters. A reusable steel pipe served as the starter casing, reducing both material consumption and environmental impact. Marine operations played a key role, with steel pipe piles installed from floating pontoons to ensure precision and stability in challenging conditions.



Figur 1. U5 Hamburg



Figur 2 Brunsbüttel Sea lock