"Vibrating instead of impact pile driving, that is the solution"

Switzerland – Domdidier, Aldi Central Office

Project Development

The Task

Production of foundation piles for a new Aldi central office building over an area of approx. 425 x 200 m.

The Challenge

- **Drilling through the medium-dense to densely packed sandy layers using vibrated cast-in-place piles**
- **Installation of a geotextile hose to ensure the required diameter and the integrity of the piles**
- **Competition with alternative piling system = precast driven pile**

The Subsoil

Peat and alluvial clay or backfill can be found near the surface. The lower limit of the layer varies between 3 and 5 m below the surface. Thereafter the subsoil consists of medium dense to densely compacted sands with a layer depth of between 6 and 12 m. Underneath this layer will be found marine clays down to the final depth of the ground exploration. The consistency of these silts and clays varies between pasty and stiff, whereby in general the pasty soil formations lie immediately beneath the sandy layers. The consistency becomes stiffer with increasing depth. The free ground-water level is between 0.7 to 2.5 m below the surface.

The Implementation

In order to determine the optimal piling system, two different types of test piles were produced in advance. These piles – precast driven piles and vibrated cast-in-place piles – were then subjected to a load test. The vibrated cast-in-place piles clearly produced better results both during the production process and in the load test. Precast driven piles could not be driven through the sandy layers. With the assistance of the BVV jetting platform and without time-consuming pre-boring, vibrated cast-in-place piles could easily be built even through the densely compacted sandy layers. The vibrated cast-in-place piling system achieved bigger test loads and showed lower pile settlements.

In order to produce a vibrated cast-in-place pile a steel tube with a base plate is vibrated into the ground using a leader mounted ring vibrator. With this type of vibrator the tube length may exceed the leader length. The base plate is sealed with a sealing mat to prevent groundwater penetrating.

Using this technique the entire concrete for one pile can be poured into the tube in a single uninterrupted process. While pulling the tube, the foot plate remains in the ground and the concrete is compacted due to the vibration of the ring vibrator. 7,500 piles with a total length of 280,000 m were produced over a period of five months. Two carrier machines with ring vibrators were in operation for five months and an additional third unit for another three months. The machines operated on a two-shift schedule. On average each unit produced 15 piles with a length of 35 m per shift. That means an average production of 525 pile meters per unit and shift. The top production achieved amounted to up to 800 pile meters per shift.

To guarantee this remarkable performance on a daily basis, a service concept was developed. Service works were carried out during the weekends. Care was also taken to ensure that worn parts were replaced as a preventive measure.

SWITZERLAND – DOMDIDIER, ALDI CENTRAL OFFICE