



Cityringen Metro Copenhagen, Denmark



PROJECT SUMMARY

PROJECT: Cityringen Copenhagen Junction to Nordhavn

DATE: 2015

CLIENT: Metroselskabet I/S

CONTRACTOR: Met Nord JV- Züblin/Hochtief

CONSULTANT: Arup & Cobe

INSTRUMENTATION SPECIALIST: SMT Denmark ApS/Geodata



OVERVIEW

The Nordhavn metro is a dual track metro branching off from the Cityringen subway.

The project comprises two tunnels of up to 1.8 km in length, an emergency ventilation shaft in Krauseparken, an underground station at Nordhavn station, a cut-and-cover tunnel and a ramp leading to the future Orientkaj station.

The retaining walls for Nordhavn station were constructed using contiguous bored and sheet piles with internal groundwater control measures.

MONITORING

The individual piles within the contiguous bored pile retaining wall had tie-backs in three places along their length using strand anchors. This eliminated the requirement for internal support, but it required comprehensive instrumentation to monitor any lateral deflection of the pile and load within the ground anchors.

As part of the monitoring scheme, Anchor Load Cells were installed on several anchors to monitor loads as excavation took place.

In line with industry standards, heavy duty steel protective covers were placed over the load cells to protect them from damage during construction.

PRODUCTS USED

HLC-6000 Hydraulic Anchor Load Cells

Hydraulic Anchor Load Cell with a vibrating wire transducer. They consist of a sensitive pressure pad formed by joining two stiff steel discs at their periphery. The void inside the cell is filled with de-aired fluid. When load is applied to the cell the pressure of the inside liquid changes. The changes in pressure correspond directly to the load applied.