Freezing

Slurry cut-off wall - Grouting

TIHANGE NUCLEAR POWER STATION

BELGIUM

Installing four water inlet and outlet ducts under a nuclear plant cooling canal

These works aimed to make watertight and consolidate soil under the nuclear plant's cooling canal in order to sink four 3.80-m diameter ducts.

These ducts carry water in and out of the plant towards a new atmospheric cooler. Canal subsoil is made up of sandy-gravelly alluvium with rocks.

The thinness of ground between the upper duct generator and the bottom of the canal required strengthening the roof, via freezing.

Works

Works were performed in 3 phases:

- Building slurry cut-off walls.
- Grouting alluvium, via ring-grouped boring from right and left banks around the canal. Cement-bentonite slurry and MICROSOL slurry were used.
- Grouted ground was frozen to a thickness of 1 m, a length of 18 m and width of 6.5 m, successively for each duct.

Freezing is performed by using liquid nitrogen in horizontal borings. For each sinking, 2 borings equipped with tempe-

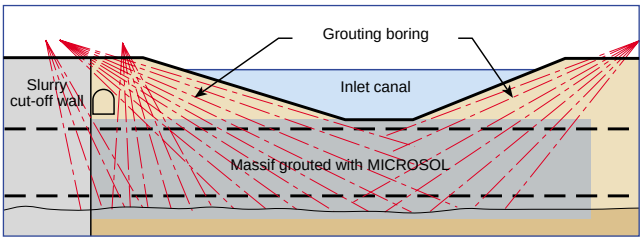
Freezing ground

CLIENT:	SEMO
GENERAL PARTNER:	TRACTOBEL
WORKS PERFORMED BY:	SOLÉTANCHE
WORKS PERIOD:	1988 - 1989

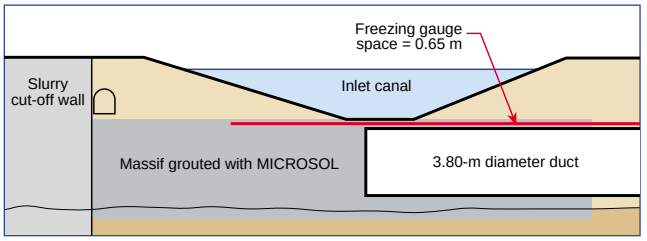
MAIN FIGURES:

- 7,400 m² of slurry cut-off wall
- 3,200 m² of watertight floors
- 6,600 ml of drilling
- 1,600 m³ of B/C + Microsol
- 1,500 m³ liquid nitrogen

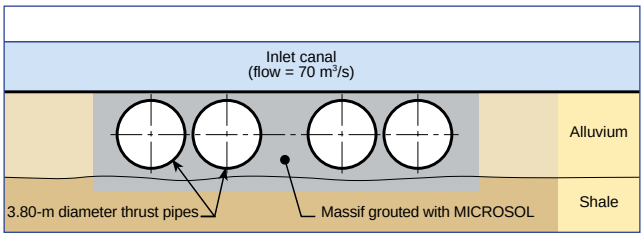
SOLETANCHE BACHY



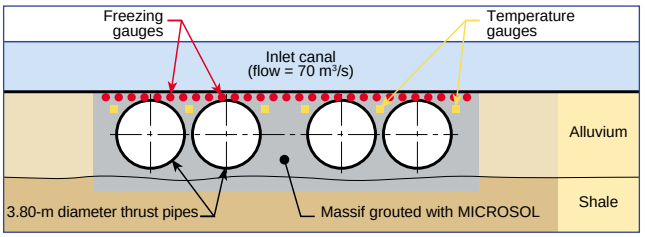
GROUTING - Long profile



FREEZING - Long profile



GROUTING - Cross-section



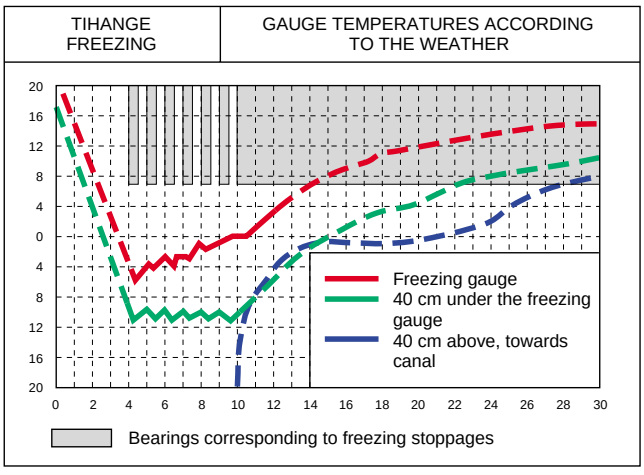
FREEZING - Cross-section

rature gauges enable to check that the freezing criteria is maintained.

These temperatures are recorded above ground, via a multichannel device.

A soil cover, set at the bottom of the canal by a diver and filled with slurry, enabled to limit loss of frigories, despite high water flow (70 m³/s) and high temperatures (26° C).

Nitrogen consumption was, however, two to three times higher than normal.



Freezing simulation

View of cut face

SOLETANCHE BACHY