WATER SEALING

CASE STUDY

Dry tunnel shafts for the metro of Copenhagen city

PROJECT
Copenhagen metro

LOCATION
Copenhagen, Denmark

CONTRACTOR
Salini Impregilo

SUB-CONTRACTOR
Christiansen & Essenbæk A / S

CUSTOMER CHALLENGES
- Leaking joints in the tunnel shafts
- Extreme high water pressure due to depth of shafts and groundwater level
- Approval from local authorities for use of injection resin in tunnel project

SOLUTIONS
PC® Leakinject Uni 6816 E
Polyurethane injection resin - 36 tons

In the 1990's, the city of Copenhagen set the ambitious goal to become the first carbon neutral metropolis in the world by 2025. This involved major infrastructure investments. A big part being the realization of a brand new metro line. Construction works on M1, the first section of the metro, started in 1997. When finished, the metro will transport more than 72 million passengers a year.
Part of the realization of a metro is the construction of the metro station's tunnel shafts. In Copenhagen they go as deep as 40 meters underground and measure 90 m in length and 40 m in width. Due to its depth, the groundwater level being 2 m below pedestrian level, and the geological conditions, the contractor Salini Impregilo, faced very high water ingress coming through the joints of the segments. To guarantee further operations, the tunnel shafts needed to be waterproof.
Salini Impregilo, an international group specialized in major infrastructure projects, selected contractor Christiansen & Essenbæk A / S for the water sealing of the tunnel shafts.

For the second and third section of the metro, Christiansen & Essenbæk A / S chose to work with TRADECC's **PC® Leakinject Uni 6816.** This one-component polyurethane injection resin is ideal for sealing leakages or active water leaks with high hydrostatic pressure. Thanks to the low viscosity it penetrates deep in even the finest cracks. And when it reacts with water, it expands up to 2200 %, forming a semi-flexible foam with high sealing capacities for cracks or joints.
Local Danish authorities impose stringent regulations on the use of construction chemicals in the metro. With the support of TRADECC, Christiansen & Essenbæk A / S obtained all necessary approvals to use PC® Leakinject Uni 6816 in the tunnel shafts. A total of 36 tons was injected, sealing all leaking joints and permitting the further realization of the metro.

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