

Drytech Restoration Systems

Key References

Infrastructure and Tunnels



Underground Railway and Stations, Algiers, Algeria

Drytech restored a 4 km-long section of the underground railway in Algiers. The underground carries around 110 million passengers every year, and Line 1 runs close to the sea, exposing the structure to a 6-8 metre water head.

Various systems were used to waterproof the tunnels and stations, none of which managed to guarantee 100% impermeability. After worldwide research, the Ministry of Transport in Algeria chose the Drytech Restoration System, based on DRYflex acrylic resin injections made from inside the structure.



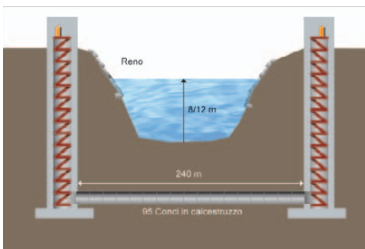
Underground Railway and Stations, Milan, Italy

Many Milanese factories closed down during the 1980s, causing a rise in the water table resulting in heavy infiltrations in Line 2 tunnels. Drytech fully waterproofed the Piola-Lambrate section, working through the night when the service was not running (without interrupting the usual train service). The work was possible despite the presence of pressurised water.



Railway Underpass, Colico Chiavenna, Italy

Waterproofing a railway underpass built in stone using the curtain grouting injection technique. DRYflex resin works using pressure and elasticity, and thus the waterproofing will remain effective despite any movement stress caused by passing trains and new infiltrations.

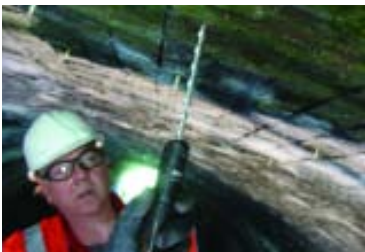


Service Tunnel below the Rhine, Basel, Switzerland

The service passage running beneath the bed of the River Rhine - at a depth of 25/27 metres - composed of 95 prefabricated segments, suffered from significant infiltrations creating considerable damage to ducts and electrical cables.

Together with the addition of a new system of ducts to transport thermal power, the state holding company ordered the complete restoration of the tunnel.

The joints were waterproofed using acrylic resin injections, carried out across the entire arch of the segments, restoring more than 2,000 metres of joints in all.



Fenton Manor Tunnel, London, England

Waterproofing injections and structural reinforcement of the Fenton Manor Tunnel, London. The Helifix techniques are used to waterproof and structurally repair a brick arch in a single operation. The rings of bricks are crossed by the Helifix injectors, uniting them and making the structure coherent. The Helifix injectors contain helicoidal channels in order to inject the resin designed for arch-pin injections.



Viaduct St. Ursanne, Switzerland

Built in 1875-76, it became a historic monument in 1900. The viaduct of St. Ursanne was fully restored between 2000 and 2002.

The original railway viaduct was replaced with large prefabricated elements, whilst the high stone vaults were reinforced with injections of cement mortar and micro-cement. The work lasted 8 months overall.

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CTE Cut and Cover Tunnel, Singapore

This tunnel was designed and built in the 1980s with a surrounding PVC membrane. Due to damage to the membrane during construction and poor workmanship the tunnel began to leak and investigations were made.

In 2001/2002 the tunnel was restored and waterproofing resin was successfully injected into the critical sections to seal the leaks.



Road Tunnel, Hong Kong, China

Repair of a road tunnel in Hong Kong.

The concrete surface continued to leak despite previous injection techniques and surface grouting. Finally the cracks were sealed with acrylic resin injections.

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Structures in contact with water or liquids in general



Dam Solis, Switzerland

Restoration works were carried out by the Drytech Systems of the immense dam walls in Solis, Grisons. Work is both possible and effective even in the presence of water under pressure, meaning that even emergency situations can be resolved.



Dam St. Anton, Austria

Restoration works were carried out by the Drytech Systems of the dam in St. Anton, Austria. The cracks in the dam tunnel were carried out and sealed by waterproofing injections. Work is both possible and effective even in the presence of water under pressure, meaning that even emergency situations can be resolved.



Danube Water Retaining Structure, Austria (Hungarian Border)

The System was used for many years also in the restoration of dams and water retaining structures.

Thanks to the properties of the resin that expands into cracks waterproofing them by pressure even cracks under a continuously moving water level can be sealed effectively.



Lake Como Pumping Station, Como

Repair of infiltrations in the basement of the pumping station in Lake Como located just a few metres away from the lake.



Castle Bottmingen, Switzerland

Drytech replaced the waterproof gunite of the submerged part of Bottmingen Castle. To prevent the capillary rise of water, injections of cement mixed with silicates were carried out before applying the macro-porous gunite.

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Basements



Underground Car Park, Iseo, Italy

Restoration work of infiltrations into an underground car park in Iseo a few tens of metres away from the lake. The considerable pressure of the infiltration water was blocked with the DRYflex resin. Drytech's 2-component acrylic resin that catalyses in a few moments, using pressure to seal the crack is effective and does not depend on the state of the walls of the crack or any subsequent expansion.



Solferino Car Park, Genoa, Italy

Waterproofing 350 metres of infiltrations between joints and cracks in floor slabs and walls.

The car park, excavated out of rock located below a square, was no longer fit for use due to the extent of water inflows escaping from the working joints, the cracks and the beam connections in the slabs.

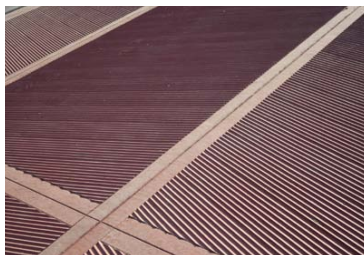
Work was carried out from within without demolition or excavation.



Underground Car Park, Basel, Switzerland

Restoration of the floor slab movement joint and floor slab beam supporting the joint in an underground car park in the city of Basel.

The injection technique was used against water leakage caused by wear and tear of the floor slab connection joint and floor slab working joint membranes.



Underground Car Park, Milan, Italy

Curtain grouting technique of Predal wall in a supermarket parking in Milan.

Intervention used for porous structures: the resin injected through the grid holes, catalyzes creating a grout curtain of resin between the wall and the ground below.

The clients of the supermarket could use the car park also during the restoration work.



Car Park under the Rhine, Frankfurt, Germany

Restoration of a car park situated under the Rhine in Frankfurt.

The waterproofing injection was made directly into the infiltration from inside the structure. No excavation or demolition work was necessary - therefore the Drytech Restoration System did not inhibit the normal use of the car park during the intervention.

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Basements



BSI Bank, Lugano, Switzerland

Urgent waterproofing of the technical rooms of the BSI bank in Lugano using DRYflex resin injections during floods in November 2002. The treasury rooms were then structurally waterproofed using the Drytech White Tank System in the presence of a water head of 2.5 metres.



UBS Bank, Lugano, Switzerland

Drytech was engaged for the waterproofing repairs of major cracks in the technical rooms in the underground building.



UBS Bank, Basel, Switzerland

During the winter the cracks in the underground air duct were subject to considerable thermal movement causing heavy infiltrations of water. A special elastic acrylic resin formulation was developed for this job capable of expanding by more than 50% of its volume.