

Tunnel waterproofing



Tunnelling

Waterproofing solutions



RASCOR – your experienced partner for preventive and remedial tunnel waterproofing.

DESCRIPTION

Tunnelling projects demand the utmost in waterproofing performance. Any leakages can have a devastating impact on the progress of the works. Consequently, the use of reliable, time-tested products and the support of experienced specialist contractors are all the more crucial for tunnelling engineers.

This is precisely the combination offered by RASCOR with its integral package of services: product technology and development know-how, a decades-long track record in hands-on application and on-site practice, and professional support from its own team of engineers.

RASCOR's expertise not only covers the remedial waterproofing of existing tunnels, but also extends to the provision of state-of-the-art solutions for new-build schemes using the White Tank waterproof concrete system. High-performance technology, a combination of crack controlling and sophisticated joint solution, vouches for absolute reliability and eliminates all unnecessary risks for the client.

SELECTED REFERENCES

- Dock-Midfield PTS station, Zurich Airport, Switzerland
- Tunnel bypass, Ennetbaden, Switzerland
- Volta-Rhine tunnel on A2 motorway, Basel, Switzerland
- Thunstetten rail tunnel, Rail 2000, Langenthal, Switzerland
- Underground railway line, Moosach Station – Leipzig Station, Munich, Germany
- Metropolitana underground railway, Milan, Italy
- T5 service tunnel, Heathrow Airport, London, UK
- Cabrera high-speed rail tunnel, Valencia, Spain
- COMET underground railway line, Copenhagen, Denmark
- Submersed tunnel to Yas Island Formula-1 circuit, Abu Dhabi, United Arab Emirates
- Terminal approach road tunnels, new Doha Airport, Qatar
- SMART (stormwater management and road tunnel), Kuala Lumpur, Malaysia
- Cross-Harbour Tunnel (submersed tunnel), Hong Kong, China
- Lai Chi Kok rail tunnel, Hong Kong, China



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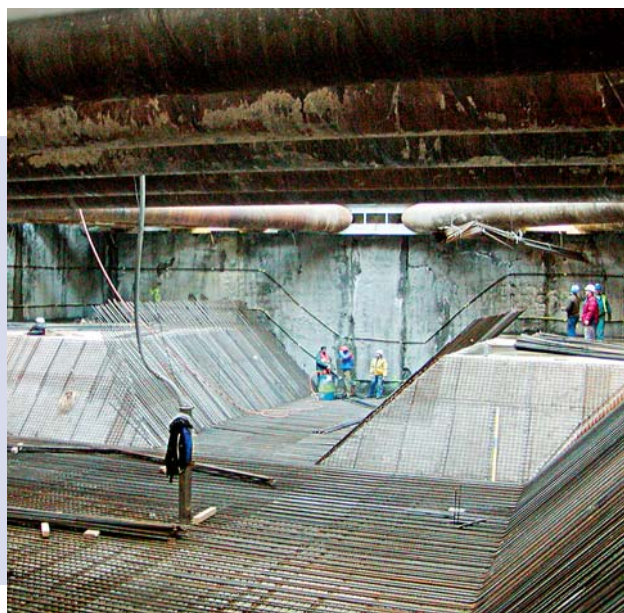
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- 1 RASCOR «White Tank» system as integral waterproofing concept
- 2 Pre-injection for ground consolidation
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- 6 Crack and construction joint injections in pedestrian areas

- 7 Injections at tubing joints and junctions with cross-passages
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- 10 Crack and consolidating injections in seawater area

Tunnelling

TBM/bored tunnels



VOID FILLING

Injection to fill and seal dry voids and water pockets behind tunnel lining.

ANNULAR SPACE

Later injection to waterproof annular space.

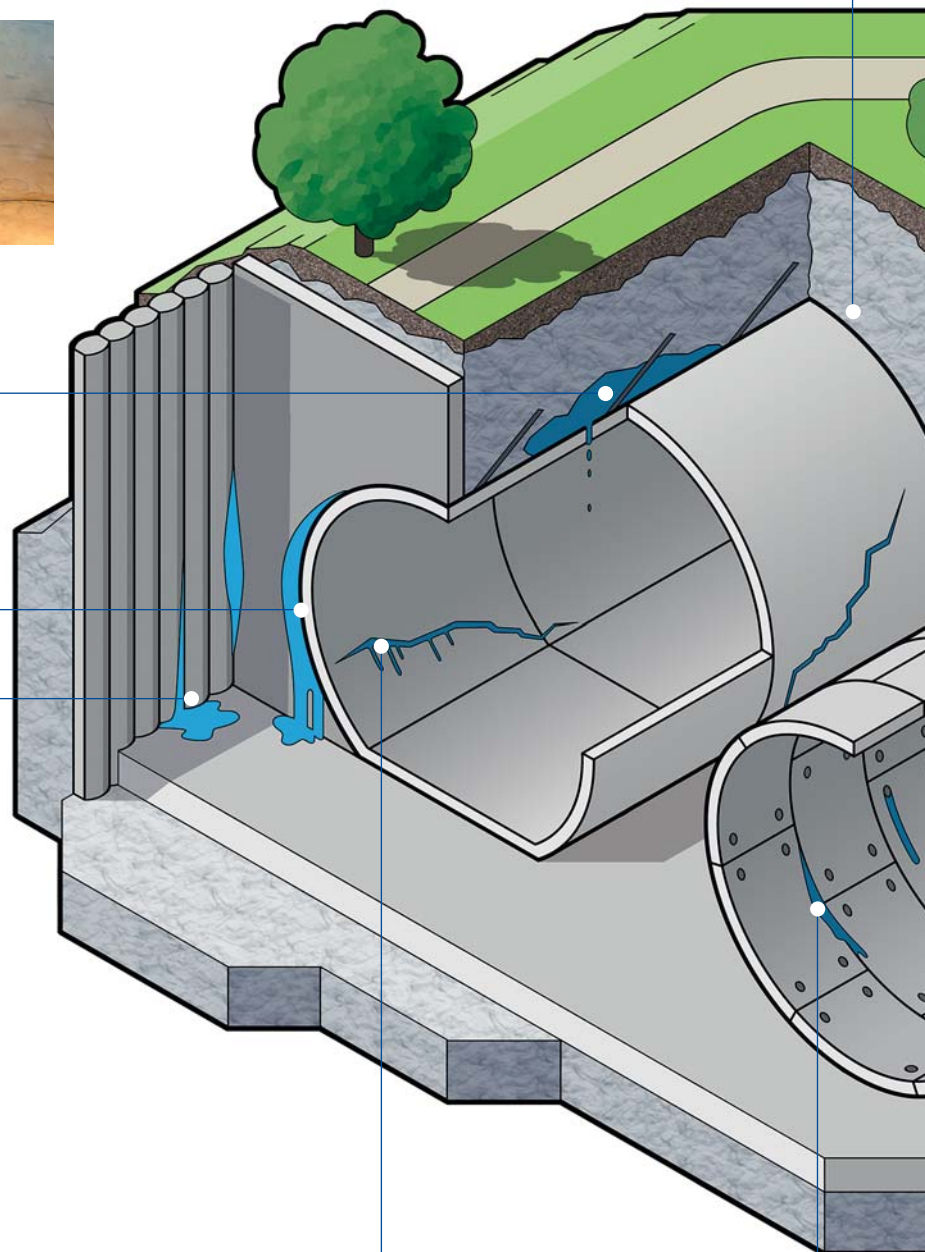
TEMPORARY EARTHWORK SUPPORT

Rapid, reliable waterproofing of contiguous bored piling, sheet piling, diaphragm walls and anchor heads as well as base of launch and reception pits.



ROCK STABILIZATION

Umbrella injection to stabilize rock prior to excavation.



CRACKS IN TUNNEL LINING

Injection of cracks in in-situ concrete tunnel lining and TBM segments for waterproofing or structural strengthening.



TUBBING JOINTS

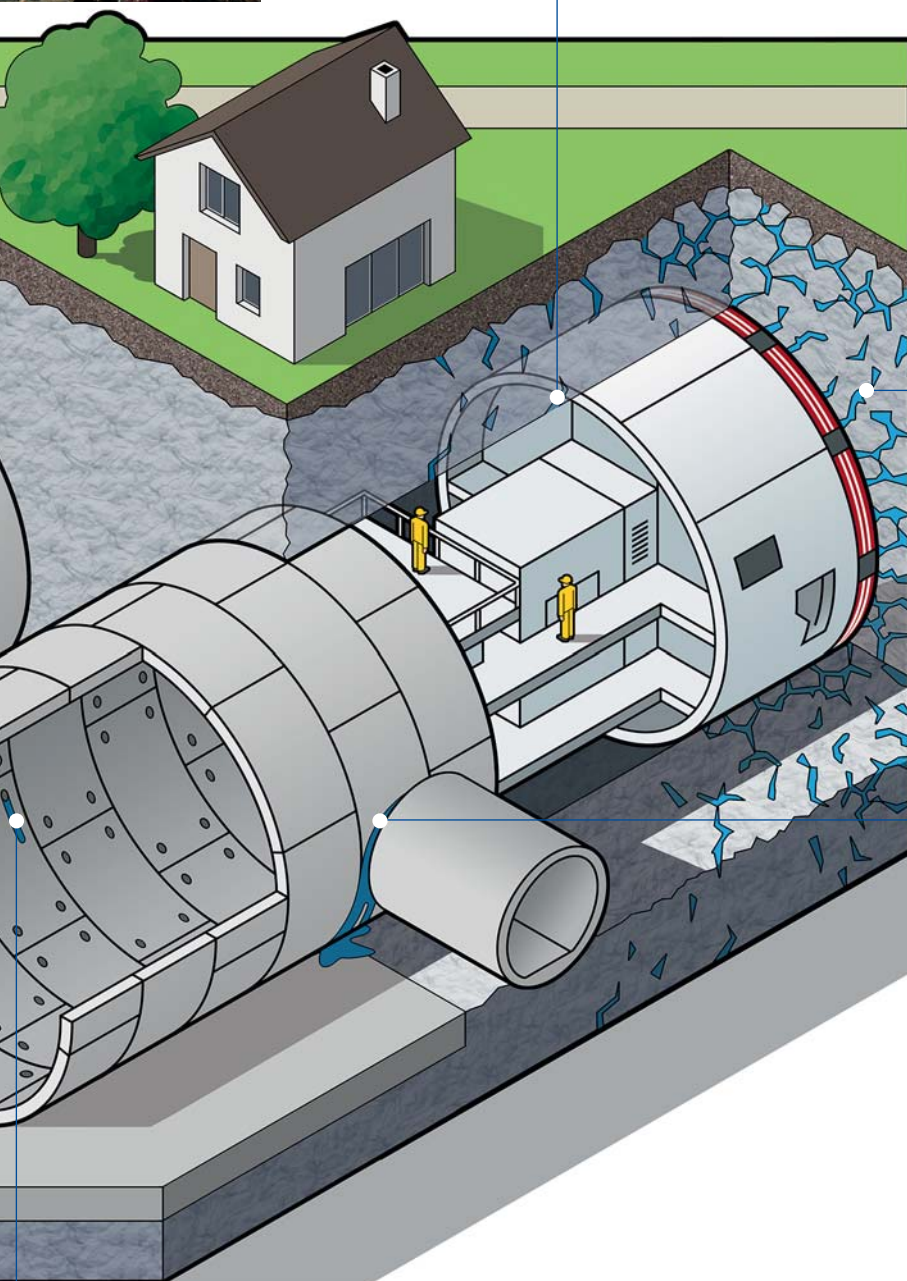
Permanent sealing of leakages due, for example, to defective rubber gaskets, through injection into joint or behind tubbings.





WATER INGRESS

Immediate localized waterproofing measures at back end of shield to prevent water infiltration.



GROUND CONSOLIDATION

Injection ahead of TBM drive to stabilize soft ground or eliminate water pockets.

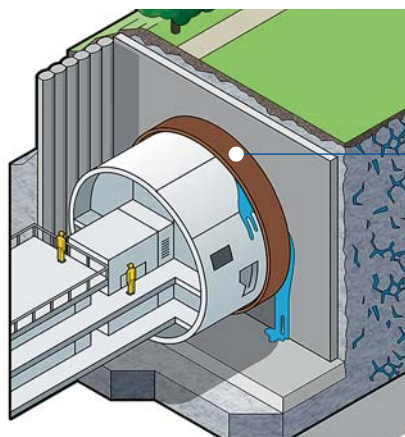
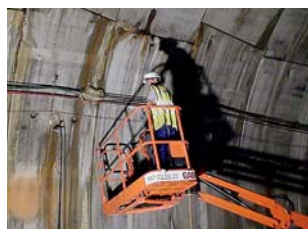


CROSS-PASSAGE JUNCTIONS

Waterproofing of junctions with connecting galleries and escape routes and/or joining these to main tunnel.

ANCHOR AND INJECTION HOLES

Localized stopping and sealing of anchor and injection holes to prevent water infiltration at these locations.



PRE-INJECTION IN TUNNEL EYE SEAL

Preventive annular injection using cuttable grouts.

Tunnelling

Cut-and-cover tunnels

Refurbishment solutions



CONTIGUOUS BORED PILING/SHEET PILING/DIAPHRAGM WALLS ETC.

Earthwork support to pit walls also necessitates temporary measures to prevent major leakages. Typical applications include sheet pile interlocks, gaps between contiguous bored piles, defects in diaphragm walls and anchors.

CRACKS IN GROUND/TOP SLABS AND WALLS

Direct injection into cracks in slabs and walls for waterproofing or structural strengthening.



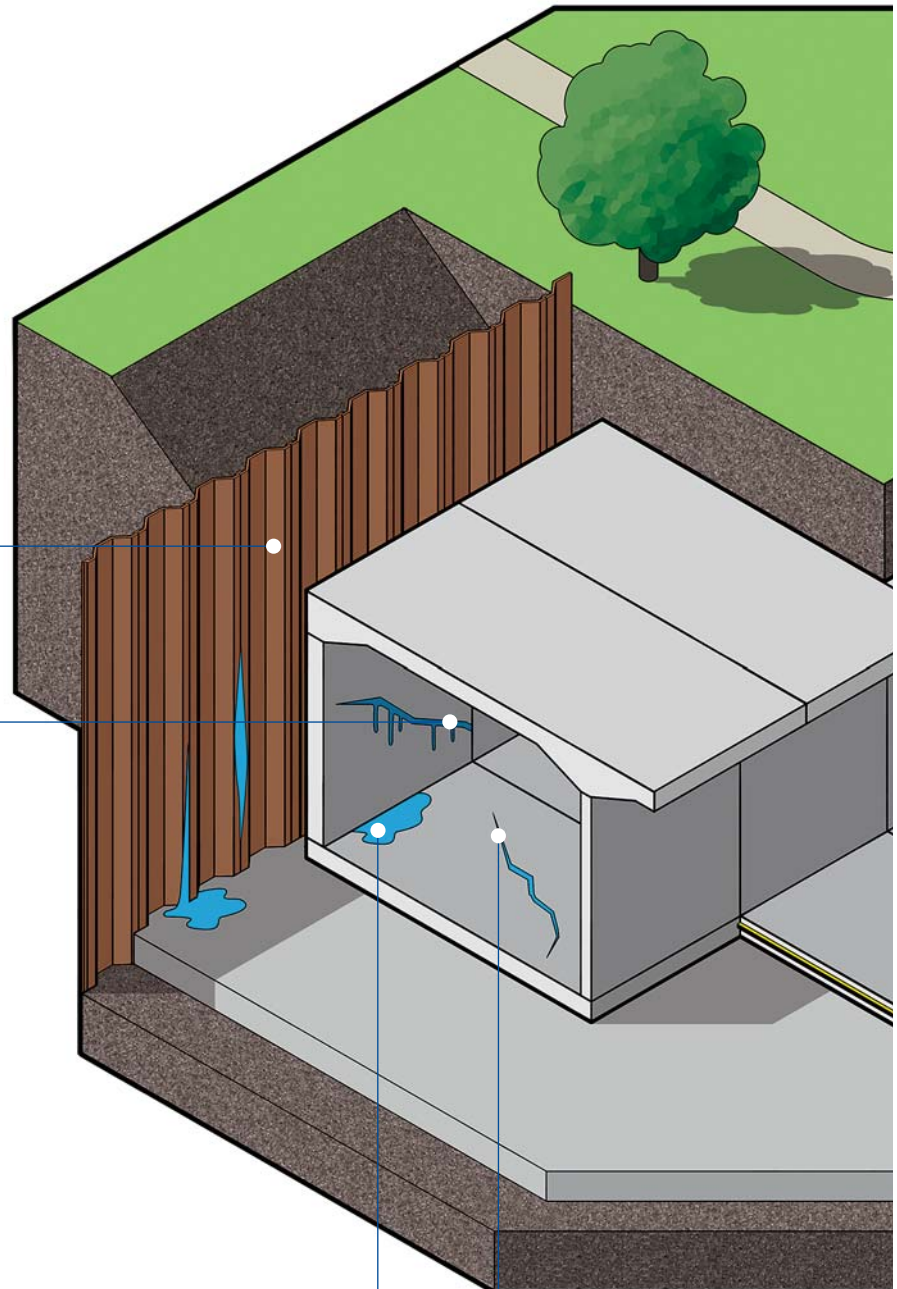
LEAKING CONSTRUCTION JOINTS

Permanent sealing of leaking construction joints at any location through direct injection into joint.



WIDE-AREA LEAKAGES

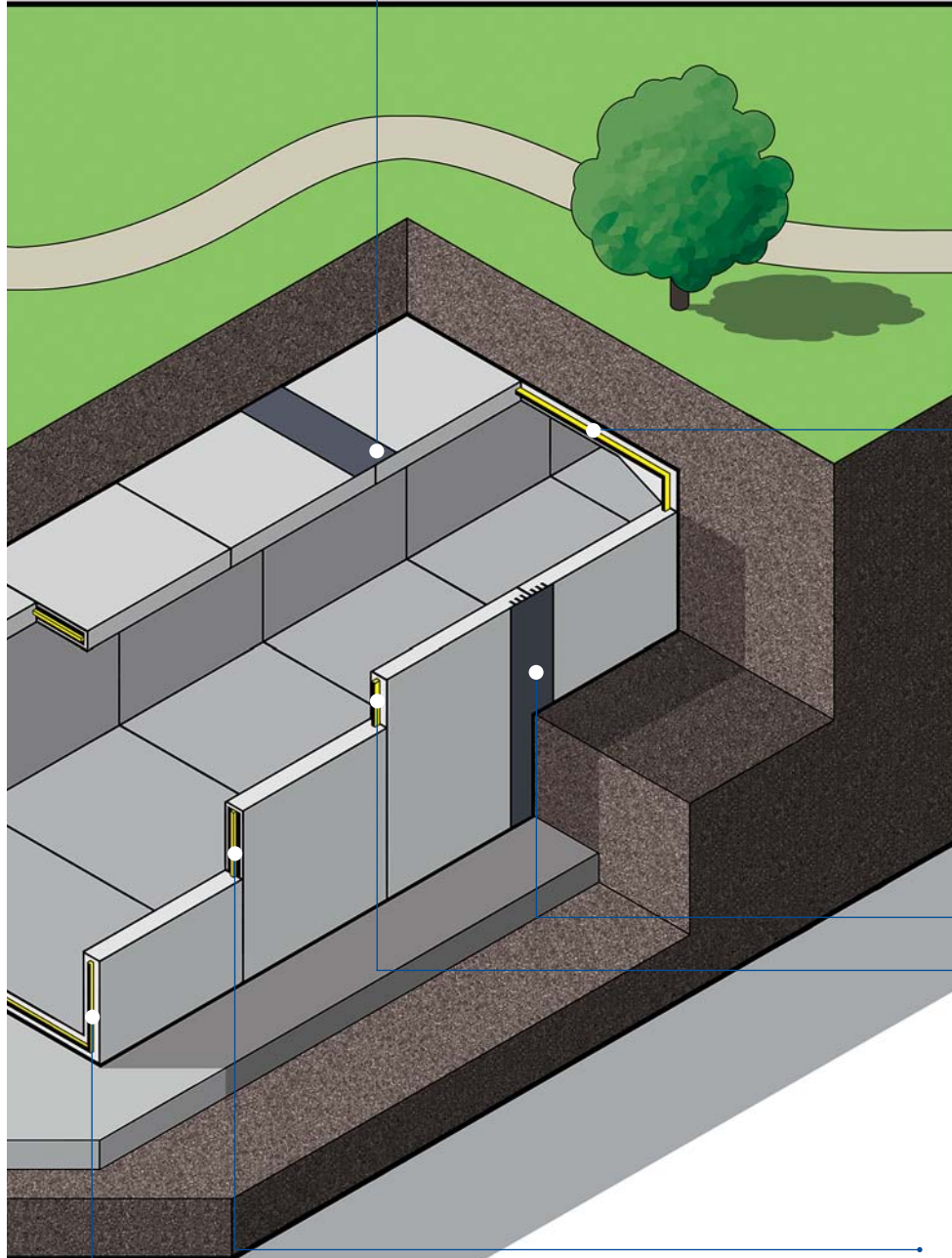
Injection of a waterproof membrane behind or below the structure is the most effective method of remedying widespread leakages due to poor concrete quality or concentrated cracking.



New-build solutions

CONSTRUCTION JOINTS WITH RASCOjoint TPE WATERBAR

The RASCOjoint TPE waterbar is bonded onto the water side of construction joints using RASCObond epoxy adhesive filler, thereby preventing any infiltration of water into the joint.



CONSTRUCTION JOINTS WITH RASCOtight HYDROPHILIC STRIP

RASCOtight hydrophilic strip offers a straightforward waterproofing solution for joints exposed to low hydrostatic pressure. The hydrophilic material swells upon contact with water, thereby forming a barrier to water flow.



CONSTRUCTION/EXPANSION JOINTS WITH RASCOjoint WATERBAR

The seal provided by RASCOjoint waterbars is based on the tortuous path principle, i.e. by lengthening the water leakage path through frequent changes of direction. Here, performance depends heavily on the concrete, which must solidly embed the waterbar bulbs and ribs.

CONSTRUCTION JOINTS WITH RASCOtight HYDROPHILIC INJECTION CHANNEL

The RASCOtight hydrophilic injection channel is a combination of hydrophilic strip and injection channel. While the hydrophilic strip constitutes the primary seal, the integral injection channel allows any grouting that may prove necessary at later time.



CONSTRUCTION JOINTS WITH RASCOtec INJECTION CHANNEL

The RASCOtec injection channel offers an unbeatable waterproofing solution for all types of construction joint. It is installed prior to concreting and injected with a flexible grout when the concrete has fully cured. Any adjoining cracks and honeycombing are also sealed during the same operation.



CRACK CONTROL WITH RASCOtec CRACK INDUCER

The use of RASCOtec crack-inducer means that the size of concrete bays is limited only by the capacity of the concreting contractor. In most cases, it is also possible to dispense with anti-crack reinforcement. As a result, cost savings are often achieved through shorter construction times and a lower reinforcement requirement.



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