

There are some issues in small number of wet locations in tunnels. There are no known issues in modern or dry tunnels.

Network Rail has chosen to temporarily suspend product acceptance for future installations of ROCS until remedial actions completed in these specific wet locations. Furrer+Frey are working closely with Network Rail to resolve this issue as soon as possible.

ROCS is based on a proven concept. This involves a standard copper contact wire supported in an extruded aluminium bar profile. The bi-metallic interface is coated with a metallic grease. This grease performs two important functions:

1. It allows traction current to freely flow between the bar and the wire
2. It provides a passive layer between the two galvanically reactive metals to prevent each reacting with the other.

Aluminium is a cost-effective material with ideal conductivity and an excellent strength-to-weight ratio. However, aluminium will corrode if exposed to certain environmental conditions; in particular, salt water or alkaline. It is essential that the ROCS is appropriately protected in those conditions.

ROCS is designed and proven to operate outside, exposed to the weather and high humidity using the grease and a protecting rain cover. Normal design service life can be expected outside. ROCS is validated in accordance with *ISO9227 Environmental Corrosion Tests* and rated as “very good” for corrosion resistance.

ROCS is not designed or intended to operate in a continuously wet (or immersed) environment or to be exposed to chemical elements, either natural or artificial.

The cases of corrosion are all linked to direct sources of water ingress. In some cases, these contain high proportions of salts/chemicals, in others, the water content has still to be determined.

When regular or constant liquid ingress is present, Furrer+Frey recommend (in no particular order):

1. Repair/re-lining of the tunnel lining where practical.
2. Installation of local water shields or diverter panels to the tunnel lining to deflect water to below contact wire height.
3. Installation of drip pans and of gutters to the tunnel lining to carry water away from critical areas.
4. Regular inspection of the tunnel lining to enable response to new leaks or changing conditions.
5. Regular passage of pantographs (even if the system is not entered into service) which sweep clean the contact surface and prevent build-up of contaminants.
6. Where tunnel mounted shields are impractical, installation of shields or deflectors onto drop tubes to prevent water entering supports or protecting covers.
7. Installation of protecting covers to the bar itself to prevent water entering bar joints and getting inside the bar.
8. Regular inspection and if necessary, cleaning of drain holes.
9. Inspect and maintain/repair existing water management measures e.g. fix leaking drip pans or gutters
10. Furrer+Frey always recommend water sampling and testing in advance of commencement of works.

The locations where corrosion has occurred coincide entirely with water ingress points which either:

1. Were known about before installation and not repaired or diverted.
2. Appeared since original water surveys but have not been assessed, diverted or repaired.

To help reduce the impact of corrosion at these sites, Furrer+Frey have designed and supplied revised protecting covers with more substantial drip details to shed greater quantities of water in still air conditions. It is incumbent on the infrastructure owner to divert water way from the conductor rail.

This protecting cover sheds water from the bar itself and prevents ingress into joints. Cantilevers and cover ends must be protected separately.

In any permanently wet and polluted locations it is not advisable in the long term to use ROCS unprotected or use any 25kV insulators without correctly diverting water flows.

General information on ROCS:

Furrer+Frey ROCS® remains the technological leader in terms of high-speed performance, ease of installation and water management. The design and engineering team are committed to cost effective design and always looking to improve the performance of the product.

Furrer+Frey Rigid Overhead Conductor-rail System (ROCS®) is successfully used in over 3000 km of electrification worldwide.

The majority of these installations are in tunnels, with a proportion installed permanently outdoors.

The system is certificated TSI compliant up to 250km/h.

For more information please contact:

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