

The conductor rail system



Furrer+Frey

FL 200/260 (T)

Conductor rail

Overhead contact lines

Railway safety control system for depots

Engines and tools

Increasing requirements on overhead contact systems with regard to safety, reliability, current carrying capacity, short circuit resistance and minimum construction height, demand innovative solutions – the conductor rail system of Furrer+Frey is one.

In order to reduce the space needed for the overhead contact line, Furrer+Frey turned to the idea of the space saving conductor rail system. Various railway companies with different electrification systems have already equipped more than 250 km of track with the conductor rail.

The absence of tensile forces in the contact wire and the small number of components make the conductor rail a safe and reliable solution for use in underground line tunnels. It may also be installed in engine workshops allowing the catenary to be swung aside for unhindered maintenance. The advantage of the retractable conductor rail can also be used for loading and unloading facilities and on movable bridges.

The conductor rail allows to follow track radii down to 120 m without special preparatory measures. A minimum radius of 40 m can be realized with prebent conductor rails.

The conductor rail profiles are normally delivered in lengths of 12 m. Pairs of inter-locking joints connect the profiles. The alloy of joints and profiles is identical.



The profile

The contact wire is clamped on the lower side of the boxshape aluminium profile. The insertion is done without tension. Standard contact wires made of copper or aluminium and with cross section dimensions up to 161 mm² can be used. A special anticorrosion grease allows the use of copper wire by preventing the ion exchange. Thanks to the big cross section of the profile, auxiliary lines such as feeders and cables are not necessary.



Turnouts and crossovers

Conductor rail overlaps are used in turnouts and crossovers. To ensure smooth pantograph passing, the overlapping end section is bent upwards.



Transition bar

At the transition from the catenary system to the conductor rail system the vibrations of the incoming contact wire are absorbed by a transition bar.



Protecting plastic cover

At the tunnel mouth or at locations where dropping water is expected, a protecting plastic cover can be clipped on the conductor rail profile.



Expansion joint

Linear expansion or retraction of the conductor rail caused by temperature variations is absorbed by expansion elements in the conductor rail axis. These elements allow the pantograph to travel unhindered, without mechanical or electrical interruptions.

Furrer+Frey

FL 200/260 (T)

Conductor rail



Fixpoint anchor

The different forces acting on the conductor rail are stabilized by the fixpoint. Vertically suspended, long conductor rail sections do not need a fixpoint as the conductor rails' own weight serves as stabilizer.



Overhead contact lines



Endpoint anchor

The contact wire of the catenary system passes into the conductor rail where the tensile force is absorbed in the anchor bar and then led into the building structure. Within the conductor rail system, the contact wire is installed without tensile force.

Railway safety control system for depots

Electrical connections

Feeder clamps can be installed on top of the conductor rail profile for electrical connections between overlapping sections or at feeding points.



Engines and tools

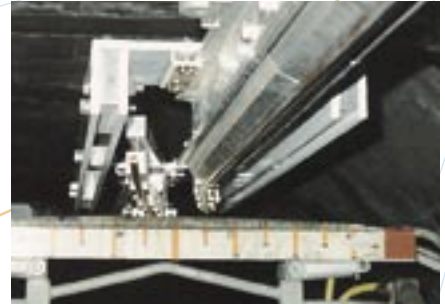
Multiple current installations

Dual voltage (AC/DC) conductor rail system installation.



Section insulators

Section insulators used for conventional overhead contact lines are adapted at the ends in order to connect with the conductor rail profile.



Earthing rods

Clips for hooking standard earthing rods can be installed on supports or anywhere on the conductor rail.

Three-phase current system

Also here an alternative

Contact wire insertion device

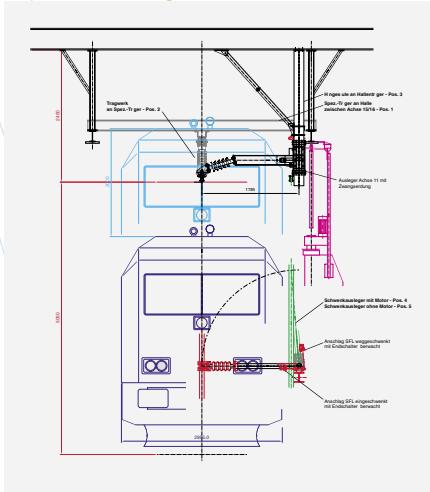
The contact wire insertion device is used for installation and replacement of the contact wire. It expands the lower part of the profile locally and lifts the contact wire so that the grooves are clamped in the profile once the insertion device has passed. The device is hauled by the installation vehicle.



Examples of special applications

In connection with the approval of the conductor rail system with the German Federal Railways it was demonstrated that even in a worst case scenario with insulators of two successive supports failing, the sagging conductor rail does not break. This not only means high

safety especially in station and train maintenance areas, but also that an overhead line zone for failing contact wires must not be taken into account. This allows important savings for otherwise costly earthing measures.



Fixed or movable conductor rail installations for maintenance depots, container terminals or other loading and unloading facilities.



Furrer+Frey

FL 200/260 (T)

Conductor rail

Overhead contact lines

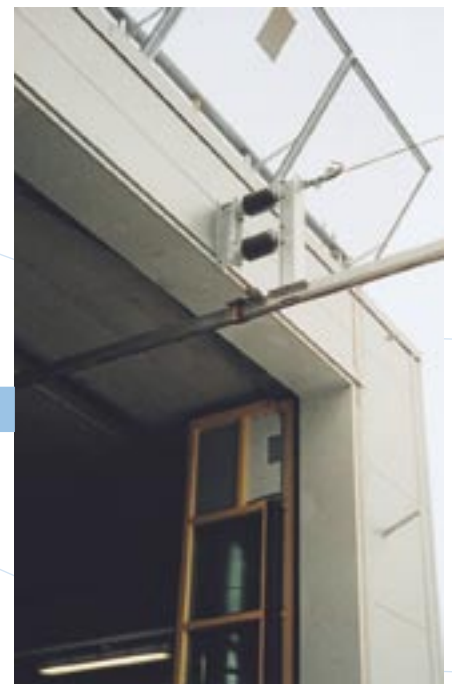


Integrated control system

Central command cabinet of a movable conductor rail installation. The integrated control system (PLC) responds to all possible safety interlocks with portal cranes, movable working platforms etc. and the actual status of all facilities is displayed.

Termination arrangement

The tensile forces in the outdoor catenary are anchored at the entrance of the train maintenance building. Inside the building there is no tensile force in the contact wire of the fixed or movable conductor rail installation. This contributes to an increased working safety.



Railway safety control system for depots

Engines and tools



Movable conductor rail

When the movable conductor rail installation is in operating position (swung out), trains can enter the maintenance or loading areas by electric traction.

When the movable conductor rail is in non-operating position (retracted), unhindered access to the train is possible with portal cranes, working platforms etc. Movable conductor rail installations with a total retractable length of more than 300 meters have already been realized.



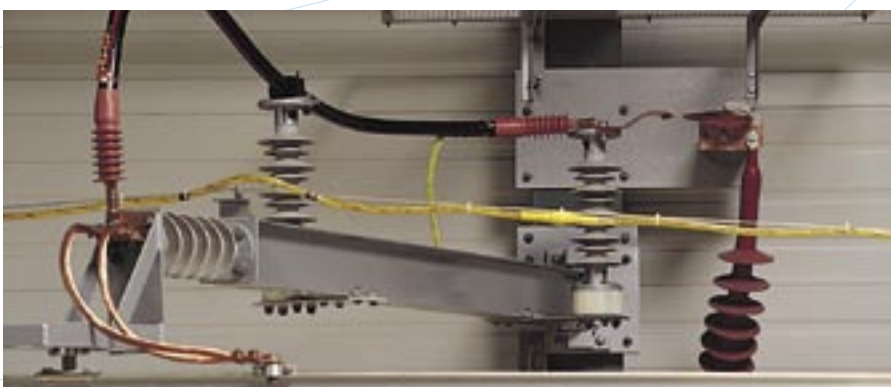
Positive earthing

Positive earthing of the movable conductor rail in the retracted position.



Electrical contacts

Neighboring movable sections are equipped with specially developed overlaps on which electrical contacts can be installed for continuous current transfer.



Feeding arrangement

Possible feeding arrangement for a movable conductor rail and running light which visually indicates when the system is powered.



Conductor rail on bridges

Swing, bascule and lifting bridges can be equipped with Furrer+Frey conductor rail. Train speeds of 150 km/h are possible.

Furrer+Frey

FL 200/260 (T)

Conductor rail



Swing bridges

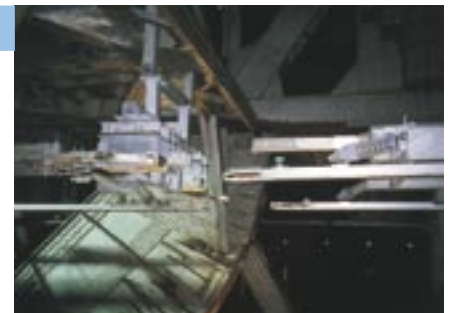
On swing bridges, rotary conductor rail transition units allow the bridge movements.



Overhead contact lines

Bascule bridges

On bascule bridges, conductor rail sections are folded in and driven back in order to free a space for the counterweight which moves down to the track level when the bridge opens.



Railway safety control system for depots

Snow und ice

All types of movable transition units together with their electrical contacts are securely working at temperatures from +40°C to -25°C and with 13 mm of ice.



Engines and tools

Open track

Conductor rail installation on open track. Cable suspension arrangements for the conductor rail allow increased mast spacings.



Supports

Typical gliding and hinged support arrangements for DC and AC applications.



Your partner for planning, supplying and installing overhead conductor rail systems.

Furrer+Frey AG
Overhead contact line engineering
Design, manufacturing, installation
Thunstrasse 35
P.O. Box 182
CH-3000 Berne 6
Switzerland

Phone +41 31 357 61 11
Fax +41 31 357 61 00
www.furrerfrey.ch