DEHN protects.

The voluntary fire brigade at incidents on railway tracks

Project overview

Sector

Railway earthing, occupational health and safety, personal protection

Application

Earthing and short-circuiting the overhead contact line of railways to protect individuals in the track area

Hardware

Voltage detectors, earthing sticks as well as earthing and short-circuiting devices for railway applications

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Challenge

The domain of many voluntary fire brigades includes railway sections. In case of accidents in the track area, electrical overhead contact lines carrying a voltage of 15,000 volts pose a great risk for emergency personnel. It is therefore important to maintain a distance of at least 1.5 m to live parts during rescue work.
If firefighters cannot keep this distance during their work, the overhead contact line must be de-energised according to the five safety rules. For this purpose, the contact wire section is switched off by the German Railways (DB) control room. However, this alone does not ensure that the overhead contact line is de-energised: Voltages of up to 5,000 volts may still be present in case of accidental re-connection or factors such as electromagnetic interference. For this reason, it is essential to carry out additional earthing measures at the scene of an incident before starting work.

Solution

As a rule, German Railways are in charge of for earthing and short-circuiting the overhead contact line. The German Railways emergency managers assume responsibility for this task in their areas. If an emergency manager has to cover a very large area, it can be a long time before he is on the spot. This can considerably delay the fire brigade operation. As a result, firefighters are trained in earthing and short-circuiting overhead contact lines and equipped accordingly. Having attained the initial basic qualification, their knowledge of railway earthing is refreshed every two years by a German Railways representative. An earthing set is also carried in the emergency vehicles of the fire brigade. This consists of voltage detectors, earthing sticks and earthing and short-circuiting devices.
At the scene, all parts of an overhead contact line system have to be connected to the return cable, namely the running rail, and earthed (traction system earthing). If several other overhead contact sections are adjacent to an overhead contact line section, several connections may be required. The number of return cable connections required must be determined with the railway operator according to the local conditions and the respective switching condition of the system. As a general rule, however, at least two earthing and short-circuiting devices must be installed per disconnected switching group. Traction system earthing is therefore always carried out twice – before and after the scene of the incident. In the event of a fault, this process generates a deliberate short-circuit and discharges any fault currents to earth. Other than equipment provided for this purpose in the system such as earthing switches, only portable earthing and short-circuiting devices may be used for connection with the return cable.

This reliably protects everyone from dangerous high voltages. Firefighters can get safely down to work, true to their motto "rescue, extinguish, salvage, protect".

Firefighters from the voluntary fire brigade in Beratzhausen during a railway earthing workshop held by German Railways.

DEHN protects human lives

- Due to accidental re-connection or technical defects, traction current may recur in the short-circuited contact wire. By short-circuiting the circuit using DEHN earthing and short-circuiting devices, an upstream protective device (e.g. overcurrent protective device) automatically switches this current off again.
- The overhead contact lines running in parallel along the railway line influence each other. As with a transformer, a life-threatening voltage can be induced from the current carrying section to the section which has already been switched-off. This voltage is also safely discharged via the DEHN earthing and short-circuiting device.

Surge Protection
Lightning Protection
Safety Equipment
DEHN protects.

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