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Level 3

Working On or About 25 kV A.C. Electrified Lines

Module 4 Maintaining the Integrity and Safe Operation of 25 kV A.C. Electrified Lines

(This module is one of a suite of modules forming Network Rail standard NR/L3/ELP/29987 'Working On or About 25 kV A.C. Electrified Lines')

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1 Purpose

This module will preserve the integrity of the 25 kV a.c. electrification system and promote its safe and efficient operation through requirements and controls for its physical condition, electrical continuity and relationship with other infrastructure systems. Further requirements for working on or about the electrified lines are contained in the Rule Book Module AC (GE/RT8000/AC).

2 Scope

This module states the requirements for maintaining the integrity and safe and efficient operation of the 25 kV a.c. electrification system, through attention to the position of the overhead line equipment relative to the track, to traction bonding, and to automatic power control inductors.

It is applicable to Network Rail personnel and to Network Rail's contractors.

To provide a consistent approach to working on or about 25 kV a.c. electrified lines, Train Operating Companies may, as best practice, apply this standard to infrastructure they control.

3 25 kV A.C. Electrification Equipment

3.1 Overhead Line Equipment Masts and Structures

Nothing shall be fixed or attached to overhead line equipment or overhead line equipment structures without the permission of the Delivery Unit Electrification and Plant Engineer (DUE&PME).

Excavation or other work which is likely to affect the 25 kV a.c. electrification equipment, in particular structures, cables or their supports or covers, shall not be carried out without the permission of the relevant DUE&PME.

3.2 Overhead Line Conductors

If objects are observed to have been thrown onto, or are hanging from, the overhead line equipment, the circumstances shall be reported immediately to the ECO.

Broken or displaced overhead line conductors, either on the ground or touching other infrastructure equipment, shall not be approached and shall be regarded as live and consequently dangerous to life. The circumstances shall be reported immediately to the ECO.

If smoking, excessive flashing, fusing or other damage is observed, the ECO may implement a block to electric trains in accordance with electrical control instructions.

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4 Traction Bonding – Description

4.1 General

Electric trains draw power from the OLE with current returning to the feeder stations via the running rails, earth wires, return conductors or autotransformer feeders depending upon the specific location design. Each OLE structure is bonded to the traction return system.

Electrically conductive structures and services, where there is a risk of exposed metalwork becoming electrically connected to live OLE (by flashover, breakage of conductors, etc.), are bonded to the traction return system, thus ensuring rapid disconnection of the traction power supply in the event of a fault. Additionally, equipotential bonding is provided where it is possible to simultaneously touch exposed metalwork and the running rails, trains or other conductive objects connected to the traction return system. This is necessary to limit accessible and touch voltages to values within acceptable limits.

The traction return current passing through the running rails and the bonding system is not dangerous to life.

However, if the rails are broken or separated, or the bonds become detached, a dangerous voltage might be present and they shall not be touched until the relevant requirements of this module and Module 7 have been met.

Network Rail standard NR/SP/ELP/21085 states the requirements for the design of earthing and bonding for 25 kV a.c. electrified lines.

4.2 ‘Red’ Bonds

Certain bonds connected to the running rails, such as those from switching stations, return conductors, auxiliary supplies transformers, earthing devices, harmonic dampers, etc. are marked in red. If disconnected at either end this could result in a dangerous voltage arising and a consequent risk of injury.

Red bonds shall be disturbed only by staff with sufficient knowledge of the electrification system working to a method of work authorised as below.

Work type	Authorised by
Maintenance	Delivery Unit Electrification and Plant Maintenance Engineer
Projects	Designated Project Engineer

Table 1 – Authorisers of methods of work

Where the DUE&PME or DPE is not competent in assessment of electrical risks, they shall seek the advice of an identified competent engineer. Competent engineers are those identified as competent in writing by the Route Asset Manager (E&P).