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Translation

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Measures to be taken to improve track circuit shunting sensitivity

Mesures à prendre pour améliorer la sensibilité au shuntage des circuits de voie
Maßnahmen zur Verbesserung der Nebenschlussempfindlichkeit der Gleisstromkreise



UNION INTERNATIONALE DES CHEMINS DE FER
INTERNATIONALER EISENBAHNVERBAND
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Leaflet to be classified in Volumes:

V - Rolling Stock
VI - Traction
VII - Way and Works

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The person responsible for this leaflet is named in the UIC Code

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Summary

The purpose of this leaflet is to make recommendations to improve track circuit shunting sensitivity.

A summary description of track circuit functioning is given in point 1. The problem of shunting, which constitutes one of the critical points for rolling stock and track circuit compatibility, is explained in point 2.

Point 3 sets out the conditions to be met as regards the voltage to be applied to tracks to ensure, generally speaking, the correct shunting of track circuits. These conditions, already established in the previous edition of this leaflet, cover most of the situations concerning low-traffic lines which are subject to heavy pollution.

Point 4 describes a set of solutions to track circuit shunting problems when the pollution is less severe.

Point 5 looks briefly at the changing constraints associated with developments in rolling stock, running quality and traffic.

These variations are taken into account in the recommendations made in point 6 to improve track circuit shunting sensitivity according to the operating conditions of the lines and the tasks performed by the track circuit.

Point 7 makes further recommendations regarding accreditation of new rolling stock, designed to prevent in-service problems relating to track circuit shunting.

Point 8 looks at the particular case of sanding, which can cause track circuit shunting to fail if no precautions have been taken.

1 - Introduction

Generally speaking, a track circuit is an installation in which the rails offering a sufficient degree of insulation between them are used as conductors for a part of the circuit in question, the track circuit being provided with a transmitter and a receiver. In most cases, the receiver commands a relay, known as track relay, which is normally energised when no trains are passing; the presence of a train causes a "shunt" in which the two rails are short-circuited, causing the track relay to become de-energised.

2 - Problems with rail shunting

The operation of the track circuit requires that the short-circuiting of the rails by the vehicle is correct - i.e. that the shunting is good enough - to be certain that the track relay does not fail to become de-energised (in the case of Track Vacancy Proving track circuits which are dealt with in this leaflet). Nevertheless certain circumstances may prevent this condition from being fulfilled to the degree required for safety purposes. The existence of an insulating film between the wheels and the rails can, for example, prevent the occurrence of a definite short-circuit. It is possible for such a film to be caused by the oxidation of the wheels (especially when the rolling stock has not been running for a long time) or by depositing an insulating layer of composite braking particles, by oxidation of the running surface of the rails (especially on low-traffic tracks), or by depositing a layer of insulating substance on the rail (particularly as a result of sanding, braking, or leaves).

The total shunting system seen from a track point of view includes not only the impedance of the axles but also the contact impedances between the wheels and the rails, which will vary according to the rail / wheel contact.

The quality of the rail / wheel contact depends on several factors, especially the effective load applied and the surface condition of the wheel and the rail.

In the extreme case, the presence of an insulating film between two metal surfaces will only allow the current to pass after mechanical breakdown or electric disruption of this film.