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Level 2

Design and Installation Requirements for Driver Only Operation (Passenger) Systems

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Issue record

Issue	Date	Comments
1	26 August 2008	First Issue
2	17 Sept 2009	Second Issue
3	04 June 2011	Third issue following publication of Issue 2 of Group Standard GE/RT8060

Compliance

This Network Rail standard is mandatory and shall be complied with by Network Rail and its contractors if applicable from 02 July 2011.

When this standard is implemented, it is permissible for all projects that have formally completed GRIP Stage 3 (Option Selection) to continue to comply with the issue of any relevant Network Rail Standards current when GRIP Stage 3 was completed and not to comply with requirements contained herein, unless stipulated otherwise in the scope of this standard.

Reference documentation

NR/L2/EBM/029	Product Introduction and Change
NR/L1/TEL/30100	Telecoms Design
NR/L2/SIG/10157	Signal Sighting
NR/SP/ELP/21085	Specification for Design of Earthing & Bonding Systems for 25Kv AC Electrical Lines
NR/L2/INI/02009	Engineering Management for Projects
GI/RT7016	Interface between Station Platforms, Track and Trains
GE/RT8060	Engineering Requirements for Dispatch of Trains from Platforms (Issue 2)
GE/GN8560	Guidance on Engineering Requirements for Dispatch of Trains from Platforms (Issue 1)
GT/TDINT100	Earthing and Equipotential bonding of Telecommunications Equipment
GT/TD GEN 096	Telecommunications Requirements for General and Emergency Use at Sub Surface Stations
GL/RT1255	Low Voltage Power Supplies in Electrified Areas
GO/RT3451	Train Movement – Staff Suitability and Fitness Requirements
BS7671:2008	Requirements for Electrical Installations. IEE Wiring Regulations
BS EN 50121-4:2006	Railway applications. Electromagnetic compatibility. Emission and immunity of the signalling and telecommunications apparatus
Code of Practice	Accessible Train and Station Design for Disabled People: A Code of Practice, Version 2, September 2010. (A joint publication by Department for Transport and Transport Scotland)

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1 Purpose

This standard in support of NR/L1/TEL/30100 – Telecoms Design, mandates the requirements for the design of Driver Only Operation (DOO) viewing systems on Network Rail infrastructure when this is the chosen method of train dispatch.

2 Scope

This standard details the optical requirements for DOO CCTV systems utilising station-mounted cameras and monitors together with requirements for design and installation. This standard also mandates requirements for platform-mounted DOO Mirrors.

This standard applies to all new DOO system designs and retrospectively to all DOO system installations carried out either as a like for like renewal or as part of an enhancement project.

This standard does not cover the health and safety requirements for the carrying out of the installation and reference should be made to the appropriate standards in this respect.

3 Definitions

CCD Camera

Charge Coupled Device Camera, a type of CCTV camera

Contrast Sensitivity

A measure of the ability of a person to resolve differences within a grey scale.

DDA Banding

Disability Discrimination Act (DDA) - A colour band applied to structures such as monitor posts so as to assist partially sighted persons in identifying those structures.

Designated Project Engineer (DPE)

As specified in NR/L2/INI/02009, person appointed by Network Rail accountable for the co-ordination and integration of technical and engineering aspects of a specific project particularly where the project includes multi-disciplinary activities. The DPE may also act as the Project Engineer (PE) for a single engineering discipline.

Discernible Image

The minimum size image which can be identified by a person whose eyesight just meets the minimum requirements of Railway Group Standard GO/RT3451 – 'Train Movement – Staff Suitability and Fitness Requirements' and whose contrast sensitivity is not less than the median of 65 year old observers.

DOO CCTV

CCTV systems and equipment used by drivers to monitor train doors at a station operated under Driver Only Operation (Passenger) Rules.

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Driver Only Operation (DOO)

The operation of a train without a person on board for the purposes of protecting the train when the driver is incapacitated and the train is stopped by, failure accident, obstruction of the line or other exceptional incident.

Driver Only Operation (Passenger) (DOO(P))

DOO as applied to trains carrying passengers

GRIP

Governance for Railway Investment Projects - process used in Network Rail to manage and control the development and delivery of infrastructure projects.

Look Back

The action of the driver leaning out of the window and looking back along the length of the train to confirm that the platform-train interface is clear.

NR

Network Rail

Portrait (image)

An image where the height is greater than the width.

Rotakin Target

A target object which produces a discernible image via a given camera and monitor.

Split Picture

The practice of displaying more than one camera image on a single monitor.

Sponsor

A Network Rail person who acts as a single point of contact between the Client as defined in GRIP and the Project Manager (or Development Manager).

TOC

Train Operating Company.

Target Object

An object which produces a discernible image via a given camera and monitor.

4 DOO System Overview

Driver Only Operation (Passenger) (DOO(P)) Systems may be one of the following type of system:

- a) DOO CCTV Systems (station-mounted cameras and monitors)
- b) DOO Mirror Systems (platform-mounted DOO Mirrors)

For a single platform car stop position, DOO CCTV systems shall not be combined with mirrors or driver look back.

For existing installations, the combination of a DOO CCTV system and mirror at a single car stop position may be retained following any renewal only where there are

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physical platform or environment conditions that prevent separate car stop positions.

5 General Requirements

The following requirements apply to both DOO mirror and CCTV systems.

5.1 Pre-Design Surveys

5.1.1 Station lighting

The Designer shall carry out a site survey to confirm that the station lighting at the platform meet the requirements. Where the station lighting is found not to meet the minimum lighting requirements, detailed in GE/RT8060 and GI/RT7016, the Designer shall consult the NR DPE and Sponsor for guidance.

The Designer shall consider the lighting levels (including sunset and sunrise conditions) when designing the system and shall specifically consider what lighting may be like 365 days a year and any light transitions apparent due to platform structures.

5.2 Generic Design Requirements

Whichever system is used the entire system shall comply with the requirements of GE/RT8060.

5.2.1 Clearance Requirements

Headroom requirements for all DOO installations suspended from platform canopies and their relative distances from the platform edge, shall comply with GI/RT7016.

5.2.1.1

All DOO equipment shall be a minimum of 450mm clear of the swept envelope, and at a sufficient height, or otherwise positioned, so as not to restrict the movement of people.

5.2.2 Number of Car Stops

The Designer shall rationalise the number of car stops at a platform when designing the system through consultation with the NR DPE and the TOC(s) using the station.

5.2.3 Sub Surface Requirements

All systems that are to be installed in a sub surface environment shall comply with the requirement of GT/TD GEN 096.

5.2.4 Safety Requirements

System shall be designed such that all equipment is installed in a green zone. Where this is not possible due to local requirements the Designer shall provide a solution for the agreement of the NR DPE including the proposed maintenance methodology for equipment outside the green zone.

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5.2.5 Earthing and Bonding

The Electrical Earthing & Bonding system shall be designed, installed, tested & documented by suitably competent persons in accordance with the requirements of NR/SP/ELP/21085, BS7671, GT/TDINT100, GL/RT1255.

5.2.6 Positioning Posts on Platform

The equipment located on a platform shall comply with the requirements of NR/L2/SIG/10157 Signal Sighting so that there is no impact upon signal sighting.

5.2.6.1

When determining the position of equipment posts on the platform the Designer shall consider the impact of the following criteria with the desired location.

- Passenger flow (e.g. reduced distance to platform edge or available area on a platform)
- Ease of maintenance (e.g. ease of access, red zone requirements or requirements to move equipment)
- Proximity to overhead line equipment
- Proximity to third rail power equipment.

5.2.6.2

The Designer shall consider the environmental issues and potential vandalism when determining the position of posts on platforms. Special consideration may be necessary for equipment positioned under girders and bridges where pests (e.g. pigeons) may cause problems.

5.2.6.3

Where equipment is to be positioned in a location with a high incidence of vandalism consideration shall be given to methods for protecting the equipment or changing the location.

5.2.7 EMC (Electromagnetic Compatibility)

The entire DOO system shall comply with the requirements of BS EN 50121-4.

5.2.8 Cables and Cable Routes

5.2.8.1 Duct Routes

Where new duct routes are required to new structures, the following shall be installed as a minimum:

- 1 x 150mm ducts for all monitor posts (or 2 x 100mm)
- 1 x 100mm duct for individual camera posts

5.2.8.2 Draw Pits and Manholes

The Designer shall contact the NR DPE to determine the minimum requirements of draw pits or manholes installed on Network Rail owned platforms in line with the following clauses.

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5.2.8.3 Draw Pit Sizes

As a minimum new draw pits shall be one size larger than that required to loop cables out of the opening and back in again without exceeding the minimum bend radii of the cables. All ducts shall be rodded and left with draw-ropes in position on completion of the works. Access covers & chambers shall be no less than 600mm x 600mm and finished in a manner which matches the platform surface. All new platform works must avoid disturbance of the platform edge tactile paving and platform surface drainage.

5.2.8.4

Draw ropes shall be inserted into all new draw pits. Draw ropes shall be 2kN, rot-free, nylon draw ropes secured to prevent withdrawal into duct.

5.2.9 Cable Trunking

Where cables are to be run along surface areas, these shall be fully contained within galvanised steel (suitable for the entire cable life) trunking or conduit, installed as per manufacturer's recommendations. The containment shall include correctly matching bends and end pieces etc, so that no cables are visible.

5.2.9.1

Trunking lids shall be secured with anti-tamper/vandal resistant screws and fixings.

5.2.9.2

Cables that require installing over footbridges shall be run through a cable containment route which is suitable for the environment in which it is being used and is acceptable to both the NR Structures Engineer and NR Maintenance.

5.2.9.3

The design shall take into account the requirements for separate cable routes for signal & power cables unless the cables can comply with the requirements of BS7671 by increased insulation breakdown voltage or by surrounding power conductors with suitable current carrying outer armour/screening.

5.3 Optical requirements

The following are the fundamental requirements for an image to be discernible by a driver with eyesight meeting the minimum standards GO/RT3451 and having Contrast Sensitivity not less than the median of 65 year old observers, based on research conducted by the Railway Group Standards Unit in 1993 and 1994.

5.3.1 Discernible image: angle subtended at eye

For the image of a target object to be discernible by the human eye, the image shall subtend at the eye an angle of at least 20 minutes of arc (0.333 degrees of arc).

5.3.2 Discernible image: image size relative to monitor

So that the image of a target object will be noticeable compared to the total area of picture displayed on a monitor for a DOO CCTV system, the height of the image of