



Health & Safety Executive
HM Railway Inspectorate



Guidance on the provision of equipment and arrangements for evacuation and escape from trains in an emergency



Guidance for the railway industry

The aim of this leaflet is:

- **To bring together all HSE guidance on evacuation and escape from trains so as to provide a useful source of information for the railway industry.**
- **To comply with recommendation 63 of Lord Cullen's Part 1 report into the Ladbroke Grove collision.**

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Foreword

This leaflet contains extracts and information drawn from HSE guidance which deal with evacuation and escape from trains. The style and level of detail may therefore vary.

The leaflet is divided into four parts. Each part draws from the relevant sections of HSE guidance on emergency evacuation and escape from trains, as follows:

Part 1

Is taken from the HSE draft guidance to the Railways (Safety Case) Regulations 2000 and the proposed 2002 amendments. The extract is based specifically on paragraphs 250-252 of the existing guidance published in 2001 *Railways (Safety Case) Regulations 2000 and 2001 amendments* (L52). It should be noted that these paragraphs include the proposed amendments not currently shown in the guidance to the Regulations. However, L52 will be updated and a new edition will be published in late 2002.

Part 2

Is extracts from the *Safety case assessment criteria* for assessment of railway safety cases under the Railways (Safety Case) Regulations 2000. Specifically criteria 11.7 and 11.13 and related paragraphs 30-38 and 58.8-67 respectively.

Part 3

Contains various paragraphs from the relevant sections of *Railway safety principles and guidance Part 2 Section F Trains* (RSPG2F) which specifically involve evacuation and escape from trains. A new edition of RSPG2F is currently in production.

RSPG2F is one of a series of books published in 1996 providing high-level guidance and advice to those involved in the design and construction of new and altered works, plant and equipment which require approval under the Railways and Other Transport

Systems (Approval of Works, Plant and Equipment) Regulations 1994. The guidance contained in RSPG2F is principally concerned with the design of trains and the equipment to be carried on trains including those which assist evacuation and escape.

Part 4

Contains draft guidance on train/vehicle evacuation or escape from a forthcoming publication about safe movement of trains. The *Railway safety principles and guidance* series is being extended to cover management and operational issues and guidance is currently under development as part of the extended series. It will set principles and provide guidance on the operation of trains rather than their design and construction or the equipment carried on them. It will include high-level guidance on the operational aspects of train evacuation and escape. The new guidance will be published following wider consultation in 2003.

Further Information and References

If you require further information, advice or wish to find out more about the relevant regulations and associated draft guidance and other publications mentioned in this leaflet please refer to these sections.

Introduction

Who should read this leaflet?

This guidance is primarily intended for use by management in train operating companies in the development of their railway safety cases. It will also be of use to rolling stock manufacturers and leasing companies and others. All railway employers will need to have systems in place to ensure that their staff are competent to undertake the various tasks required of them.

Background

The subject of evacuation and escape from trains has achieved higher profile following the collision at Ladbroke Grove in 1999.

This publication brings together existing guidance produced by HSE and new guidance currently under development on the subject of evacuation and escape from trains and so provides a useful source of information.

Evacuation in an emergency is regarded as the controlled egress of passengers from a train or vehicle to a place of safety, which is supervised by railway or emergency services personnel. Whereas, escape in an emergency is regarded as the unsupervised egress of passengers from a train or vehicle to a place of safety. In the latter circumstances, passengers may follow the advice of train signage and instructions provided, and may use on-board emergency equipment, emergency door-release devices, or any emergency exit windows.

Recommendation 63

Recommendation 63 (of the Part 1 report on Lord Cullen's inquiry into the collision at Ladbroke Grove) requires adequate guidance to be produced by the Health and Safety Executive to support the provisions in Schedule 1 to the Railways (Safety Case) Regulations 2000 (as amended in 2001) 'as to evacuation and escape' from trains. The guidance contained in this leaflet is part of HSE's commitment to fulfil this recommendation. It includes planned revisions to all relevant guidance to take account of recommendation 63 eg L52, RSPGs and the *Safety case assessment manual*.

The relevant provisions in Schedule 1 are as follows:

'15 Particulars of the arrangements the duty holder has established- ...

(c) for the provision of equipment and arrangements for the evacuation of persons in an emergency from trains operated by the duty holder; and

(d) for the provision of equipment and arrangements for the escape of persons in an emergency from trains operated by the duty holder.'

PART 1

Railways (Safety Case) Regulations 2000 including the 2001 amendments

The following amendments (in italics) are being made to this publication (L52) specifically to page 61, paragraphs 250-252 of the guidance:

250 The safety case should describe the equipment and arrangements in place for facilitating the evacuation and escape from trains in an emergency. This covers emergency exits; *facilities for the removal of windows where applicable*, such as hammers; *door emergency release devices*; escape lighting; signs indicating emergency exits or equipment; training of on-board staff in evacuation procedures; and information and instructions to passengers. The equipment and arrangements to be provided on different types of train will depend on the type of train, and on practicalities. Equipment needs to be:

- (a) **sufficient**, so that it is available to all staff and passengers when needed;
- (b) **suitable**, so that it performs its intended function satisfactorily in the conditions in which it will be foreseeably used;
- (c) **suitably sited**, so that it is easily accessible while not providing an obvious target for vandalism; and
- (d) **easy to use**, regarding the conditions in which it may be used, including poor light.

251 The duty holder should describe the arrangements to provide suitable instructions for passengers on the means of escape and on the use of the emergency equipment provided. This includes information on the position of escape routes, escape route signs and any emergency exits, and how to use the exits in emergency, including, where appropriate, the information *describing the means of releasing doors in an*

emergency. This information could be provided in writing, eg in the form of an illustrated card provided at each seat, through information notices and/or announcements. Simple, bold instructions also need to be provided on the release and use of hammers *where supplied* and other emergency devices, placed next to hammers and capable of being read in poor light.

252 Where changes are proposed to train interior design, equipment, or evacuation and escape procedures, the effectiveness of the arrangements as a whole will need to be carefully assessed. Amendments to safety cases will need to be considered and submitted to HSE.

PART 2

HSE Safety case assessment criteria

The following is taken from criteria 11.7 and 11.13 and related paragraphs 30-38 and 58.8-67. The full document is available on the HSE website:

'Criterion 11.7: The Safety Case should describe the arrangements that are in place to ensure that the equipment to be mobilised for mitigating the consequences of incidents will be fit for purpose and available when called upon for use.

Reason

30. Schedule 1(14) requires it (See paragraph 5).

31. It is important that the equipment to be used in the event of an incident is available when needed and is fit for purpose.

Examples of evidence

32. Performance standards are laid down for the availability of equipment including the times to transport it to the site of the incident. This is particularly important where the equipment is owned by a third party.

33. The equipment is capable of operating in all foreseeable weather conditions.

34. The equipment is capable of operating in the local environmental conditions which are expected to be experienced during emergencies.

35. The equipment is stored in an appropriate manner and location.

36. The possibility of loss of services, such as power, water and communications has been taken into account and alternative supplies provided where necessary.

37. The equipment provided is compatible where necessary with that of the emergency services and that provided by other railway operators affected by the emergency.

38. Appropriate personal protective equipment (PPE) is provided for the foreseeable range of scenarios that are likely to be encountered. It is stored in suitable conditions to prevent deterioration and is replaced before its shelf life expires.

Criterion 11.13: The Safety Case should provide details of the equipment provided and the procedures implemented to enable the safe evacuation or escape when necessary from trains.

Reason

58.8. Schedule 1(15)(c) and (d) requires:

“Particulars of the arrangements the duty holder has established - ...

(c) for the provision of equipment and arrangements for the evacuation of persons in an emergency from trains operated by the duty holder

(d) for the provision of equipment and arrangements for the escape of persons in an emergency from trains operated by the duty holder.”

59. In the event of an accident it is foreseeable that both passengers and employees may have to escape/evacuate from damaged parts of the train. Unless the passengers' health and safety is at risk they should be encouraged to remain within the train until the emergency services arrive.

Examples of evidence

60. The procedures for ensuring safe evacuation of trains. These should cover all persons on the train and all types of trains including passenger, freight and engineer's trains.

61. Preference is given to disembarking passengers at a station or transferring them to another train to continue to the disembarkment point.
62. The procedures take account of any factors which may present additional risks including, for example, the presence of tunnels and third-rail traction current systems.
63. The arrangements for the training of staff in the emergency procedures including the testing of the procedures in various scenarios.
64. The equipment provided to enable the safe evacuation of trains. (See Criterion 11.7 for any equipment provided to staff that are trained and competent in its use).
65. The competence would need to cover the use of the equipment on a regular basis so that staff are sufficiently familiar and experienced to cope with it in emergencies.
66. Notices placed throughout the train advising passengers what action should be taken in the event of an accident and the designated escape routes.
67. Provision should be made for the removal of glazing where it forms part of an escape route and this should be provided in each carriage with appropriate instructions for passengers.'

The relevant railway group standard is GO/RT 3471 *Incident Response Planning* For further information on how to obtain a copy of the standard contact the Railway Safety Enquiry Desk on 0207 904 7518.

Please refer to the *Safety case assessment manual* for further information eg standards, emergency planning, training in emergency response, testing of emergency and escape procedures, maintenance of emergency equipment etc.

PART 3

Railway safety principles and guidance Part 2 Section F Trains

The following is taken from the relevant sections of *Railway safety principles and guidance Part 2 Section F Trains* (RSPG2F) which refer to evacuation and escape from trains. It should be noted that this is a summary of the guidance text as this structure does not exist in the published edition. The information has been taken from several sections by the author to help highlight the relevant details from the publication (where appropriate paragraph numbers have been given).

A new edition of RSPG2F is currently in production which will include updates related to new legislation, standards and this topic. The new edition is scheduled to be published by the end of 2002.

Fire safety

On-board fire safety provisions should take into account the needs of passengers and staff when evacuating their accommodation to a place of relative safety along the train or, after the train has stopped, away from the train. These needs will vary according to the type of operation, the characteristics of the infrastructure, the speed of the train, the flammability of materials and the fire load, the efficiency of any fire detection and/or suppression equipment. The need for suitable provision within the infrastructure (eg emergency access/egress in tunnels) should also be taken into account and an overall fire safety strategy developed.

Passengers and staff should be protected from the effects of fire, heat, smoke and toxic fumes to enable them to evacuate safely. The time required to reach a place of safety should be assessed and taken into account.

See RSPG2F, paragraphs 35-55.

Signage and information

The means of providing advice to passengers may include, public address announcements, passenger information cards and fixed signage at appropriate locations on the vehicle, or any combination of these. Signs should be visible at all times and should be clear and unambiguous. Internationally recognised pictograms and/or multi-lingual signs should be used where appropriate.

Any advice intended for the emergency services should be of an agreed format.

Escape routes, equipment and procedures should be clearly signed in all circumstances, making use of internationally recognised pictograms. Consideration may be given to indicating automatically the escape routes to passengers.

See RSPG2F, paragraphs 162, 164, 238, 249, 253 and 256.

Doors and glazing

In an emergency it should be possible for people to:

- (a) open designated external doors or windows, once the train is stationary;
- (b) move from one vehicle to the next (where suitable access exists); or
- (c) remove the glazing (or panel etc) where it forms part of an escape route.

Inter-vehicle gangways or internal doors should not prevent passengers from escaping.

Passengers should be able to exit their vehicle using more than one route. There should be no 'dead end' traps. End doors, that form part of an escape route, should be usable by passengers to evacuate.

The normal operation of doors and windows should not cause any serious injury to people.

See RSPG2F, paragraphs 160-169 and 226-254. This includes information on the use of selective door opening equipment.

Partitions

Partitions in passenger saloons should not obstruct escape routes and due account should be taken of their effect in this regard when the vehicle is not in an upright position.

See RSPG2F, paragraphs 25-26.

Lighting

Passenger compartment lighting should remain operational at all times. A reduced level of lighting may be permitted in the event of an emergency to conserve the secondary power source and should last long enough to permit the train to be evacuated safely. Emergency lighting provisions should include escape routes and signs.

Lighting in connecting passageways and at steps and exits should be even, adequate and at a similar level to elsewhere in the vehicles. A reduced level of lighting may be acceptable in an emergency.

See RSPG2F, paragraph 198-199 and 216.

One-person or automatic operation

Where trains are operated automatically or on one-person-operated underground railways or in other circumstances that restrict evacuation, the control centre should be able to communicate with the passengers direct.

See RSPG2F, paragraphs 268-269.

Public address

A public address system, or similar, should be provided to enable the train crew (or, where appropriate, the train control centre staff) to communicate with passengers. The system should be available during an emergency, and where appropriate, to members of the emergency services.

See RSPG2F, paragraphs 255-269.

On-board equipment for staff use in an emergency

Conductor rail electric traction current short-circuiting devices, track circuit short-circuiting devices and similar emergency equipment should be provided appropriate to the traction and signalling systems in use.

Ladders and tools etc may also be required. Where provided, it should be securely stowed to prevent unauthorised use but be readily accessible when required.

See RSPG2F, paragraph 114 and 225.

PART 4

Safe movement of trains

The following advice on train/vehicle evacuation or escape is taken from guidance that is currently being prepared on the safe movement of trains. The *Railway safety principles and guidance* series is being extended to cover management and operational issues and the safe movement of trains guidance is currently under development as part of the extended series. It will set principles and provide guidance on the operation of trains rather than their design and construction or the equipment carried on them. It will include high-level guidance on the operational aspects of train evacuation and escape. The document will be published following wider consultation in 2003.

Note: Guidance on the physical features of trains or vehicles provided for use in emergencies, for example door lock releases and signs, is contained in *Railway safety principles and guidance Part 2 Section F* which railway companies should consider in conjunction with this guidance.

(a) Objective

In the event of a train being involved in an emergency, the overall objective should be to minimise any further risk to the passengers and staff on the train. This may be achieved by a variety of means including:

- the provision of suitable information to inform passengers of the action to take in an emergency; and
- enabling those at risk to move to a safe part of the train or, where necessary, to leave the train and move to a place of safety.

(b) Evacuation

Evacuation in an emergency is the controlled egress of passengers from a train or vehicle to a place of safety, which is supervised by railway or emergency services personnel.

(i) Planning

Plans should be in place which include arrangements for safe evacuation of passengers from trains to a place of safety in the event of an emergency occurring. Train operators should develop such plans in consultation with other relevant bodies including the emergency services. Plans should cater for the evacuation of passengers who are mobility-impaired.

(ii) Training

All staff likely to be involved in train evacuation should be conversant with the factors they should consider and the actions they should take. The plans developed to achieve safe evacuation should be used as the basis for the training of staff. Training should be arranged periodically to ensure that staff and others likely to be involved, for example the emergency services, remain conversant with their roles and the use of emergency equipment. Practical evacuation exercises are a useful means of achieving this.

(iii) Procedures

Procedures should be developed for use in the event of a train evacuation becoming necessary, including arrangements for:

- communication between railway staff on the train;
- communication between railway staff and passengers on the train;
- communication between the train and the train movement control centre;

- communication between railway staff and any necessary emergency services;
- the train to be stopped, where possible, in a suitable place for evacuation and external assistance, eg not in a tunnel or on a viaduct;
- the blockage of all lines affected on which trains could approach;
- the isolation and discharge of traction current;
- the identification and use of a safe place, clear of all lines, for the assembly of evacuated passengers; and
- aisles and passageways on the train to be kept clear of obstructions, for example luggage and bicycles.

(c) Escape

Escape in an emergency is the unsupervised egress of passengers from a train or vehicle to a place of safety. In these circumstances passengers may follow the advice of train signage and instructions provided, and may use on-board emergency equipment, emergency door-release devices, or any emergency exit windows.

Passengers should be advised that escape from the train should only be attempted as a last resort since harm may arise from the act of alighting from the train, from live electrical equipment or from other trains which may be passing.

Notes:

'egress' means to exit from.

'Place of safety' means a place safe from the effects of the emergency and other immediate hazards of the railway, eg an unaffected vehicle on the train or a place well away from railway lines.

'Railway staff on the train' means train crew and other staff on the train who are required to assist in train/vehicle evacuation.'

Further Information

This document is not intended to set out mandatory standards. It describes the top-level principles which will need to be considered by the duty holders to ensure safety and assist them in the development of their own standards.

It has specifically been written in this way so as not to hinder technical innovation and allow for flexibility to take account of the differing risks on the railway network. HSE recognise the need for a new standard to be developed on evacuation and escape from trains, which will allow for consistency of approach among train operators and provide detailed advice on best practice. This standard should take account of current research programmes on this subject as well as industry good practice and is most appropriately developed by the railway industry. HSE would like to work with the industry to achieve this goal and has provided this leaflet to assist the process.

This leaflet can be found on the HSE website www.hse.gov.uk and copies can be obtained from HSE Books (see page 23).

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This leaflet contains notes on good practice which are not compulsory but which you
may find helpful in considering what you need to do.

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INDG358 07/02 C50

Printed and published by the Health and Safety Executive