Guidance on Medical Fitness for Railway Safety Critical Workers

Issue record

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Superseded documents

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Supply

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Part 1  Introduction

1.1 Purpose of this document

1.1.1 This document provides guidance on medical fitness for railway safety critical workers. This guidance is intended to assist infrastructure managers and railway undertakings in understanding their responsibilities in relation to medical fitness and how they may approach the setting of their own medical fitness criteria, where appropriate. It does not constitute a recommended method of meeting any set of mandatory requirements.

1.1.2 This document also includes appendices which provide further useful information related to important medical conditions and are relevant to the medical health guidance within this document.

1.2 Background

1.2.1 Historically, medical fitness standards within the rail industry have related to specific occupations, or groups of occupations that are similar.

1.2.2 In 2005 the RSSB Strategy for Standards Management introduced a number of guiding principles including:

a) Only those parameters or processes that directly govern the ability of two (or more) duty holders to interface / co-operate with each other to the extent that harmonisation is required to deliver safety in the most economical way should be given the status of mandatory measures. This means that Railway Group Standards (RGS) have focussed on controlling risks between railway duty holders; interface risks. Measures required to control risks that are confined to a single duty holder should be a matter for the duty holder to determine.

b) The 'European' approach provides the framework for the future and the steps set out in the strategy will migrate towards it. This has led to the convergence of fitness standards with European requirements such as Technical Specifications for Interoperability and the Train Driving Licences and Certificates Regulations 2010.

c) The mandatory measures contained within Railway Group Standards (RGSs) will not usually repeat legislation.

1.2.3 Current RGSs only mandate medical fitness standards that relate to the control of interface risks and not necessarily the whole of an individual's job. Individual duty holders need to decide, in consultation with their occupational health advisers, what additional medical fitness requirements may be necessary in the context of specific occupations. These requirements may be mandatory or have discretionary elements that may be open to discretion on the part of the medical assessor and responsible manager.

1.2.4 The Equality Act makes it unlawful for an employer to treat a disabled person unfavourably because of their disability, unless they can show that the treatment is a proportionate means of achieving a legitimate aim.
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1.4 Approval and authorisation of this document
1.4.1 The content of this document was approved by Standards Committee on 04 March 2014.
1.4.2 This document was authorised by RSSB on 02 May 2014.
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Part 2  Guidance for infrastructure managers and railway undertakings on medical fitness standards

2.1 Content of medical fitness standards

GN1 Infrastructure managers and railway undertakings should develop medical fitness criteria that comprise, as a minimum, the following three elements:

a) Vision requirements – which may include distance, near and intermediate visual acuity as well as colour vision, depending on the requirements of the job.

b) Hearing requirements – pre-determined standards against which to assess a person’s hearing.

c) General health requirements – which include general medical standards determined by a task analysis carried out by the infrastructure manager or railway undertaking together with medical advisors. These are aimed at detecting conditions that may impair important functions necessary for safe performance of duties including sight, hearing, awareness, mobility, balance and coordination.

GN2 Infrastructure managers and railway undertakings should include the following within medical fitness standards:

a) The group to whom the standard applies.

b) The necessary qualifications and experience of persons carrying out the assessments.

c) The periodicity of the assessments and the validity of any certificate.

d) The medical fitness criteria.

GN3 Infrastructure managers and railway undertakings may consider, depending on the occupation and the specific tasks involved, that additional medical fitness criteria are required.

GN4 Infrastructure managers and railway undertakings should consider consulting occupational health advisers to help decide what additional medical fitness standards may be necessary in the context of specific occupations.

GN5 Infrastructure managers and railway undertakings may include the requirement for alcohol and drugs screening as part of medical fitness examinations.

GN6 Infrastructure managers and railway undertakings may include simple urine tests to detect diabetes as part of a general medical examination.

2.2 Mandatory and discretionary standards

GN7 Infrastructure managers and railway undertakings, when developing medical fitness standards, should take into account all of the relevant fitness standards for a particular occupation and be aware of the basis for each of those standards.

GN8 Infrastructure managers and railway undertakings should clearly indicate which of their standards are mandatory and which may be open to discretion on the part of the medical assessor and responsible manager. Discretionary standards may be important to assist with making adjustments as part of a safe system of work, for example to accommodate a disabled person.
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GN9 Infrastructure managers and railway undertakings may consider using a hierarchical structure when creating their medical standards.

GN10 Infrastructure managers and railway undertakings should, when devising medical fitness standards, align them with elements mandated by any of the following:

a) Act of Parliament or Statutory Instrument, for example Train Driving Licences and Certificates Regulations 2010.

b) Railway Group Standards.

c) Other regulatory or accrediting bodies.

2.3 Choice of medical assessor

GN11 Infrastructure managers and railway undertakings should arrange for medical examinations to be carried out by, or under the supervision of, a registered medical practitioner with:

a) Expertise of occupational medicine.

b) Knowledge of the hazards of the work concerned and of the railway environment.

c) An understanding of how measures intended to eliminate or reduce risks from those hazards could be affected by lack of medical fitness.

d) Other accreditation, certification or registration if required by regulatory authorities in the circumstances.

GN12 Infrastructure managers and railway undertakings should, if it is not reasonably practicable for a physician meeting the requirements specified above to conduct or exercise direct supervision over medical assessments, have arrangements in place for the medical assessor and employer to have access to such a physician for advice on the interpretation of medical fitness standards, and to monitor consistency of their application.

GN13 The Train Driving Licences and Certificates Regulations (2010) requires medical assessments to be carried out by, or under the supervision of, recognised doctors who appear on a register of doctors maintained by the Office of Rail Regulation (ORR).

2.4 Frequency of medical assessments

GN14 Infrastructure managers and railway undertakings should consult occupational health advisers to help determine the frequency of medical assessments, where the frequency of medical assessments for safety critical staff is not mandated in Railway Group Standards.

2.5 Specific medical requirements

2.5.1 Visual acuity

GN15 Infrastructure managers and railway undertakings should, as part of the task analysis, identify the visual acuity requirements for each occupation. This will enable suitable visual acuity standards to be defined.

GN16 Infrastructure managers and railway undertakings should consider whether some occupations, even those where mandatory visual acuity standards currently exist, require additional or more stringent visual acuity standards in order to control other identified risks.
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GN17 Infrastructure managers and railway undertakings should consider additional tasks as part of the task analysis, for example:
   a) Reading displays, instruments and documents.
   b) Identifying distant or moving objects.
   c) A need for a continual change of focus between near and distant objects.

GN18 Infrastructure managers and railway undertakings may include, as part of their visual acuity standards, requirements with respect to the use of particular corrective appliances such as spectacles, contact lenses, progressive, tinted or photochromic lenses. Appendix A contains further information on laser eye surgery.
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2.5.2 Colour vision

GN19 Infrastructure managers and railway undertakings should define colour vision requirements within their medical fitness standards for occupations required to perform colour dependent safety critical tasks. Appendix B provides guidance on colour vision.

2.5.3 Hearing

GN20 Infrastructure managers and railway undertakings should, as part of the task analysis, identify the hearing standards for each occupation. This will enable suitable hearing standards to be defined.

GN21 Infrastructure managers and railway undertakings should consider whether some occupations, even those where mandatory hearing standards currently exist, require additional or more stringent hearing standards in order to control other identified risks. This might be, for example, a train driver or shunter working on or near the line. It should be noted that the widely adopted hearing standard for persons who are required to maintain their own safety when working on or near the line is that hearing loss should not exceed 30 dB averaged over frequencies 0.5, 1.0 and 2.0 kHz in either ear. Appendix C provides further guidance on factors relating to hearing.

2.5.4 General health

GN22 Infrastructure managers and railway undertakings should, as part of the task analysis, identify the general fitness requirements for each occupation. This will help define general fitness standards.

GN23 Infrastructure managers and railway undertakings should pay particular attention when determining general health standards for those safety critical occupations that require the individuals to remain vigilant, access difficult environments or operate particular types of equipment.

GN24 Infrastructure managers and railway undertakings should consider whether some occupations, even those where mandatory health standards currently exist, require additional or more stringent health standards in order to control other identified risks.

GN25 Infrastructure managers and railway undertakings should, as part of their medical standards, consider how they will manage medical conditions that are likely to cause sudden, unpredictable or even gradual, unnoticed, impairment of a person’s ability to carry out safety critical tasks.

GN26 Infrastructure managers and railway undertakings should, as part of their medical fitness standards, have a process in place to prevent persons carrying out safety critical work where there is reason to believe they are suffering from any medical conditions or are taking any medication, drugs or substances, which are likely to impair performance; for example:

a) Sudden loss of consciousness.

b) A reduction in attention or concentration.

c) Sudden incapacity.

d) A loss of balance or co-ordination.

e) Significant limitation of mobility.
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| GN27 | Infrastructure managers and railway undertakings should seek medical advice about any treatment or adjustments that would reduce the likelihood of conditions such as a) -e) above to a safe level, so that the individual could return to normal or modified duties. |
| GN28 | Infrastructure managers and railway undertakings should document any adjustments as part of a risk assessment process and safe system of work, and communicate it to the relevant people. |
| GN29 | Guidance on diabetes, obstructive sleep apnoea and excessive daytime sleepiness can be found at appendices F and G. |

### 2.5.5 Disability

| GN30 | Infrastructure managers and railway undertakings should, when applying medical fitness standards, take care to make reasonable adjustments to accommodate a disabled employee if it is possible to do so. |
| GN31 | Infrastructure managers and railway undertakings should consider carrying out individual medical assessments for disabled employees in order to identify all factors relevant to their case. |
Appendix A  Laser eye surgery

A.1  Introduction

A.1.1  This appendix has been compiled to help employers make risk-based decisions when cases of laser eye surgery are reported.

A.1.2  Laser eye surgery is unlikely to be a necessity simply for the purpose of meeting the visual acuity standards. Employers should not encourage or promote the use of eye surgery in these circumstances because the risks of surgery can be avoided by choosing to wear spectacles or contact lenses instead.

A.1.3  An employer cannot prevent an individual from having eye surgery, or any other treatment, if they choose to. However, it may be necessary to discuss the potential impact on their employment.

A.2  Laser treatment techniques

A.2.1  PRK, LASIK and LASEK are acronyms for three common laser eye surgery techniques - they are not proprietary or trade names but generic descriptions:

a) PRK - Photo-refractive keratotomy.

b) LASIK - Laser in-situ keratomileusis.

c) LASEK - Laser in-situ epithelial keratomileusis.

A.2.2  LASIK treatment is normally associated with rapid recovery and improvement of vision. Certain patients may be unsuitable for LASIK or choose not to have it because of some of the complications that may occur. LASEK is essentially a modified form of PRK.

A.2.3  Treatment methods are constantly improving and the risk of complications is diminishing with better technology and skilled surgeons. New procedures are always being developed and the Royal College of Ophthalmologists has published some excellent guidance for patients contemplating laser eye surgery and other forms of treatment (see reference 1).

A.3  Surgical and post-operative procedures

A.3.1  Typically the patient will spend less than a day in hospital for treatment and will use antibiotic and anti-inflammatory eye drops for about a week. Artificial tears are used for a slightly longer period, sometimes up to six months.

A.3.2  After surgery the patient will be unfit for ordinary work for three to seven days while useful vision recovers. However, vision often takes one week to three months to become stable, depending on the type of treatment. In some complicated cases this process can take three to nine months. People who depend on normal vision for their job (for example, train drivers) will not be able to perform their duties until their vision becomes stable.

A.3.3  If one eye is treated at a time, further periods of absence are possible. Typical post-operative follow up might be at one and seven days followed by checks at one and three months to establish that visual acuity is stabilising and no other problems are developing.

A.3.4  Patients with low or moderate degrees of short-sightedness do well after laser surgery with about 90% managing the 6/6 (normal) line and almost all managing 6/12 on the opticians chart without the use of glasses. Results are not quite so good for long-sighted or very short-sighted people.
A.4 Complications

A.4.1 The incidence of complications following laser corrective eye surgery is difficult to determine for a variety of reasons, including:

a) Variability of the skill and experience of surgeons.

b) Variable techniques and equipment used.

c) Rapidly advancing knowledge and technology.

d) Variable definitions of success and failure.

e) Differences in the eyes that are treated.

f) Commercial pressures to quote low levels of complications.

A.4.2 Reports of complications range from 1-40% of cases, depending on the source. Many relate to issues of failure to correct the vision exactly to normal, a difference between the two eyes or problems reading. All of these can usually be corrected with re-treatment or glasses. Other problems relate to infection, comfort or sensitivity and tend to settle quite readily. Complications relating to the corneal ‘flap’ in LASIK can often be corrected and serious sight threatening complications are very rare.

A.4.3 Complications of an occupational significance include:

a) Reduced visual acuity.

As a rough estimate up to 4% of all treatments will result in a reduction of two lines of best corrected visual acuity on the optician’s chart (the best that can be achieved even with glasses or contact lenses).

b) Decreased night or low light vision.

Patients may experience difficulty discerning detail in low light or low contrast conditions. Some report problems with halos, glare or starbursts around objects or light sources. These problems are often temporary and recover over a six-week period but in some cases the problem persists. Newer surgical techniques help to minimise this problem.

A.5 Assessment of job applicants

A.5.1 The British Society for Refractive Surgery (BSRS) has published information concerning the assessment of job applicants with a history of refractive surgery. An examination to consider the suitability of a refractive surgery patient for a particular profession should include:

a) A slit lamp examination to confirm that the eye has returned to normal and that there is no significant loss of corneal transparency.

b) Refraction, topographic examination and pachymetry to screen for keratectasia. The candidate should provide details of their pre-operative refractive error and if possible details such as their post-operative corneal thickness and the nature of any complications that may have occurred during or following the procedure.
c) Candidates should have their visual performance assessed using a technique sensitive to the presence of scattered light and aberrations. The Snellen letter chart is inadequate alone but a low contrast logMAR chart or contrast sensitivity test provides some information.

d) Candidates should not be considered until all medication has ceased.

A.5.2 These are specialist examinations that are likely to be outside the capabilities of most occupational health service providers. Current Royal College guidelines indicate that most of this information should be given to the patient and recorded in their notes. The employee could be asked to obtain a report from their ophthalmic surgeon. Alternatively an independent examination and report could be arranged. In any case an occupational physician with knowledge of the rail environment can advise on the scope of the information required and its interpretation, taking into account the specific duties of the applicant.

A.6 Long term implications

A.6.1 There is already a chance that the eyesight of workers who have not undergone laser eye surgery will deteriorate between normal periodic medicals and existing procedures take account of that. Furthermore, all employees have a duty to report to their manager if they believe they are unfit for work because of failing vision. Additional measures following laser eye surgery should be aimed at controlling any additional risk that arises as a result of the surgery.

A.6.2 Laser eye surgery techniques were introduced quite recently and they are rapidly improving. It is almost impossible to estimate the likelihood of long term visual complications or deterioration of vision that would not be amenable to correction with glasses or other means. The indications are that the incidence of these problems will be very low but they may arise within a period that is shorter than the normal frequency for periodic medical examinations. Employers and their occupational health providers should have appropriate procedures for detecting these cases amongst safety critical workers following laser eye surgery.

A.7 European requirements

A.7.1 The Operation and Traffic Management Technical Specification for Interoperability (OPE TSI) and the Train Driving Licences and Certificates Regulations 2010 (TDLCR) permit laser eye surgery for train drivers and other train crew subject to annual examinations or at intervals set by the occupational doctor.

A.8 Summary

A.8.1 Laser eye surgery is a matter of individual choice and can be associated with some complications so it should not be encouraged or required simply for the purpose of meeting visual standards.

A.8.2 Patients undergoing surgery will require a period of time off work and their visual acuity may take a number of months to stabilise. In a very small number of individuals the effects of surgery could make them unfit for safety critical work in the long term or even permanently.

A.8.3 Employers may experience additional costs in the short term due to temporary unfitness and in the long term due to increased numbers of medical assessments or medical reports.
A.8.4 The effects on visual acuity may be variable in the months following laser surgery. It is important to have appropriate procedures to ensure that the risk of that variability affecting safety critical work is controlled. These procedures are likely to involve assessment by an occupational physician, who will probably liaise with the ophthalmic surgeon responsible for post-operative follow up.

A.8.5 Employers should consider the operational implications where a return to work is delayed or impossible and employees should be advised of the possible consequences for their employment.

References (Appendix A)

1 The Royal College of Ophthalmologists

2 British Society for Refractive Surgery
   http://www.bsrs.co.uk
   Report on the current status of refractive surgery (July 2002). Produced by the council on behalf of the British Society for Refractive Surgery.
Appendix B  Colour vision

B.1  Background

B.1.1  About 8% of males and 0.4% of females have an inherited defect of colour vision that typically causes confusion between certain red and green colours.

B.1.2  Inherited colour vision defects will persist throughout an individual’s life and it is very important that they are detected before embarking on a career where there is a requirement for normal colour vision.

B.1.3  Late detection of colour vision defects and consequential declaration of unfitness can be very costly for the employee and their employer, as well as potentially dangerous.

B.1.4  Acquired defects can develop later in life and affect both men and women. Acquired defects are much more variable in their occurrence, severity and duration than inherited defects. They may affect the perception of yellow and blue as well as red and green and are often associated with other visual impairments and medical conditions. These cases will require individual specialist assessment under the guidance of a registered medical practitioner, with knowledge of the hazards of the work concerned and of the railway environment.

B.1.5  Where normal colour vision is important for safety reasons, colour vision testing is crucial in deciding on fitness for work. Colour vision and colour vision testing is a complex subject and an excellent introduction can be found in two Health and Safety Executive (HSE) publications aimed at employers and occupational health professionals (see references 1, 2).

B.1.6  It is not possible to correct abnormal colour vision by wearing coloured spectacles or contact lenses, although colour discrimination may be improved in some specific circumstances.

B.1.7  As with many occupational settings, there are situations in the railway environment when normal colour perception is a requirement for operational safety reasons. Obvious examples relate to the recognition of signal colours when train driving, coloured warning flags and signs on the lineside or controls in a signalling control centre or identifying different colour-coded wires in safety related equipment. However, there is no single list that includes all railway occupations that require normal colour vision.

B.1.8  In any event, it is the responsibility of the employer to identify the risks arising out of any work activity and to eliminate or control them. This will include an analysis of tasks that require normal colour vision. In some circumstances the elimination of colour vision dependent tasks or the provision of non-colour dependent information will be the preferred control measure.

B.1.9  Notwithstanding any risk assessment for specific occupational tasks, the commonest requirement for railway work is the ability to recognise a red, green and yellow signal under all conditions.

B.2  Testing of colour vision

B.2.1  Over many years, large numbers of rail workers have been required to pass a colour vision test at the pre-employment stage and at subsequent periodic medical examinations. Fitness standards for many groups, such as train drivers, guards, signallers, crossing keepers and shunters have included normal colour vision as determined using a specific colour vision test, the Ishihara Test. In some cases, employers and occupational health providers have chosen, for particular reasons, to use alternative testing methods, for example the City University Test.
B.2.2 Many different tests are available for detecting the presence of colour vision defects and some can also give an indication of the degree of abnormality. However, different tests may not be equivalent when measuring the same aspect of colour vision. Therefore, some individuals may be able to pass one test but not another and this has important implications for interoperability and for the employee that wishes to change their employer or job.

B.2.3 For operational safety purposes in the rail industry, there has been no requirement to determine the degree of colour vision deficiency and a test that simply discriminates between normal and defective has been sufficient. This is because an incident could occur where incorrect colour discrimination was suggested as a possible cause and it would have been almost impossible to refute that if the employee had any degree of colour vision defect.

B.2.4 Colour vision tests need to be easy to administer while giving accurate and reproducible results. The Ishihara Test meets these requirements and is very sensitive for detecting red-green abnormalities.

B.2.5 Ishihara is not useful for detecting blue-yellow deficiencies but these are less likely to have operational safety implications. Where a rare or acquired defect is suspected, or specific colour dependent tasks require it, the responsible occupational physician may recommend alternative or additional tests.

B.2.6 Newer technology may permit the development of bespoke colour vision testing methods for specific occupations, based on a detailed task analysis of the colour dependent tasks associated with those occupations. This may have the advantage of permitting a wider range of individuals to meet the fitness requirements for a given occupation, despite having some degree of permitted colour vision defect. However, employees with some defect of colour vision may not be eligible for promotion or transfer into other roles with different colour vision requirements and specialist colour vision testing methods may involve additional costs.

B.2.7 RSSB research project T924 ‘Identification of a robust colour-vision testing protocol for the rail industry’ provides an objective view of colour vision testing to identify cost effective practices that will enable employers to allow all qualified employees wishing to undertake colour-vision dependent safety critical work and to do so safely.

References (Appendix B)


c) RSSB research project T924 Identification of a robust colour-vision testing protocol for the rail industry. Available on Spark (http://spark.rssb.co.uk).
Appendix C  Hearing

C.1  Introduction

C.1.1 RSSB, on behalf of infrastructure managers and railway undertakings, commissioned research into the use of digital hearing aids by drivers, train managers and platform staff (RSSB project reference T664 Use of hearing aids by operational staff). The research was to determine if staff who fail to meet the hearing standard and recommended hearing levels for safety critical tasks associated with train movements, can continue in their roles once fitted with a digital hearing aid, and to identify any additional controls that are required.

C.1.2 This appendix provides a summary of key points from the research and the reader should refer to the full research report for additional information. The recommendations and methodology are relevant to other safety critical roles. However, infrastructure managers and railway undertakings may need to conduct additional task analysis and risk assessment where a safety critical role differs significantly from train movement tasks.

C.2  Hearing and railway safety critical work

C.2.1 Hearing requirements for railway staff engaged in safety critical work are based on the need to be able to hear:

a) Spoken safety communications using a range of media, including face-to-face speech, in outside as well as enclosed environments.

b) Audible warnings and alerts in driving cabs.

c) Audible warnings, such as train horns, when on or near the line, when carrying out work on the infrastructure or when other duties such as driving or shunting necessitate going on or near the line.

C.2.2 The type of work to be carried out and the environment it is to be carried out in are significant factors in assessing the hearing requirements for safety critical work, and may change over time. For example, train driving in some parts of the network is less dependent on communications from (external) signal post telephones than was previously the case.

C.3  Hearing criteria

C.3.1 Railway Group Standards GO/RT3451 Train Drivers – Staff Suitability and Fitness Requirements and GO/RT3452 Train Movement – Medical Fitness Requirements mandate the use of audiometry to carry out hearing tests and that staff shall have sufficient hearing to enable them to hold a telephone conversation and to be able to hear warning sounds, alert tones and radio messages.

C.3.2 Hearing assessments should take account of the individual’s normal working environment, including ambient noise levels and the communications equipment available (see Appendix C of this document).

C.3.3 For over 60% of trains operated on the network managed by Network Rail, cab-secure radio (CSR) removes the need for the driver to leave the cab to talk to the signaller using a signal post telephone (SPT), often seen as a difficult environment for drivers to hear what is being said by the signaller. A new radio system, Global System for Mobile communications – Railways (GSM-R) will bring this facility to almost all drivers within five years from the publication date of this guidance.
C.3.4 The revised hearing criteria mirror the European Operation and Traffic Management Technical Specification for Interoperability (OPE TSI) for both conventional (see reference 2) and high speed (see reference 3) rail networks as well as the Train Driving Licences and Certificates Regulations 2010 (TDLCR) (the Directive) (see reference 4).

C.4 The RSSB research project T664 Use of hearing aids by operational staff

C.4.1 The research was initiated by RSSB following an initial pilot study in response to technical developments in hearing aid equipment in the past 10 years (especially digital hearing aids) and also to assist with compliance with disability legislation. The unreliability of older types of equipment, especially outdoors in poor weather or in crowded areas, had previously been a factor that presented difficulties for managers and occupational health practitioners agreeing to their use.

C.4.2 The research makes the following conclusions:

a) The additional risk posed by staff with digital hearing aids undertaking safety critical roles is minimal, subject to them working within a safe system of work.

b) The majority of concerns identified by stakeholders are either not significant or can be readily managed by the application of appropriate controls.

C.4.3 The conclusions are made on the assumption that a staff member with a digital hearing aid correctly prescribed for operating in the railway environment can be expected to hear the alarms, alerts and speech required to ensure that train operations are carried out safely.

C.4.4 Consequently, subject to the controls in the safe system of work detailed below (section C6), the research recommends that safety critical staff with a suitable hearing aid (or aids) should be able to return to their normal duties.

C.5 Potential drawbacks associated with hearing aid use by safety critical workers

C.5.1 The research recommends that consideration be given to the risks associated with:

a) The hearing aid making noises excessively loud.

b) Use of temporary replacement hearing aids that are not equivalent to the aid they are replacing.

c) Reported battery life of longer than four weeks.

C.5.2 Any of the above can mean that the hearing aid is not being used or is not performing in the intended way.

C.5.3 There can be compatibility problems between hearing aids and communication devices such as the possibility of a hearing aid filtering out or reducing the volume of an alarm or alert, although, in practice these are rare. It is therefore important to verify, using a workplace assessment, that a member of staff with a hearing aid can use the main communication devices they are likely to use in the normal course of their duties.
C.5.4 The research recommends that staff manually programme their hearing aid rather than leaving the hearing aid to select the settings. The probability of a staff member selecting an incorrect programme and not being able to hear important sounds is low.

C.5.5 The risk of rain causing hearing aids to fail when used by safety critical workers is very low (although credible). Therefore, the research recommends that exposure to rain should not be used to determine whether a staff member is suitable for being fitted with a hearing aid, but it is advisable to consider practical means to reduce the exposure of hearing aids to rain.

C.6 Safe System of Work

C.6.1 The research recommends a safe system of work which covers both audiology and the required procedures for the use of hearing aids. Should consideration be given to the implementation of this safe system of work, it should be tailored to each specific operating situation and requirement.

C.6.2 To allow some flexibility, the requirements of the safe system of work are specified, but not the method of implementing them. Care should be taken to ensure safe systems of work address each particular circumstance. Additional requirements may also be implemented beyond those recommended below if it is deemed to be appropriate.

C.6.3 It is important to remember that a safe system of work should be used in support of (not instead of) normal Safety Management Systems (SMS).
C.7 The main stages

C.7.1 The safe system of work starts when an employee in a safety critical role fails an RGS hearing test. Its main stages are illustrated below.

1. Verify that hearing does not meet the standard
   - Is this individual's hearing loss really below the standard and, if so, is it likely to (a) be a long term problem and (b) is it predictable?

2. Select staff for hearing aids
   - Is the individual in a role covered by the safety assessment and do they want to try hearing aids?

3. Equip staff with hearing aids
   - The hearing aid audiologist equips the individual with a hearing aid (or aids) and tests their hearing

4. Retrain
   - The individual is retrained for their safety critical role plus they do a functional (in the workplace) hearing test

5. Normal duties & on going monitoring
   - The individual returns to normal duties but with additional reporting and monitoring and an annual hearing test

C.7.2 The safe system of work is intended to be used in addition to (not instead of) the operator’s normal procedures, in particular their Competence Management System (CMS). For example, depending on the time the staff member has been absent from work, a ‘Training Needs Analysis’ may be required.
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C.8 Verifying that hearing does not meet the standard

C.8.1 When an employee in a safety critical role fails the required hearing standard it is recommended that an Occupational Health (OH) physician or Ear, Nose and Throat (ENT) specialist, if necessary, should examine the individual and their medical history to determine if they have:

a) A temporary hearing loss that can be treated or will correct itself, in which case their hearing should be retested after the condition has cleared.

b) A relatively stable and predictable hearing condition, in which case they may be considered for the hearing aid programme. However, this should only be done once every effort has been made to verify whether or not the individual's hearing meets the requirements of the RGS hearing test, for example, by retesting the individual's hearing using an alternative method such as a Bekesy test. While hearing aids work well for many, it is still preferable that they are only considered where they are really needed.

C.9 Selecting staff for hearing aids

C.9.1 A decision should be made on whether the individual's role is covered by their safety analysis.

C.9.2 If the individual is in a suitable role they should be briefed about the option of wearing hearing aids, what this involves, the responsibilities associated with it and that it does not guarantee a return to safety critical duties.

C.9.3 If the individual agrees, they should be referred to an Hearing Aid Audiologist (HAA).

C.10 Equipping staff with hearing aids

C.10.1 The HAA will then:

a) Equip the individual with a hearing aid or aids and test their hearing.

b) Show the individual how to use and look after their hearing aid.

c) After an 'acclimatisation period', review and refine the hearing aid prescription as necessary.

C.10.2 Hearing test results should be obtained to check whether an individual has passed. This may require consultation with the HAA or the OH physician. It is also helpful for the results of the HAA’s tests to be copied to the OH physician.

C.10.3 If an individual is fit for return to safety critical duties, subject to the hearing aid safe system of work, then their manager should:

a) Document the basis for the decision.

b) Endorse the individual’s medical report as fit for normal duties subject to the hearing aid safe system of work.

C.10.4 If the individual’s hearing cannot be returned to an acceptable standard with the help of a hearing aid, it is recommended that they do not continue carrying out safety critical work.
C.11 Retraining

C.11.1 Employees who are fit to return to their safety critical roles should be retrained and reassessed. This includes:

a) Meeting the requirements of the duty holder’s competence management system (CMS).

b) Briefing the individual on (and ensuring they understand) the additional responsibilities and operating requirements for hearing aids.

C.11.2 During retraining, the individual should:

a) Be fully supervised.

b) Pass a workplace hearing assessment.

c) Demonstrate they understand when to use their different hearing aid programmes (the use of different programmes is described in the technical report).

C.11.3 The individual may return to normal duties once the above requirements have been completed satisfactorily, and they have confirmed that they are happy to return to safety critical duties.

C.12 Normal duties and ongoing monitoring

C.12.1 Once the individual has returned to normal duties, their progress should be monitored for compliance with their responsibilities, for their successful ability to undertake their duties and to ensure any problems they are having with their hearing aid(s) are resolved. The monitoring regime should involve:

a) Both regular and random ‘on-the-job’ monitoring to confirm that they are using their hearing aid(s) and carrying spare batteries.

b) Discussions with their local manager or team manager to check that they:

i. Are clear on their responsibilities and how to report and resolve problems.

ii. Are satisfied with the arrangements in place.

iii. Have the opportunity to identify any problems they might be having with their hearing aids and get them resolved.

C.12.2 Initially, monitoring should be frequent but, as the individual’s confidence develops, the monitoring can reduce in frequency.

C.12.3 The research recommends that the following approach is adopted to verify the staff member is using their hearing aid and is carrying spare batteries:

a) Week one to four : Monitoring twice per week (can be checked when signing on by Resource or Station Coordinator).

b) Week five to eight : Monitoring once per week.

c) Thereafter, random checks at least once every three months.
C.12.4 Consideration may be given to requesting that the individual provides a weekly written report during the first three months, highlighting any issues they have had with their hearing aid, and for the local manager or team manager to interview the individual once a month.

C.12.5 Thereafter, the local or team manager interviews the individual at least once every six months. The workplace assessment checklist (see Appendix 2 of T664) includes examples of the questions that might be used during these interviews.

C.12.6 The research recommends that the individual's hearing then be retested annually by a HAA in accordance with the tests recommended in the technical report. It is also helpful for the OH physician to be notified of the test results.

C.12.7 If the staff member is off work for a prolonged period, then the individual’s retraining requirements should be assessed on their return to work. This might involve repeating some, or all, of the retraining requirements above (in particular the workplace hearing assessment).

C.12.8 The results of discussions, monitoring and hearing re-tests should be recorded and reported internally in line with each duty holder’s normal practice.

C.13 Operating requirements

C.13.1 Staff with hearing aids should at all times when they are undertaking safety critical work:

a) Use their hearing aid(s) and carry spare batteries.

b) Use the correct programme for the situation.

c) Report any concerns or problems with their hearing aid(s) to their manager at the earliest opportunity; agree the significance of each problem and any action that may be appropriate.

C.13.2 The following additional actions should be considered in the event of problems:

a) Low battery warning (or flat battery): the individual should replace the battery at the earliest opportunity.

b) Excessive battery life: if the individual finds their hearing aid battery lasts longer than four weeks then they should consult their HAA as this probably indicates that the hearing aid has not been working correctly.

c) Hearing aid fails: the individual may continue to work in their safety critical duties if they have a replacement hearing aid that has the same programmes and settings as their normal hearing aid.

d) Whistling in the ear (feedback): the individual should ensure their hearing aid is in their ear properly and that it has been thoroughly cleaned to remove any wax build up. If the problem persists, they should also see their HAA.

e) Ear inflammation or infection: the individual should see their GP. If the problem persists, they should also see their HAA.

f) The hearing aid makes noises excessively loud or the hearing aid is distracting or uncomfortable: the individual should see their HAA.
C.14 Workplace hearing assessment

C.14.1 The purpose of a workplace hearing assessment is to demonstrate that the individual’s hearing is effective in their normal work environment, which is very different to the controlled environment of the HAA. The research recommends that an assessment is carried out to:

a) Identify the main safety critical communications systems that the individual is likely to use (for example, National Radio Network - NRN - radio, signal post telephone, cab secure radio, etc).

b) Identify the main safety related alarms and alerts the individual is likely to have to respond to (for example, Automatic Warning System – AWS - bell and horn or a platform whistle).

c) Ensure that by the end of the retraining period the individual has been observed successfully using each of these systems in a normal working environment.

C.14.2 The research recommends that face to face conversations are undertaken with the individual. They should be representative of those conversations and working environments the individual might be in (for example, on a platform or in a train cab) and include both noisy and quiet environments. At least three conversations are recommended to enable the conversations to cover a range of working environments. The frequency of such conversations should be based on each individual’s personal circumstances. The purpose of these conversations is to determine if the individual is able to hear what was said by the other person in all environments.

C.14.3 This conversation does not require the quality of hearing to be assessed, but rather that the message was understood. Whilst carrying out conversations it is also recommended that the person’s response to any alarm or alert is also monitored.

C.15 Further information

C.15.1 More detailed information will be found in the research report T664, including a human factors checklist and helpful background information that conforms to the same structure as the safe system of work described here.

C.15.2 The final report for project T664 is available on Spark (http://spark.rssb.co.uk).

References (Appendix C)


4. RSSB research project T664 Use of hearing aids by operational staff. Available on Spark (http://spark.rssb.co.uk).
Appendix D Safe use of medicines

D.1 Introduction

D.1.1 Around 1000 million National Health Service (NHS) prescription items are dispensed each year and the general public spends £2 billion on over-the-counter remedies (see reference 1). It is not surprising that many people who are attending for work on a regular basis will also be taking medicines. However, certain medicines may cause drowsiness, impaired concentration or other unwanted effects that make it unsafe for a person to do their job where there is a risk of injury to themselves or others.

D.1.2 The guidance in this appendix is aimed at people who are responsible for ensuring that workers are fit and able to perform their duties safely, especially safety critical workers, though it will also be relevant to other groups. The guidance sets out the main issues and offers general advice. An in-depth discussion of the effects of individual medicines and specific occupations is beyond the scope of this document and references to more detailed information have been provided.

D.2 Definitions

Medicine
Has the same meaning as ‘medicinal product’ in the Medicines Act 1968. Medicines may be supplied on prescription, pharmacy only or general sale.

Psychotropic medicines
Medicines that are capable of affecting the mind, emotions or behaviour. They include antidepressants, tranquillisers and anti-psychotic medicines (used to treat serious mental illness).

Over-the-counter medicines
These medicines include all medicines on general sale to the public via all sources including the internet and those available through a pharmacy. Alternative medicines and herbal remedies/medicines are also classified in this definition.

D.3 Legal and regulatory requirements

D.3.1 Many people will be aware of the legal requirements to prevent drug and alcohol misuse while people are working on the railway. However, they may not realise that the same provisions apply to ordinary medicines if they could affect a person’s ability to work safely.

D.3.2 It is an offence under section 27 of the Transport and Works Act 1992 (2) for employees to carry out, and for employers to allow employees to carry out, safety critical work while under the influence of drugs or alcohol. The law defines ‘drug’ as any intoxicant other than alcohol. That would include prescribed or over-the-counter medicines, if they cause intoxication. The employer needs to exercise ‘due diligence’ to prevent the commission of an offence under this section and that is usually supported by a drugs and alcohol policy.

D.3.3 Even in cases where specific railway legislation does not apply there are general duties under the Health and Safety at Work Act (1974) that impose similar requirements on employers and employees.
D.3.4 The Railway Group Standard GE/RT8070 Testing Railway Safety Critical Workers for Drugs and Alcohol (see reference 3) and guidance GE/GN8570 (see reference 4) also set out measures for railway undertakings and infrastructure managers to control risks caused by the effects of drug and alcohol use. In that context a drug means any substance that could affect a person’s ability to carry out their duties safely, including medication either prescribed by a medical practitioner or purchased over the counter.

D.3.5 Drug and alcohol policies are likely to define ‘drug’ as any substance that could affect a person’s ability to carry out their duties safely, including medication either prescribed by a medical practitioner or purchased over the counter.

D.4 How can medicines affect safety?

D.4.1 Many medicines are known to produce some impairment of function. These are usually medicines that have effects on the central nervous system. Typical problems include:

a) Drowsiness.
b) Poor concentration.
c) Slow reactions.
d) Poor co-ordination.
e) Inability to assess danger.
f) Inability to assess the level of impairment.

D.4.2 A few medicines can produce adverse effects in other ways, notably visual impairment.

D.4.3 These effects can vary between individuals and even in the same individual depending on many factors such as:

a) Overall duration of use of the medicine.
b) The dose of medicine taken and whether the dose has been changed recently.
c) When the medicine is taken in relation to working hours.
d) The preparation or brand of medicine.
e) Concurrent use of alcohol.
f) Level of fatigue.
g) Interactions with other medicines used at the same time.
h) The effect of the underlying health problem.
i) Factors specific to the individual such as age, sex, weight and metabolism.

D.4.4 Many medicines that can impair performance in the initial stages may be well tolerated after a period of time and dose adjustment. Also it should be noted that medicines might alleviate or overcome some of the effects of illness that would otherwise cause impairment at work, for example, pain or mood disturbance.
D.4.5 Because of this wide range of variables, it is difficult to conduct research that would make it possible to reliably predict who will be affected, when and to what extent.

D.4.6 Some good research relates to motor vehicle driving, which is a common and potentially dangerous activity requiring a high degree of alertness, good co-ordination and adequate vision. Carter deals with the subject in more detail in ‘Fitness to Drive’ (see reference 5).

D.4.7 Research published by the Health and Safety Executive in 2004 (see reference 6) showed that psychotropic medication can reduce performance efficiency, and so affect safety at work. Such effects have been shown to be present for groups of medicines known as benzodiazepines, tricyclic antidepressants and the Selective Serotonin Reuptake Inhibitors (SSRI) antidepressants.

D.4.8 Certain over-the-counter medicines are known to cause drowsiness, and therefore have the potential to affect operational safety. Most are used for the treatment of coughs and colds, allergies, pain, nausea and gastrointestinal upsets. Antihistamines are the largest group known to have these effects (see reference 7).

D.4.9 Less frequently encountered medicines that may impair performance include eye drops used to dilate the pupils at eye clinics and general anaesthetics, which may exert an effect for several hours after recovery.

D.5 Labelling of medicines (see also Appendix F)

D.5.1 Cautionary and advisory labels for dispensed medicines are listed in the British National Formulary. About 260 medicines have to carry labels 2 or 19, which relate to drowsiness when driving or operating machinery. A further 40 medicines are listed under the section on driving, indicating they may affect driving in some way and the patient should be counselled by the pharmacist. These lists are constantly updated.

D.5.2 Medicines for the treatment of severe pain, psychosis, depression, anxiety, epilepsy, migraine and Parkinson's disease make up the majority of the list along with antihistamines, which are frequently available over the counter. Insulin is a special case and has been dealt with in separate guidance.

D.6 Why not produce a list of prohibited medicines?

D.6.1 Some medicines will almost always be incompatible with safety critical work, for example strong antipsychotic medication or powerful morphine related painkillers (narcotic analgesics).

D.6.2 Also, the use of certain medicines is clearly an indication that expert medical opinion will be required concerning safety critical work, for example insulin or anti-epileptic medication. Nevertheless, the employee may still be fit for their duties.

D.6.3 Medicines that require special labels because of potential effects when driving or operating machinery are listed in the British National Formulary (BNF) (see reference 8). Although the list is extensive it does not include all medicines that may affect work in some way.
D.6.4 However many medicines are known to produce unwanted effects in certain circumstances but not in every case. It would not be reasonable to simply prohibit their use and it may amount to disability discrimination to do so. Therefore some form of individual assessment is required in these cases.

D.6.5 Finally, any list of medicines is bound to become out-of-date very quickly as new medicines are invented and medical knowledge about existing medicines increases.

D.7 What can employers do?

D.7.1 In order to ensure operational safety and to comply with legal requirements each employer will have procedures to control the risks associated with the use of medicines in the workplace. These may include:

a) A requirement for employees to report the use of medication to a responsible person.

b) A process for deciding which duties the individual can be assigned to and any additional arrangements.

c) Access to expert advice concerning the effects of medicines in relation to work on the railway.

d) Arrangements for regular review.

e) Provision of training and information for managers and employees.

D.8 What can employees do?

D.8.1 Employees have a personal responsibility to present themselves for work in a fit state and to report to their manager any concerns about their ability to work safely. Most people will at some time attend for work while taking or after taking some sort of medicine. Some may not realise the potential effects on their performance. If it is necessary to take medicines that may have effects during working hours, the individual should:

a) Discuss their occupation with the doctor or pharmacist supplying their medicine.

b) Ask about the most appropriate time to take their medicine in relation to their working hours, and the dose to take.

c) Read the label and packet insert, noting any warnings or advice.

d) Be aware of the potential for medicines to interact with other medicines or alcohol.

e) Follow the procedure set out by their employer with regard to the use of medicines.

f) Consult their doctor if they think their medicine may affect their ability to work safely or effectively. In many cases it will be possible to identify a suitable alternative medicine that is equally effective but produces fewer unwanted effects. Other options are to consider the timing or dosage of medication and to ensure that unwanted interactions with other medicines are avoided.
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D.9 Summary

D.9.1 Many working people will benefit from using medicines occasionally and some may depend on medicines in the long term.

D.9.2 Employers have a responsibility to ensure that the risks associated with the use of medicines are controlled by following appropriate procedures.

D.9.3 Employees should comply with those procedures. They should take responsibility for working with their healthcare provider so that medicines do not interfere with their ability to work safely and effectively.

D.9.4 The range of medicines that may impair performance is large and it is not possible to produce a definitive list because of the numerous factors involved. Psychotropic medicines for depression, anxiety and serious mental illness form the largest group of prescription medicines that may affect performance. Strong painkillers can also cause problems. Antihistamine remedies for sickness and allergy are available over the counter and also deserve special attention.

References (Appendix D)

1. Proprietary Association of Great Britain.


3 GE/RT8070 Testing Railway Safety Critical Workers for Drugs and Alcohol. RSSB http://www.rgsonline.co.uk.

4 GE/GN8570 Guidance on the Management of Drugs and Alcohol. RSSB http://www.rgsonline.co.uk.


Appendix E  Cautionary labels 2 and 19 for medicines - British National Formulary

Label 2  Warning: This medicine may make you sleepy. If this happens, do not drive or use tools or machines. Do not drink alcohol

To be used on preparations for adults that can cause drowsiness, thereby affecting coordination and the ability to drive and operate hazardous machinery; label 1 is more appropriate for children. It is an offence to drive while under the influence of drink or drugs.

Some of these preparations only cause drowsiness in the first few days of treatment and some only cause drowsiness in higher doses.

In such cases the patient should be told that the advice applies until the effects have worn off. However many of these preparations can produce a slowing of reaction time and a loss of mental concentration that can have the same effects as drowsiness.

Avoidance of alcoholic drink is recommended because the effects of CNS depressants are enhanced by alcohol. Strict prohibition however could lead to some patients not taking the medicine. Pharmacists should therefore explain the risk and encourage compliance, particularly in patients who may think they already tolerate the effects of alcohol (see also label 3). Queries from patients with epilepsy regarding fitness to drive should be referred back to the patient's doctor.

Side-effects unrelated to drowsiness that may affect a patient's ability to drive or operate machinery safely include blurred vision, dizziness, or nausea. In general, no label has been recommended to cover these cases, but the patient should be suitably counselled.

Label 19  Warning: This medicine makes you sleepy. If you still feel sleepy the next day, do not drive or use tools or machines. Do not drink alcohol

To be used on preparations containing hypnotics (or some other drugs with sedative effects) prescribed to be taken at night. On the rare occasions when hypnotics are prescribed for daytime administration (e.g. nitrazepam in epilepsy), this label would clearly not be appropriate. Also to be used as an alternative to the label 2 wording (the choice being at the discretion of the pharmacist) for anxiolytics prescribed to be taken at night.

It is hoped that this wording will convey adequately the problem of residual morning sedation after taking 'sleeping tablets'.
Appendix F  Railway workers and diabetes – general guidance

F.1  Introduction

F.1.1 The purpose of the guidance contained within this appendix is to highlight the important factors that should be taken into account when assessing the fitness of people with diabetes when they carry out safety critical duties. The information is aimed primarily at managers who are responsible for ensuring that individuals are fit to perform their duties, and for making any special arrangements which are needed in individual cases. Diabetes is a common condition in the general population that may present itself at any age, varies greatly in severity and may be associated with a range of other health effects that develop over time. This means that diabetes may affect different people in different ways at various stages of their working lives.

F.2  About diabetes – overview and disability issues

F.2.1 Diabetes mellitus is a metabolic disorder characterised by excessive amounts of glucose in the blood. Insulin is a hormone that is responsible for regulating blood glucose levels and people with diabetes have insufficient insulin or cannot respond normally to it.

F.2.2 Type 1 diabetes typically develops in childhood or young adults when the insulin producing cells in the pancreas (beta cells) are destroyed by an auto-immune process. About three people in 1000 (0.3% of the population) are affected and they will require lifelong insulin injections and a special diet.

F.2.3 Type 2 diabetes usually develops after the age of 40 and affects 30 people in every 1000 (3% of the population). This is due to a resistance to the effect of insulin as well as a failure to produce sufficient quantities of insulin. Obesity and lack of exercise make the condition worse. Treatment is with diet, weight loss and tablets. Some patients eventually require insulin.

F.2.4 Diabetes is associated with a number of long term complications including heart and circulatory problems, stroke, visual impairment, kidney failure and nervous system disorders. Research (see references 1 and 2) has shown that careful attention to blood glucose control will reduce the incidence of these complications. Patients who use insulin or certain types of tablets to bring their blood glucose down to normal levels have to balance their food intake and exercise carefully. Otherwise their blood glucose will continue to fall to dangerously low levels. The brain is dependent on glucose so low blood glucose (hypoglycaemia or ‘hypo’) is associated with impaired concentration and confusion, progressing to loss of consciousness. Sometimes the well motivated person with diabetes, who works hard to prevent their blood glucose rising above the normal range, may also encounter more frequent problems with hypoglycaemia. Further information can be found on the Diabetes UK website.

F.2.5 The Equality Act 2010 enshrines in law the principle that disabled people should not be discriminated against in employment or when seeking employment. Many individuals with diabetes could claim to be covered by the Act.
F.2.6 In the past, people with diabetes, especially those using insulin, were barred from certain occupations as a matter of policy. This was often based on the idea that these individuals would be prone to hypoglycaemia or other health conditions that would make them unsafe or unreliable in their role. Although this may be true for some people with diabetes it is not true for all. Modern treatments and risk assessment methods have enabled some insulin treated individuals to perform safety critical roles just as well as other people.

F.2.7 People with diabetes have successfully challenged (see reference 3) employers who sought to exclude them from jobs simply because they were ‘diabetic’, rather than assessing them as individuals. This means that a ‘blanket ban’ for people with diabetes is no longer acceptable, except where there is a legal requirement.

F.3 How diabetes may affect fitness for work – general health

F.3.1 Diabetes may affect fitness for work gradually or suddenly. It is sudden, unnoticed or unexpected impairment that is the greatest concern for workers in safety critical roles.

F.3.2 People with diabetes may suffer a gradual deterioration of their health due to long term complications such as angina, visual impairment or kidney failure. These are a matter of concern in people with diabetes, just as in other individuals with the same conditions. They can be assessed and managed within the normal periodic medical assessment. Where such a problem arises between medical assessments the employee has a duty to bring this to the attention of their employer, who will in turn seek the opinion of an occupational health professional.

F.3.3 Sometimes these long term health effects can be associated with an increased risk of sudden incapacity due, for example, to stroke or irregular heart rhythm. These people may be medically unfit for certain jobs as a result of these risks but not simply because they have diabetes.

F.4 Hypoglycaemia

F.4.1 The main area of concern that is peculiar to people with diabetes is the risk of loss of awareness, impaired concentration or loss of consciousness while performing their duties, as a consequence of hypoglycaemia.

F.4.2 The symptoms of hypoglycaemia (a ‘hypo’) are due the release of adrenaline, as well as the reduced glucose available for the brain. The individual experiences hunger, nausea, anxiety, sweating and increased pulse rate associated with impaired awareness and concentration. If untreated they may progress to collapse, loss of consciousness and fits. Some people do not experience any of the early symptoms of a hypo and progress to impaired awareness, collapse or loss of consciousness without warning. This is known as hypoglycaemia unawareness or reduced hypoglycaemia awareness, which has important implications for work.

F.4.3 Hypoglycaemia may be symptomatic or asymptomatic (only identified on biochemical testing). Symptomatic hypoglycaemia may be mild and easily rectified by the individual, or severe, that is, requiring third-party assistance or causing coma or seizure.
F.4.4 Symptomatic hypoglycaemia may occur when the blood glucose is below about 4.0 mmol/l and endogenous insulin production normally ceases below this level in people who are not diabetic. Symptoms are common when blood glucose falls below 3.0 mmol/l and significant changes in brain function occur when the blood glucose falls below 2.6 mmol/l.

F.4.5 People with diabetes may experience symptoms of hypoglycaemia if they are treated with insulin or with certain tablets known as the insulin secretagogues (the commonest type being sulphonylureas, such as glibenclamide and tolbutamide). This is because the treatment action cannot be stopped when the blood glucose falls. Other medications do not normally cause hypoglycaemia if used as a single treatment.

F.4.6 Therefore, the diabetic person who is at risk of hypoglycaemia must learn to balance their food intake (which raises blood glucose) against their treatment and exercise levels (which lower it). About 7% of people with diabetes will experience at least one severe hypo each year if they are treated with the insulin secretagogue group of medicines. The figure for hypoglycaemia rises to about 30% in insulin treated patients. However it is difficult to get accurate figures and it should be remembered that the majority of people with diabetes do not have any severe hypos, so individual assessment is always required.

F.5 Safeguards and regular review

F.5.1 Diabetes UK’s Driving and Employment Working Party has produced the following guidelines (see reference 4) for assessing the suitability of people with insulin-treated diabetes for employment where there may be a risk of injury or harm to themselves or to the public:

a) People should be physically and mentally fit in accordance with non-diabetic standards.

b) Diabetes should be under regular (at least annual) specialist review.

c) Diabetes should be under stable control.

d) People should self-monitor their blood glucose, and be well educated and motivated in diabetes self-care.

e) There should be no disabling hypoglycaemia (low blood sugar), and normal awareness of individual hypoglycaemic symptoms.

f) There should be no advanced diabetes-related eye or kidney disease (retinopathy or nephropathy), nor severe symptomatic peripheral or autonomic nerve damage (neuropathy).

g) There should be no significant circulation disorders of heart, legs or brain (coronary heart disease, peripheral vascular disease or cerebrovascular disease).

h) Suitability for employment should be re-assessed annually by both an occupational physician and diabetes specialist; and should be based on the criteria outlined above.
F.6 Prevention of hypoglycaemia

F.6.1 Over the past decade, an increasing number of people with diabetes, including those who use insulin, have worked safely in occupations that were considered unsuitable in the past. These people understand the importance of avoiding hypoglycaemia at work and adopt a variety of strategies to achieve that:

a) Maintaining a detailed knowledge of their diabetes and its treatment.

b) Frequent blood glucose monitoring.

c) Establishing a routine that includes regular meals and snacks.

d) Being able to react appropriately to changes in their blood glucose.

e) Keeping blood glucose high enough to avoid hypos during critical work periods.

f) Carrying carbohydrate food in case hypos are threatened or meal breaks are delayed.

g) Working closely with their doctor to choose tablets or insulins that are less likely to cause hypos.

h) Choosing insulin regimes that are more flexible.

F.7 Medical assessment of rail workers with diabetes

F.7.1 Concerns about people with diabetes and their fitness for safety critical work are based on the knowledge that some of these individuals have a greater than average likelihood of impairment of awareness or concentration, sudden incapacity or loss of consciousness. Although such impairments may be due to gradually developing disorders such as visual impairment or ischaemic heart disease, these are normally detectable in the context of the periodic medical examination. Hypoglycaemia is of particular concern because it is difficult to assess or predict and may affect otherwise healthy, well controlled patients with diabetes.

F.7.2 The rail environment differs significantly from other workplaces and occupational physicians working in this field are expected to have knowledge of the hazards involved. Workers may be exposed to train movements when going on or near the line or be expected to control the movement of trains when performing a signalling role. The physical demands of these jobs and working hours vary considerably. Even in the context of a single job such as train driving the risks may vary depending on the type of locomotive, the route and the train protection measures in operation.

F.7.3 In the UK rail industry, fitness standards apply to workers with safety critical duties, but there have never been requirements specifically relating to diabetes. The Operation and Traffic Management Technical Specification for Interoperability (OPE TSI) and the Train Driving Licences and Certificates Regulations 2010 (TDLCR) contain a general health requirement that operations staff ‘must not’ be suffering from medical conditions, or be taking medical treatment likely to cause:
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a) Sudden loss of consciousness.
b) Impairment of awareness or concentration.
c) Sudden incapacity.
d) Impairment of balance or co-ordination.
e) Significant limitation of mobility.

F.7.4 Similar wording will be found in other medical fitness guidance relating to rail workers.

F.7.5 Whether there are regulatory standards or whether infrastructure managers and railway undertakings define their own fitness standards, the underlying principle of excluding people with conditions that are likely to cause these impairments is still important.

F.7.6 Diabetes and some treatments for diabetes have the capacity to produce effects under one or more of these categories. It is for the examining medical practitioner to advise the employer whether the employee can meet the general health requirement for their job. Any medical assessment will be performed by, or under the supervision of, a doctor having experience of occupational medicine and knowledge of the hazards of working in the railway environment.

F.7.7 If an individual does not meet all of the medical requirements the employer can still decide to permit the person to continue with their duties providing they take advice from their occupational physician and introduce measures to control the additional risks arising from the medical condition. In the case of an employee with diabetes, the occupational physician will take all of the relevant information into account and use their professional judgement before advising on fitness.

F.7.8 The employer has overall responsibility for deciding which duties an employee should be given, taking into account the advice from their occupational health provider. Should the employee disagree with their employer’s decision, they should use the usual company procedures to resolve the matter.

References (Appendix F)


Appendix G  Obstructive Sleep Apnoea and Excessive Daytime Sleepiness

G.1  Introduction

G.1.1  This appendix has been published to promote greater awareness of the risks associated with obstructive sleep apnoea and excessive daytime sleepiness, highlighting the important factors that should be taken into account when assessing the fitness of affected workers if they carry out safety critical duties. The information is aimed primarily at medical assessors but may also be of interest to those who are responsible for ensuring that individuals are fit to perform their duties.

G.1.2  The content has been peer-reviewed by the Association of Railway Industry Occupational Physicians (ARIOPS) and endorsed as representing current good practice.

G.2  Background

G.2.1  About sleep disorders - excessive daytime sleepiness

G.2.1.1  Excessive daytime sleepiness (EDS) may be described as a tendency to fall asleep at inappropriate times while intending to stay awake. Non-medical causes of EDS include irregular sleep schedules (for example, shift work), disturbed sleep, insufficient sleep or sleep deprivation. Fatigue management strategies often include measures to control the risks related to EDS due to non-medical causes.

G.2.1.2  EDS may also be a feature of a number of medical conditions, especially sleep disorders, of which there are many. This guidance focuses on obstructive sleep apnoea (OSA), which is a recently recognised sleep disorder that is present in about 2% of females and 4% of males in the middle aged population, depending on the definition used (see reference 1). A study of a large number of American lorry drivers (see reference 2) revealed that 17.6% had mild sleep apnoea, 5.8% had moderate sleep apnoea and 4.7% had severe sleep apnoea. Overall, the prevalence of sleep apnoea in lorry drivers was approximately 28%, much higher than that in the general male population. Recent research amongst UK train drivers indicated a prevalence of symptomatic OSA in the region of 7%, based on questionnaire responses (see reference 3).

G.2.2  About sleep disorders - obstructive sleep apnoea

G.2.2.1  Obstructive sleep apnoea is characterised by repeated episodes of complete or partial upper airways obstruction occurring during sleep (apnoea or hypopnoea). Episodes that last for 10 seconds or more are associated with sleep interruption and can cause a decrease in oxygen saturation in the blood. This sleep-wake cycle may occur hundreds of times a night. The symptoms that are suggestive of OSA are EDS, loud habitual snoring and apnoeic events witnessed or reported by spouses or others.

G.2.2.2  Formal diagnosis requires an assessment of respiration during sleep with evidence of repetitive oxygen desaturations or reductions in airflow.
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G.2.2.3 The severity of OSA is expressed in terms of the number of respiratory disturbances (apnoeas or hypopnoeas) that occur per hour. This is referred to as the respiratory disturbance index\* (RDI), which is measured using polysomnography, a specialist sleep study that is not available in an occupational health (OH) facility.

G.2.2.4 In all but mild OSA, treatment with continuous positive airways pressure (CPAP) will be recommended. This involves breathing slightly pressurised room air delivered via a nasal or oral mask during sleep, which can produce a considerable improvement in symptoms.

G.2.2.5 OSA sufferers are at increased risk of coronary vascular disease, high blood pressure and stroke as well as obesity related illness. Research has shown that OSA sufferers are at increased risk of motor vehicle accidents, especially if the OSA is severe (see below). It is important to note that the increased risk is also present in some sufferers of OSA who do not experience any appreciable EDS. Therefore the detection of EDS alone cannot be relied upon to identify sufferers of severe sleep apnoea, who are more likely to be impaired during work and at increased risk of accidents.

G.2.3 Other medical conditions

G.2.3.1 Other medical conditions associated with EDS include narcolepsy, Parkinson’s disease, other neuromuscular disorders, chronic respiratory disease and painful musculo-skeletal conditions. These conditions are not discussed further in this guidance, other than with respect to the identification of EDS that may be associated with them.

G.2.3.2 A detailed description of sleep disorders, their diagnosis and management is outside the scope of this guidance but references to further reading are provided.

G.2.4 Sleepiness versus fatigue

G.2.4.1 Sleepiness, or the tendency to fall asleep, should be distinguished from fatigue or tiredness. People may be fatigued without feeling sleepy, for example following physical labour or due to chronic illness. However many people may experience sleepiness associated with fatigue, for example after working long hours or due to social factors. RSSB has produced guidance on fatigue, much of which focuses on fatigue related sleepiness. The Health and Safety Executive has a human factors topic on fatigue and the Office of Rail Regulation has published guidance on the management of fatigue (please refer to ‘further reading’ section of this document).

* RDI of 5 to 14 = mild sleep apnoea, 15 to 30 = moderate sleep apnoea and greater than 30 = severe sleep apnoea.
G.3 How sleep disorders may affect fitness for work on the railway

G.3.1 Simulator studies have shown that sleeps of up to two minutes may not be noticed or remembered by the subject and shorter periods of lack of awareness correlate with altered brain activity that is indicative of sleep; known as “micro-sleeps”. These findings are present in sleep deprived normal individuals. Most sleep related motor driving accidents typically occur in healthy males who are sleep deprived and fall asleep while driving at night. The impairment of driving in subjects with sleep deprivation, and with sleep disorders, can be similar to that of a driver with a blood alcohol concentration above the legal limit (see references 4 and 5).

G.3.2 However, sleep does not occur spontaneously from an alert state and there is always a feeling of increasing sleepiness beforehand. Therefore the individual will have been aware that there was a likelihood of falling asleep, even if they cannot recall the shorter episodes of sleep, and they have a responsibility not to continue with safety critical tasks in those circumstances.

G.3.3 Concerns about people with sleep disorders and their fitness for safety critical work in the rail industry are based on the growing body of research in other areas, especially road motor driving. Research has shown that OSA is associated with accident risk increased by two to seven times when driving and that more severe cases of OSA have the greatest increase in risk (see references 6, 7, 8 and 9).

G.3.4 Increased accident risk associated with severe OSA has been shown to be reduced by effective treatment (see reference 10).

G.3.5 Although there is no comparable data for the rail industry yet, the indications are that OSA will be a significant issue in relation to safety critical work. Expert opinion is that some rail workers who suffer from EDS and sleep disorders such as OSA will have an increased likelihood of impairment of awareness or concentration, or even falling asleep, while performing safety critical work.

G.3.6 The rail environment differs significantly from other workplaces and occupational physicians working in this field are expected to have knowledge of the hazards involved. Workers may be exposed to train movements when accessing the lineside environment or be expected to control the movement of trains when performing a signalling role. The physical demands of these jobs and working hours vary considerably. Even in the context of a single job such as train driving the risks may vary depending on the type of locomotive, the route and the train protection measures in operation. Therefore the current medical knowledge will require interpretation by medical assessors in the light of their knowledge of railway work and the specific medical risk assessment of affected individuals in particular roles.

**A possible exception to this would be uncommon clinical conditions such as narcolepsy, which would be a bar to employment as a safety critical worker.
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G.4 Managing the risks related to sleep disorders

G.4.1 Manager’s responsibilities

G.4.1.1 Managers should:

a) Make sure that employees understand the dangers of working while excessively sleepy. Those affected should be encouraged to seek medical advice and treatment, rather than ignoring or concealing their symptoms.

b) Seek the advice of their occupational health provider if they think an employee may be unfit due to any medical condition, such as OSA.

c) Consult with their OH provider to establish what individual adjustments or safe systems of work should apply if an employee is found to suffer from OSA.

d) Check that their OH provider routinely considers EDS and OSA when assessing the medical fitness of safety critical workers.

e) Arrange for the medical status of individuals involved in sleep related accidents and Signals Passed at Danger (SPADs) to be established, in order to exclude sleep disorders as an underlying cause.

G.4.1.2 The Rule Book (GE/RT8000) states that rail workers must not put themselves or others in danger, so there is a personal responsibility not to attempt to perform safety critical work while excessively sleepy.

G.4.1.3 Employees who suffer from OSA, with or without EDS, should also be:

a) Made aware that factors that cause sleepiness can affect them more than other people, for example, alcohol, medicines, loss of sleep or irregular sleep patterns.

b) Reminded of the importance of complying with the advice of their doctor and any recommended treatment.

c) Reminded of the importance of looking after their treatment device.

d) Encouraged to be open and honest about their symptoms so that they can receive appropriate treatment and support.
**G.5 Medical assessments of rail workers with sleep disorders**

G.5.1 Fitness standards that apply to railway workers with safety critical duties usually include a general health requirement that candidates shall not be suffering from medical conditions likely to cause impairment of awareness or concentration. There are unlikely to be specific requirements relating to OSA or other sleep disorders and this is the same for other conditions, for example; heart disease or diabetes.

G.5.2 The content of medical assessments is a matter for the individual employer and their occupational health provider to decide, taking into account the nature of their operations. Medical assessors will be aware of the risks associated with EDS and OSA so medical assessments of safety critical workers will include elements of questioning and physical examination that will screen for these conditions. If the results indicate an increased probability of OSA then further medical assessment and possible specialist referral may be indicated.

G.5.3 Sleep disorders are common but specialist sleep laboratory studies are expensive and in great demand. Clinicians are developing ways of identifying patients who are most likely to have OSA and therefore be likely to benefit from specialist sleep studies that lead to effective treatments. Most of these methods are based on a combination of reported symptoms, physical measurements and simplified monitoring equipment (see reference 11).

G.5.4 Factors that are predictive of OSA (see reference 12) include:

a) A history of disruptive snoring.

b) Witnessed apnoeas or history of frequent reported choking/gasping during sleep.

c) History of hypertension.

d) Neck circumference greater than 40cm.

G.5.5 Medical assessments should address these factors, which can be combined in an algorithm or “clinical decision rule” used in an occupational context so that appropriate subjects can be referred for further investigation (see references 13 and 14). An example of such a strategy based on “adjusted neck circumference” will be found on page 41 (figure G1).

G.5.6 Adjusted Neck Circumference of greater than 48cm, when considered in conjunction with the severity of symptoms, indicates a high probability of having a sleep study result that is diagnostic of sleep apnoea (see reference 13). \( \text{ANC} = \text{neck circumference (in cm)} + 4 \text{ (if hypertension)} + 3 \text{ (if reports of frequent snoring)} + 3 \text{ (if reports of frequent choking /gagping/apneas at night)}. \)

G.5.7 The Epworth Sleepiness Scale (see reference 15) gives an estimate of EDS and scores of 16 or more are indicative of moderate or severe sleepiness, which is associated with an increased risk of sleep related vehicle accidents. The absence of EDS is not a reliable indication that the subject does not have OSA so medical assessments must include other factors that are predictive of OSA. There is no validated procedure that can assess EDS in a way that is predictive of an individual persons accident risk and there are concerns about the objectivity of questionnaires in the context of a medical assessment where the subject’s livelihood may be at stake.
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G.5.8 Medical assessments may be used as a screen to identify workers who could be at increased risk of accident because of EDS or an underlying sleep disorder. For example, any employee with:

a) A prior history of OSA.
b) An adjusted neck circumference score of more than 48cm.
c) An Epworth Score of 16 to 24.

G.5.9 These employees will normally be considered to be unfit for safety critical work, pending further investigation and liaison with their doctor. Each case should be assessed individually and other factors may be taken into account before determining the employees fitness for work.

G.5.10 Specialist tests such as portable monitoring (see reference 16) or polysomnography may be required to establish the severity of OSA. Individuals with severe OSA should not perform safety critical work until their condition has been properly evaluated and effectively treated.

G.6 Safeguards and regular review

G.6.1 Employees engaged on safety critical duties who suffer from EDS and/or OSA should be kept under regular review by the responsible occupational physician, for example, on an annual basis.

G.6.2 General factors to be taken into consideration include:

a) The nature of the person’s job.
b) How sleepy or alert is the person during working hours?
c) Can they recognise the onset of sleepiness or might they doze unexpectedly?
d) Do they understand the factors that can make sleepiness more likely?
e) Are they able to take appropriate action if they become sleepy at work?

G.6.3 Specific factors in relation to OSA include:

a) History of sleep disordered breathing.
b) Severity of the condition, including the RDI.
d) Level of compliance with treatment.
e) Associated medical conditions such as respiratory or cardiovascular disease and obesity.

G.6.4 Persons with severe OSA (RDI greater than 30) will not normally be considered fit for safety critical work until they are receiving and complying with effective treatment.
G.6.5 Effective treatment would be expected to reduce the level of symptoms and produce a reduction of the RDI to less than 15, which can be verified with portable monitoring or polysomnography.

G.6.6 Continued compliance with CPAP therapy is particularly important and may be verified, preferably using data logged by the CPAP machine.

G.6.7 Every case will require individual occupational health assessment and liaison with the treating physician will be necessary to establish the clinical status and progress of the individual. An example of letters and forms used to correspond with the treating physician can be found in DVLA Road Safety Report No. 45, pp19-21 (see further reading).

G.7 Summary

G.7.1 Excessive daytime sleepiness is often due to non-medical causes but may be related to underlying medical conditions such as sleep disorders. Obstructive sleep apnoea is a common sleep disorder that is related to increased accident rates, depending on its severity, and can be improved with appropriate treatment.

G.7.2 Medical assessments can be used to identify individuals who may have EDS or OSA so that further evaluation can be arranged. Individuals who are suffering from significant daytime sleepiness or untreated severe OSA are unlikely to be fit for safety critical work. Individual assessment, regular review and liaison with the treating physician are necessary. Compliance with and response to treatment should be objectively verified before recommencement of safety critical duties.

G.7.3 Employees have a personal responsibility not to work when excessively sleepy and managers should ensure that safe systems of work are followed.
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Figure G.1 example of a sleep apnoea evaluation and management strategy for safety critical workers (Reproduced with the permission of the Railway Association of Canada. Canadian Railway Medical Rules Handbook, May 2007, p18).

*ANC* - Adjusted Neck Circumference

\[ \text{neck circ (in cms)} + 4 \text{ (if hypertension)} + 3 \text{ (if reports of frequent snoring)} + 3 \text{ (if reports of frequent choking/gasping/apneas at night)} \]

†RDI - Respiratory Disturbance Index (number of respiratory disturbances per hour)

‡PSG - Polysomnography
References (Appendix G)


16. Flemons WW; Littner MR; Rowley JA; Gay P; Anderson WM; Hudgel DW; McEvoy RD; Loube DI. Home diagnosis of sleep apnea: a systematic review of the literature: an evidence review cosponsored by the American Academy of Sleep Medicine, the American College of Chest Physicians, and the American Thoracic Society. Chest. 2003;124; 1543-1579.
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Further reading


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Definitions

Infrastructure Manager
‘infrastructure manager’ means a person who:

a) In relation to infrastructure other than a station, is responsible for developing and maintaining that infrastructure or, in relation to a station, the person who is responsible for managing and operating that station, except that it shall not include any person solely on the basis that he carries out the construction of that infrastructure or station or its maintenance, repair or alteration; and

b) Manages and uses that infrastructure or station, or permits it to be used, for the operation of a vehicle.

(Note: This definition is sourced from The Railways and Other Guided Transport Systems (Safety) Regulations 2006)

Medical Practitioner
A medical practitioner registered in accordance with the Medical Act 1983.

Over-the-counter medicines
These medicines include all medicines on general sale to the public via all sources including the internet and pharmacy. Alternative medicines and herbal remedies / medicines are also classified in this definition.

Psychotropic medicines
Medicines that are capable of affecting the mind, emotions or behaviour. Includes antidepressants, tranquillisers and anti-psychotic medicines (used to treat serious mental illness).

Railway Undertaking
A transport undertaking, as defined in the Railways and Other Guided Transport Systems (Safety) Regulations 2006(as amended), whose safety certification covers operation of trains on the managed infrastructure, as defined in the Railway Group Standards Code.

Safety critical worker
A person employed to carry out tasks defined as safety critical in the Railways and Other Guided Transport Systems (Safety) Regulations 2006 (as amended) regulation 23(1).
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References

The Catalogue of Railway Group Standards gives the current issue number and status of documents published by RSSB. This information is also available from www.rgsonline.co.uk.

RGSC 01 Railway Group Standards Code
RGSC 02 The Standards Manual

References given in the appendices to this document are not repeated here.

Documents referenced in the text

Railway Group Standards

GE/GN8570 Guidance on the Management of Drugs and Alcohol
GE/RT8000 Rule Book
GE/RT8070 Testing Railway Safety Critical Workers for Drugs and Alcohol
GO/RT3451 Train Drivers – Suitability and Fitness Requirements
GO/RT3452 Train Movement – Medical Fitness Requirements

Other references


ROGS Railways and Other Guided Transport Systems (Safety) Regulations 2006 (as amended)

2006/920/EC Technical Specification of Interoperability relating to the subsystem ‘Traffic Operation and Management’ of the trans-European conventional rail system

96/48/EC Technical Specification for Interoperability relating to the Operation subsystem of the trans-European high-speed rail system Equality Act 2010 (c. 15)

http://www.opsi.gov.uk/acts/acts2010/ukpga_20100015_en_1

The Equality Act