

Rail Delivery Group



RDG Guidance Note: Extreme Weather Arrangements, including Failure or Non-Availability of On-Train Environment Control Systems

RDG-OPS-GN-015
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About this document

Explanatory Note

The Rail Delivery Group is not a regulatory body and compliance with Guidance Notes or Approved Codes of Practice is not mandatory; they reflect good practice and are advisory only. Users are recommended to evaluate the guidance against their own arrangements in a structured and systematic way, noting that parts of the guidance may not be appropriate to their operations. It is recommended that this process of evaluation and any subsequent decision to adopt (or not adopt) elements of the guidance should be documented. Compliance with any or all of the contents herein, is entirely at an organisation's own discretion.

Other Guidance Notes or Approved Codes of Practice are available on the [Rail Delivery Group \(RDG\) website](#).

Executive summary

This document provides guidance on how to minimise the impact of extreme weather conditions on passengers and staff.

It also provides advice on responding to the failure or non-availability of on-train environmental control systems (in particular air conditioning / heating), both in general and in conjunction with trains suffering extended delays or becoming stranded as a result of extreme weather where this may be a critical factor.

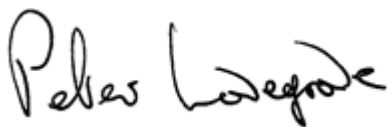
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1 Introduction, purpose and scope

1.1 Introduction

This document provides guidance on how to minimise the impact of extreme weather conditions on passengers and staff.

It also provides advice on responding to the failure or non-availability of on-train environmental control systems (in particular air conditioning / heating), both in general and in conjunction with trains suffering extended delays or becoming stranded as a result of extreme weather where this may be a critical factor.

1.2 Purpose

This Guidance Note is intended to complement RDG and Network Rail Guidance Note RDG-OPS-GN-049 - Meeting the Needs of Passengers Stranded on Trains.

It focuses on two factors which contribute to making such needs more acute and/or more difficult to meet:

- i. Failure or non-availability of on-train air conditioning (or heating in the event of cold weather), as this will result in a potentially rapid deterioration of the on-board environment.
- ii. Extreme weather, as this will both increase the likelihood of trains suffering extended delays or becoming stranded and serve to reduce the available response options (such as making evacuation unacceptable/impossible).

The greatest risk occurs when both factors apply simultaneously. In extreme cases, most obviously where a train is stranded without air conditioning during extremely hot weather and/or in direct sunlight or without heating in extremely cold weather, this may present a potentially serious risk to the health and safety of both passengers and staff on board the train.

Sections 3 to 7 of this document focus on the risks posed by extreme weather and provide guidance on arrangements that can be put in place in advance of forecast extreme weather events to better meet passenger and staff needs, both in general and with specific reference to service disruption.

Section 8 provides guidance on responding to the failure or non-availability of on-train environmental control systems in general, i.e. within the context of otherwise normal train operation and in the event of trains becoming stranded.

1.3 Scope

This Guidance Note has been prepared for passenger railway undertaking members of RDG. However, its content may also be of use or interest to others.

2 Definitions

For purpose of this guidance document the following definitions apply:

| Term | Definition/description in the context of this document |
|----------------|--|
| Control | Central office with real time oversight of the state and operation of the network and responsibility for managing incidents in such a way as to ensure safety while minimising disruption to train services, passengers and freight customers. This is normally a Route Control with joint Network Rail and TOC staffing but there can also be separate Network Rail and TOC Controls. |

| | |
|--|---|
| On-train environment control system | The system(s) which control(s) temperatures and air circulation or provide(s) heating in on-train passenger accommodation together with any systems associated with the operation of or access to on-train passenger toilets. |
| Stranded train | <p>As per the definition in RDG-OPS-GN-049 - Meeting the Needs of Passengers Stranded on Trains, i.e.</p> <ol style="list-style-type: none">a. A passenger train stationary (or moving very slowly) other than as scheduled; andb. it is established that<ol style="list-style-type: none">i. either there is no reasonable certainty that it will resume its journey within the next X minutes.ii. or there is reasonable certainty that it will resume its journey but only after a delay of at least Y minutes (since coming to stand). <p>TOCs should liaise and agree with Network Rail (as infrastructure manager) the values of X and Y to be applied – it is suggested that a default value of 10 be used for X and of 30 for Y.</p> <p>A train stopped at a station where it is not booked to stop and from which passengers cannot easily continue with their journey is defined as stranded. A train stopped at a booked station is not defined as stranded.</p> |
| Train Manager | Conductor, Guard, Senior Conductor or other person designated as in charge of the train. This includes the driver where services are Driver Only Operation (DOO) or Driver Controlled Operation (DCO). |

3 Extreme weather arrangements - overview

When operating train services during periods of extreme weather, railway undertakings should be aware of the impact of such conditions on passengers and staff and enhance their operational arrangements appropriately, implementing pre-planned extreme weather arrangements. The purpose of this section of this guide is to promote good practice in regard to such arrangements.

Many forms of extreme weather can have an adverse effect on the ability to operate through their impact on infrastructure, rolling stock, staff and passengers. These include:

- i. Extremely high temperatures
- ii. Extremely low temperatures
- iii. Snow
- iv. Frost
- v. Icing (including ice from freezing rain)
- vi. Strong winds
- vii. Extreme rainfall or thawing of snow/ice where this results in flooding
- viii. Lightning
- ix. Prolonged wet weather (in that this increases the risk of landslides and flooding)

In addition to increasing the likelihood of trains suffering extended delays or becoming stranded, they may also make responding to such events more challenging. It is possible, given the situation/failure, that a number of trains may be affected at the same time within the same area.

Temperatures of over 40°C were recorded for the first time in the UK in July 2022 and future UK climate projections indicate an increased incidence of 'extreme' events. Consideration of extremes of temperature therefore needs to form part of routine risk assessment and contingency planning. For further information please refer to Network Rail's latest Adaption Report (the third such report, published in December 2021, as of the date of issue of this Guidance Note). This sets out its understanding of the risks associated with climate change, how these impact on the performance and safety of the railway and how it is acting to enhance resilience and adapt to the impacts – see: <https://www.networkrail.co.uk/sustainability/climate-change/climate-change-adaptation/>.

Of the forms of extreme weather listed above, the two with the potential to directly impact on conditions inside the train in the event that on-train environment control systems are unavailable are high and extremely low temperatures.

High temperatures, particularly if combined with direct sunlight, can result in a very rapid increase in on-board temperatures to dangerous levels and there are few means of keeping people cool in such circumstances.

Extremely low external temperatures are less immediately problematic – on-board temperatures will cool at a much slower rate than that at which they rise in hot weather conditions and temperatures will at worst come to equal external temperatures rather than reach greater extremes. In addition, the train will continue to provide full protection from rain, sleet, snow, etc. and wind chill. At the same time, various options are likely to be available to keep passengers warm, for example by asking passengers to congregate together to preserve body heat. Many will, in any event, have with them additional 'outdoor' clothing that can be used.

Conversely, if evacuation to trackside is being considered, extreme cold is likely to present more of a hazard than extreme heat, particularly as it is likely to also affect conditions under foot through the presence of snow, ice or frost.

Sections 4 to 7 address, in turn, i) arrangements applicable generically with regard to all forms of extreme weather; ii) arrangements applicable jointly to extremely hot and extremely cold weather; iii) arrangements specific to extreme hot weather; and iv) arrangements specific to extreme cold weather.

4 Considerations and arrangements applicable to extreme weather in general

4.1 Overview

All forms of extreme weather are liable to have an adverse impact on the performance of the rail network through their effects on the infrastructure, rolling stock, staff (including their ability to report for duty) and passengers. It follows that there is increased likelihood of trains being seriously delayed or stranded in such conditions. The remainder of this section sets out actions that railway undertakings should consider in anticipation of this.

4.2 Company plans

Railway undertakings should maintain plans for extreme weather events. These should include both preparation and response arrangements. They should be reviewed and updated on a regular basis and in the light of experience and lessons learned. These extreme weather plans normally form part of the respective seasonal working arrangements railway undertakings produce. It is good practice for this planning to take place in collaboration with Network Rail

Such plans should be flexible and include a range of options that can be implemented according to circumstance. Responsibilities for determining when and the extent to which the plan is to be applied should be clearly set out along with the means by which such decisions are to be communicated /disseminated.

Arrangements should be in place to ensure that all staff concerned are familiar with the content of such plans and competent to the extent necessary in their application and also that staff are made aware of any changes to these plans, including briefing where appropriate.

Adoption of a simple system of colour coding to indicate the expected severity of the predicted extreme weather, as used by a number of railway undertakings, may be helpful in providing a useful structure.

4.3 Advice to and preparation of staff

All operational and other relevant staff, including media and customer communications teams, should be made aware of the expected extreme weather, including the nature, severity, location, timing, likelihood (i.e. the level of confidence of the predictions) and the anticipated impact (such as speed restrictions, route closures, etc.). Included within this advice should be the time of the next update.

Action should be taken to check that all staff with responsibilities for responding to stranded trains/passengers are familiar with the content of company procedures for such incidents, including any recent revisions, and are competent in their application.

Train crew should be instructed to be extra alert to likely delays and the need to provide advice and re-assurance to passengers and ready to implement stranded train procedures in a timely fashion.

4.4 Increased provision of response staff

With extreme weather likely to both increase the number of failures (see Section 4.1) and the severity of the consequences, additional response staff should be provided. This includes increasing the number of on call Train Operator Liaison Officers (TOLOs) to reduce geographical burden on response staff responding to stranded train events.

Planning for this should be done in collaboration with Network Rail and the British Transport Police (BTP) and with a view to co-locating response staff at key strategic locations.

4.5 Advice to passengers

Consider advising passengers that journey times may be extended and that they may wish to prepare for this by, for example, taking with them additional supplies of food and drink.

4.6 Provision of additional refreshments

Arrangements should be made to confirm that buffet cars/trolleys are fully stocked prior to the start of each journey and re-stocked en route.

Emergency supplies of water and basic snacks (such as chocolate) should be carried on board all services liable to be affected.

Stockpiles of such emergency supplies from which trains can be restocked should be set up and maintained at suitable stations on lines of route.

Consideration should also be given to making arrangements for suitable road vehicles to be available at strategic locations to enable customer support staff and supplies of suitable refreshments to reach seriously delayed and stranded trains.

4.7 Access to toilets

In the event of on-train toilets becoming inoperable/unacceptable, consideration should be given to extending station stops at appropriate stations to allow passengers to use station toilet facilities. In such cases, on-train announcements to this effect should be made and steps taken to prevent passengers from being inadvertently left behind.

Announcements should also be made at stations encouraging intending passengers to use the facilities there rather than relying on those on board trains.

4.8 Arrangements at stations

In anticipation that passengers may be obliged to spend more time on stations as a result of service disruption, the following should be considered:

- i. Toilets to be inspected and cleaned more frequently.
- ii. If practicable, opening hours of waiting rooms to be increased - this is particularly important if waiting rooms are the only locations at the station providing seats and shelter from the elements.

- iii. If practicable, opening hours of cafes and shops to be increased. This may be something that can be arranged in advance with retailers once aware of the extreme weather being forecast.

4.9 Communications and media

In addition to providing updates on train services proactively to the media, National Rail Enquiries, etc., consideration should be given to putting in place means of enhancing existing capabilities in terms of monitoring and responding to posts on social networking sites. Robust arrangements need to be implemented to ensure that where such posts refer to deteriorating conditions on board a particular train – whether of the physical environment (temperature, air quality, etc.) or the general mood of passengers – then Control is immediately alerted to the situation and can feed this intelligence into their decision making process.

5 Considerations and arrangements applicable to extreme hot and extreme cold weather

5.1 Advice to passengers

Extreme hot and extreme cold weather differ from other forms of extreme weather in that they typically affect a wide geographical area and may apply over an extended time period. Their effects are also more generic and to this extent easier to anticipate.

Basic advice to passengers planning to travel during extreme hot and extreme cold weather can therefore be prepared in advance and be produced in leaflet form, published on web sites, social media and displayed in poster form at stations. The advice should include travel tips and some explanation of how and why train services can be affected, including advice about amended timetables. An example of the sort of advice that should be published for extreme hot weather is attached at Appendix A.

Additionally, the Cold Weather Plan for England and the Heatwave Plan for England do include useful examples for communication with the public – see:

<https://www.gov.uk/government/publications/cold-weather-plan-cwp-for-england> and
<https://www.gov.uk/government/publications/heatwave-plan-for-england>.

This activity is inexpensive, can be done in advance of the extreme hot or cold weather and demonstrates empathy and concern for passengers.

5.2 Closing of exterior doors/windows

Extremes of temperature, whether hot or cold, place particular demands on on-train air conditioning/heating systems. To minimise loss of cool/warm air from trains, train crew should be instructed to manually close all exterior train doors and openable windows during turnrounds and at intermediate stations with extended dwell times.

5.3 Arrangements at stations

Environment control systems in waiting rooms and other indoor areas used by passengers should be left running on a 24/7 basis to maintain acceptable ambient temperatures.

Maintenance staff should be made available at key locations to deal quickly with any failure of air conditioning and/or heating equipment at stations or on trains.

5.4 Alternative transport

Procedures for responding to service disruption often include provision for alternative transport if trains are cancelled or severely delayed. Such procedures often include instructions that state that if a passenger has an alternative rail service within one hour, then road transport will not be provided. In extreme hot weather these instructions should be relaxed, particularly for vulnerable passengers.

The provision of alternative transport also needs to take into consideration the weather risks as part of the wider safety considerations.

Consideration should also be given to other options should the nature of the extreme weather be such that its unsafe to travel at all, e.g. if the police are advising people to stay off the roads for safety reasons.

6 Considerations and arrangements applicable to extreme hot weather

6.1 Planning and implementing extreme hot weather arrangements

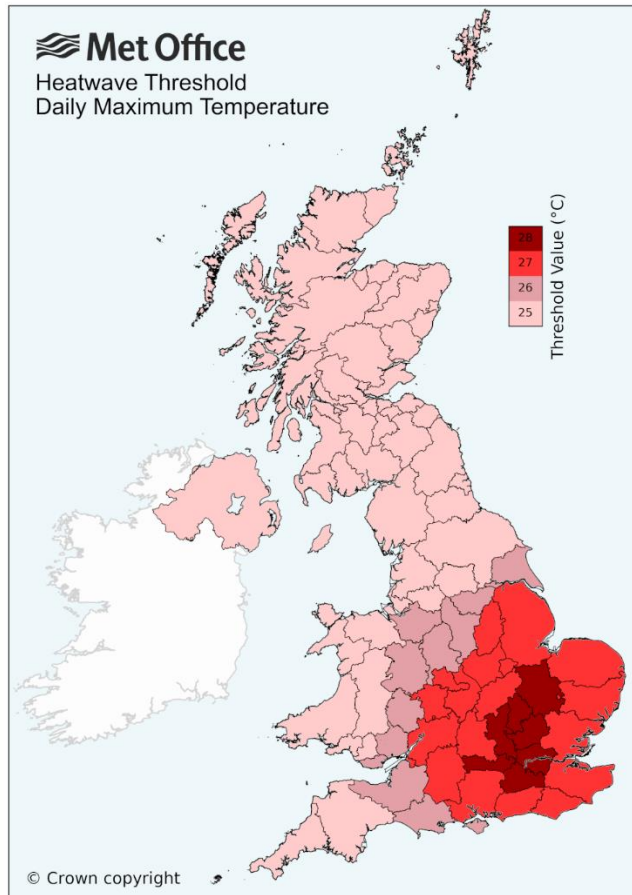
Railway undertakings should plan extreme hot weather arrangements in advance as part of their annual seasonal preparations and implement them as necessary.

6.2 Triggering of extreme hot weather arrangements

Railway undertakings should determine the trigger temperature or temperatures for activation of their extreme hot weather arrangements, noting that it may be appropriate to have different triggers, e.g. for different types of stock and/or different parts of the country or for different elements of the arrangements to be implemented as part of an escalation process.

Factors which it may be helpful to take into account include:

- i. Warnings/alerts issued by government agencies and recognised authorities. These principally comprise:
 - The Meteorological Office
 - For England only: the Weather-Health Alerting System provided by the UK Health Security Agency (UKHSA) in partnership with the Met Office and covering the period between June and September – <https://www.gov.uk/government/news/heat-health-alerts-issued-by-ukhsa-and-the-met-office>
- ii. Declaration of a heatwave. A UK heatwave threshold is met when a location records a period of at least three consecutive days with daily maximum temperatures meeting or exceeding the heatwave temperature threshold. There are four such thresholds (25-28°C) and these vary by UK county, as shown on the next page:



Source: Meteorological Office – <https://www.metoffice.gov.uk/weather/learn-about/weather/types-of-weather/temperature/heatwave>

It should, however, be noted that on-train temperatures may rapidly exceed external air temperatures should a train become stranded in direct sunlight without functioning air conditioning.

- iii. Rolling stock type – as some will absorb/retain heat more readily than others.
- iv. The geographical area – ‘abnormally high’ temperatures in northern parts of the UK will be lower than those in the south.

Such variability means that no single national trigger temperature can be recommended - there will be no single national trigger temperature. However, it is expected that individual trigger temperatures will be in the range 20 - 27° C.

It should also be noted that extreme heat is more likely to affect people if they are not acclimatised to hot weather. Therefore a sudden heatwave is more likely to be a problem than a prolonged hot spell with a gradual build up. Thus, the first hot period of the year, and the first few days of a heatwave, are likely to cause more issues than those that occur later when people have had chance to acclimatise.

6.3 Impact of extreme hot weather on passengers and staff

People will begin to feel uncomfortable and be affected by heat if the station or train that they are using is too hot. Heat and strong sun will have four main impacts on people:

Dehydration

This is the loss of water from the body, and with it important blood salts like potassium and sodium which play a vital role in the functioning of organs such as the kidneys, brain and heart. Dehydration can lead to confusion, lethargy and problems with breathing and heart rate.

Heat exhaustion

Persons exposed to high ambient temperatures are liable to suffer from heat exhaustion. This is caused by a loss of salt and water from the body, usually through excessive sweating, and develops gradually. Children and older people are particularly susceptible.

Typical symptoms include:

- i. Rapid shallow breathing
- ii. Weakness or fainting
- iii. Tiredness
- iv. Headaches
- v. Dizziness and confusion
- vi. Loss of appetite
- vii. Nausea
- viii. Sweating, with pale clammy skin
- ix. Cramps in the arms, legs and the abdominal wall
- x. Rapid, weakening pulse

In all cases, medical assistance should be sought as soon as possible from qualified First Aiders, or any qualified medical persons travelling on the train. However the first priorities should be to replace any lost body fluids (by offering sips of water, little and often) and salt and to cool the person affected down. Other responses which may offer some immediate relief include:

- i. Getting the person to lie down with their legs raised
- ii. Loosening excess clothing
- iii. Cooling the person with lukewarm water by sponging

NOTE: Use of ice as a coolant is NOT recommended for people showing signs of heat exhaustion.

Heatstroke

In some cases heatstroke follows heat exhaustion when sweating ceases and the body then cannot be cooled by the evaporation of sweat. Heatstroke can develop with very little warning, causing unconsciousness within minutes of the affected person feeling unwell. In such cases it is essential that the person's body temperature is lowered as quickly as possible and that urgent removal to hospital is arranged.

Sunburn

Sunburn is both painful and increases the risk of contracting skin cancer. The fatal form melanoma kills more than 2000 people a year in the UK.

Change of behaviour

In addition to the above, hot weather changes people's behaviour. Absenteeism rises and the normal pattern of travel shifts, with people travelling to and from work earlier than normal. In addition, there is anecdotal evidence that by the late afternoon more passengers than normal are under the influence of alcohol.

6.4 Extreme hot weather arrangements

Railway undertakings should put extreme hot weather arrangements in place to help their passengers and staff handle the impact of extreme hot weather. The following should be considered:

Air conditioning equipment

Prior to the summer season and any forecast period of extreme hot weather, railway undertakings should ensure that air conditioning equipment at stations and on trains is working properly, also that suitable arrangements are in place for monitoring its condition so that faults can be identified and rectified quickly.

Station and train environments

During periods of extreme hot weather, railway undertakings should seek to maintain acceptable station and train environments. The following should be considered:

- i. Station vendors should be encouraged to sell 'cold' products, such as chilled bottled water and ice cream.
- ii. Thought should be given to encouraging ice cream vans to park outside busy suburban stations.
- iii. The shading of outside areas where passengers congregate should, if practicable, be improved.
- iv. Blinds or curtains of trains should be drawn where trains are standing in direct sunlight.
- v. The possibility of making available an air-conditioned room or naturally cooler indoor area to those particularly vulnerable to or distressed by the heat, whether passengers, staff or the public more generally.

At stations, there should be increased engagement with first aid providers / ambulance services, for example in the provision of hydration or setting up of assistance points to which passengers suffering from the effects of extreme heat can self-report.

Refreshments

Refreshments can reduce the risk of dehydration and heat exhaustion. However, the consumption of alcohol should be discouraged because of the behavioural problems that can result. Passengers should instead be encouraged to increase their intake of other liquids and railway undertakings should consider providing free bottled water, and possibly dried fruits and fruit juice, during extreme hot weather. Normal restrictions on how late a train must be before free refreshments are provided should be relaxed in such circumstances.

Suitable road vehicles should also be available at strategic locations to enable customer support staff and supplies of suitable refreshments to reach seriously delayed and stranded trains.

Face wipes

Railway undertakings should consider the practicality of providing face wipes to passengers during extremely hot weather, especially on seriously delayed and stranded trains.

Vulnerable passengers

Railway undertakings should consider the needs of those particularly vulnerable to extreme hot weather. The following groups may be at particular risk of dehydration and heat exhaustion:

- i. Pregnant women
- ii. Babies and young children (up to the age of four)
- iii. Elderly people
- iv. Those who are obese

Most railway undertakings provide travel assistance for some groups of vulnerable passengers, principally those who are disabled. In extreme hot weather, railway undertakings should consider extending travel assistance to cover the above groups. The help offered should include:

- i. Being accompanied to and from trains.
- ii. Being given assistance with luggage to and from trains.
- iii. Being given priority over other passengers in boarding trains.
- iv. Being allowed to travel in first class accommodation without additional charge if they hold standard class tickets but no standard class seats are available.
- v. Being given free bottled water when seated.

Staff should be encouraged to be proactive in identifying and helping vulnerable passengers at risk in terms of dehydration and heat exhaustion during extreme hot weather.

Passengers under the influence of alcohol

Consumption of alcohol is more likely during hot weather. It can contribute to dehydration and heat exhaustion and its effects combine with theirs to severely impair both judgement and physical capacity. During extreme hot weather, staff (including those monitoring CCTV) should be encouraged to be more vigilant in checking for passengers who appear to be under the influence of alcohol, liaising with security staff and the British Transport Police as necessary.

Staff

Railway undertakings should consider the needs of all their staff, both 'front line' and 'back office'.

All managers and supervisors should appreciate that safety and commercial standards can be compromised if staff become dehydrated or subject to heat exhaustion and take appropriate steps to avoid this happening.

Railway undertakings should issue guidance to all their staff on how to cope with extreme hot weather. An example of such guidance is given at Appendix B.

7 Considerations and arrangements applicable to extreme cold weather

7.1 Overview

Railway undertakings should put arrangements in place to help their passengers and staff handle the impact of extreme cold weather. The factors in the following sections should be considered.

7.2 Heating equipment

Prior to the winter season and ahead of any forecast period of extreme cold weather, railway undertakings should undertake checks of heating equipment at stations and on trains to confirm it is working properly, and that suitable arrangements are in place for monitoring its condition so that any faults are identified and rectified quickly.

7.3 Refreshments

Consumption of hot drinks and food can help to maintain or restore body heat and should be encouraged.

In the event of it not being possible to maintain reasonable on-train temperatures, railway undertakings should consider providing free hot drinks to passengers with normal restrictions on how late a train must be before free refreshments are provided relaxed in such circumstances.

Suitable road vehicles should also be available at strategic locations to enable customer support staff and supplies of suitable refreshments to reach seriously delayed and stranded trains.

7.4 Clothing

In the event that on-train temperatures have fallen or are likely to fall, passengers should be encouraged to put on extra layers of clothing. Such additional clothing may be more effective in preventing a drop in body temperature than restoring temperature and its early use is therefore recommended.

7.5 Emergency blankets

In areas or conditions where extreme cold weather may be encountered, consideration should be given to supplying emergency blankets to passengers, with priority given to the most vulnerable (see Section 7.7 below). As part of the seasonal preparation, consideration should be given to whether these are placed on trains or made available at strategic locations covering the area of operation and also at any known areas of concern during extreme cold weather.

7.6 Relocation of passengers

Where there is or is likely to be an extreme drop in on-train temperature, consideration should be given to concentrating passengers in as few vehicles of the train as possible as a means of conserving body heat.

7.7 Vulnerable passengers

Railway undertakings should consider the needs of those who may be particularly vulnerable to extreme cold weather. The following groups may be at particular risk:

- i. Babies and young children
- ii. Elderly people
- iii. Those with pre-existing medical conditions that render them particularly susceptible to the cold

Most railway undertakings provide travel assistance for some groups of vulnerable passengers, principally those who are disabled. In extreme cold weather, railway undertakings should consider extending travel assistance to cover the above groups. The help offered could include:

- i. Being accompanied to and from trains
- ii. Being given assistance with luggage to and from trains
- iii. Being given priority over other passengers in boarding trains
- iv. Being allowed to travel in first class accommodation without additional charge if they hold standard class tickets but no standard class seats are available
- v. Being given free hot drinks when seated

Staff should be encouraged to be proactive in identifying and helping vulnerable passengers at risk during extreme cold weather.

7.8 Staff

Railway undertakings should consider the needs of all their staff, both 'front line' and 'back office'.

All managers and supervisors should appreciate that safety and commercial standards can be compromised if staff suffer a drop in body temperature and take appropriate steps to avoid this happening. This should include checking that staff are equipped with suitable clothing and given access to hot drinks if working in low temperatures.

Occupational health or safety teams within railway undertakings can also offer helpful advice and guidance to staff.

Railway undertakings should issue guidance to all their staff on how to cope with extreme cold weather.

8 Failure or non-availability of on-train environment control systems

8.1 Introduction

Most modern rolling stock is fitted with systems to control on-train temperature and air quality. While these are generally able to quickly establish and maintain a comfortable environment for passengers, the absence of passenger accommodation with external windows that can be opened, even in an emergency, does mean that the non-availability of such systems may result in a potentially rapid deterioration of on board conditions.

Clearly the speed and extent of any such deterioration will depend to a considerable extent on the conditions outside the train. Problems resulting from such failures or non-availability are likely to be exacerbated in cases where trains have become stranded for extended periods and these on-train environment control systems are inoperative.

Though on-train environment control systems, as defined, include temperature control and operation of or access to on-train passenger toilets, it is the failure or non-availability of on-train air conditioning that is likely to have the widest and most significant impact on passengers. Indeed, in extreme cases, most obviously where a train is stranded without air conditioning during extreme hot weather and/or in direct sunlight, this may present a potentially serious risk to the health and safety of both passengers and staff on board the train. It is accordingly the failure or non-availability of on-train air conditioning on which the majority of this part of this document (i.e. Sections 8.3 onwards) primarily focuses.

It is important that failures in these on-train systems are communicated to the respective operations Control function so that Control staff are aware. This means that if there is an incident affecting that train in question, then the already degraded on-train conditions are fed into the decision making process from the outset.

8.2 Toilets

The majority of trains are now provided with modern toilets which typically cease to function and/or be usable once the toilet water tank is empty, the controlled emission tank is full or power is lost. On-train staff should be alert to this, particularly when trains are heavily delayed or become stranded, and take steps to ensure that at least some toilets on the train are kept in a usable state for as long as possible. Section 7.7 of RDG and Network Rail Guidance Note RDG-OPS-GN-049 provides further detail and guidance.

8.3 Purpose

The purpose of this section of this Guidance Note is to advise railway undertakings of good practice in regard to responding to the failure or non-availability of on-train air conditioning in passenger accommodation. Sections 8.5 to 8.8 refer to such situations when the train is otherwise able to operate normally; Section 8.9 refers to such situations when the train is stranded.

It does NOT address failure of air conditioning in driving cabs for which reference should be made to the instruction concerning failure of cab heating and cooling equipment in the Rule Book.

8.4 Failure or non-availability of on-train air conditioning - general

There are broadly three circumstances which will result in an inability to provide air conditioning in passenger accommodation:

- i. Failure of the air conditioning equipment itself in one or more vehicles.
- ii. On hauled services, inability to provide a locomotive with the required electric train heating (ETH) capability.
- iii. A more general failure of the train or of the infrastructure (e.g. engine failure on a diesel operated service or loss of traction current on an electrically operated one).

It should be noted that in the first two cases the train is otherwise able to operate normally whereas in the third it will be disabled – this is a key difference when determining the appropriate response.

8.5 Responding to failure or non-availability of on-train air conditioning

Railway undertakings should consider in advance how best to respond to the failure or non-availability of on-train air conditioning equipment on a train otherwise able to operate normally. The response is likely to be influenced by a number of factors including:

- i. The nature and extent of the failure/non-availability.
- ii. Whether the failure/non-availability occurs before the train starts its journey or en-route.
- iii. The anticipated degree of internal overheating (extreme hot weather) or cooling (extreme cold weather), taking account of both weather conditions and load factors.
- iv. Whether the anticipated degree of internal overheating/cooling is acceptable in the context of the type of train service (commuter/regional/express) affected.
- v. The impact of the response on passengers, staff and the wider train service.

8.6 Integrity of on-train air conditioning systems

Responsibilities of Maintenance Controllers

Maintenance Controls should produce an up to date list of vehicles with known on-train environment control system defects and this should be interrogated daily by Maintenance Controllers to identify which sets/units are affected.

Pre-advice to on-train, station and customer information staff

Where there are sets/units with known on-train environment control system problems, details should be made available to the following:

- i. Train crew and other on-train staff
- ii. Station staff (as applicable)
- iii. Those responsible for station cis displays (as applicable)
- iv. Those responsible for seat reservation labelling (as applicable)
- v. The operational/train service Control function so that they are aware of the situation on that train/affected part of that train

Such advice should ideally be provided to train crew at the time of booking on duty and as a minimum should be in sufficient time to allow contingency arrangements to be put into place before the start of the journey.

Contingency arrangements

Possible contingency measures that can be taken to mitigate the impact of known defects include:

- i. Reallocation of seat reservations to alternative vehicles.
- ii. Station announcements advising passengers to avoid the vehicle(s) concerned.
- iii. Messages on station/platform departure screens advising passengers to avoid the vehicle(s) concerned.
- iv. Direction of passengers already on board the train to other vehicles. Consideration should be given to declassifying of first class accommodation to increase the number of seats available to holders of standard tickets.

Where train loadings are such as to make it impractical to accommodate (i.e. seat) all passengers comfortably in alternative vehicles then consideration should be given to making (additional) stocks of cold/hot drinks available on the train.

Informing the infrastructure manager

The infrastructure manager should also be informed of vehicles with defective on-train environment control systems operating on their infrastructure so that an appropriate response can be given in the event of a failure or serious delay.

Defects occurring to trains already in service

When train crew become aware of any faults affecting on-train environment control systems during the journey which have not been notified to them previously, then these should be reported to Maintenance Control.

8.7 Arrangements for managing on-train air conditioning system failures

Routine assessments

Routine assessments by members of train crew should be made to identify vehicles with deteriorating conditions.

Redirection of passengers

Spreading of passengers through the train where practicable may help to reduce the immediate effects of overheating/cold vehicles or those with poor air quality. Consideration should be given to declassifying first class accommodation if this will assist in relieving the problem.

Blinds and curtains

Window blinds should be lowered and/or curtains drawn on affected vehicles to reduce the heating effects of direct sunlight.

Advice to passengers re refreshments

In cases of extreme hot weather where most or all of the train is affected, passengers should be advised not to consume alcoholic beverages as this can increase the likelihood of dehydration and catering staff should be instructed to dissuade passengers from selecting such items. Staff should consider suspending the sale of alcoholic beverages if they believe that, due to the on board conditions, this might increase risk to the well-being of passengers.

Wearing of uniforms

During extreme hot weather, rules on the wearing of staff uniforms by on-train staff should be eased – for example, removal of ties and neckerchiefs should be permitted.

8.8 Conditions within kitchens and buffet cars

Overview

It should be recognised that on board catering/retailing areas, particularly kitchens, can be warm working environments under normal conditions, so any failure of on-train environment control systems is likely to exacerbate the situation. However it should be noted that while such areas may be warm, this does not necessarily render them unsafe.

Assessing the risks

In the event of the failure or non-availability of the on-train environment control system, the Train Manager (or other person designated as in charge of such areas) should make an assessment of the environmental conditions within these areas and whether it is both safe and appropriate for staff assigned to them to continue to operate normally. Any assessment of the risk should take account of:

- i. Whether redeployment of staff from these areas to other parts of the train would be a more productive use of resources.
- ii. Whether the temperature is such as to present a real health hazard (as opposed to merely rendering them uncomfortably warm), e.g. whether staff are showing symptoms of heat exhaustion or similar (see Section 6.3).

If either (or both) of the above apply, then the following should additionally be considered:

- i. Whether service can be maintained for the duration of the train's journey - the longer the journey, the greater the risk.
- ii. Whether staff can be rotated to permit sufficient breaks from the worst affected areas; regular short (5-10 minute) breaks will help the body cope with the effects of heat increase.
- iii. Higher ambient temperatures require fridges to work harder, adding further to any heat build-up - consideration should be given to shutting them down if not already without power.
- iv. Staff should be encouraged to drink plenty of water to maintain body fluids.

Possible closure of facilities

Where the assessment has indicated that conditions pose a genuine health/safety hazard and the above mitigation measures are either impractical or insufficiently effective then the catering/kitchen/retail facilities should cease operation.

8.9 Failure or non-availability of on-train air conditioning on stranded trains

Introduction

Diesel powered services which become stranded are generally able to maintain full on-train environment control systems as power for them is generated within the train itself and hence their operation is independent of the infrastructure.

Even in cases of train failure, most diesel powered passenger trains (including almost all DMUs) have two or more separate engines and the simultaneous failure of these and hence loss of on-train systems, while possible, is comparatively rare.

Conversely, operation of on-train environment control systems on electrically powered trains is reliant on the continuing availability of power drawn from the catenary or third rail and hence such systems are vulnerable both to train and infrastructure failures. Train batteries provide some contingency against loss of traction current but are primarily intended to maintain a minimum level of lighting and support continued operation of GSM-R and the on-train public address system and are not able to sustain on-train environment control systems for any useful length of time. Once the external power supply is interrupted, these systems will therefore shut down and the on-train environment will begin to deteriorate.

Thus any event which results in an electrically powered train becoming stranded can quickly escalate to a major incident if a rescue train or locomotive (with appropriate coupling or coupler adaptor) cannot be provided in a short space of time or some other means found of maintaining an acceptable on board environment.

RDG/Network Rail Guidance Note RDG-OPS-GN-049 - Meeting the Needs of Passengers Stranded on Trains – provides general guidance on responding to the needs of stranded passengers. The purpose of this section is to provide more detailed information specifically on the consequences of losing on-train air conditioning and how these may be mitigated.

Factors affecting the deterioration of the on-train environment

The speed at which and extent to which on-train conditions on a stranded train deteriorate following the loss of air conditioning will depend primarily on the following:

- i. High external temperatures and/or bright, direct sunshine: This can quickly increase internal heat and humidity leading to a range of serious medical issues (see Section 6.3).
- ii. The number and distribution of passengers on the train: This will also be significant – clearly air quality in particular will diminish more rapidly in areas where there are large concentrations of people.

Health and safety risks

Heat in itself may give rise to dehydration, heat exhaustion and heatstroke, which are described in Section 6.3 above. In addition, lack of fresh air or failure of air re-circulation systems within a vehicle may lead to a rapid rise in carbon dioxide (CO₂) levels to the point at which they become dangerous. The presence of high levels of CO₂ will not be obvious in itself, but the effects on people will be – breathlessness, tiredness, headaches, nausea. Substantial exposure to CO₂ can have fatal consequences.

Loss of air conditioning may also result in increased humidity levels. Apart from making the conditions feel less comfortable, these impact on the ability of sweat to evaporate from the skin, which is the main method of heat loss in humans, thus increasing the risk of heat exhaustion.

8.10 Opening of external doors to provide ventilation

Introduction

When a train has become stranded, is without operational air conditioning and there is no prospect of either immediate rescue or restoration of power to those systems, an option may be to release one or more doors to allow entry of fresh air to the train. It should be recognised that it is unlikely that a fully effective cool draught will result (especially on warm sultry days) but the presence of fresh air may be beneficial to those who may be suffering health effects. It is also likely to have a general positive psychological effect on passengers independent of any direct medical benefits.

Management/supervision of door release

Door release should only be undertaken where responsible staff or members of the public are available who can be tasked to monitor the released door so that no one accidentally falls onto the track or attempts to self-evacuate. The use of a physical barrier (where available) or hazard tape or similar will assist in the control of these potential exits. Relocating passengers to occupy less carriages to aid supervision should be considered, although crowding and full carriages should be avoided as this could raise temperatures.

Consideration should be given to which side the doors should be released with priority given to opening cess side doors if possible. Line speed and visibility of approaching trains should also be considered along with whether the train is tilting as a result of track cant.

The impact (delay) on restarting and moving the train if an external door has been opened should also be recognised and considered, including the time needed to re-set on-train safety systems.

Liaison with infrastructure manager

Authority of infrastructure manager staff should be sought when possible before releasing external doors as they may need to suspend or caution trains passing on adjacent or nearby running lines.

If on-train conditions are deteriorating to a level where it may affect the health of passengers, carriage doors may be released while observing the instructions in Section 8.10 above.

Appendix A – Example of passenger guide to rail travel during hot weather

During hot weather, help make your journey more comfortable with these travel tips:

- Always carry a bottle of cold water with you. This year xyz TOC will be distributing mineral water at... in association with abc brand.
- Many stations and trains on this route have places where you can buy refreshments. It is helpful to increase your liquid intake during hot weather to guard against dehydration.
- Remember that when you are hot, alcohol can make the effects of dehydration even worse and make your body more susceptible to heat exhaustion.
- On long journeys, wear loose fitting clothes and where possible avoid synthetic fabrics.
- If you are able to travel outside the peak periods you will find trains less busy and your journey cooler and more comfortable.

Changes to train services

We are aware that sometimes our services will be affected by hot weather and carriage temperatures may be higher than we would like.

This year we have continued upgrading air conditioning on our trains and new rolling stock with improved air conditioning and ventilation will operate on many routes. Our diesel trains have had new coolers fitted to reduce the chance of engines losing power or shutting down on very hot days.

Very high temperatures can adversely affect the reliability of our trains. Track and line side equipment can suffer in the high temperatures too. This year on our routes, Network Rail has invested in summer precautions to keep these disruptions to a minimum. However, in extremely hot weather rail temperatures can reach 50°C or more, meaning that for safety reasons speed restrictions have to be imposed. Services will therefore take longer and some may have to be cancelled.

We will do everything possible to manage these issues, but some delays and cancellations may still occur. We will keep you informed through announcements and screen displays on trains and at stations while real time running information is also available through the National Rail website (www.nationalrail.co.uk).

Appendix B – Example of staff guide to hot weather

Stay cool – keep your cool

How to survive hot weather at work - a guide for rail staff

With hot weather on the way here are eleven tips to help you avoid the worst effects of the summer:

- Stay in the shade or wear a hat while working outside.
- Use sunscreen factor 15+, especially on the back of your neck. Those with less hair remember the top of your head.
- Keep covered up, but if you wear short sleeved shirts or open neck tops remember that exposed areas of skin will need sunscreen too!
- Increase your fluid intake - drink more than 2.5 litres a day or eight glasses of water. Remember to bring water to work with you each day. Do not judge your need for a drink by thirst. Always drink more than you think you need to, but drink moderately and regularly.
- Drink plenty of liquids to avoid the risk of dehydration.
- For your meals, try to increase the amount of fresh fruit and vegetables you eat. Avoid high calorie and high protein foods as these raise your body's metabolism and temperature. Replace chocolate snacks with dried fruits.
- Do not take salt tablets unless told to do so by your doctor. Taking calcium supplements, however, is a good idea.
- Keep your office and work places well ventilated. First one in the office should open windows in non air conditioned areas. Remember to turn on fans to keep the air circulating.
- Sun worshippers should be considerate of those who feel the heat, so use window blinds to keep rooms cool.
- Remember hot weather in the city often results in higher ozone and air pollution. If you suffer from asthma or hay fever, remember to bring your medication to work with you.
- If you are taking any prescribed or over the counter medications, check with your doctor or pharmacist whether they will affect your body's ability to regulate your temperature, thus making you more vulnerable to heat exhaustion. As a general rule, these types of drugs may affect you: gastrointestinal drugs containing atropine, antidepressants, antihistamines, certain cardiovascular drugs including beta blockers and diuretics. If you take these drugs, take special care to drink regularly through the day.

To help staff through the hot weather:

Water dispensers and bottled water are available at.....

If your work place is getting too hot for comfort, contact office facilities who will get you a portable fan to aid ventilation.

Staff who work office hours are reminded that core office hours have been amended. You may start work at 06.00 hrs and finish by 15.00 hrs with the agreement of your section leader.

Dress codes for front line staff have been changed for this hot weather. Ties do not need to be worn and smart white short sleeve shirts are acceptable. Remember though that you must wear your name badge while working with passengers.

Drivers, conductors and on-train staff are requested to report any defects with air conditioning as soon as possible. Remember we need the vehicle number and the service that the train was operating when the defect was observed.

This year we have negotiated a free swim at xyz leisure club so that you can unwind after a hot day at work. You can join xyz with a special rate negotiated by employee relations. Contact... for details.

Remember our passengers will be hot and bothered too!

Keep extra vigilant for vulnerable passengers who may be suffering in the heat - pregnant women, elderly or very young people and those who are very obese. If you can, pay special attention to their needs, giving them priority access to train accommodation and do not let them stand too long in queues.

Make sure you know how to get hold of free drinks if a passenger is in distress owing to the hot weather.

Watch out for passengers who have had too much alcohol to drink and apply the issued local instructions.

Check you know what special arrangements come into force when 'hot weather instructions' apply. Your local management team will brief these to you.

Remember passengers are more likely to be tired and irritable during hot weather. Keep a smile on your face and keep your cool!

Rail Delivery Group



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