



Fatigue Management Guidance


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TERMS AND ABBREVIATIONS

Table A – Terms

| Term | Definition |
|---|--|
| Booking on Point | Location or area for recording the start and end times of an individual's working period (for example booking on and off) |
| Controller of Safety Critical Work | Any person controlling the carrying out of safety critical work on a transport system or in relation to a vehicle used on a transport system |
| Door-to-Door | Direct from point of origin (place of residence) to point of destination (sign on point) |
| Duty Holder | Person in charge of operational activities at a particular time |
| Fatigue | There is no single agreed definition but for the purpose of document – 'a state of perceived weariness that can result from prolonged working, heavy workload, insufficient rest and inadequate sleep' |
| Fatigue Risk Management System | 'A data-driven means of continuously monitoring and maintaining fatigue related safety risks, based upon scientific principles and knowledge as well as operational experience that aims to ensure relevant personnel are performing at adequate levels of alertness.' (International Civil Aviation Organisation) |
| Hidden Limits | Generic limits of working time that were adopted as a consequence of the inquiry into the accident at Clapham Junction in 1988 which have now been withdrawn. |
| Line of Sight | Operating mode where a tram should be able to stop before a reasonably visible stationary obstruction ahead, from the intended speed of operation using the service brake |
| Microsleep | Unintentional periods of sleep lasting anywhere from a fraction of a second to a few minutes. They are often, but not always, characterised by the closing of eyes or head nodding actions. (RAIB) |
| Safety Critical Worker | A competent person that carries out safety critical tasks |
| Safety Management System | A formal management system or framework to manage health and safety |
| Shift Work | Shift work is an employment practice designed to provide service across, all 24 hours of the clock each day of the week (often abbreviated as 24/7). The practice typically sees the day divided into shifts, set periods of time during which different groups of workers perform their duties |
| Sleep Inertia | Feeling of grogginess upon awakening. Associated with longer reaction times and reduced performance; effects are most severe for the first 5 minutes after waking, but can last for at least 30 minutes; worse if woken from deep sleep, particularly if this coincides with the window of circadian low (WOCL) (Clockwork Research) |
| Window of Circadian Low | Individuals living on a regular 24-hour routine with sleep at night have two periods of maximum sleepiness, also known as "WOCLs". One occurs at night, roughly from 3 a.m. to 5 a.m., a time when physiological sleepiness is greatest and performance capabilities are lowest. The other is in the afternoon, roughly from 3 p.m. to 5 p.m. (Basics of Aviation Fatigue) |

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Table B – Abbreviations

| Abbreviation | Definition |
|--------------|---|
| FRF | Fatigue Reporting Form |
| FRMS | Fatigue Risk Management System |
| HSWA | Health and Safety at Work Act 1974 |
| HSE | Health and Safety Executive |
| KPI | Key Performance Indicator |
| LRSSB | Light Rail Safety and Standards Board |
| MHSWR | Management of Health and Safety at Work Regulations 1999 |
| ORR | Office of Road and Rail |
| RAIB | Rail Accident Investigation Branch |
| ROGS | Railways and Other Guided Transport Systems (Safety) Regulations 2006 |
| RSSB | Rail Safety and Standards Board |
| SMS | Safety Management Systems |
| SPAD | Signal Passed at Danger |
| WTR | Working Time Regulations (as Amended) 1998 |
| WOCL | Window of Circadian Low |

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1. Introduction

- 1.1. This guidance supports the high level principles set out in LRG 1.0 Tramway Principles and Guidance (TPG) published by the Light Rail Safety Standards Board (LRSSB).
- 1.2. This document provides high level guidance for fatigue management for safety critical workers in relation to the operation of Light Rail (tram) vehicles based on 'line-of-sight' operations only. As with all guidance, this document is not prescriptive and is intended to give advice, not to set a mandatory industry standard and it is based upon goal setting principles as best practice.
- 1.3. This guidance is based on the experience gained from existing UK Light Rail systems (tramways) and other related industries support by published documents:
 - 'Managing Rail Workers Fatigue' guidance Office of Road and Rail (ORR)¹;
 - 'Fatigue and shift work for freight locomotive drivers and contract trackworkers' RSSB Report T699; and
 - 'Human factors study of fatigue and shift' RSSB Report T059.
- 1.4. It does not prescribe particular arrangements adopted by any of these systems and is intended to give guidance and advice to those involved in the management of fatigue management applicable to the operation of Light Rail systems in the UK.
- 1.5. Managing fatigue is a shared responsibility between the organisation and workers. For example, the organisation must provide a schedule or pattern of work that does not cause unreasonable levels of fatigue, provide adequate rest opportunities and makes adjustments when they have evidence to indicate changes are necessary. The worker (operating a vehicle in both normal and degraded operating conditions) must use their opportunities for rest, and report when circumstances prevent them from doing so, or they are experiencing elevated fatigue levels for other reasons.
- 1.6. As safety depends, among other things, on employees being fit for duty whilst at work, the risk of fatigue is an important factor for a Light Rail operator, as fatigued people are very likely to be at risk of making mistakes. The effects of serious fatigue have been judged as comparable to being over the drink driving limit in respect of reaction times. The risk of fatigue and any potential reduction in reaction time alone could result in more serious outcomes.
- 1.7. This document sets out guidance for Duty Holders in relation to fatigue, such as (but not limited to) the monitoring and controlling of excessive working hours by employees, in particular those who undertake work activities of a safety critical nature. However, it is to be borne in mind that managing fatigue is everybody's responsibility both morally and legally.
- 1.8. This guidance document has been reviewed by an external independent occupational health consultant.

¹ Managing rail staff fatigue | Office of Rail and Road (orr.gov.uk)

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2. Scope

- 2.1. There is no single agreed definition of fatigue, but for the purposes of this guidance, fatigue will be considered as:

“a state of perceived weariness that can result from prolonged working, heavy workload, insufficient rest and inadequate sleep”.

- 2.2. This involves a general feeling of tiredness resulting in a reduced ability to perform work effectively. A fatigued person will be less alert, less able to process information, will take longer to react and make decisions, and will have less interest in working compared to a person who is not fatigued. Fatigue increases the likelihood of errors and adversely affects performance especially in tasks requiring, for example, vigilance and monitoring, decision making, awareness, fast reaction time, tracking ability and memory.

- 2.3. In terms of the workplace, the features below make fatigue a particular concern in any safety critical work:

- Fatigued workers are not adequately able to perceive risk and tolerate risks they would usually find unacceptable, including accepting lower standards of performance and safety;
- Workers communication, monitoring and co-ordination activities are also adversely affected;
- People can often be completely unaware of the extent to which their performance is being reduced by fatigue and are unaware of lapses in attention or having episodes of micro-sleep; and
- Fatigue is hard to detect in workers as unlike other causes of temporary mental impairment such as drugs and alcohol, there is currently no definitive objective test for fatigue (like a breathalyser or blood test) that proves we are over a certain limit of fatigue.

- 2.4. Causes of fatigue can include:

- work related factors for example timing of working and resting periods, length and number of consecutive work duties, intensity of work demands;
- individual factors for example lifestyle, age, diet, medical conditions, drug and alcohol use, which can all affect the duration and quality of sleep; and
- environmental factors for example family circumstances and domestic responsibilities, adequacy of the sleeping environment.

- 2.5. It is important to note that it is not simply the disruption of sleeping and waking periods that we must consider with shift work, but also that this means that we can be working during a time of day that we are naturally very sleepy (0200-0600, the Window of Circadian Low), and therefore at elevated risk of fatigue.

- 2.6. Equally, having to get up early for very early starts also means trying to fall asleep earlier in the evening, as we have a natural ‘peak’ in alertness of approximately 2 hours before we habitually go to bed. In this way, working against our body clock can be a direct cause of fatigue (as in the early morning hours of a night shift) and indirectly, through causing sleep loss or sleep disruption.

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3. Duty Holder Legal Responsibilities

- 3.1. Sections 2(1) and 3(1) of the Health and Safety at Work etc Act 1974² (HSWA) place general duties on employers to reduce risks so far as is reasonably practicable, including risks from worker fatigue.
- 3.2. Section 7 of the HSWA requires employees to co-operate with their employer by for instance ensuring they are adequately rested to do their work safely, and by reporting any concerns about fatigue promptly to their employer.
- 3.3. The Management of Health and Safety at Work Regulations 1999³ (MHSWR) requires employers to assess risks arising from their operations, including risks from worker fatigue. It also requires employers to put in place effective arrangements for the planning, organisation, control, monitoring and then review these controls.
- 3.4. When considering fatigue management, reference is often made to the Working Time Regulations (as Amended) 1998⁴ (WTR) which, amongst other things, place maximum limits on the amount of time an employer can ask an employee to work. Employers and other duty holders need to consider and comply with the requirements of WTR. However, it is important to note that by complying with WTR is not in itself sufficient to seek to adequately control risks from workers fatigue, as some work patterns could comply with WTR but still be potentially fatiguing.
- 3.5. In addition to the above more general duties, Regulation 25 of the Railways and Other Guided Transport Systems (Safety) Regulations 2006⁵ (ROGS) places specific fatigue management duties on controllers of safety critical work in the railway industry.

² Health and Safety at Work etc. Act 1974 (legislation.gov.uk)

³ The Management of Health and Safety at Work Regulations 1999 (legislation.gov.uk)

⁴ The Working Time Regulations 1998 (legislation.gov.uk)

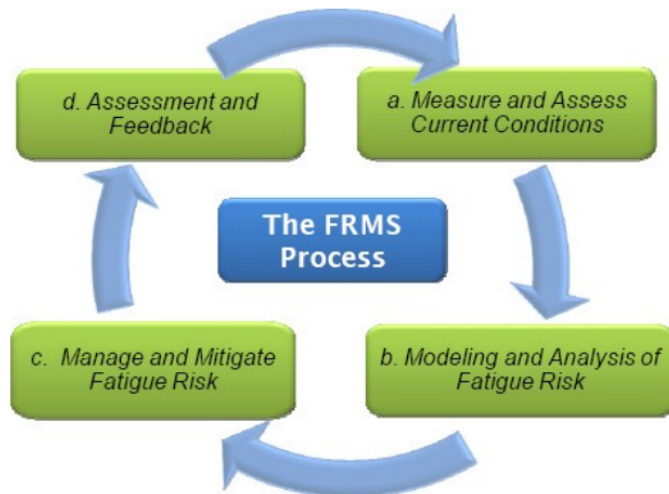
⁵ The Railways and Other Guided Transport Systems (Safety) Regulations 2006 (legislation.gov.uk)

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4. Fatigue Risk Management System (FRMS)

- 4.1. Duty Holders whose workers are likely to work long hours from time to time, work significant overtime or undertake shift work are likely to have a greater potential fatigue risks. Therefore, they are likely to need formal arrangements for minimising the risk by controlling fatigue, especially if workers undertake work where being alert is important for safety.
- 4.2. Duty Holders should already have various controls in place to reduce the risk of fatigue, including for instance: workers selection procedures which consider any medical conditions which could contribute to fatigue, limits on working hours and patterns, and requirements for what workers and managers should do if someone considers they are or appears to be too tired to work safely.
- 4.3. A formalised control can be described as a 'Fatigue Management System' (FRMS) which is a formal system of data-driven fatigue specific controls that continuously monitor and maintain fatigue related safety risks. This is based upon scientific principles and knowledge, as well as operational experience and aims to ensure relevant workers are performing at adequate levels of alertness. A FRMS will also have Fatigue Reporting Forms (FRFs) in place (see Appendix B for examples).
- 4.4. A typical FRMS identifies and draws together all preventive and protective measures, based on data gathered from experiences within the organisation and from best practice gained from experience of similar organisations, which help a Light Rail system to control risks from fatigue.
- 4.5. Any FRMS should be based on a comprehensive understanding of fatigue and seek to manage it in a flexible way and to an appropriate degree in relation to the risk and also the nature of the workers role and responsibilities. Ideally, an FRMS should as far as possible:
 - Be based on sound fatigue control principles rather than custom and practice (although best practise can be included);
 - Take account of fatigue information collected about the Light Rail system's own operations and feedback from workers (for example, in FRFs) and then tailoring fatigue controls accordingly;
 - Be integrated with the company Safety Management Systems (SMS); and
 - Be a continuous and adaptive process, continuously monitoring and managing the risk of fatigue, whatever its causes.
- 4.6. A FRMS would use several layers to reduce the risk of fatigue and fatigue-induced errors from developing into incidents or accidents. An FRMS functions as four successive, repeating steps which together comprise a continuous fatigue risk management process and should result in continuous improvement and reductions in fatigue related risk.
- 4.7. The cyclic process of an FRMS, and each step is expanded below in Figure 4.1.

Figure 4.1 The Cyclic Process of an FRMS



- 4.8. **(a) Measuring and assessing current conditions.** The starting point of an FRMS is measuring and then assessing the existing level of risk of fatigue associated with current work patterns and operations. Understanding the existing conditions within the Light Rail system is critical for developing an effective fatigue management system. Such collection of information should include the following (not exclusively):
- workers fatigue reports (for example, FRFs – refer to Appendix B for examples);
 - workers fatigue surveys;
 - fatigue related errors and incidents;
 - work patterns; and
 - any other factors that could potentially lead to the risk of fatigue.
- 4.9. **(b) Modelling and analysing.** Root causes of fatigue are then sought by modelling the work patterns and analysing the likely associated risk of fatigue. These risks are then assessed and traced back to the conditions that may contribute to the risk. Fatigue risk assessment tools (such as the HSE Fatigue Risk Index tool) can help find the specific factors that could lead to the risk of fatigue, however, the use of such tools requires an understanding of their outputs and limitations.
- 4.10. **(c) Managing and mitigating fatigue risk.** Based on the findings of the modelling and analysis, fatigue control measures are devised and put in place seeking to reduce the risk of worker fatigue. Managers should take a collaborative approach by involving workers and consulting other relevant parties such as trade unions in devising and setting up control measures to seek to eliminate or reduce the factors which could contribute to fatigue
- 4.11. Measures introduced will be particular to the Light Rail system and appropriate to the workers and roles and may include the following (but not exclusively):
- shorter shifts;
 - length of rest periods;
 - fewer successive shifts without a rest day;
 - steps to reduce short-notice variations in planned start times;

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- enhanced fatigue education and training; and
- monitoring systems to highlight breaches.

4.12. Both workers and other parties have to co-operate with Light Rail systems to ensure that potential risks from fatigue are properly controlled.

4.13. **(d) Assessment and feedback.** To complete the cycle, evidence is sought to consider whether the changes to fatigue control measures that have been brought from the earlier stages are successfully reducing risks of fatigue, and the findings are fed back into the FRMS. Evidence should include (but not exclusively):

- comparisons of fatigue rating scale scores and / or workers fatigue survey findings before control measures were introduced compared with subsequent survey findings;
- changes in fatigue assessment tool scores;
- number of workers reported fatigue problems;
- analysis of alertness monitoring equipment is useful, and can provide an objective measure of fatigue, most only highlight extreme cases (for example, microsleeps during a task) so should not be relied upon to provide an overall picture of fatigue exposure;
- a measure of increased reported sleep from workers; and
- accidents and incidents in which fatigue is identified as a factor.

4.14. The purpose of this is to check whether any fatigue control measures introduced have made any impact to the reduction of fatigue. Not all measures may be as effective in reducing fatigue as had been anticipated, and is therefore essential that control measures are adjusted and further measures introduced if necessary. The assessment and feedback step is also important to check for any unintended consequences of mitigations. For example, due to a change in roster, fatigue could be increased elsewhere in the organisation.

4.15. As can be seen from the process, for a FRMS to be fully effective, there needs be agreement and cooperation between workers and management, and a positive culture towards safety within the Light Rail system. Workers have to take sufficient responsibility to obtain sufficient sleep, and management have to foster an undertaking to treat fairly any workers who may report that they are suffering the effects of fatigue whatever the reason they consider they are too tired to work safely irrespective of cause. Having to justify severity of fatigue or the circumstances that led to the symptoms could be perceived as a barrier to open reporting.

4.16. The effectiveness of a FRMS is also further enhanced when it is integrated with the Duty Holders wider Safety Management System (SMS). The building blocks of the FRMS should be an extension of existing processes for managing safety. For example, existing incident reporting forms may only need slight expansion to collect information for fatigue analysis or alternatively the introduction of specific report forms associated to recording managing fatigue, such as the example FRFs in Appendix B of this guidance document.

4.17. In practical terms, organisations with an existing and established SMS may simply need to review their existing processes to identify those data streams and existing risk control measures that contribute to fatigue management, and to assess whether there are any reasonably practicable ways of further reducing risks from fatigue.

5. The ROGS Nine-Stage Approach for Critical Safety Workers

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- 5.1. Managing the risk of fatigue is especially critical for critical safety workers.
- 5.2. Within legislation, ROGS identifies that the controller of safety critical work should establish effective arrangements for managing the risks arising from fatigue in safety critical workers. There is also guidance provided by the ORR ('Managing Rail Workers Fatigue'). This process must include the nine stages outlined below and as illustrated in Table 5.1 below.

Table 5.1: Managing Rail Workers Fatigue

| Stage | | Summary |
|-------|---|--|
| 1 | Identifying those safety critical workers affected | Identify those people carrying out safety critical work who are liable to be or could become fatigued when carrying out such work. |
| 2 | Setting standards and designing working patterns | Identify, set and adhere to appropriate standards and good practice for working patterns, observing any relevant working time limits that apply. |
| 3 | Limiting exceedances | Ensure that any standards and limits that have been identified and set are only exceeded with prior approval and only on an infrequent basis and in exceptional circumstances. |
| 4 | Consulting with safety critical workers | Consult with safety critical workers and their safety representatives on the arrangements needed to manage fatigue and when standards and limits are to be changed. |
| 5 | Recording the arrangements | Maintain a record of arrangements for managing the risks arising from fatigue in safety critical workers. |
| 6 | Providing information to safety critical workers | Provide all safety critical workers under your management, supervision or control with relevant information on risks to health and safety owing to fatigue and your arrangements for managing fatigue. |
| 7 | Monitoring | Monitor the arrangements for managing fatigue to assess how effectively the risks arising from fatigue are being controlled. |
| 8 | Taking action when safety critical workers are fatigued | Ensure, so far as is reasonably practicable, that safety critical workers who report for duty where they are clearly unfit owing to fatigue, or who, through the course of their work shift become clearly unfit owing to fatigue, do not carry out or continue to carry out safety critical work. |
| 9 | Reviewing the arrangements | Review the arrangements for managing the risks arising from fatigue when there is reason to doubt the effectiveness of the arrangements. |

Stage 1 – Identify Safety Critical Workers Affected

- 5.3. Controllers of safety critical work should identify those people carrying out safety critical work; if these workers become fatigued there are likely to be adverse effects on the safety of users of the Light Rail system.

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- 5.4. In identifying such people, controllers of safety critical work should take into account any relevant significant findings of risk assessments that have been carried out and take any appropriate measures accordingly.

Stage 2 – Setting Standards and Designing Work Patterns

- 5.5. Controllers of safety critical work should identify, clearly set out and then follow all appropriate industry standards for working hours and working patterns, adhering to any relevant working time industry limits that apply. The ORR recommends using the fatigue factors (not “hidden limits”, which can be fatiguing) when:
- Assessing current work patterns and designing new working patterns;
 - Agreeing the rostering principles underlying work patterns;
 - Assessing proposed changes to work patterns (for example, overtime, rest-day working, shift swaps) Investigating incidents and fatigue concerns; and
 - Developing key performance indicators (KPIs) for fatigue, to help identify likely fatigue hotspots and prioritise fatigue risk control efforts
- 5.6. The standards and limits set by the controller of safety critical work should also take into account recognised national industry good practice guidance applying to railways and other guided transport systems (for example, LRG 1.0 - TPG).
- 5.7. It is critical that workers who devise working patterns receive training in roster design and the potential impacts on the risks of fatigue. Training should also be given to any workers or trade union representatives significantly involved in devising or negotiating working patterns. Trade unions have a role to play in ensuring that negotiated terms and conditions and the resulting working patterns do not give rise to the risk of fatigue at work.
- 5.8. If there are elements that are not covered by existing national industry standards, limits or guidance, the standards and limits set by the controller of safety critical work should, so far as is reasonably practicable, take into account foreseeable causes of fatigue, including (not exclusively):
- job design;
 - workload and the working environment;
 - the shift system in operation;
 - shift exchange;
 - control of overtime;
 - on-call working;
 - the frequency of breaks;
 - recovery time during periods of duty; and
 - the nature and duration of any time spent travelling.
- 5.9. It must be noted that limits in relation to hours worked and working patterns for safety critical workers are generally stated in standards, limits and guidance as a maximum not a target, for example (not exclusively):
- length of any work shift or period of duty;
 - number of hours to be worked in any seven day period;
 - number of consecutive day shifts;

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- number of consecutive night shifts and early-morning shifts; and
- period of time between breaks, including breaks for meals.

5.10. Similarly, some of the standards, limits and guidance refer to **minimum** periods of time, for example, rest interval between any periods of duty and frequency of rest days.

5.11. Numerical limits on hours worked can help managers decide on a practical day to day basis what may or may not be acceptable. However, taken in isolation, a set of simplistic limits on work and rest hours as outlined above cannot take responsibility for any impact on the risk of fatigue in relation to operational factors. Other factors that need to be accounted for include differences in workload (for example, primarily on segregated verses another that may be primarily street running) and working conditions and personal factors such as age, health, medication, domestic and social activities. Feedback from the workforce is another key measure to aid managers in their practical decision making.

5.12. Under ROGS, working patterns should be designed to:

- minimise the build-up of fatigue by restricting the number of consecutive night or early-morning shifts,
- allow fatigue to dissipate by ensuring adequate rest between shifts and between blocks of shifts, and
- minimise sleep disturbance.

5.13. Planned work patterns may vary when workers are on call or when unplanned overtime needs to be worked, for example, as a result of worker shortages or sickness. Therefore these features should also be assessed and managed to minimise the risks of fatigue. Proposed changes to work patterns should, wherever reasonably practicable, be risk assessed to check whether they adequately take account of good fatigue management practices. Short-notice changes should be avoided so far as is reasonably practicable. Assistance can be provided by software packages to help Duty Holders more easily estimate likely risks of fatigue from changes to planned rosters, provided the software package's limitations are appreciated.

5.14. Length of periods of duty is critical as the duration of a shift is a key factor influencing the risk of fatigue; long shifts have been linked to an increased risk of accidents. There is a strong case for limiting the duration of a shift to a maximum of 12 hours, with further restrictions on duties, such as nights and early-starts and other factors that impinge significantly on the normal hours of sleep. For example, while it may be acceptable to work a 12-hour day shift, lower limits such as 10 hours should be considered where night shifts or early morning start times are planned. Rail Safety Standards Board (RSSB) Report T699 provides some useful guidance.

5.15. In addition, there is evidence⁶ that human performance deteriorates significantly when people have been at work for more than 12 hours. Therefore, controllers of safety critical work should consider whether any shift for safety critical workers (including overtime) could exceed 12 hours, and if so, consider the risks involved in activities that workers could be carrying out after the twelfth hour (including travelling home).

⁶ For example, Managing Rail Staff Fatigue ORR

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- 5.16. The risk of fatigue when working below 12 hours, may depend on other aspects of the working time pattern, such as the adequacy of breaks taken during the shift, the length of interval since the previous duty, the nature of the work and the working environment etc.
- 5.17. Even shifts of eight hours or less can be fatiguing if the work is very intense, demands continuous concentration, there are inadequate breaks, or is very monotonous.
- 5.18. According to RSSB Report T059 ('Human factors study of fatigue and shift work') good practice for maximum shift lengths would be as follows:
- Day shift – twelve hours;
 - Night and early shifts – ten hours; or
 - Shifts starting before 0500 - eight hours.
- 5.19. It is important to recognise that controlling the time actually "at work" may not be enough to properly manage the risk of work related fatigue, for example, if travel times to and/or from the place of work to home or lodgings are significant. To attempt to mitigate this, some rail industry systems place limits on maximum "door-to-door" times between leaving and returning to the home or lodgings to help to control the risks of fatigue, including work related road risks. For further information see Section 6 below.
- 5.20. The daily rest interval for safety critical workers must be adequate to enable them to return to work sufficiently rested. Studies⁷ have suggested that the average amount of sleep required per 24 hours is 8.2 hours, and that if people are continuously awake for more than about 16 hours, lapses in performance can be expected to increase. To be at their best, studies indicate that 90% of people need somewhere between 7 and 9 hours of sleep each night. This is relevant to shift workers, particularly those working early starts, late finishes or night shifts, which could result in workers getting under eight hours sleep. It is therefore advisable to include a minimum rest period of 12 hours between consecutive shifts, increasing to 14 hours rest in the case of consecutive night shifts.
- 5.21. Evidence shows that time spent travelling to and from work does not provide rest in the same way as the equivalent time spent at home (see Section 6 below). It is therefore important that those who devise working patterns understand and monitor long travelling times to and from work in order to consider how this could reduce the opportunity for adequate daily rest and so increase the risk of fatigue. Where a large proportion of a group of safety critical workers have long travelling times, this ought to be taken into account when considering changes to working time patterns or locations of work. Long travelling times could be mitigated by increasing the length of minimum rest periods to ensure that all staff are provided with an 8 hr sleep opportunity.
- 5.22. A feature of some shift work patterns is the occasional short rest interval of around eight hours. However, this will not usually be an adequate rest interval for most workers and duties, and therefore, patterns involving such short rest intervals should be revised as soon as is reasonably practicable. Until any such shift pattern is revised to eliminate these short intervals, it is important to ensure that other daily rest intervals in the shift pattern are of sufficient length and that breaks during the shift after the short interval are also sufficient.

⁷ Such as 'The Cumulative Cost of Additional Wakefulness' Van Dongen et al, 2003

- 5.23. Recovery time is also a key consideration to allow sufficient rest days to allow 'cumulative fatigue' accumulated over successive shifts to dissipate. The planning of rest day arrangements for safety critical workers must take account of the length of shifts and daily rest intervals as well as frequency of rest days and the length of the recovery time. Workers may benefit from regular (at least fortnightly) recovery periods of at least 48 hours. These may be particularly important for shift workers, especially those working nights as shortened or interrupted sleep over a period can result in them spending part of their rest day sleeping. Studies⁸ suggest that where sleep is restricted to seven hours or less, there are cumulative effects on cognitive performance over the successive days.
- 5.24. In general, workers may need longer to recover properly from a night or very early shift than a day shift.
- 5.25. Good practice for the maximum number of consecutive shifts before a rest day is provided in Table 5.2 below:

Table 5.2: Maximum Number of Days By Shift Type

| Shift Type | Maximum number of consecutive shifts before a rest day |
|--------------------------------|--|
| Day (including mixed patterns) | 7 |
| Night | 3 |
| Early | 5 |

- 5.26. However, where there is a greater need for night work, limiting the number of consecutive nights could mean more switching from night shifts to day shifts and then back. Therefore, it is important that Controllers of Safety Critical Work or those who devise working patterns assess the relative pros and cons of such trade-offs and make a judgement on the best overall solution and document their reasoning. Consecutive shifts at similar times promote better sleep than those with large variation in start time between shifts.
- 5.27. Good practice suggests that following a night shift, more rest days be allowed if being followed by an early start, than rest periods before an early shift which follows a late shift. The recuperative value of single days off (after shifts of any timing) is very limited. Therefore, rest-day working should be kept to a minimum, to ensure that planned recovery time is effectively provided.
- 5.28. However, some safety critical workers work rotating shifts which may include night work. These workers may have difficulty in adjusting to varying sleep patterns, or to daytime sleep due to the effect of the internal 'body clock' regulating sleep and wakefulness. In addition, it may also be difficult to find the right conditions at home for daytime sleep. The effects of this reduction in the quantity and quality of sleep can build up over a period. On average, a person may lose two hours sleep for each night shift worked.
- 5.29. Therefore, the resulting fatigue that these safety critical workers may experience is likely to be most noticeable on the night or early-morning shift, and more marked if the task is monotonous or repetitive. While some people prefer to work more consecutive shifts in

⁸ Such as 'The Cumulative Cost of Additional Wakefulness' Van Dongen et al, 2003 and 'Patterns of performance degradation and restoration during sleep restriction and subsequent recovery: a sleep dose-response study' Belenky et al, 2003

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order to take a block of days off afterwards, this must be balanced with the higher risk of fatigue from the greater number of shifts worked consecutively.

- 5.30. Rotating shift patterns that change around once a week are likely to be more difficult to adjust to than a more rapidly or more slowly changing one. A 'forward rotating' shift pattern (each shift beginning at the same time or slightly later than the previous shift) is easier to cope with than a 'backward rotating' shift pattern (where shifts get successively earlier). This is because it is easier to extend our day, staying up later and waking up later, than it is to get up earlier and fall asleep earlier.
- 5.31. Other industries (for example, the nuclear industry) devise shift patterns based around generally fixed start times and always the same duration and describe that for three-shift systems, it is better to have shift patterns that rotate rapidly in a forward direction.
- 5.32. An example of this may be MMAANNRR, MAAAANNRR or MMAANNRR (where M is a morning shift, A is an afternoon and R is a rest day) with rest days generally best placed after the sequence of nights to optimise recovery. To avoid early starts and late finishes, and reduce sleep disruption on the morning and afternoon shifts, the recommended changeover times are close to 07:00 hrs, 15:00 hrs and 23:00 hrs. However, whilst the above may assist with examples of good practice for fixed duty cycles such as those in Control Centres it is not necessarily representative of a shift pattern for much of the workforce of the Light Rail Sector.
- 5.33. For two shift systems with 12 hour shifts, similar considerations about the placement of rest days apply. However, fatigue levels towards the end of the 12 hours are likely to be higher, especially if the work is demanding and therefore require close attention and require more fatigue control measures. Although 12 hour shifts can be seen to have advantages (for example reducing the number of handovers and journeys to and from work, popularity due to increased days off, and improving workers morale), this must be balanced against the risk of fatigue and potential increased incident and error rates. Where 12 hour shift patterns are used, to avoid early starts on the day shift, it used to be recommended changeover time is at or soon after 07:00 hrs. However, more recent studies have indicated that shifts beginning at 07:00 hrs can be associated with sleep loss for many people who do not live on-site where they work.
- 5.34. For safety critical workers who are on call, or whose starting time frequently varies with very little notice given, this uncertainty makes it difficult to plan suitable sleep time and fatigue is more likely as a result. A particular example is drivers on 'spare duties', who can have large variations (up to four hours) in their duty start time. If consecutive duty start times vary by so much, then risk of fatigue is high. As far as possible, shift start times and on call duties should be planned to avoid variations of more than two hours. Where this is not possible then additional fatigue control measures, such as additional rest breaks within a period of duty or a shorter shift length, should be considered. In addition, a series of consecutive rostered duties with large variations in start times should be avoided.
- 5.35. The main problem in the management of shift work is to cover the night-time hours when alertness is naturally low as the risk of fatigue-related accidents is also related to the time of the day. The worst time is in the early morning from midnight to 6 am, with a lesser problem in the middle of the afternoon from 2 pm to 6 pm. A recent RSSB analysis of SPAD

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(Signal Passed at Danger) incidents⁹ indicated that the risk factor increased between two and three fold between midnight and 06:00.

- 5.36. People who work in the late night or early morning can often feel sleepy and fatigued during their shift due to their internal 'body clock'. Early morning shift workers have to wake up very early and can have a reduced length of sleep, leading to a progressive build-up of fatigue over successive early starts. Night workers who have to sleep during the day and their sleep can often be of a poorer quality than if taken at night. Therefore, it may sometimes be practicable to plan (or limit) safety critical work to avoid these times when alertness is low. Other fatigue control measures should be introduced, for example (but not exclusively):
- planned rest breaks;
 - working in pairs;
 - encouraging workers to stand up and move around;
 - changes to the working environment such as higher levels of lighting and lower ambient temperatures; and
 - training and awareness of fatigue factors and sleep hygiene.
- 5.37. **It must be noted** that the examples above do not mean that that turning up the air conditioning etc. make for an effective fatigue mitigation strategy.
- 5.38. The risk of accidents and injuries increases over spans of four consecutive night shifts, as some studies indicate that performance errors increase and alertness decreases¹⁰. However, some individuals report that over successive night shifts they find less difficulty concentrating and find sleep between shifts progressively easier, finding the first in a series of night shifts to be particularly fatiguing¹¹. It may be that workers changing from a 'daytime awake / night-time asleep' pattern may feel less fatigued on their second and third night shifts than their first night shift, as their 'body clock' adjusts. However, this may be countered by a steady accumulation in 'sleep debt' with each night worked due to generally shorter, poorer quality daytime sleep. Duty Holders should therefore assess the relative pros and cons of such trade-offs and make a judgement on the best overall solution and documenting their reasoning.
- 5.39. It is unlikely that individuals will adapt to night shifts completely, a recent study¹² found that less than 3% of permanent night workers adapted completely. In addition, individuals vary in their ability to cope with successive night shifts. Special consideration may also be warranted for the first night shift, for example, by making it shorter.
- 5.40. People differ in their ability to adapt to and tolerate shift work. For instance, studies¹³ of ageing and the ability to cope with shift work suggest that older workers generally cope well with the demands of early shifts but may experience more difficulties with the night shift.
- 5.41. When allocating individuals to particular shift patterns, workers who devise working patterns should make reasonable efforts to accommodate personal preferences, some of which may stem from such trends in shift work tolerance. However, consideration should

⁹ RSSB Report T699

¹⁰ Managing Rail Staff Fatigue ORR

¹¹ RSSB Report T699

¹² RSSB Report T699

¹³ RSSB Report T699

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also be given to what activities may be taking place when a safety critical worker is using time outside of work for example, volunteering or caring for others as this can be as fatiguing and rest restricting as work itself (even if the same levels of alertness is not required for these tasks).

- 5.42. Controllers of safety critical work should be aware of factors affecting the risk of the onset of fatigue, and therefore design tasks and the working environment to maximise alertness so far as is reasonably practicable. A number of factors may affect the onset of fatigue, including the nature of the work itself, for example, tasks that require sustained vigilance, low levels of workload or repetitiveness may be more susceptible to fatigue or, for example, driving the same route a number of times in the same shift.
- 5.43. The working environment (including low lighting levels, high temperature, and quiet conditions) may also increase fatigue and feelings of drowsiness, particularly for sedentary tasks.
- 5.44. Inspections undertaken by HSE on fatigue management of train drivers, identified the following factors that might affect the onset of fatigue:
 - repetitive routes;
 - long night turns;
 - insufficient rest before starting a night shift after working an early shift;
 - high vacancy levels;
 - very short turnaround time provided;
 - poor timing of meal breaks in early shifts;
 - variations in start time of spare turns; and
 - not including training days within roster.
- 5.45. In addition, it is recommended that Light Rail Operators collect data from their own operation to determine which factors (which may include those listed, but may be others) are most significant in their operation, so that they can identify controls specific to their operation.
- 5.46. Controllers of Safety Critical Work must not allow critical safety workers to undertake safety critical work if they have not had sufficient rest before starting a period of duty. Critical safety workers have a duty to report to the Controller of Safety Critical Work if they have not had sufficient sleep. Guidance should be provided to both critical safety workers and Controllers of Safety Critical Work on what constitutes 'sufficient sleep', and what the procedure is for what happens next. For example, is the worker sent home or set to work on a non-safety critical task, are their implications to payment and when and or if (not recommended) to submit a fatigue report.

Breaks

- 5.47. Controllers of safety critical work should make arrangements for critical safety workers to take breaks during periods of duty. The length and timing of breaks should be appropriate to the nature of the work and the length of time spent on duty. Frequent short breaks during a shift may help manage the risk of fatigue and help to maintain attention.
- 5.48. Research has found that during periods of high workload, a fifteen minute break may overcome reductions in performance due to fatigue, a six minute break overcame many but

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not all reductions in performance, and a two minute break was of some benefit but was considerably less effective.¹⁴ Less demanding tasks are likely to require shorter breaks than more demanding tasks.

- 5.49. However, it must be noted that the research into breaks cited above was based on relatively generic laboratory based studies and not specific to the tasks undertaken by safety critical workers in the Light Rail environment. Therefore, given the relationship to the specific task and break frequency to the improvements granted, it is important to reflect on breaks meet the reality of safety critical workers environment.
- 5.50. Wherever reasonably practicable, safety critical workers who work at a workstation (for example in a driver's cab or signal box) should be given the opportunity to spend breaks away from the workstation due to its sedentary nature and the need for continuous sustained attention. For many roles, these breaks may be away from company managed facilities (for example, drivers, or permanent-way staff), breaks need to be in an appropriate location and of the right length to allow personnel to attend to personal needs (drinks, toilets, snacks etc), which might take longer than office-based workers for whom everything is on site.
- 5.51. The timing of breaks is important. Research has found that scheduling breaks at the start or end of a shift was found to reduce any beneficial effects; breaks should be scheduled at a suitable time with respect to the task activities, and ideally towards the middle of a shift¹⁵.
- 5.52. General advice for tasks which require continuous sustained attention where there are no natural breaks and where a lapse in attention can lead to safety implications, is for a regular 10-15 minute break every two hours during the day and every hour during the night. For driving tasks, good practice would be to plan a short break about every three hours.
- 5.53. The quality of breaks is also important, for example:
- a food and drink preparation area;
 - a quiet rest area at a suitable temperature and with suitable seating;
 - the facility to talk to colleagues; and
 - access to the outside (staff based indoors or in a cab) boosts alertness and helps stabilise the circadian rhythm.
- 5.54. In the case of safety critical workers on night shifts, the facility to take a short nap during a break may be especially beneficial. However, while a short nap is a good use of time during a night shift, it must be carefully controlled to ensure that risks associated with sleeping at work are managed (for example, sleep inertia impacting performance upon return to work). Short naps of no more than 10 minutes are advisable if safety critical tasks are to be resumed within 20 minutes of waking. To this end, it is recommended that organisations generate a 'napping policy' which should outline the following (not exclusively)
- Where naps are to be taken;
 - How long a nap should be (maximum duration);
 - How long after waking an individual should wait before returning to duties (ensuring sleep inertia is managed);
 - Which members of the workforce are permitted to nap, and which are not (if any); and

14 HSE CRR 254, 1999 pg9

15 RSSB Report T699

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- Alternative strategies to be used by any workers who are not permitted to nap, or for use during duties where workload means that napping is not possible.

Fatigue Risk Assessment

- 5.55. Once draft working patterns have been prepared incorporating good fatigue management principles, a fatigue risk assessment should be carried out. Appendix A lists some information to consider. This assessment may include the use of a fatigue assessment tool to assist and to help check whether the pattern is likely to adequately control fatigue and also to identify whether there are any opportunities for further reducing the risks of fatigue.
- 5.56. However, general principles and fatigue assessment tools are not perfect, so it is important to seek workers feedback on whether the pattern is actually adequately minimising the risk of fatigue and whether it is adequately controlling fatigue in practice. This general sequence can be summarised as follows, with consultation of workers at appropriate stages as below:
- a) design the work pattern, maximising good fatigue management practices;
 - b) assess likely risks of fatigue from the resulting work pattern, using a fatigue assessment tool; and
 - c) ask workers whether the working pattern is controlling fatigue and to suggest any particular features which may need further improvement.
- 5.57. Some fatigue risk assessment tools can be incorporated into resource planning and monitoring software, with the aim of helping organisations to devise fatigue-friendly rosters more easily and quickly from the outset. They can also help managers make more informed decisions when considering overtime, extra duties, or shift exchange by identifying workers whose working pattern over previous days / weeks means they may, on average, be less likely to be fatigued. However, as with any software, it is vital that the outputs of such tools are not used in isolation for such decisions but as a general indication of the likely risk of fatigue. They cannot take into account the many individual factors which can make an individual more or less fatigued than a bio-mathematical model may suggest.

Stage 3 – Limiting Exceedance

- 5.58. Controllers of safety critical work should ensure that any standards and limits that have been identified and set are only exceeded with their prior approval (and recorded), on an infrequent basis and in exceptional circumstances. These circumstances relate to situations where extended working is necessary to avoid or reduce risks to the health and safety of people on a transport system or significant disruption to services where it is not reasonably practicable to take alternative steps. Such circumstances could include, for example, extreme weather conditions, equipment failure, or an accident or other serious incident. By their nature, these circumstances will be unplanned and unforeseeable.
- 5.59. Duty Holders should have a clear, documented process for deciding whether to authorise an exceedance of their limits, and workers able to authorise an exceedance should receive training in the process. Before authorising an exceedance, the risk of fatigue (and other risks) should be assessed in or to decide whether the risks are likely to be acceptable.
- 5.60. This process may include the use of exceedance authorisation forms to guide workers through this risk assessment process. This should require those making authorisation decisions to:

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- Consider whether any reasonably practicable alternative options are available (for example doing the work at another time with less fatigued workers);
- Identify what reasonably practicable mitigation measures may be taken to address the risk of fatigue;
- Consider the factors which are likely to affect the risk of fatigue including for example (not exclusively):
 - the level of supervision,
 - the frequency and quality of rest periods,
 - the working pattern leading up to the requested exceedance,
 - the opportunity for breaks,
 - time of day,
 - nature of the work including how demanding it is,
 - the working environment including lighting and weather,
 - individual factors such as experience,
 - level of alertness, and
 - travelling time.
- Make a written record of the decision summarising the risks considered and the corresponding fatigue control measures and mitigation measures.

5.61. Where it is considered that the limits are likely to be exceeded frequently, for example where hours of work are already close to the limits, controllers of safety critical work should plan accordingly and make any necessary contingency provision to ensure that the limits are not exceeded except on a very infrequent basis. Where there are foreseeable circumstances, suitable action should be taken instead of exceeding the limits for critical safety workers. These may include the following (not exclusively):

- Planned training or safety briefings;
- the existence of long-standing job vacancies;
- a block of maintenance work extending over a few days (for example, plant shut down or blockade working);
- training delays; and
- planned organisational changes that affect the numbers of safety critical workers.

5.62. In exceptional circumstances where extended working is necessary and has been assessed as acceptable, all reasonable steps should be taken to relieve safety critical workers who have worked in excess of any limits as soon as possible and to ensure that they have sufficient time to be fully rested before their next period of duty.

Stage 4 – Consulting With Safety Critical Workers

5.63. Controllers of safety critical work should consult with safety critical workers and their safety representatives on the arrangements needed to manage to risk of fatigue and when standards and limits are being changed. Following consultation, controllers of safety critical work should take account of the views and experiences of the safety critical workers affected, as expressed either directly or through their safety representatives.

Stage 5 – Recording The Arrangements

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- 5.64. Controllers of safety critical work should maintain a record of their arrangements for managing the risks arising from fatigue in safety critical workers. Those arrangements should be incorporated into the SMS for those controllers of safety critical work.

Stage 6 – Providing Information To Safety Critical Workers

- 5.65. Workers have a duty under Section 7 of the Health and Safety at Work etc Act 1974 to take reasonable care of their own health and safety and that of others who may be affected by their activities at work. This duty implies that they should take steps to understand the risk factors in their work (such as the potential causes of fatigue), comply with safety rules and procedures and ensure that they do not put anyone at risk as they carry out their duties.
- 5.66. Therefore, controllers of safety critical work should provide all safety critical workers under their management, supervision or control with clear and relevant information on potential risks to health or safety due to fatigue, and on their arrangements for managing fatigue.
- 5.67. Safety critical workers should be made aware of their role and their responsibilities and the requirement for them to meet the arrangements for managing the risk of fatigue. They should be aware of the impact of their activities on the safety of the Light Rail system and the influence that their alertness and fatigue can have on that safety when performing safety critical tasks.
- 5.68. Safety critical workers should be made aware of the standards and limits that apply to the work they are to undertake, and the nature of any exceptional circumstances in which the limits may be able to be exceeded and only with prior approval.
- 5.69. Safety critical workers should be made aware of the procedures to be followed if they consider that there are circumstances, such as significant life events or medical conditions, that may cause them to consider they are or may become so fatigued that health and safety could be affected.
- 5.70. A plan for the frequency of refresher (and update) training would be beneficial, together with details on how competence will be demonstrated following completion of training
- 5.71. Training of workers within the organisation about the risks of fatigue and how fatigue can be managed may include topics that cover the following (not exclusively):
- The science of sleep and fatigue;
 - Recognising signs of elevated fatigue;
 - Strategies that can be used to manage fatigue;
 - Specific (job role) responsibilities for fatigue management; and
 - Fatigue related changes in domestic circumstance – organisational support to assist with fatigue management.

Stage 7 – Monitoring

- 5.72. Controllers of safety critical work should monitor the arrangements for managing the risk of fatigue to assess how effectively they are controlled.

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- 5.73. The actual hours worked by safety critical workers should be monitored and recorded. This should include any periods of overtime (whether planned or unplanned) and any periods of non-safety critical work that could have a bearing on the risk of fatigue on the safety critical worker and their ability to undertake safety critical work.
- 5.74. The work patterns undertaken by safety critical workers should be monitored against the standards and limits that the controller of safety critical work has identified and set and recorded. The elements of actual work to be monitored should include the following (not exclusively):
- overtime,
 - any delays to start and finish times of duties,
 - rest day working and
 - shortened lost or extended breaks.
- 5.75. For samples of higher risk workers (for example workers recording the most hours worked, and workers working patterns which are otherwise likely to be more fatiguing, for instance involving a greater proportion of nights), assessing the likely risk of fatigue from actual hours worked using a fatigue assessment tool can help to suggest particular features of working patterns warranting closer attention. However, this should not be used exclusively but be complemented by comparisons with good fatigue management practices as outlined in this guidance, and by seeking feedback from workers on how fatiguing they find the working pattern in practice (for example, by examining any trends figure reports to see if a higher are associated with a particular portion of the shift pattern, type of shift or area of the operation etc.).
- 5.76. If working hours information for monitoring fatigue is derived from payment systems, Light Rail systems should ensure that the information accurately reflects hours actually worked as other considerations such as travel to and from work may also be a consideration.
- 5.77. Where the organisation's standards and limits have been exceeded, the reasons for the exceedance should be identified and recorded and suitable measures should be taken to reduce the risks arising from fatigue and to prevent the exceedance reoccurring or if this is likely to reoccur, to assess (as above) and put measures in place.
- 5.78. Excessive overtime levels that could have a bearing on the risk of fatigue for the safety critical worker and their ability to undertake safety critical work should be monitored, controlled and recorded.
- 5.79. The nature and duration of time spent travelling should be monitored and, so far as is reasonably practicable, controlled if it could have a bearing on the risk of fatigue and the person's ability to undertake safety critical work.

Stage 8 – Taking Action When Safety Critical Staff Are Fatigued

- 5.80. Controllers of safety critical work should ensure, so far as is reasonably practicable, that safety critical workers who report for duty where they are clearly unfit due to fatigue, or who through the course of their work shift clearly become unfit due to fatigue, do not carry out or continue to carry out safety critical work.

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- 5.81. The reason(s) why the safety critical worker is or has become fatigued should be established so far as is reasonably practicable, then recorded and assessed to consider whether there may be a recurrence, and whether there are any appropriate mitigation measures. If the reason why an individual became fatigued was due to a work-related factor (for example, elements of the roster, workload etc.), monitoring should also consider recurrence in other safety critical workers, not only in that one individual. This will aid in the identification of additional mitigations that could be implemented.
- 5.82. In the event of a safety critical worker being considered unfit for safety critical work, appropriate fatigue control measures (such as providing sufficient rest) should be applied before the safety critical worker recommences work.

Stage 9 – Reviewing Arrangements

- 5.83. Controllers of safety critical work should review their arrangements for managing the risks of fatigue when they have reason to doubt the effectiveness of the arrangements.
- 5.84. A review should be undertaken where, for example (not exclusively):
- there has been a significant change in circumstances, such as job design, workload, or organisational changes;
 - there are plans to change the existing working patterns and existing limits;
 - there is a change in relevant recognised good practice standards, and limits for managing fatigue in the railways and other guided transport systems;
 - fatigue has been identified as a causal factor in an incident investigation which gives reason to doubt the effectiveness of the arrangements;
 - monitoring has shown that standards and limits are being exceeded on a regular basis;
 - long-term sickness, a significant number of unfilled job vacancies or industrial action results in frequent exceedances;
 - there is a significant incidence of safety critical workers being stopped from carrying out safety critical work due to being unfit because of fatigue; and
 - there is any other reason to doubt the effectiveness of the arrangements.
- 5.85. So far as is reasonably practicable, controllers of safety critical work should act upon recommendations from reviews related to the risks of fatigue.

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6. Travel Time

- 6.1. Time spent travelling to and from work or between work areas does not provide rest in the same way as time spent at home. This is especially true of workers who drive themselves to, from or at work since or have to travel between different work areas during the shift, to state the obvious, driving provides no opportunity for sleep. Travelling as a passenger in a car, van, taxi or by public transport prevents a tired employee endangering other road users, but does not allow the same opportunities for sleep and rest as a bed at home or in lodgings, with consequences for subsequent fatigue.
- 6.2. In terms of work, an estimated 25 to 33% of fatal and serious UK road traffic accidents involve drivers who are on the road for work related reasons¹⁶. 17% of UK road traffic collisions causing injury or death on major roads are sleep related¹⁷.
- 6.3. How long people have been awake is a key consideration; long journeys to work mean workers may become unfit to work safely later in the shift or are unfit to drive home safely after their shift. Light Rail systems are recommended to consider the likely effects of travel times when recruiting workers, especially into safety critical roles. Further consideration should be given on workers that move to a new house during employment and how any such move may impact on an individual's fatigue levels if travel times are extended.
- 6.4. Shift workers are more likely to be tired on the drive to and from work than non-shift workers. In particular, sleepiness has been reported to be higher on the drive home after a night shift than from all other shifts. Factors found to contribute to the risk of falling asleep are previous sleep periods of less than six hours, and travel time over 35 minutes, though the significance of travel time will obviously vary depending on the length of the shift.
- 6.5. Travel time can be a significant issue when considered in conjunction with time spent working on a site activity. A survey undertaken¹⁸ found that 8% of freight train drivers reported a journey to their booking on point of more than an hour, and that 7% of contract track workers travelled more than two hours to work. The same study found that levels of fatigue reported at the start of a shift correlated with the amount of time spent travelling to work, with increased fatigue from longer travel times. Therefore, travel time can contribute significantly to fatigue.
- 6.6. Fatigue management systems should therefore include arrangements for assessing and controlling risks from travel time. If assuming 8 hours for sleep, an hour for waking, washing, breakfast etc and a minimum of an hour on returning to home/ lodgings for a meal, shower, contacting family and winding down to get some quality sleep, this leaves an absolute maximum of 14 hours between leaving home / lodgings and returning. This time has to cover not only work on site but the associated travel there and back.
- 6.7. It is also of note that the example above potentially paints an unrealistic expectation on how little time shift workers may spend with their families at home during their pre and / or post worktime (dependant on the time of the shift). Particularly, the case when working hours clash with hours that have the highest social and family value were workers may choose to make up on this time when they can.

¹⁶ Health and Safety Executive Work-related Road Safety Task Group, 2001

¹⁷ Dept for Transport 2010a

¹⁸ RSSB T699

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- 6.8. Therefore, this 14 hour period of door-to-door time may be considered as the maximum which may be permitted on an exceptional basis with extra fatigue control measures in place, but even for a single shift, especially a night shift, it is likely to lead to the risk of excessive fatigue. Although better than completely uncontrolled door-to-door travel time arrangements, such a schedule is nevertheless likely to be very fatiguing if carried out repeatedly and is very likely to make workers unfit even, for example, to drive after their shift.
- 6.9. Some fatigue assessment tools take into account commuting times in overall assessments of the risk of fatigue. However, risks of fatigue from travelling can only be properly assessed if adequate information is collected.
- 6.10. The responsibility of Light Rail systems to manage workers fatigue should be to make reasonable efforts to ensure that the travelling and sleeping arrangements are realistic in line with working periods and patterns and will not give rise to the risk of excessive fatigue. For example, provided that workers are required to record their sleeping locations, free internet journey-planning sites can easily be used to assess whether journeys are feasible in line with the fatigue management system.

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7. Fatigue Reporting

- 7.1. The absence of fatigue reports or reporting of fatigue is not evidence that fatigue or the risk of fatigue is not a problem, it could be evidence that effective fatigue reporting processes are not in place. Light Rail systems need to encourage proactive reporting of fatigue and its precursors. Unless an established, effective, well used safety concern reporting system is already in place and this captures precursors to fatigue, it may be necessary to introduce a dedicated fatigue reporting system using FRFs (refer to Appendix B for example forms).
- 7.2. As well as tracking reports of fatigue, a dedicated fatigue reporting system may also raise the profile of the risks of fatigue among workers and emphasise that there is a concern about the risk of fatigue and tackling it.
- 7.3. The use of workers FRFs provide a formal method for collecting data on fatigue and its likely causes, and provides a mechanism for workers to raise their concerns and also to suggest possible solutions.
- 7.4. A fatigue reporting system should be supported by a system for managing and responding to concerns and possible solutions raised on the FRFs. As well as the pooling of concerns and possible solutions, this also demonstrates to workers that the FRFs and thus reporting of fatigue and concerns etc. is worthwhile, confirming that reports are taken seriously and are being considered. Irrespective of cause or solution (or lack of), in order to support a reporting culture, it essential that an acknowledgement of all reports should be sent soon after a report is submitted. Initial feedback is essential and can be followed up with further investigatory material following the initial acknowledgment.
- 7.5. The FRF system can help to build a picture of fatigue and the risks of fatigue in the operation of the Light Rail system, and should help identify problems as identified above, for example: shifts, locations, roles, routes etc, and can also identify trends over time. This helps efforts to target reductions in fatigue where they are most needed and most effective.
- 7.6. To encourage reporting, forms should be readily accessible, for example, hard copies kept in depot break rooms, rest areas, booking points or staff notice boards etc not in driving cabs as they may be viewed as a distraction. They should also be quick and easy to complete, usually no more than one page long. They should also incorporate both "tick box" questions tailored to the individual organisations operational reality, i.e. making them easier for workers to use and also to assist categorisation and analysis, and free text space to allow descriptions of concerns and possible solutions.
- 7.7. Organisations with online systems and apps may choose to duplicate fatigue reporting forms through online portals, for easy access from tablets, phones and computers. These also provide an advantage of enabling workers to complete outside of the workplace and also for the subsequent management and analysis of larger numbers of fatigue reports or identifying trends in fewer reports over a longer time frame.
- 7.8. Careful consideration should be given to confidentiality of the data within the FRFs, with the option of anonymising the reporters of incidents. To help organisations protect confidentiality organisations could consider providing the option for staff to submit a report anonymously but provide feedback of actions (or not) publicly. To protect confidentiality of all reports it may be advisable to make the initial point of contact to a team outside normal rostering and scheduling arrangements such as the safety team. This could enable them to

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code and analyse reports before passing them on to other areas of the organisation where necessary. For example, details of a report could be released to a rostering team once it has been established that a roster needs to be changed.

- 7.9. The data from the FRFs and any response to the data collected and from its analysis including measures introduced and feedback given should be inputted into the FRMS and the SMS. It is recommended that a fatigue reporting database is maintained, where common contributors of fatigue in reports can be trended, as can any mitigations recommended be tracked and analysed for effectiveness. Initially, a database may appear unnecessary as it would be anticipated that the number of reports are small and easily tracked. However, as the system matures reports may increase (an indicator that in part the FRMS is seen as having value to workers). A database also provides protection for organisational knowledge in the event of changing personnel.

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Appendix A Fatigue Reports – Information to Consider

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| | |
|---|---|
| Unable to attend work due to fatigue An incident A general fatigue concern | Name and role? (organisation to consider confidentiality issues) Contact details |
| Date of incident or concern Time Location | Physical signs No physical signs noted Rubbing eyes Yawning Frequent blinking Staring blankly Long blinks Difficulty keeping eyes open Head nodding |
| Description of incident or concern | Cognitive (mental) signs No cognitive signs noted Impaired attention Impaired memory Negative mood Reduced communication Impaired problem solving Increased risk taking Impaired situation awareness Other |
| Activity at time of event / concern Journey to work Work activity (specify/multiple choice) Journey back from work Etc | How did you feel? (Samn-Perrelli 'subjective fatigue' scale) 1. Fully alert, wide awake 2. Very lively, responsive, but not at peak 3. OK, somewhat fresh 4. A little tired, less than fresh 5. Moderately tired, let down 6. Extremely tired, very difficult to concentrate 7. Completely exhausted |
| Factors which may have contributed: Multiple consecutive duties Variation in duty timing Quality of sleep (home? Lodging?) Start time Finish time Travel to / from work (mode of travel?) Location for example postcodes (of home / lodging / work site)? Insufficient rest time Roster disruption | Suggestions for fatigue reduction (corrective actions)? |
| Long turn (duty near maximum-hours limits), Workload – overload, Workload – underload, Health, Home issues – rest Home or personal issues – other, Long term fatigue Other, (details requested). | |

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Appendix B Example Fatigue Reporting Forms (FRFs)

Duty Form

Sleep Prior to Duty Form

Variation to Duty and Shift Swap Request Form (VDSR)

Emergency Working Time Exceedance Authority Assessment (EWTEA)

Exceedance and Fatigue Occurrence Notification (EFON)

DUTY

| day mon year <div style="border: 1px solid black; width: 100px; height: 30px; margin: 0 auto; display: flex; align-items: center; justify-content: center;"> / / </div> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|--|-----------------------|-----------------------|-----------------------|-----|------|-----------------------|-----------------------|-----------------|------|--|--|---------------|--|---------------------------------|--|---------------------------------|--|---------------------------------|--|---------------------------------|--|--|--|--|--|--|--|
| Date duty started: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| To what extent do you feel you have recovered from your last duty/run of duties? | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| completely | <div style="border: 1px solid black; width: 100px; height: 30px; display: flex; align-items: center; justify-content: center;"> 1 2 3 4 5 6 7 </div> | not at all | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2">PLANNED</th> <th colspan="2">ACTUAL</th> </tr> <tr> <th>hrs</th> <th>mins</th> <th>hrs</th> <th>mins</th> </tr> <tr> <td colspan="2" style="height: 40px; vertical-align: bottom;">Duty START time</td> <td colspan="2" style="height: 40px; vertical-align: bottom;">Duty END time</td> </tr> <tr> <td colspan="2" style="height: 40px; vertical-align: bottom;">Duty END time</td> <td colspan="2" style="height: 40px; vertical-align: bottom;">How much overtime did you work?</td> </tr> <tr> <td colspan="2" style="height: 40px; vertical-align: bottom;">How much overtime did you work?</td> <td colspan="2" style="height: 40px; vertical-align: bottom;">Was this originally a rest day?</td> </tr> <tr> <td colspan="2" style="height: 40px; vertical-align: bottom;">Was this originally a rest day?</td> <td colspan="2" style="height: 40px; vertical-align: bottom;">If 'YES', did you volunteer to work today?</td> </tr> <tr> <td colspan="2" style="height: 40px; vertical-align: bottom;">If 'YES', did you volunteer to work today?</td> <td colspan="2" style="height: 40px; vertical-align: bottom;">What time did you leave home prior to this duty?</td> </tr> </table> | | PLANNED | | ACTUAL | | hrs | mins | hrs | mins | Duty START time | | Duty END time | | Duty END time | | How much overtime did you work? | | How much overtime did you work? | | Was this originally a rest day? | | Was this originally a rest day? | | If 'YES', did you volunteer to work today? | | If 'YES', did you volunteer to work today? | | What time did you leave home prior to this duty? | |
| PLANNED | | ACTUAL | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| hrs | mins | hrs | mins | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Duty START time | | Duty END time | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Duty END time | | How much overtime did you work? | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| How much overtime did you work? | | Was this originally a rest day? | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Was this originally a rest day? | | If 'YES', did you volunteer to work today? | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| If 'YES', did you volunteer to work today? | | What time did you leave home prior to this duty? | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">NO</td> <td style="width: 50%; text-align: center;">YES</td> </tr> <tr> <td style="text-align: center;"> <input type="radio"/> </td> <td style="text-align: center;"> <input type="radio"/> </td> </tr> <tr> <td style="text-align: center;">NO</td> <td style="text-align: center;">YES</td> </tr> <tr> <td style="text-align: center;"> <input type="radio"/> </td> <td style="text-align: center;"> <input type="radio"/> </td> </tr> <tr> <td style="text-align: center;">hrs</td> <td style="text-align: center;">mins</td> </tr> <tr> <td colspan="2" style="height: 40px; vertical-align: bottom;">What time did you leave home prior to this duty?</td> </tr> </table> | | NO | YES | <input type="radio"/> | <input type="radio"/> | NO | YES | <input type="radio"/> | <input type="radio"/> | hrs | mins | What time did you leave home prior to this duty? | | | | | | | | | | | | | | | | | |
| NO | YES | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NO | YES | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| hrs | mins | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| What time did you leave home prior to this duty? | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Please indicate the type of duty | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DRIVING/ SHUNTING | SPARE | DRIVING UNDER SUPERVISION | OTHER * | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | | | | |
| * If 'OTHER', please specify | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| If you were driving/shunting, please complete the following: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Approx. how much time did you spend driving/shunting during this period? | | <div style="border: 1px solid black; width: 100px; height: 30px; display: flex; align-items: center; justify-content: center;"> / / </div> | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| What was the longest continuous period of time spent in the cab? | | <div style="border: 1px solid black; width: 100px; height: 30px; display: flex; align-items: center; justify-content: center;"> / / </div> | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Were there occasions when you experienced 'heavy eyelids' while driving/shunting? | | NO YES | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="radio"/> <input type="radio"/> | | mins | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| If 'YES', for how long did this last? | | <div style="border: 1px solid black; width: 100px; height: 30px; display: flex; align-items: center; justify-content: center;"> / / </div> | | | | | | | | | | | | | | | | | | | | | | | | | | | |

SLEEP PRIOR TO DUTY

SLEEP PRIOR TO DUTY

Please indicate the following times of your sleep period:

| IN BED AT | ASLEEP AT | AWOKE AT | GOT UP AT |
|-----------|-----------|----------|-----------|
| hrs mins | hrs mins | hrs mins | hrs mins |
| : | : | : | : |

Where did you sleep?

☐ Home
 ☐ Lodgings/Hotel
 ☐ Other

After your final awakening, how much more sleep did you require? (circle one number)

no more considerably more

Within the sleep period, please estimate the:

TOTAL NUMBER OF AWAKENINGS

TOTAL DURATION OF AWAKENINGS

Please rate the quality of your sleep: (circle one number)

extremely good extremely poor

Was your sleep disturbed by any of the following factors? (tick all that apply)

- ☐ Thoughts on mind
 ☐ Light
 ☐ Other
- ☐ Aches/pains/physical discomfort
 ☐ Temperature
 ☐ Please specify:
- ☐ Noise
 ☐ Not tired

Was the time available for sleep restricted by any of the following commitments? (tick all that apply)

- ☐ Family/social
 ☐ Hobbies/DIY
 ☐ Other
- ☐ Work
 ☐ Other employment
 ☐ Please specify:

NAPS PRIOR TO DUTY

If you take any naps/short sleeps prior to your next duty, please record the start time and duration of each nap:

START TIME

| 1st NAP | 2nd NAP |
|----------|----------|
| hrs mins | hrs mins |
| : | : |

DURATION

Please add any additional information about your sleep or the following shift here:

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|---|---------------------|---------------------------|--|-----|---|---------|------|-----|-----|-----|----------------|--|
| VARIATION TO DUTY AND SHIFT SWAP REQUEST | | | | | | | | | | | VDSR No | |
| PART A. Personal and General Details – to be completed in all circumstances | | | | | | | | | | | | |
| Name | | | | | | Roll No | | | | | | |
| Department | | | | | | | | | | | | |
| Line Manager | | | | | | | | | | | | |
| Role | | | | | | | | | | | | |
| Date | | | | | | Time | | | | | | |
| PART B. Details of Variation – tick and give details as appropriate | | | | | | | | | | | | |
| Unpaid Absence | | Details of Reason: | | | | | | | | | | |
| Duty Swap | | | | | | | | | | | | |
| Variation to Duty Time | | | | | | | | | | | | |
| Other Absence | | | | | | | | | | | | |
| PART C. Rest Day or Duty Swap Details – give details | | | | | | | | | | | | |
| Employees should enter name and rest day/s or duty/s currently allocated that they wish to swap. Note - exchange of duty or rest day will not be considered valid until approved by Line Manager. | | | | | | | | | | | | |
| NAME | ROLL NO | ROSTER LINE NO | SUN | MON | TUE | WED | THUR | FRI | SAT | SIG | AUTH | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| PART D. Variation to Duty – give details | | | | | | | | | | | | |
| Give date and duty details → | Date | SUN | MON | TUE | WED | THUR | FRI | SAT | | | | |
| | Duty | | | | | | | | | | | |
| PART E. Authorisation – tick as appropriate | | | | | | | | | | | | |
| Authorisation of shift swap → | Authorised | | If declined give reason: | | | | | | | | | |
| | Declined | | | | | | | | | | | |
| Changes made on the following → | Tick as appropriate | | Line Manager _____ | | | | | | | | | |
| | Master Roster | | | | | | | | | | | |
| | Roster book | | Signature _____ Date _____ | | | | | | | | | |
| | Staff Room Copy | | | | | | | | | | | |
| Simplifiers | | | | | | | | | | | | |
| A COPY OF THIS FORM MUST BE HANDED BACK TO THE INDIVIDUAL REQUESTING VARIATION OR DUTY SWAP | | | | | MINIMUM OF SEVEN DAYS NOTICE IS REQUIRED FOR ANY REQUESTS TO VARIATION OF DUTY | | | | | | | |

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EMERGENCY WORKING TIME EXCEEDANCE AUTHORITY ASSESSMENT

EWTEA No

PART A. Personal and General Details – to be completed in all circumstances

| | | | | | |
|--------------|--|------------|------|---------|--|
| Name | | | | Roll No | |
| Employee | | Contractor | | | |
| Department | | | | | |
| Line Manager | | | | | |
| Occupation | | | | | |
| Date | | | Time | | |

PART B. Guidance and Consideration of Fatigue Risks

Listed below are a series of factors that are known to contribute to fatigue and increase risk. The table has been designed to help you reach an informed decision about whether you believe it is safe to authorise the individual to work beyond their working time thresholds.

| Issue | Consideration | Risks | Possible Control Measures |
|------------------------|---|---|--|
| Quality of rest period | <p>Will the individual have had sufficient rest before working the exceedance?</p> <p>Will the quality of the rest period be affected by matters outside of work?</p> <p>Will the individual's travel arrangements to and from work impact on the rest period?</p> <p>Does the exceedance impact on the next rest period?</p> | <p>It is Important that individuals have sufficient recovery time between shifts. Ideally sufficient rest must include time to travel home, wind- down, have a full 6/7-hour sleep. Have at least one meal and return back to work.</p> <p>The quality of the rest may be affected by non-work circumstances such as a new baby, a medical condition, or personal worries that could affect the quality of the rest period?</p> <p>Research shows how travelling time to and from work can contribute to fatigue. For example; commutes of + 1 hour has an impact on fatigue.</p> <p>Travelling during peak rush hours is more tiring and waiting time for public transport can add significantly to the overall travelling time.</p> | <p>Provision of a full rest period before next shift.</p> <p>Provide driving assistance if there are long travelling times.</p> <p>Consider lodging turns for staff travelling + 2 hrs to a worksite.</p> <p>Shift swap to allow longer rest period. Avoid, where reasonably practical, authorising exceedances for staff whose circumstances outside of work may impact on the quality of their rest.</p> |

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| Issue | Consideration | Risks | Possible Control Measures |
|-------------------------------------|---|--|---|
| Work Pattern | Will the individual be more at risk from fatigue because of the shifts they have been working prior to the exceedance? | <p>Fatigue accumulates over successive work periods. This will be greater if the individual has been working successive nights or successive early shifts which start before 07:00.</p> <p>The fatigue that accumulates over successive periods can be dissipated with adequate rest periods between shifts. At least two night's sleep is usually needed to dissipate fatigue associated with successive nightshifts</p> | Where reasonably practicable avoid authorising exceedances which involve more than 7 consecutive nights for an individual who has not had sufficient rest prior to the exceedance. |
| Type of shift | Does the exceedance involve working additional hours on nights or early shifts? | The risks associated with working additional hours or additional shifts varies according to the type of stint. Night shift's present the greatest risk-levels of alertness and performance are at their lowest as we are working at a time normally reserved for sleep. Early shifts, particularly where they start before 07.00, present a risk because of shortened sleep periods. | Where reasonably practicable avoid authorising exceedances which involve consecutive nights and early shifts that start before 07:00. |
| Nature of work and work environment | <p>Is the work particularly mentally demanding (i.e. involving long periods of concentration?)</p> <p>Are there natural breaks, quiet periods during the work period?</p> <p>Are there other unusual conditions such as degraded working?</p> <p>Are there more work activities than normal?</p> <p>Are the working conditions excessively uncomfortable?</p> | <p>If an individual is going to be working excessive hours then it is important that they have the opportunity for regular breaks, even if they are short in duration and refreshment in order to maintain levels of alertness.</p> <p>Very hot or very cold or wet conditions can result in a level of discomfort that results in stress and therefore increases fatigue level.</p> | <p>Provide additional breaks.</p> <p>Make arrangements for suitable refreshments to be provided.</p> <p>Vary the work being undertaken.</p> <p>Where the working conditions are uncomfortable ensure opportunities are provided for the individual to take breaks away from that environment.</p> |
| Individual | <p>Is the individual who is going to be working the exceedance new?</p> <p>Does this individual persistently work overtime?</p> | <p>Work requiring more effort and therefore more tiring for those new to the job.</p> <p>Volunteering to work additional hours / shifts can mitigate the impact of fatigue slightly because it is associated with an increase in morale.</p> <p>However, care should be taken with individuals who persistently work overtime as this is an indication they could feel compelled to or have personal difficulties that mean they want to / have to be at work more and may not be managing their fatigue levels.</p> | <p>Ensure arrangements for additional monitoring or additional support from a colleague or supervisor are in place.</p> <p>Avoid, where reasonably practicable, using the same individuals to work overtime.</p> |

PART C. Work Time Exceedance Authorisation – complete details

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| Details of Exceedance | | | |
|---|---|--|--|
| Location | | | |
| Date | | | |
| Shift | | | |
| Type of exceedance - <i>tick as appropriate</i> | | | |
| → | <input type="checkbox"/> + max consecutive shifts | <input type="checkbox"/> + 12 hours per shift | |
| | <input type="checkbox"/> + 72 hours per week | <input type="checkbox"/> Less than 12 hours rest between shifts | |
| Amount of exceedance - <i>give value</i> | | | |
| → | Additional hours = | Number of Additional Shifts = | |
| Circumstances - <i>tick most relevant</i> | | | |
| If shortage of staff, indicate ONE reason for shortage → | <input type="checkbox"/> Extreme weather conditions | <input type="checkbox"/> Equipment failure | |
| | <input type="checkbox"/> Accident of serious nature | <input type="checkbox"/> Unforeseeable shortage of staff e.g. Sudden illness | |
| | <input type="checkbox"/> Short term absence | <input type="checkbox"/> Long term vacancy | |
| | <input type="checkbox"/> Long term absence | <input type="checkbox"/> Emergency leave | |
| | <input type="checkbox"/> Delayed relief | <input type="checkbox"/> Other – Provide details | |
| Alternative options for consideration - <i>tick most relevant</i> | | | |
| Indicate options if other give details → | <input type="checkbox"/> Relief by member of staff | <input type="checkbox"/> Cancellation of works | |
| | <input type="checkbox"/> Reduce manning | <input type="checkbox"/> Relief by Team leader/ Manager on call Manager | |
| | <input type="checkbox"/> Other | | |
| → | Details: | | |

| | | | |
|--|------------------------------------|--------------------------|------------|
|  Light Rail Safety and Standards Board | FATIGUE MANAGEMENT GUIDANCE | LRSSB - LRG - 6.0 | |
| | | Issue | 1 |
| | | Revision | 0 |
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| | |
|--|--|
| <h2 style="margin: 0;">EXCEEDANCE AND FATIGUE OCCURRENCE NOTIFICATION</h2> | <div style="border: 1px solid black; padding: 5px; min-height: 40px;"> EFON No </div> |
|--|--|

PART A. Personal and General Details – to be completed in all circumstances

| | | | |
|---------------------|--|----------------|--|
| Name | | Roll No | |
| Employee | <input type="checkbox"/> Contractor | | |
| Department | | | |
| Line Manager | | | |
| Occupation | | | |
| Date | | Time | |

PART B. Fatigue Causation – provide details of fatigue

Listed below are a series of factors that are known to contribute to fatigue and increase risk. Although not exhaustive the list should be used for guidance. Please indicate most relevant associated to circumstance.

| | | | | |
|---------------------------|----------------------------|---|----------|----------|
| Illness | Emergency call out | Is fatigue recurrent | y | n |
| Medication | Medical condition | Is investigation required | y | n |
| Lack of sleep | Thermal exhaustion | If yes to any of the above questions please provide brief details below | | |
| Unplanned overtime | Other- give details | | | |

Please give details

PART C. Work Activity Restrictions – tick as appropriate

| | | | | |
|--|--|--------------|-------------|-------------------|
| Allocation of alternative non safety critical duties | | FROM | Date | Time |
| Temporary removal from duties – additional rest period | | UNTIL | | |
| Removal from all safety critical duties | | UNTIL | Date | Time |
| Removal from all duties | | | | |
| Issue employee with guidance relating to control of fatigue | | | | y n |

PART D. Fatigue Control Acceptance – sign

I confirm that I accept and understand fatigue safety controls as detailed.

Employee Signature ----- **Date**-----
Time-----

I declare that employee has been briefed on and understands fatigue safety controls as detailed.

Manger Signature ----- **Date**-----
Time-----

Please forward copy to Health and Safety Department on Completion