OP 1.4.4
Operational Protocol

Fatigue Management

Document control

Release history

Version	Date	Author	Summary of changes
2.0	December 2015	Manager State Operations	Protocol developed to replace guidelines

Reviewed by

Name	Title	Date
AC Yorke	Director Response & Coordination	01/12/2015
PRC	Policy Review Committee	22/02/2016
CEG	Corporate Executive Group	15/03/2016

Approved by

Name	Title	Date
DC Rogers	Executive Director Operations	1/2/16

Related documents

Document name	Version
Service Standard 3.1.14 - Fatigue Management	2.0

OP 1.4.4

OPERATIONAL PROTOCOL
FOR
FATIGUE MANAGEMENT

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Contents

DICTIONARY

Critical Incident Support Services (CISS):	Critical Incident Support Services provided by a team of specially trained personnel to assist NSW RFS members to deal with the effects of critical incident stress
Crew Resource Management (CRM)	A technique of management consisting of making best use of all the available resources including: i. People; ii. Equipment; iii. Supplies; and iv. Information
IC	Incident Controller
IMT	Incident Management Team
I'MSAFER	The acronym used by the NSW RFS as a checklist against which members may assess their ability to respond to an incident and consists of: **I**llness or injury **M**edication **S**tress **A**lcohol or drugs **F**atigue **E**xpertise **R**eview (new component) (Review is a new component of IMSAFE. It asks the question: "Am I fit for frontline firefighting today?", or As a Leader/Supervisor, are all my crew fit for frontline firefighting duty today
Microsleep	A brief and unintended period of sleep. Often characterised by head snapping, nodding or closing your eyes. Microsleeps commonly occur while trying to stay awake while performing monotonous tasks, like driving
Nap	any sleep period of less than 3 hours duration
OIC	Officer in Charge
SA	Safety Advisor (works in the field and reports to SO)
SO	Safety Officer (works within the IMT and reports to IC)

1. Links

- SS 3.1.14 Fatigue Management
- P7.1.10 Organisational Risk Management
- SS 3.1.6 Operational Protocols
- SS 7.1.1 Chaplaincy

- SS7.1.2 Critical Incident Support Services
- Fire Fighters Pocketbook (IMSAFE check)
- NSW RFS Health, Safety and Welfare section safety@rfs.nsw.gov.au

2. Superseded Procedure

- 3.1.14 Fatigue Management V1.0 Operational Guideline 22/8/13

3. Purpose

3.1 This Operational Protocol provides organisational guidelines and general information for managing fatigue. The Protocol should be read in conjunction with Service Standard 3.1.14 Fatigue Management.

3.2 Service Standard 3.1.14 Fatigue Management highlights the role that fatigue plays in the effectiveness and safety of firefighting operations and describes the responsibilities of all members of the NSW RFS in relation to fatigue management during incidents.

4. Operational Protocol for Fatigue Management

4.1 The NSW RFS Operational Protocol for Managing Fatigue contains the NSW RFS suggested better practice standards on working hours and work/sleep patterns during incidents.

4.2 The better practice standards on working hours and work/sleep patterns for the NSW RFS described in these documents form only one component of a broader fatigue risk management system.

4.3 These suggested standards should be read and understood as guides for planning rather than prescribed rules. The unique nature of each individual incident requires strategies to be appropriate for that incident.

4.4 This Protocol also provides general information to assist in the development of strategies for managing fatigue caused by sleep loss, including principles for designing shift work schedules, methods for enhancing the quality of sleep, and methods for improving wakefulness during shift work operations.

Determining individual fitness for duty

4.5 Each member of the NSW RFS has a responsibility to ensure the health and safety of themselves and others. The onus is on individual members who report for duty to monitor and assess their individual fitness for duty as honestly as possible.

4.6 Assessing individual fitness for duty is especially pertinent for members in supervisory roles, especially those responsible for operational activities.

Members who hold such roles have an ethical and operational obligation of self-care and must ensure they get adequate sleep to be effective in their supervision of other members. More experienced leaders are often characterised by the particular care they take to obtain sufficient sleep.

Tools and techniques to assess individual fitness for duty

4.7 There are a number of tools and techniques to assist members assess their individual fitness for duty. In the NSW RFS, the I'MSAFE(R) check is commonly used to perform a personal risk assessment. I'MSAFE(R) asks individuals a series of questions about any:

Illness/Injury

Medication

Stress

Alcohol/Drug use and levels of

Fatigue and

Expertise

Review (Refer Dictionary for details)

On commencement of a shift, periodically throughout their deployment/shift/activity and on resuming duties after a break of any length, members should exercise the I'MSAFE(R) check periodically throughout the deployment/ shift/activity. If they feel they are fatigued, or are at risk of fatigue they should advise their supervising officer or a colleague.

4.8 In addition to these, individual strategies for managing the impacts of fatigue related to shift work include:

(a) Individuals monitoring their sleep periods and keeping a sleep/activity log as a way of monitoring how much sleep has been achieved;

(b) encouraging members to write down tasks or messages received because fatigue is likely to affect an individual's short term memory and ability to recollect the timing of events;

(c) adopting a 'brief back' procedure whereby the receiver of a message repeats the message back to the sender to confirm that they have received and correctly understood the message;

(d) cross-checking calculations and decisions with team members; and

(e) using checklists when levels of fatigue are likely to degrade memory and performance.

Methods of improving wakefulness

4.9 Ways of improving wakefulness during incidents where it is likely that fatigue will impact performance include:

(a) allowing frequent breaks to alleviate or prevent potential difficulties such as strain, boredom and complacency that can be associated with long, tedious work shifts;

(b) teaming up personnel to undertake tasks, support each other, and check and double check each other's wellbeing, performance and motivation;

(c) increasing interpersonal interaction, i.e. peer support between members, particularly during night shift;

(d) if possible, changing and rotating tasks; and

(e) providing suitable facilities to allow napping.

Enhancing the quality of sleep

4.10 Ways of enhancing quality of sleep include:

(a) creating conditions conducive to sleep, including:

i. a darkened sleeping area;

ii. a sleeping area with a temperature ideally between 18 and 24 degrees Celsius;

iii. a ready supply of ear plugs and eye shades for those who find them comfortable to use;

iv. a quiet sleeping area away from busy operations rooms, main travel routes, resupply and refueling areas etc; and,

v. within reason, restricting social interactions during times nominated for sleep.

(b) ensuring that personnel routinely take personal sleeping gear (ear plugs, ear shades) with them on operations, even when the duration of an operation is expected to be short;

(c) minimising alcohol consumption. Alcohol disturbs the sleep cycle and causes early and more frequent awakening;

(d) avoiding stimulants like nicotine, caffeine and energy drinks prior to sleep; and

(e) encouraging good dietary practice and exercise.

NSW RFS Recommendations on Working Hours and Rest Periods

Number of hours of sleep opportunity

4.11 The guidance regarding shift lengths and rest periods is based on ensuring adequate sleep opportunities are provided to NSW RFS members. Eight hours of sleep is recommended for adults to perform at their best during a subsequent duty period. Given this, members should be provided with the opportunity for 8 hours of sleep.

It should be remembered that even though the opportunity for 8 hours of sleep is provided by the NSW RFS to its members, actual sleep obtained may be less than 8 hours. Members may not always fall asleep straight away for reasons that may include:

(a) they are feeling the lingering effects of adrenalin or stress from the day's activities, or

(b) because they are sleeping in an unfamiliar environment (e.g. a base camp or motel room instead of at home).

Number of hours of sustained wakefulness

4.12 Another key determinant of fatigue-related risk as related to the number of hours of sleep opportunity is the length of time an individual is continuously awake.

4.13 The fatigue-related risk increases the longer a person is awake. Research by sleep experts suggests that the performance of a person who has been awake for 17 hours continuously is equivalent to a person with a blood alcohol reading of 0.05 %, the legal driving limit.

4.14 Given that NSW RFS members should be provided with the opportunity for 8 hours of sleep, the maximum amount of sustained wakefulness in any 24 hour period should not exceed 16 hours.

4.15 There are a range of activities that members may be engaged in during their waking hours which may include:

(a) NSW RFS related work (both operational and normal work duties);

(b) non-RFS related work (for volunteers); and

(c) travel to or from an incident.

Irrespective of what the member did during their waking hours, it is more important that the maximum amount of sustained wakefulness in any 24 hour period is not exceeded. This concept is illustrated at Appendix 2 Example scenarios, Example 2.

Shift length

4.16 Twelve hours is the recommended maximum shift duration for incidents, plus additional time for changeovers and briefings.

4.17 When a major incident is anticipated, it is recommended that in readiness, arrangements should be made for some members to be stood down prior to the incident in order to obtain sleep in anticipation of shift work.

4.18 Naps taken in anticipation of a night shift are an effective method of maintaining performance levels. The Operational Readiness and Alert Status

and 4 day forecast should be used as a guide in situations where shift work is likely.

Changeovers and briefings

4.19 A recommended maximum total period of 1 hour should be provided to take part in changeovers and briefings before a shift (30mins) and after a shift (30mins).

Arrangements for rostering the first night shift of a major incident

4.20 The arrangements for rostering the first day and night shifts following the commencement and escalation of a major incident present challenges because of the:

(a) difficulties in finding sufficient numbers of people willing to undertake the first night shift at short notice;

(b) need to change the sleeping patterns of members undertaking the first night shift at short notice; and,

(c) need for members on the first day shift to work extended hours.

4.21 The consequences of rostering shift work at short notice will be that:

(a) following the commencement and escalation of a major incident, some members may not be provided with 8 hours of sleep opportunity; and,

(b) the recommended maximum shift duration on the first day shift may exceed 12 hours.

Example 1 in Appendix 2 Example scenarios is provided as a guide and illustrates one way of rostering the first night shift. It is based on a 12 hour rotation shift, with changeovers at 0700hrs and 1900hrs.

Rest periods between shifts

4.22 A recommended minimum rest period of 9 hours should be provided between shifts. The rest period includes 8 hours opportunity for sleep plus time to prepare, eat and wind down. During this rest period, members should be completely removed from NSW RFS duties.

Transportation and accommodation

4.23 The recommended 9 hour rest period between shifts does not include travelling time. Given the recommended maximum shift duration of 12 hours, travel to accommodation needs to be no longer than 1 hour duration to and from the incident. Therefore, where a member's place of residence is located in excess of 1 hour travel time each way to and from the incident, local sleeping arrangements should be considered.

As a summary, a breakdown of activities over a 24 hour period is shown in Figure 1.

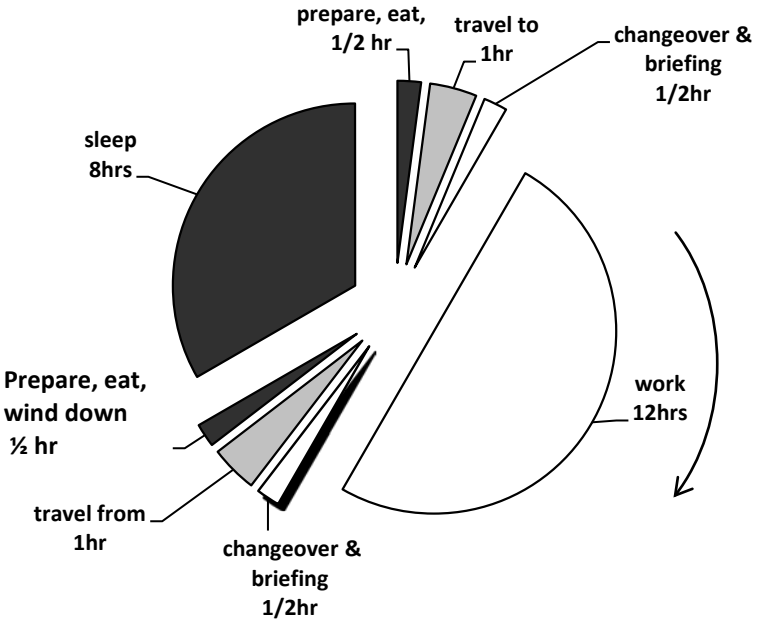

Figure1. A breakdown of activities over a 24 hour period.12 hours is the recommended maximum shift duration for incidents (shown in white). One hour in total is the recommended maximum period spent in changeovers and briefings before and after a shift (also shown in white). 9 hours is the recommended minimum rest period between shifts (shown in black). The rest period includes 8 hours opportunity for sleep plus time to prepare, eat and wind down. The remainder time is allocated to travel to and from the incident (shown in grey). Travel to and from the incident needs to be no longer than 1 hour duration, otherwise local sleeping arrangements should be considered.

Breaks within shifts

4.24 Long periods of continuous duty without breaks are fatiguing. Regular breaks, free from any work related activities, should be provided. The frequency and timing of breaks will depend on the nature of the work being carried out and characteristics of the individual members. The frequency and timing of breaks should be able to be determined by the members carrying out the duties in consultation with their supervising officer.

Number of consecutive shifts

4.25 **Day Shifts:** members may complete up to 5 consecutive day shifts. A minimum 24 hour rest period must be provided after 5 consecutive day shifts before the member is rostered onto another shift. Travel days outside of the 5

consecutive shifts may be required for members attending out-of-area incidents.

4.26 **Night Shifts:** members may complete up to 3 consecutive night shifts. A minimum 24 hour break must be provided after 3 consecutive night shifts. Travel days outside of the 3 consecutive night shifts may be required for members attending out of area incidents.

Shift patterns

4.27 The recommended day shift pattern is:

Up to 5 days on shift then
↓
1 day rest then
↓
Up to 5 days on shift then
↓
2 days rest [repeat cycle]

4.28 The recommended night shift pattern is:

3 nights on shift then
↓
1 day rest then
↓
3 nights on shift then
↓
2 days rest [repeat cycle]

Shift swapping/rotation

4.29 Continually changing shifts from day to night shift or vice versa is to be avoided. In circumstances where a member changes shift, a minimum of 48 hours rest should be provided from night shift to day shift and a minimum 24 hour rest from day shift to night shift.

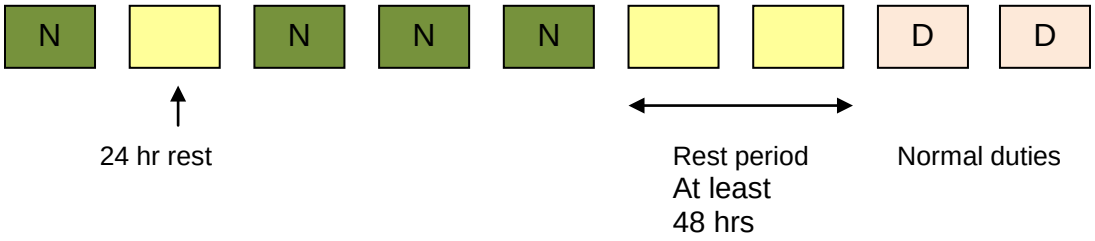

Figure 2 illustrates the rest period where a member changes from night shift to day shift.

Rest periods after the end of a deployment

4.30 **Day shifts:** Members who complete ***one day shift cycle (up to 5 days) or less*** should be provided with a rest period of **24 hours** after the end of a deployment to allow sufficient rest before commencing 'normal' activities. Normal activities may include normal work duties for members whose place of residence is located locally.

Members who complete ***two consecutive day shift cycles or more*** should be provided with a rest period of **48 hours** after the end of a deployment to allow sufficient rest before commencing 'normal' activities.

4.31 **Night shifts:** Members who complete ***night shift cycles (up to 3 nights)*** should be provided with a rest period of **48 hours** after the end of a deployment to allow sufficient rest before commencing 'normal' activities. The rest period of 48 hours applies to any number of night shift cycles completed.

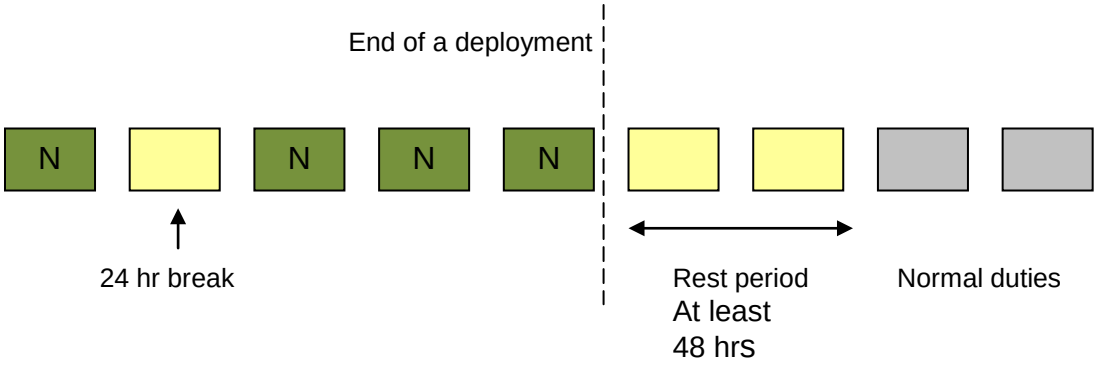

Figure 3 illustrates the rest period at the end of a night deployment.

Rest periods after attending out-of-area incidents

4.32 In circumstances where members drove themselves to attend an out-of-area incident, a rest period of at least 10 hours at the end of up to 5 consecutive day shifts and 24 hours at the end of 3 consecutive night shifts should be made available before they drive home. A longer rest period is required for members undertaking night shift because a longer adjustment period is required for these members to revert back to a day cycle.

Note: this rest period applies to members who drove themselves to attend an out-of-area incident. It does not apply to members who are transported to an out-of area incident.

4.33 All members who are provided with transport home after attending an out-of area incident should be given a rest period of at least 48 hours at the end of the deployment and before commencing normal duties, as outlined above.

4.34 It is important to note that what is more important than the prescribed number of hours of rest is how much actual sleep was obtained during shift work by individuals. For example, if members averaged less than 5 hours sleep each 24 hour period (irrespective of the prescribed hours), they need at least 3 days to get back to near-baseline performance.

Exceptional circumstances

4.35 Requirements may be altered in circumstances where life and property are at imminent and significant risk. If so, supplementary monitoring using dynamic risk assessments (by the IC, IMT and/or SO) is to be applied to monitor individual fatigue levels and monitor decision making.

4.36 Where deployed interstate or internationally it is a requirement that shift patterns and lengths are adjusted to ensure a smooth transition into local arrangements as approved by the State Operations Controller.

5. General Information on Fatigue

5.1 This section contains general information for the NSW RFS on attitudes towards fatigue, principles for designing shift work schedules and organisational strategies for managing shift work related fatigue.

Attitudes and behavioural norms towards fatigue

5.2 In high-risk industries such as the emergency services, certain dangerous attitudes in relation to fatigue can exist. One misconception called “myth of immunity” (or “hero syndrome”) is the belief among some that they are somehow immune to the effects of fatigue. Admitting to fatigue is viewed as a “sign of weakness”.

5.3 Another attitude is the “can do” attitude which may help to achieve difficult and challenging jobs faced by the NSW RFS, but also has the potential for members to allow operational pressures to distort decision making and compromise safety standards.

5.4 A third related attitude is the “badge of honour” in which members feel compelled to get their tasks done and “carry the load”, even if it means working extended hours to finish. Some members may feel they are indispensible to the success of a mission, when in reality members who “tough it out” are at an increased risk of having, or causing, an accident.

5.5 These attitudes within an organisation signal a culture that may benefit from a program to enhance understanding of the limitations on human performance due to fatigue. These attitudes may undervalue the importance of sleep and can place the organisation at risk.

Principles for designing shift work schedules

5.6 Any organisational strategies for managing fatigue should take into consideration the following design principles when developing shift work schedules:

(a) The human body clock or human circadian rhythm has been shown to work to a 24 hour cycle. Therefore, wherever possible, any shift work schedule should be consistent with a 24 hour cycle;

(b) Wherever possible the main rest/sleep period should be at the same time in each 24 hour period, particularly for extended operational periods (i.e. more than two days);

(c) Sleep during the night is usually more restful and restorative than sleep during the day which may be disrupted, shorter and less satisfying;

(d) Long shifts are a primary cause of fatigue. Its effect is most significant on night and early morning shifts;

(e) Early shift starts (before 0700) should be avoided because early starts are correlated with sleep loss. It has been shown that just getting one hour less sleep than usual has measurable performance deficits for the next day or so;

(f) Less sleep than required over consecutive shifts may accumulate sleep deficit and increase the incident risk due to fatigue. This sleep deficit cannot be made up for later on;

(g) Shift swapping can be fatiguing. In particular, the risk is greatest when there is a switch from a night shift to an early morning shift.

Organisational strategies for managing shift work-related fatigue

5.7 Strategies for managing the fatigue-related risks associated with shift work within an organisation include:

(a) using training to enhance awareness of the effects of sleep loss and improve understanding of individual tolerance to sleep loss;

(b) preparing work/sleep plans to meet the needs of the expected operational conditions; and

(c) encouraging as routine, the practice of looking for signs of fatigue in peers, subordinates and superiors during operations in order to recognise and avoid fatigue-related risks.

6. Background Information on Fatigue

6.1 This section provides background information about fatigue, its causes and its effects. The information is general in nature and specialist information may be obtained from the NSW RFS Health Safety and Welfare section on 02 8741 5221.

The recommended number of hours of sleep for adults

6.2 Most adults need 7-8 hours of sleep per night in order to perform effectively and safely throughout the next waking day.

Causes of fatigue

6.3 Insufficient or disrupted sleep is the main cause of fatigue. However, there are other health risk factors associated with fatigue which may include:

(a) sleep disorders (e.g. sleep apnoea, insomnia);

(b) obesity or being overweight;

(c) medical conditions (e.g. heart disease, anaemia, hypothyroidism, diabetes, cold, flu, headache);

(d) alcohol or drug use;

(e) psychological conditions (e.g. depression);

(f) caffeine and other stimulant overload.

6.4 Fatigue related to an incident may be caused by:

(a) intense emotional strain and mental workload;

(b) strenuous and sustained physical exertion;

(c) inadequate food and water intake and/or food lacking in nutrition;

(d) adverse environmental conditions (heat, smoke, noise, poor lighting);

(e) periods of monotonous, boring activities.

The effects of shift work on health and safety

6.5 Poorly managed shift patterns can have wide-ranging effects on shift workers. The hazards associated with shift work include:

(a) fatigue;

(b) gastro-intestinal, cardiovascular and reproductive health problems;

(c) work related stress;

(d) family problems;

(e) anxiety, irritability and depression.

The organisational consequences of fatigue

6.6 The organisational consequences of fatigue include:

(a) increased risk of errors and accidents;

(b) increased sick leave, absenteeism and turnover;

(c) increased use of health services;

(d) decreased productivity;

(e) decreased motivation, mood swings and depression.

6.7 Research also suggests that people who obtain less sleep are more likely to violate rules and procedures and behave in an unethical manner.

Signs of fatigue

6.8 The mental and emotional signs of fatigue include:

(a) confusion;

(b) poor concentration;

(c) general cognitive slowness/slow reaction times;

(d) forgetfulness;

(e) narrowed perception;

(f) carelessness;

(g) loss of situation awareness;

(h) poor decision making;

(i) decreased interaction with team members;

(j) lowered morale;

(k) loss of sense of humour,

(l) moodiness, irritability, argumentativeness.

6.9 The physical signs of fatigue include:

(a) tiredness and sleepiness;
(b) yawning;
(c) headache;
(d) dizziness;
(e) sore or aching muscles;
(f) muscle weakness;
(g) slurred speech;
(h) impaired hand-eye coordination;
(i) appetite loss;
(j) reduced immune system function;
(k) blurry vision;
(l) vacant stare with sunken bloodshot eyes.

6.10 It is important to note that a decline in mental performance is usually not apparent to the individual who is fatigued. Given the insidious nature of fatigue, a fatigue risk management system cannot rely solely on an individual's self-assessment of their level of fatigue.

Individual differences in fatigue-related risk

6.11 There are individual differences in the degree to which individuals are affected by fatigue. As such, a one size fits all, prescriptive approach to fatigue risk

management is unlikely to meet the sleep needs of all individuals within the NSW RFS.

6.12 All members need to assess their physical well being for performing the tasks they are allocated so as to minimise the possibility of fatigue related incidents. Members should ensure they are physically fit to undertake tasks and provide advice to officers in charge, when they may consider that they are unable to complete their tasks.

6.13 Where an officer or crew leader is concerned that a member's physical condition may impact their ability to manage their fatigue they should discuss this with the member involved.

Time of day effect

6.14 The human body clock (circadian rhythm) works on a 24 hour cycle. Human performance is at its worst and accidents are more likely to occur during troughs in the circadian rhythm. Troughs occur from midnight until dawn, and during the mid-afternoon, about 1400-1800 hrs (also known as the circadian, post-lunch dip or 3 o'clock-itis).

6.15 Peaks in mental performance occur in the early morning (0700 til 1200). Peak vigilance and reaction time performance occurs in the early evening (1900-2100).

Fatigue and age

6.16 Research suggests that older people require less sleep as they age, have increased difficulty adjusting to changes in sleep and work schedules, and are more likely to be adversely affected by disruptions to routine sleep. This has implications for older NSW RFS members rostered on to night shift. Research also suggests:

(a) ageing is associated with progressive intolerance to sleep disturbance and irregular working schedules;

(b) shortfalls in usual sleep duration will be more disruptive for older people;

(c) in older people, sleep becomes more fragmented and is more susceptible to disruption by noise;

(d) the restorative value of sleep decreases with age.

Physical vs. mental fatigue

6.17 The amount of sleep required for tasks that are purely physical in nature and that required for tasks that mainly require mental processes suggests that mental tasks require as much, if not more sleep, than tasks that are mainly physical in nature.

Fatigue and driving

6.18 Driving a vehicle while fatigued is a major risk. Night–shift workers are at least twice as likely as day workers to have traffic accidents while travelling home from work. This has implications for other activities that require similar motor skills and which firefighters commonly undertake (e.g. operating chainsaws,

heavy machinery and driving tankers), and specialist roles such as RAFT and RART.

Fatigue-related performance and blood alcohol concentration

6.19 A fatigue-related performance index, comparing fatigue levels with blood alcohol concentrations suggests:

(a) after 17 hours of sustained wakefulness, performance on cognitive (ie memory, judgment and reasoning) and psychomotor tasks (such as hand-eye coordination) decreases to a level similar to performance with a 0.05% blood alcohol content;

(b) 24 hours of wakefulness compares with a 0.10% blood alcohol content level (twice the legal driving limit);

(c) a person with a blood alcohol content of 0.05% is twice as likely to have an accident as a person with zero blood alcohol content;

(d) a person with a blood alcohol content of 0.10% is 7 times more likely to have an accident.

Napping as a technique for maintaining performance

6.20 Napping is an effective technique for managing fatigue in extraordinary circumstances. Defined as any sleep of less than 3 hours, research suggests the longer the nap the greater the benefits in improving mood, performance and alertness. Even short naps of 10 to 30 minutes, preferably taken in quiet environments, are better than no sleep.

A 30 minute nap will decrease the rate of decline in performance by improving performance for a period and a 1 hour nap may reduce the frequency and duration of microsleeps.

6.21 Naps are usually more effective in the late afternoon or late evening. However, any daylight nap will be beneficial particularly after a night without sleep. During periods of chronic sleep loss, naps taken in the morning (0400 to 0600 hours) help to recover performance whilst naps taken late at night (2200 to 2400 hours) help to maintain performance.

6.22 Importantly, naps can, and wherever possible should, be taken in anticipation of a night shift. Taking naps can positively impact alertness and performance levels for approximately double the length of the nap taken. For example, a 2 hour nap before a night shift will on average, help maintain performance for approximately 4 hours. Such benefits accumulate for naps as long as 8 hours.

Appendix 1

Summary of key points of Service Standard 3.14 Fatigue Management and this accompanying Operational Guideline

Parameter	NSW RFS Operational Guidelines
Number of hours of sleep opportunity	Recommended minimum of 8 hours of sleep opportunity
Number of hours of sustained wakefulness	Recommended maximum 16 hours of sustained wakefulness
Shift length	Recommended maximum 12 hours of shift, except first shift maximum 16 hours of sustained wakefulness
Rest periods between shifts	Recommended minimum 9 hours of rest
Changeovers and briefings	Recommended maximum 1 hour in total spent in changeovers and briefings before and after a shift
Transportation and Accommodation	Local sleeping arrangements should be considered for members whose place of residence is located in excess of 1 hour travel time each way to and from the incident (see Section 2.23 for details).
Breaks between shifts	Regular breaks as required
Number of consecutive shifts	Maximum of up to 5 consecutive day shifts followed by a 24 hour rest Maximum of up to 3 consecutive night shifts followed by a 24 hour rest
Shift patterns	DAY Shift: Up to 5 days on shift - 1 day rest – Up to 5 days on shift - 2 days rest, continue cycle NIGHT Shift: 3 nights on shift - 1 day rest – 3- nights on shift - 2 days rest, continue cycle
Shift swapping	Minimum 48 hours rest at the change of shifts from night to day shift or 24 hours rest from day to night shift
Rest periods after the end of a deployment	Minimum 48 hours of rest at the end of a deployment For members actively driving from an out-of-area incident to their place of residence: • A minimum 10 hrs rest at the end of up to 5 consecutive day shifts to be provided before commencing their return journey • A minimum 24 hrs rest at the end of 3 consecutive night shifts to be provided before commencing their return journey • Note, the 10 hr and 24 hr rest periods do not apply to members who are transported to and from out-of- area incidents (e.g. by air or coach)

Appendix 2

Example scenarios

Example 1: *Arrangements for rostering the first night shift of a major incident*

This example is provided as a guide and illustrates one way of rostering the first night shift. It is based on a 12 hour rotation shift, with changeovers at 0700hrs and 1900hrs. Figure 4a and 4b illustrate the example using diagrams.

Assuming Dave, a NSW RFS member, had been awake since 0700hrs, started work at 0800hrs, and worked a full day of employment before attending this incident, he should not be working past 2200hrs and should be asleep by 2300hrs in order to not exceed 16 hours of continuous wakefulness. Already Dave has been working an extended day shift (up to 14 hours, counting both normal work duties and RFS operational duties).

Members rostered for the first night shift are relieved from their normal work duties from the time the incident commences and are provided an opportunity to nap in anticipation of night work until the beginning of their night shift. The night shift then operates a shorter 9 hour shift from 2200hrs until 0700hrs. The night shift is replaced by a 'day crew' that have rested overnight and they resume a 'normal' 12 hour shift from 0700hrs to 1900hrs. The previous night shift returns the following night for a 12 hour shift from 1900hrs to 0700hrs.

In this example, members undertaking the first day shift will inevitably obtain less than the minimum 8 hours of sleep and members undertaking the first night shift will most likely obtain even less sleep.

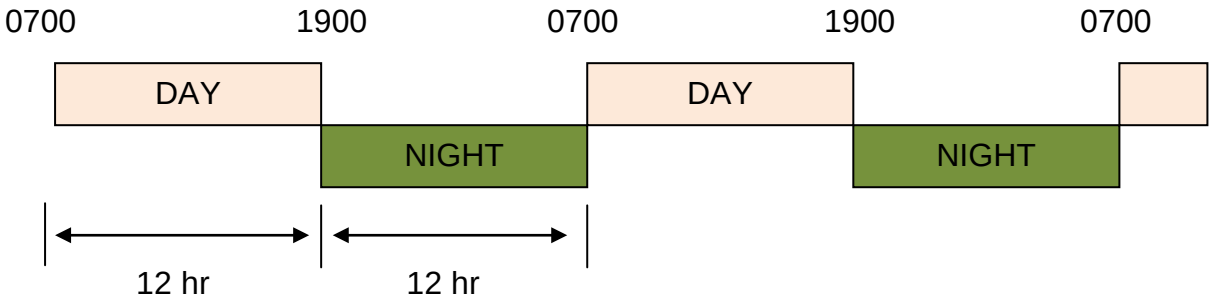

Figure 4a one way of rostering the first night shift of a major incident. This example is based on a 12 hour rotation, with changeovers at 0700hrs and 1900hrs. Day shift starts at 0700hrs and ends at 1900hrs. Night shift starts at 1900hrs and ends at 0700hrs. The figure illustrates the 'desired' or the 'end state' shift work schedule for this example.

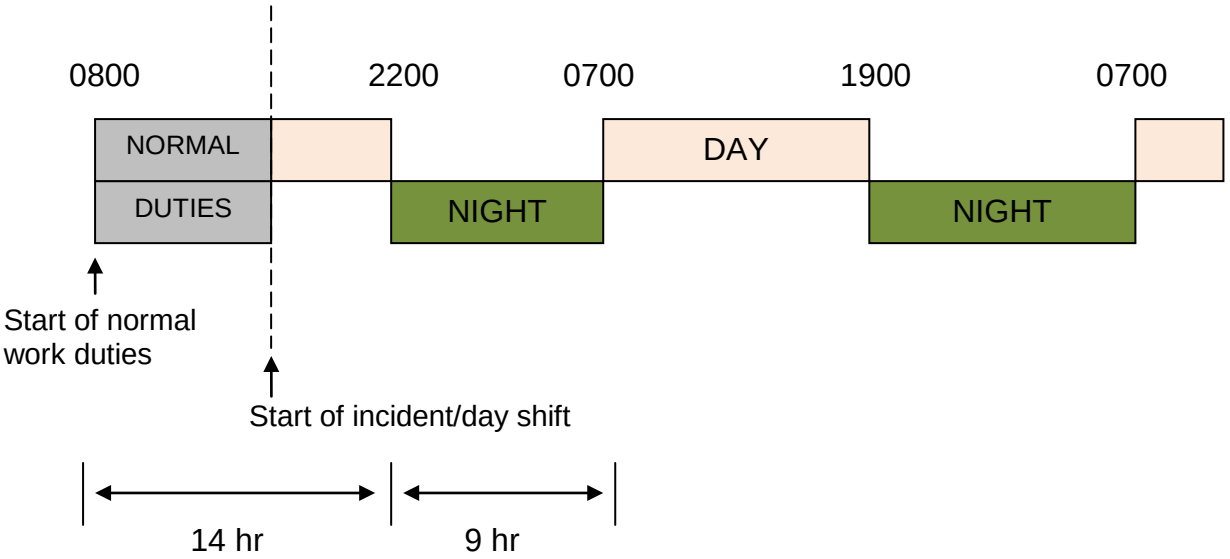

Figure 4b. This example assumes the members working the first shift woke at 0700hrs and started 'normal' duties at 0800hrs. In order to achieve the shiftwork schedule shown in Figure 5a, members rostered for the first day shift start their shift when the incident begins and work until 2200hrs, in order not to exceed 16 hours of sustained wakefulness. Members rostered for the first night shift are relieved of their normal work duties from the time the incident commences and are provided an opportunity to nap in anticipation of night work until the beginning of their night shift. The night shift then operates a shorter 9 hour shift from 2200hrs until 0700hrs.

Example 2: *Number of hours of sustained wakefulness*

John, a volunteer attends an incident at 1500hrs. Assuming he woke up at 0700hrs and worked a full day of employment and accumulated fatigue before attending this incident, John should not be working on the fireground past about 2200hrs and be able to sleep by 2300hrs in order to not exceed 16 hours of sustained wakefulness.

In this example, John is a volunteer who took part in non-NSW RFS work duties during the day. It is important to recognise that the activities John took part in before attending the incident will contribute to his overall level of fatigue. In managing John's fatigue, it is important that he is not continuously awake for more than 16 hours in any 24 hour period. The activities that members of the NSW RFS may be engaged in during their waking hours can include NSW RFS related work (both operational and normal work duties) and travel to and from an incident.

Example 3: *Interruptions to sleep*

Bill, a volunteer is called out to attend a local incident at 0200hrs. It is a short incident and he is back in bed by 0400hrs.

Managing Bill's fatigue will depend on how much pre-incident sleep and total sleep he achieved and will require a collaborative approach between Bill and his supervising officer. If Bill was asleep by 2000hrs because he anticipated being called out, he would have gained 6 hours sleep before being called out at 0200 hrs. Although anchor sleep is best (i.e. sleep in one period), napping (a sleep of less than three hours in one sleep period) and broken sleeps can be reasonably effective in making up for not getting one extended sleep. Given this, a 2 or 3 hour nap at 0400 hrs would be adequate and Bill should be able to perform effectively and safely throughout the next working day.

However, if Bill went to sleep at 2300 hrs and gained only 3 hours sleep before being called out at 0200 hrs and obtained a 3 hour nap after returning to bed at 0400hrs, Bill obtained less sleep than required and incurs a sleep deficit. Bill should consider sleeping in further or starting work later the next day, based on his own self-assessment and understanding of fatigue.

It is important to consider any special characteristics of the individuals involved and the relationship of the effects of fatigue with other risk factors such as age, illness, depression or life events, when assessing the risks associated with fatigue. If, for example, Bill is 65 years of age, he may have found the disrupted sleep particularly disturbing. He may not have been able to get back to sleep at 0400 hrs. He should consider turning his pager off after returning to bed at 0400 hrs, or removing himself from work the next day, based on his own self-assessment and understanding of fatigue.

If Bill has to work the next day, he should advise his employer of his NSW RFS activities the previous night. He may consider taking extra breaks during the day and if he is required to operate heavy machinery, Bill's supervising officer should consider giving Bill low risk work until he recovers from the sleep deficit.

If Bill has a particularly busy period and has interrupted sleep 2 or 3 days in a row, he may suffer from the accumulated and compounded effects of sleep deficit. The Duty Officers in his district should consider sharing the workload so that busy night shifts are shared between the other officers in the team or between adjacent districts. Bill should also ensure he advises his employer of his NSW RFS activities.

Example 4: *Number of consecutive shifts and rest periods after the end of a deployment*

Sarah is a staff member who works as a Planning Officer in an IMT during incidents. A major incident commences, an IMT is formed and Sarah is rostered onto a night shift.

If, for example, the incident started on a Monday and continues for more than 3 days, Sarah should work until Wednesday night then be provided with a minimum 24hr rest before commencing another 3 consecutive night shifts (from Friday night until Sunday night). During her 24hr rest and with the knowledge that she will continue another 3 consecutive night shifts, Sarah should continue as much as possible, to sleep in a night cycle and use the rest period provided to her appropriately. She may want to think about ways to ensure her daytime sleep is not interrupted (e.g. turning her phone off, putting a sign on the door). The cycle of work and rest based on 3 nights on shift followed by 1 day rest then 3 nights on shift followed by 2 days rest continues until the incident ends.

At the end of Sarah's deployment, she should be provided with at least 48hrs rest from the end of her night shift so that she can revert back to a day cycle. If, for example, Sarah worked Sunday, Monday and Tuesday nights, the earliest she could return to normal duties would be on Friday morning. If Sarah drove herself to attend an out-of-area incident, she should not be driving herself home in the first 24hrs after the end of her deployment. During her 48hr rest period, she should not be doing normal work duties and should be completely removed from NSW RFS duties.

This example illustrates how consecutive shifts and rest periods work for a NSW RFS staff member. The same conditions apply to NSW RFS volunteer members who need to ensure that they are adequately rested before returning to non-RFS work duties and that they inform their employers of their involvement in NSW RFS activities which may contribute to their overall levels of fatigue.

Example 5: *Out-of-area crews*

A crew from one region is called to respond to an incident in another region. They were awake in the morning, travel by air in the afternoon, and arrive at 2200hrs.

The crew should be rested until 0800hrs before commencing their deployment. Even though the crew spent a large part of the afternoon and evening being transported to the incident, and assuming that the crew did not sleep during their flight, the crew accumulated fatigue throughout the day. There is no distinction made in the activities members engage in during their waking hours.

Note, there may be situations where there may be detrimental impacts on team morale should newly arrived crews not immediately commence work to support the local teams who are tired or exhausted. It is up to the supervising officer to make an informed decision about how to manage the situation based on an assessment of the situation and an understanding of the associated risks.

Example 6: *Providing transportation and accommodation*

A crew from one region is called to respond to an incident in another region. They were awake in the morning, travel by air in the afternoon, and arrived at 2400hrs. The crew members are provided with a meal then rostered immediately on to the night shift which finishes at 0600hrs.

The crew have been awake for 20 hours continuously. Transportation to and from the incident, and suitable accommodation (located less than 1 hour travel time to and from the incident) have not been provided.

In this instance, the consequence of not providing adequate transportation and accommodation may present an increased risk that the crew may have, or cause, a road accident whilst driving to and from the incident. The consequence of rostering newly arriving crews to a night shift without adequate opportunities for sleep may also present an increased risk of accidents on the fireground. The decisions of the supervising officer in this instance, may indicate an impaired ability to make sound judgments (perhaps due to fatigue in the person involved) and an absence of mutual scrutiny within the IMT.

Appendix 3

Examples of how food may assist fatigue management

- Meals made up largely of carbohydrates are known to facilitate better sleep.
- Meals made up largely of protein are considered to assist wakefulness and work activity.
- Upon waking, eat protein (meat, eggs). Proteins promote tissue growth and regeneration and are digested best in the mornings.
- Regular meal timings help to regulate the circadian cycle.
- During the night shift, main meals should be eaten before 0100 hrs.
- In the morning after a night shift, a light snack of carbohydrates should be taken no later than two hours before expected sleep time.
- Carbohydrates (bread, milk, cheese, potato) take longer to break down and provide slow release energy the next day.
- Minimise alcohol use. Alcohol may assist in falling asleep, but it disturbs the sleep cycles and can cause early awakening. Alcohol also exacerbates fatigue and impairment of mental processes.
- Avoid stimulants like nicotine and caffeine prior to sleep.

Adapted from *Fatigue Management During Operations: A Commanders Guide by Murphy, P (2002) p78-79.*