Fatigue Risk Management Guidelines

A Guide to Proactively Managing Fatigue in the Australian Pipelines and Gas Association

Version 1.2
September 2018

Important note on use of the Fatigue Risk Management Guidelines.

The Fatigue Risk Management Guidelines have been developed for the use of APGA members and their employees. The guidelines have been made available for general use to benefit the wider industry.

Please contact apga@apga.org.au for further information.

Contents

Foreword 2
Who should use these guidelines? 3
What is fatigue? 3
What are the consequences associated with fatigue? 4
Implementing a Fatigue Risk Management System 5
Fatigue risk management policy 5
Hours of work 5
Fatigue risk management processes 6
1) Establish risk context 6
2) Identify hazards 6
3) Assess risks 6
4) Treat risks 6
5) Monitor and review 7
6) Record keeping 7
Training and education 7
Reporting systems and processes 7
Fitness for work 8
Observation 8
Errors, incidents and accidents 8
Incident investigation 8
Audit and assurance 9
How do employers implement and embed a FRMS? 9
Working together to reduce the fatigue risk in the pipeline industry 10
Next steps 10
Resources 11
Acknowledgements 11
References 12

Foreword

Fatigue can have serious consequences for worker safety when poorly mitigated and managed. Some of the most catastrophic disasters in recent decades have been attributed to fatigue and/or human error. The reality is that fatigued workers are less productive, do not perform as well, experience more health issues, and are significantly more likely to be involved in an incident at work or on the roads. Worker fatigue is not only a risk to the individual's safety; it also poses a risk to the health and safety of all those present in the work environment, as well as members of the community. The impact of fatigue-related incidents is widespread, impacting workers, organisations,families and the broader community.

As a result of the identified health and safety risk that fatigue poses, increasing focus has been placed on understanding the impacts of fatigue on a workers' cognitive and physical performance, as well as determining best practice strategies to mitigate and manage the risks of fatigue within organisations. This is the key driver for ensuring that employers understand what steps need to be taken to effectively address fatigue across their workforces.

Fatigue is a critical issue for organisations in the pipeline industry and requires considered management. Merely ensuring compliance with legislative requirements by adhering to prescribed drive, work and rest hours is not be enough to ensure all workers are provided with a safe work environment. Good fatigue management practices encompass a fatigue risk management system that incorporates a systematic approach to risk management, adequate training and education for workers, and well-developed and implemented policies and procedures to support proactive fatigue management strategies.

The Australian Pipelines and Gas Association has prepared these guidelines with the intent to encourage the adoption of uniform fatigue management practices across the industry.

2. Who should use these guidelines?

These guidelines should be used by employers and workers in the pipeline industry. This includes:

- the person in charge of a business or undertaking
- principal contractors/syndicates, contractors, subcontractors
- industry participants such as managers, supervisors, team leaders, health and safety practitioners, human resource personnel and workers.

3. What is fatigue?

The term 'fatigue' is a general term used to describe the feeling of being tired, drained or exhausted.

It is a physical condition that can result from inadequate or disturbed sleep, physical exertion, mental exertion, or prolonged waking times. Fatigue can be, in some cases, a natural response to the mental and physical effort of everything we do, and adequate sleep is essential for restoring the balance and promoting recovery.

Signs and symptoms of fatigue can typically be grouped into three categories: physical, mental and emotional (see Table 1). A range of factors can contribute to fatigue (see Table 2).

Table 1. Fatigue symptoms checklist

Physical Symptoms	Mental Symptoms	Emotional Symptoms
Yawning ▪ Heavy eyelids ▪ Blurred vision ▪ Head drooping ▪ Feeling tired after sleep ▪ Reduced performance ▪ Slower reaction time ▪ Impaired hand eye coordination ▪ Headache	▪ Difficulty concentrating on task ▪ Lapses in attention ▪ Difficulty remembering what you are doing ▪ Failure to communicate important information ▪ Risk taking behaviour ▪ Disorganisation ▪ Lack of situational awareness ▪ Accidently doing the wrong thing (error) ▪ Accidently not doing the planned thing (omission)	▪ More quiet than usual ▪ Withdrawn ▪ Increased stress levels ▪ Reduced motivation ▪ Lacking energy ▪ Anxiety and decreased tolerance ▪ Mood disturbances ▪ Emotional outbursts ▪ Irritability

Source: McCulloch, et al. (2007a).

Table 2. Factors contributing to fatigue

Work-Related Factors	Personal Factors
▪ Cumulative hours worked ▪ Task demands (workload, time pressure) ▪ Predictability of roster ▪ Type of work (physical/mental) ▪ Accommodation ▪ Time of day of work ▪ Commuting ▪ Recovery periods between shifts ▪ Roster cycle length ▪ Shift length ▪ Payment incentives ▪ Environmental stressors (e.g. light, noise, climate, vibration) ▪ Organisational culture	▪ Medical conditions ▪ Diet ▪ Alcohol and drugs ▪ Age and gender ▪ Sleep quality and quantity ▪ Time of day that sleep occurs ▪ Family and social life ▪ General health ▪ Exercise ▪ Lifestyle choices ▪ Sleep disorders ▪ Environmental factors affecting sleep (noise, heat, light) ▪ Secondary employment and voluntary work

4. What are the consequences associated with fatigue?

Fatigue is a risk to which anyone can be exposed on a daily basis. With the lines between work and home life being blurred by the use of technology and ever-increasing demands on time, the ability to balance family, work and social activities is complex. Whilst a certain level of fatigue can be a normal response to everyday living, high levels of fatigue can have a range of undesirable outcomes for the individual, the organisation and the community (see Table 3).

Table 3. Consequences of fatigue

Individual	Organisations	Community
▪ Poorer health and wellbeing ▪ Impacts to cognitive functioning ▪ Impacts to short-term memory function ▪ Increased likelihood of social alienation ▪ Increased instances of relationship problems ▪ Increased likelihood of being involved in an incident	▪ Increase in the frequency and consequences of fatigue-related incidents ▪ Increased mortality rates ▪ Increased costs associated with incident management ▪ Increased levels of absenteeism and lost time ▪ Increased levels of presenteeism (i.e. coming to work despite injury, illness or other, resulting in reduced productivity) ▪ Poorer workplace morale and satisfaction ▪ Poor communication ▪ Impacts to company image and reputation	▪ Increased potential for incidents to occur in the community (i.e. road crashes) ▪ Increased need for trauma counselling services ▪ Increased use of medical facilities and allied health services ▪ Broader ripple effects of serious injury, disability and death in the community

5. Implementing a fatigue risk management system

Until recently, reducing fatigue risk was addressed prescriptively, including limiting work hours and encouraging sufficient rest breaks. While such regulations are simple, they are inflexible, often non-scientific and largely a result of industrial relations negotiations. An important disadvantage of this type of framework is that safety may be perceived or assumed simply by following the rules.

A fatigue risk management system (FRMS) is a scientifically based, data-driven set of integrated management practices, beliefs and procedures for identifying and managing fatigue and safety risks. A FRMS allows a systematic and structured approach to implementing processes to prevent and manage fatigue, and to audit the control processes for efficacy and compliance.

Because a FRMS is a subset of a safety management system (SMS), its core concepts can be conceptualised in a similar vein and should contain the following at a minimum:

- Fatigue risk management policy
- Hours of work risk assessment and monitoring (including actual hours worked, not only scheduled hours)
- Fatigue risk management processes
- Fatigue management training and education for employees, management and families
- Fatigue reporting system for employees
- Sleep disorder management
- Fatigue incident investigation
- Internal and external auditing and safety assurance processes.

6. Fatigue risk management policy

As with a safety management policy, the fatigue management policy document outlines what commitments an organisation will make in order to manage fatigue-related risk and how these mitigations will be conducted in the organisation.

The policy document is essentially the written version of the FRMS and aids the organisation in coordinating all of its efforts to improving safety.

7. Hours of work

The primary goal of monitoring hours of work is to measure the extent to which the organisation provides workers with an adequate sleep opportunity. As sleep opportunity is reduced, the likelihood that a worker will be fatigued increases. Working hours should be designed to allow for adequate sleep opportunity and sufficient recovery time between shifts and the cumulative hours of work over successive shift rosters, days, weeks and potentially months (e.g. hours worked and hours rest over a three-month period).

When planning work schedules and rosters, consideration may be given to the implementation of fatigue monitoring software or roster risk assessment tools to highlight potential fatigue-related risks associated with planned and actual hours of work.

8. Fatigue risk management processes

Fatigue must be risk managed like any other workplace safety hazard. A step-by-step process, known as the risk management process, should be undertaken.

1) Establish risk context

In order to establish the risk context, the following questions need to be answered:

1. Why is this risk assessment being conducted?
2. What is the scope of the risk assessment?
3. Are there any limitations that need to be taken into consideration?

This will allow the organisation to define the boundaries for the fatigue risk management process.

2) Identify hazards

A number of sources can be used to fully understand the extent and severity of fatigue- related risks. This may include one or more of the following:

- consultation with workers
- workplace inspection (i.e. environment, equipment, materials, substances, tasks)
- consideration of the organisation and management of work
- data analysis (i.e. hours of work records, incident data).

A Fatigue Hazard Checklist has been provided in the APGA Fatigue Management Handbook to assist organisations in identifying the factors contributing to fatigue.

3) Assess risks

Once fatigue-related hazards have been identified, the next step is to assess the risk in order to prioritise control measures. This step involves:

- Identifying control measures currently in place to manage the risk by either reducing the consequence or likelihood of the risk.
- Assessing the effectiveness of current control measures.
- Identifying the likelihood of the risk occurring with current control measures in place.
- Identifying the potential consequence or impact that would result if the risk was to occur.
- Determining whether additional control measures are required.

4) Treat risks

A certain amount of fatigue in the workplace may be acceptable provided the risks are adequately managed. Adopting a hierarchy of risk control measures allows organisations to effectively manage the level of risk associated with fatigue, so far as is reasonably practicable.

The APGA Fatigue Management Handbook provides a list of control measures to assist organisations implement a tailored solution.

5) Monitor and review

The risk management process should be continually monitored and reviewed to ensure:

- controls are working effectively
- changes in the workplace have not negatively impacted the effectiveness of current controls
- new hazards are identified
- the impact resulting from changes to legislation and best practice are considered.

6) Record keeping

Accurate records of the risk management process should be kept, including:

- Risk assessment attendance sheet.
- Signed risk assessment template outlining:
    - Hazards identified;
    - Assessment of the risks associated with those hazards;
    - Decisions on control measures to manage exposure to the risks;
    - Timeframes and responsibilities for implementation; and
    - Any checklist/s used during the process.
- Evidence of monitoring and review of the effectiveness of control measures.

9. Training and education

Appropriate training and education should be provided to workers and their families to assist them identify the signs and symptoms of fatigue, and provide them with information and techniques to manage fatigue effectively. It is important this training also includes familiarisation with the relevant policies and procedures. Management, supervisors, local fatigue champions and rostering personnel should also be provided with training, which provides the knowledge and skills to understand:

- Obligations and responsibilities for various roles
- The causes and consequences of fatigue
- How to identify signs and symptoms of fatigue in others
- Implementation of risk management strategies to minimise fatigue (e.g. hierarchy of control and defences-in-depth approaches)
- The importance of a workplace culture that supports fatigue management and reporting
- The importance of good leadership practices in achieving effective fatigue management.

10. Reporting systems and processes

Reporting systems and processes need to consider setting up limits or guidance to workers as to when they need to report to their direct manager and guidance on when additional controls might be required. The reporting system should also include guidance for colleagues to identify fellow workers who may be fatigued and the processes that should follow post identification.

The work culture of an organisation should encourage appropriate handling of fatigue- related incidents and accidents, avoiding under-reporting or poor reporting of workplace injuries and illness. Fatigue must not be a taboo topic. People must be able to openly speak about fatigue impairment without fear of discipline or demotion.

11. Fitness for work

It is important to focus on setting guidelines for times that workers should report to their Supervisor for further advice or instruction. With regard to fatigue, the organisation may establish minimum sleep and maximum wake thresholds to provide workers with guidance on whether they have had sufficient sleep to start or continue work.

Individual alertness assessments and behavioural checklists may be provided for self-identification purposes. See the APGA Fatigue Management Handbook for examples.

A critical link between sleeping disorders and fatigue is that disrupted sleep (induced by sleeping disorders) results in greater daytime sleepiness and falling asleep through the day. Profiling the prevalence of sleeping disorders and putting in place systems to assist workers identify, monitor and manage sleep disorders is another important step in understanding and managing fatigue risk.

12.Observation

The observation and reporting of fatigue-related symptoms and behaviour is an important element of the fatigue risk management process. Effective observations and associated reports can assist the organisation to:

Identify whether the minimum sleep opportunity set by the work schedule is appropriate
Indicate whether personal factors may be impacting on the risk of workplace fatigue
Indicate whether individuals might have a medical condition or sleep disorder impacting on sleep
Identify ineffective control measures in the FRMS.

Symptoms checklists can be used to assist management and workers identify fatigue signs in themselves and their colleagues. These tools can be provided as part of a training program or incorporated into the organisation's fitness for work guidelines.

Errors, incidents and accidents

It is vital that fatigue-related hazards, errors, incidents and accidents are reported to allow for an organisation's fatigue statistics to be accurately monitored. Reporting of fatigue-related errors or occurrences offers a great opportunity to analyse the effectiveness of a FRMS, and identify opportunities to improve the system, rosters or work tasks.

13. Incident investigation

Investigating whether fatigue contributed to an incident provides the opportunity to identify the absence of appropriate and effective hazard control measures in the FRMS. Investigation procedures and training should provide Investigators with the knowledge and skills to determine:

1. if the worker was fatigued at the time of the incident, and
2. whether the error preceding the incident was consistent with a fatigue-related error.

14. Audit and assurance

The FRMS should be monitored for continuous improvement and to ensure it is flexible to change with changing work practices or functions. There are many ways in which assurance can be achieved including:

- Monitoring and reviewing fatigue control measures.
- Evaluating the effectiveness of the FRMS through lead and lag indicators (see the APGA Fatigue Management Handbook for examples).
- Conducting internal and external audits.

15. How do employers implement and embed a FRMS?

A FRMS must be embedded into the organisation's SMS and subsequently, the workplace culture. The senior management team plays a key role, like in any change management process, by creating and promoting the values and behaviours that are expected to be demonstrated by the workforce.

To fully embed the importance of fatigue risk management, fatigue needs to be recognised as a genuine safety risk and promoted at every level of the organisation and at every stage of the employee life cycle.

The ultimate goal is for fatigue management to become the 'way we do things around here'.

16. Working together to reduce the fatigue risk in the pipeline industry

There is much that can be gained by industry members supporting each other to achieve positive outcomes regarding fatigue management.

Within organisations, stakeholders must discuss the best strategies for the organisation in managing fatigue risk. All levels of the organisation should be included in consultation processes and provided with opportunities to make suggestions and recommendations. All relevant stakeholders need to be educated regarding their role in managing fatigue and equipped with the necessary knowledge and abilities to enact such practices.

At the industry level, strategies to manage fatigue can be enhanced through a defined commitment to share knowledge and information about tried and tested fatigue management approaches. With a broader commitment, and the establishment of a minimum benchmark for fatigue management, the industry should see improvements in safety performance through improvements to the fatigue management culture and decreases in fatigue-related incidents.

17. Next steps

To ensure your organisation is doing everything it can to protect health and safety with regard to fatigue, conduct a review of your FRMS against these Guidelines and determine whether any gaps or deficiencies exist.

A FRMS Implementation Checklist has been provided in Appendix A to assist organisations establish a FRMS specific to their organisational needs.

Resources

APGA's Fatigue Management Toolkit is available on the APGA website and includes:

- Fatigue Management Study
- Fatigue Management Study Infographic
- Fatigue and Your Workplace Infographic
- Fatigue Management Handbook.

Acknowledgements

The Australian Pipelines and Gas Association (APGA) has commissioned these Fatigue Management Guidelines in consultation with stakeholders from member organisations. The HSE Committee has endorsed these guidelines and would like to thank TMS Consulting Pty Ltd for its assistance in the development of the guidelines and associated Handbook.

References

Gander, P., Hartley, L., Powell, D., Cabon, P., Hitchcock, E., Mills, A. & Popkin, S. (2011). Fatigue risk management: Organisational factors at the regulatory and industry/company level. *Accident Analysis and Prevention, 43,* 573-590.

Health and Safety Executive (2006). Managing shiftwork: Health and Safety Guidance. Retrieved February 17, 2014, from: http://www.hse.gov.uk/pubns/priced/hsg256.pdf

International Association of Oil & Gas Producers (2012). Performance indicators for fatigue risk management systems. Guidance document for the oil and gas industry. Retrieved February 16, 2014 from https://www.iogp.org/bookstore/product/performance-indicators-for-fatigue-risk-management-systems/

IPIECA (2007). Managing fatigue in the workplace: A guide for oil and gas industry supervisors and occupational health practitioners. http://www.ipieca.org/resources/good-practice/managing-fatigue-in-the-workplace/

McCulloch, K., Baker, A., Ferguson, S., Fletcher, A. & Dawson, D. (2007a). Fatigue Risk Management System for the Canadian Aviation Industry – Policies and Procedures Development Handbook. Retrieved February 16, 2014, from: http://www.tc.gc.ca/eng/civilaviation/publications/TP14576-6042.htm

McCulloch, K., Baker, A., Ferguson, S., Fletcher, A. & Dawson, D. (2007b). FRMS for the Canadian Aviation Industry: Developing and Implementing a Fatigue Risk Management System. Retrieved February 16, 2014, from: http://www.tc.gc.ca/eng/civilaviation/publications/tp14576-3-fatigue-6098.htm#_3_5

SafeWork Australia (2011). How to Manage Work Health and Safety Risks Code of Practice. Retrieved February 16, 2014, from https://www.safeworkaustralia.gov.au/doc/model-code-practice-how-manage-work-health-and-safety-risks

TMS Consulting Pty Ltd (2011). Fatigue and its relationship to roster cycle length. Retrieved February 13, 2014, from: http://www.tmsconsulting.com.au/fatigue-and-its-relationship-to-cycle- length-white-paper/

TMS Consulting Pty Ltd and APGA (2013). Fatigue Management Study. Milestone study of fatigue in the pipeline industry. Retrieved February 16, 2014, from: http://www.tmsconsulting.com.au/fms

WorkSafe Victoria (2004). Fatigue Management Handbook for the Forestry Industry. Retrieved February 17, 2014, from: https://www.worksafe.vic.gov.au/resources/fatigue-management-guidelines-forestry-industry

Appendix A: FRMA Implementation Checklist

Tasks	Response
Establish support and governance	
• Formally seek commitment and support from senior management	
• Ensure the provision of resources to invest time in the development and implementation of the FRMS	
• Activate Fatigue Risk Management Steering Committee to oversee the development and implementation of the FRMS	
• Clearly define accountabilities and responsibilities for fatigue risk management	
• Prepare a change management and communication plan	
• Identify and appoint local fatigue management champions to dedicate time and effort to the development and implementation of the FRMS	
• Activate/convene local working group to develop and monitor site fatigue risk management plans	
Develop and implement a tailored FRMS	
• Draft Fatigue Risk Management Policy outlining organisation specific fatigue risk management requirements and tools	
• Undertake broad consultation on the Fatigue Risk Management Policy	
• Update the Fatigue Risk Management Policy following consultation	
• Finalise and document control Fatigue Risk Management Policy	
• Undertake (or review) Fatigue Risk Assessments and incorporate any findings into the organisation's Risk Register	
• Draft and consult on Site Based Fatigue Risk Management Plan/s	
• Update and implement Site Based Fatigue Risk Management Plan/s	
• Identify training requirements and develop suitable training and education programs for all personnel	
• Incorporate fatigue as a hazard/observation and contributing factor in the incident reporting and recording system	
• Develop system to maintain and store all fatigue-related documentation	
• Add fatigue as an agenda item at health and safety meetings	
• Assess work schedules and rosters in line with Fatigue Risk Management Policy requirements	
• Rollout fatigue management training and education programs to all personnel according to a training schedule	

Tasks	Response
Enable and embed cultural change	
• Communicate Fatigue Risk Management Policy requirements to all personnel and contractors	
• Hold information sessions, toolbox talks, pre-start meetings to enhance understanding of policy requirements and provide an opportunity for questions	
• Include workers in fatigue risk assessment workshops	
• Recruit local champions to promote cultural change	
• Develop a poster campaign and distribute posters periodically	
• Disseminate feedback and updates from the Fatigue Risk Management Steering Committee and local working groups	
• Distribute newsletters to workers	
• Provide notices and updates on notice boards	
• Provide management with regular updates (e.g. monthly progress reports, compliance reports)	
Review and monitor FRMS	
• Monitor fatigue-related incident reports	
• Monitor occurrences of self-reported fatigue and peer observation	
• Schedule the Fatigue Risk Management Policy review for one year post implementation	
• Schedule the FRMS Audit and Assurance activities in line with the Fatigue Risk Management Policy	
• Schedule dates to maintain, monitor and review Fatigue Risk Assessment and Fatigue Risk Management Plans	
• Conduct an employee perception survey	

These guidelines are provided on the understanding that:

- The authors, editors and Australian Pipelines and Gas Association Ltd are not responsible in any way for any errors or omissions, nor the result of any actions taken on the basis of information in the guidelines.
- The publisher is not engaged in rendering professional services. The publisher, authors and editors expressly deny all and any liability to any person, however these guidelines were obtained by them, in respect of anything done by any such person in reliance, whole or partial, upon the whole or any part of this publication.

These Guidelines do not in any way override any State, Territory or Federal safety requirements or regulation.