Appleton Institute submission on the draft model Code of Practice: Managing fatigue risks at work

November 2024

General comments

We would like to thank SafeWork Australia for providing the opportunity for public feedback on the new draft model Code of Practice: Managing fatigue risks at work. In our view, this document will be critical for a range of Australian industries as a resource on how to effectively manage fatigue-related risk at work. We have provided some suggestions for revision of the document to align with evidence-based best practice and international standards, and to support adoption by organisations.

Critically, we believe that a restructure is required. It appears that the content has been aligned with similar Codes of Practice for other hazards (i.e., sections entitled 'identify', 'assess', etc.). However, this structure is problematic in the context of fatigue. Rather than being used to 'identify' fatigue, the working time arrangement features noted in the 'identify' section (e.g., long hours) would typically be used as part of a risk assessment process (and therefore would belong in the 'assess' section). See the below **Risk assessment and control** section for further information. Similarly, many other sections – while appropriate for other hazards – do not directly align with fatigue specifically (e.g., use of the hierarchy of controls, use of walkthroughs to identify fatigue).

In this draft, there is some conflation of the terms 'hazard', 'risk', and 'likelihood'. We suggest ensuring that these terms are clearly defined in line with relevant international standards (i.e., ISO31000) and used consistently throughout the document.

The draft Code of Practice in its current form is 54 pages long. In our view, if the document could be reduced in length, the content would be significantly easier for industry readers to digest and implement. Currently, a lot of information is presented (some in duplicate or triplicate), which hinders understanding and consequently application in workplaces. One option for reducing the length could be to refer to (or even hyperlink to) other relevant documentation (e.g., much of the front matter and information regarding general work, health and safety duties and context). Alternatively, this information could be presented in Appendices. A more condensed writing style may also support greater uptake and use from industry readers.

Additionally, much of the information in the draft Code of Practice appears to present prescriptive limits for organisations to follow. For example, specific guidance around certain hazards (e.g., shift length, number of consecutive night shifts, etc.) is presented in such a way that a reader could interpret this as a set of 'rules' that should be used to govern working time arrangements. While it does not appear that this is the intention of the document, consideration should be given to how this guidance is described. In our view, it should be clear to a naïve reader that where necessary, that identified bands of tolerance (e.g., maximum shift duration, maximum weekly work hours) could be extended if, and only if, an appropriate risk assessment is undertaken and critically, where sufficient controls are in place. To this end, better alignment between the body of the document and the approach adopted in the "Risk Management Chart" (Appendix A; Table 2) would enhance a *risk-based* versus *prescriptive* approach to managing fatigue. This reflects both our understanding of the intention of the Code of Practice and what is currently considered to be best practice in many sectors (i.e., a risk-based approach).[1]

Similarly, we suggest ensuring that specific guidance on fatigue management systems, including risk assessment and recommended controls (e.g., nap duration, working time arrangement) are demonstrably based on current scientific evidence (with links to that evidence provided as an appendix where possible). We also suggest ensuring that the definition of fatigue provided aligns with best practice and focuses on impairment. For example, this document could mirror the definition presented in the Queensland Health Fatigue Risk Management Resource Pack:

"Fatigue is a common and unavoidable by-product of the 24-hour delivery of patient care. Defined as a decreased capacity to perform mental or physical work, or the subjective state in which one can no longer perform a task, fatigue manifests in physiological performance decreases and cognitive impairment."

Risk assessment and control

For a best practice risk assessment, organisations will generally align with the ISO31000 International Standard for Risk Management. This involves evaluating a) the likelihood of fatigue and b) the consequences of fatigue, typically within a 5 × 5 risk matrix framework. This procedure is described in detail in documents such as the Queensland Health Fatigue Risk Management Resource Pack and the Civil Aviation Safety Authority Fatigue Risk Management System Handbook, and aligns with the legislative requirement for organisations to quantify risk.

Likelihood of fatigue is generally determined via an assessment of[2]:

- **Level 1:** Sleep opportunity.
  Typically assessed by bio-mathematical models and/ or manual evaluation of working time characteristics – including for example, shift duration, cumulative hours of work, regularity of work hours, shift start/end times, and break schedules.
- **Level 2:** Prior sleep wake behaviour.
  Typically assessed via self-reported prior sleep and/or sleep monitoring (e.g., wearables).
- **Level 3:** Behavioural signs and symptoms of fatigue.
  Typically assessed via validated scales designed to measure fatigue (e.g., Karolinska Sleepiness Scale[3]).

Using these characteristics, organisations can establish the likelihood of fatigue for a specific roster or situation on a 5-point scale. These scores can then be used alongside consequence ratings to determine risk (see Figure 1 for example risk matrix[4]).

We also suggest providing specific guidance on how a bio-mathematical model could be used in this context.[5]

Likelihood of Fatigue-Related Error	Severity of Consequence				
	Insignificant	Minor	Moderate	Major	Catastrophic
Rare	Low	Low	Moderate	Moderate	Moderate
Unlikely	Low	Moderate	Moderate	Moderate	High
Possible	Moderate	Moderate	Moderate	High	High
Probable	Moderate	Moderate	High	High	Extreme
Almost Certain	Moderate	High	High	Extreme	Extreme

Figure 1. Example risk matrix[4]

The current draft document presents a series of tables where potential controls are identified. While we believe it is important to present options for controls (noting that appropriate controls will differ depending on industry/organisation), specific guidance should be provided on which controls may be appropriate given different levels of identified risk. For an example of how this could be presented, see the Logging Investigation and

Training Association (LITA) guidelines for developing and implementing a fatigue management policy for the forestry industry.

Given the differences between industries in Australia, we believe it will be critical to develop industry-specific guides on how fatigue should be managed. This would present the opportunity for more specific risk profiles to be developed, in addition to tailored control measures that would be appropriate given the level of risk and contextual factors in specific industries.

Incident investigation

In the current draft Code of Practice, limited mention is made of post-incident investigations. In our view, it is critical that a new section be developed to address this process. It would be useful to include guidance on how organisations may determine whether fatigue was a causal factor in an incident, and how this information could be gathered and evaluated. We suggest aligning with published evidence in this area.[6]

Organisational commitment and culture

The management of fatigue-related risk in any organisation is dependent on commitment from managers/leaders to identify, quantify and control the risk using a shared responsibility approach. This requires both workers and managers to have knowledge about the causes and consequences of fatigue. For many organisations, education and training is an essential starting point for fatigue management, and for all organisations it should be part of continual improvement processes. Further, identifying and quantifying risk requires input from workers and managers in terms of their experiences of fatigue, including potential controls. A culture of reporting in order to collect and utilise relevant data should be developed as part of a fatigue management system. In organisations without existing safety management systems, and thus without embedded practices, it will take some time to establish and test new systems or processes.

Education and training

For many other hazards, such as those relating to physical plant and equipment, considerable expertise often resides within the workplace in order to effectively identify hazards, assess risks, and implement effective controls. With respect to fatigue, the requisite level of expertise is often absent. To address this issue, education and training for both the workforce, as well as supervisory and management staff is necessary to develop a shared understanding around individual and workplace sources of fatigue-related risk. We

suggest a specific section in the Code of Practice around education and training, with an outline of the requisite knowledge and skills for workers as well as decision-makers (rosters and schedulers) and supervisory and management staff would be beneficial.

Feedback on specific sections

Below are detailed comments on each section, aimed at improving the document's quality, ensuring it is evidence-based, and enhancing its user-friendliness. The following comments, while relating to specific sections in the current draft, should be interpreted in the context of our previous suggestions to restructure the draft Code of Practice.

Section 3

In our view, Section 3 would benefit from more detailed guidance. For example, in Section 3.1 organisations would benefit from clear examples or frameworks that outline specific criteria or methods for evaluating whether workers are fit for duty. Fitness for work assessments could also be highlighted as a proactive control measure, with examples of how these assessments could be integrated into a broader fatigue risk management framework.

Regarding Section 3.3, we question the appropriateness of walkthroughs as a method to identify fatigue-related hazards. Walkthroughs are unlikely to be effective for this purpose and should only be mentioned briefly, if at all. Instead, the section should lead with evidence-based strategies, such as risk management workshops and worker surveys, which have been shown to be more effective in identifying fatigue risks. The inclusion of lead and lag indicators for fatigue monitoring would also be valuable. For example, organisations could track metrics such as fatigue reports, fatigue-related errors, hours of work, and compliance with rest periods. Further guidance on how to use these data for trend analysis and ongoing monitoring would provide organisations with more practical tools to address fatigue. However, we do note that this content may be better placed later in the document, where monitoring and review is addressed.

We also note the importance of organisational culture in managing fatigue. Workers must feel safe to report fatigue without fear of disciplinary action. Guidance could be provided on establishing robust reporting mechanisms, such as dedicated fatigue reporting systems or clear organisational policies that outline how fatigue reports will be managed.

On page 19, the statement that 'tools are available which support work planning and can assist to prevent fatigue' is made. We suggest that examples of specific tools be included to guide industry readers. This is particularly important for smaller organisations that may lack the resources to develop tailored solutions.

Section 4

In our view, the information presented in section 4 would ideally be strengthened, with practical guidance on how organisations could assess fatigue-related risk as described above. In addition, we propose that reference could be made to existing tools that can be used 'off the shelf' to aid in the risk assessment process, particularly for smaller organisations.

One additional minor consideration within Section 4 is regarding the comment that 'if you already know what the risks are and how to control them effectively, you can implement the controls without undertaking a risk assessment and then check to confirm these have been effective' (page 23). We would urge caution with this guidance, as presumably for an organisation to 'already know' what the risks are, a risk assessment would have been undertaken. We therefore suggest a wording update to clarify that where a pre-existing risk assessment has been undertaken, it may be appropriate to use and critically, to evaluate, established controls. Further, there is an ongoing need to keep risk assessments updated, and responsive to organisational changes and emerging risk. The current wording may not capture this requirement sufficiently.

Section 5

Section 5 should not be a standalone section - it should be incorporated with the identify and assess sections, per risk management practice. Controls should be designed to reduce the likelihood and/or consequence of fatigue in the organisation, should be multi-layered, and must be tailored to the specific fatigue risks of the organisation.

A shopping list of controls might be useful as an appendix, the selection of which will be dictated by a risk assessment done with workers. As noted above, it would be useful to provide guidance (and specific examples; see Appendix A) on the specific controls that may be most appropriate given the level of risk identified.

Section 5.2 is entitled 'Preventing fatigue'. Fatigue cannot be prevented in many workplaces. Where night work, long hours, irregular or on-call hours are used, fatigue will be elevated due

to sleep and circadian disruption. Rather than preventing fatigue, the focus should be on mitigating the likelihood and/or consequence of fatigue.

As such, controls should be designed based on the fatigue risks identified.

Additionally, the inclusion of the concept of 'absolute authority to stop'—where workers can cease work if they or others are unfit to safely perform duties—would align this section with best practice in supporting worker autonomy and safety culture.

Section 6

Section 6 "Maintain and review control measures" is clear and concise, and makes the appropriate suggestion to draw on the same measures as used in the initial hazard identification process to monitor the effectiveness of controls.

Many industries are using clearly defined Safety Performance Indicators (SPIs) to guide the monitoring of the effectiveness of controls when managing the risk of fatigue. These SPIs set clear thresholds for expected and acceptable performance, and triggers to identify when existing controls might not be delivering sufficient levels of fatigue risk management.[7]

This section could include a brief paragraph about the role of identifying appropriate sources of data for monitoring, (building the second set of dot points in this section) and setting performance thresholds. For instance, when monitoring actual hours of work, a threshold of 20 hours of overtime per fortnight could be set as a trigger to review.

References

1. Sprajcer M, Thomas MJ, Dawson D. Approaches to Fatigue Management: Where We Are and Where We're Going. The Handbook of Fatigue Management in Transportation: CRC Press; 2023. p. 259-71.
2. Dawson D, McCulloch K. Managing fatigue: It's about sleep. Sleep medicine reviews. 2005;9(5):365-80.
3. Åkerstedt T, Gillberg M. Subjective and objective sleepiness in the active individual. The International journal of neuroscience. 1990;52(1-2):29-37.
4. Sprajcer M, Wong I, Dawson D. Deciphering Fatigue Risk Management Systems: A Holistic Approach to Mitigating Work-Related Fatigue. The Synergist. 2022.
5. Dawson D, Darwent D, Roach GD. How should a bio-mathematical model be used within a fatigue risk management system to determine whether or not a working time arrangement is safe? Accident Analysis & Prevention. 2017;99:469-73.
6. Dawson D, Reynolds AC, Van Dongen HPA, Thomas MJW. Determining the likelihood that fatigue was present in a road accident: A theoretical review and suggested accident taxonomy. Sleep Medicine Reviews. 2018;42:202-10.
7. International Air Transport Association. Fatigue Safety Performance Indicators (SPIs): A Key Component of Proactive Fatigue Hazard Identification. Montreal, Canada: IATA; 2014.

Appendix A. Potential control measures depending on level of risk identified - from the LITA Guidelines for developing and implementing a fatigue management policy in forestry

Table 1. Generic control measures

Risk level	Control Measures
Low	Do nothing unless indicated by a higher-level control
Mod	Minor increase in likelihood of fatigue. Notify co-workers and supervisors. Self-management controls usually sufficient. Typical controls include; self-monitoring, caffeine, task rotation, self-paced workload, self-managed breaks
High	Moderate increase in likelihood of fatigue. Notify co-workers and supervisors. Team and process management controls usually sufficient. Increased supervision, task re-assignment, where appropriate re-proceduralisation of tasks to reduce likelihood/consequence of error
Extreme	Significant increase in likelihood of fatigue. Notify co-workers and supervisors. Document a SMS incident report. Do not continue in a safety critical task without 1-up approval and documentation based on pre-existing risk assessment. Controls unlikely to be sufficient. Typically permitted only used where risk of continuing to work is less than risk associated with stopping (i.e. exceptional circumstances).

Table 2. Indicative risk controls for Low, Moderate, High and Extreme risk categories for each of the four elements of the FRMS.

		Low	Moderate	High	Extreme
Policy Governance		Basic policy framework	Explicit shared responsibility framework Employee sign off on training	To continue working- 1-up sign off Employee sign-off as FFW	To continue working- 2-up sign off to work Employee sign off as FFW
Training & Education		Induction training about non-work causes of fatigue and reporting when not FFW Competency based training	TLIF PFMS training without assessment Basic awareness of PSW rules around FFW Competency based training Nationally accredited supervisor training	TLIF-PFMS with assessment PSW rules competence KSS competence Competency based training Nationally accredited supervisor training	Fatigue-proofing training Authority gradient challenge training for employee/Supervisor Competency based training Nationally accredited supervisor training
Risk Mitigation	**L1**	Ensure compliance with rules-of-rostering	Active discussions on non-work factors that might impact on level of sleep opportunity	Active discussion of secondary employment Active discussions of commute times	Seek expert opinion(s) as to whether rosters are scientifically defensible
	L2	Exceptional PSW reporting	Peer support Active interrogation of additional hours Supervisor trained in use of fatigue calculator	Supervisory support Active interrogation at start and during shift Employee trained in use of L2 policy	Detailed and documented discussion of all individual FFW before continuing to work
	L3	Exceptional KSS reporting	Peer decision support Active interrogation before additional hours	Supervisor decision support Active interrogation at start and during shifts	2-up decision support Frequent monitoring during work period
Monitor/ Review		Documented- L1 formal Annually, actual hours of work formally checked quarterly L2 informal L3 informal	Review to be performed by a competent person (internal) Documented L1 formal quarterly L2 formal L3 informal	Review to be performed by a competent person (external independent review) Documented L1 quarterly L2 formal L3 formal	Review to be performed by a competent person (external independent review) Documented- Pre-incident modelling Post-incident review Corrective action review

Note that all controls from lower levels of risk would generally be included when a Moderate, High, or Extreme level of risk is identified.