



FATIGUE MANAGEMENT

In the transportation industry, crews often work long and irregular schedules—sometimes in challenging conditions or crossing multiple time zones—that are not always conducive to proper restorative sleep. Fatigue poses a risk to the safety of air, marine, and freight train operations because of its potential to degrade several aspects of human performance.

The situation

Fatigue is pervasive in modern societies that rely heavily on 24/7 industries like transportation. A Statistics Canada study released in 2017¹ revealed that about a third of Canadian adults slept less than the recommended 7 to 9 hours per night.² Short sleep duration and poor sleep quality were also reported as relatively common.

Fatigue can impact human performance in ways that can lead to accidents. This is why the Transportation Safety Board of Canada (TSB) routinely investigates if fatigue was present in an occurrence, if it played a role, and if the operator had practices in place to manage the associated risks effectively.³

From the early 1990s until mid-2022, the TSB has made findings or issued safety messages about sleep-related fatigue in 99 occurrences: 38 in the air transportation sector, 29 in marine, and 32 in rail. A safety issue investigation published in 2012 highlighted the risks that fatigue poses in the fishing industry.⁴

The issue of fatigue management in freight train operations has been on the Watchlist since 2016 and was expanded in 2018 to include air and marine operations. There have been 6 additional reports with fatigue-related findings or safety messages published since the 2020 Watchlist.⁵

To date, actions proposed or initiated by Transport Canada (TC) and the industry to address the risk of fatigue have not yet been fully implemented.

¹ J-P. Chaput, S. L. Wong, and I. Michaud, "Duration and quality of sleep among Canadians aged 18 to 79," at <https://www150.statcan.gc.ca/n1/pub/82-003-x/2017009/article/54857-eng.htm> (last accessed on 25 August 2022)

² M. Hirshkowitz, K. Whiton, S. M. Albert et al. "National Sleep Foundation's updated sleep duration recommendations: Final report," *Sleep Health*, Issue 1 (2015): pp. 233–243.

³ Transportation Safety Board of Canada (TSB), Backgrounder: [Fatigue in the transportation industry](#).

⁴ TSB Marine Investigation Report [M09Z0001](#), *Safety Issues Investigation into Fishing Vessel Safety in Canada* (2012).

⁵ TSB transportation safety investigation reports [R20D0088](#), [R19W0002](#), [A19P0112](#), [A19Q0091](#), [A18A0085](#), and [R18E0007](#).





The risks to people, property, and the environment

Despite the existence of work/rest provisions, work scheduling continues to be a challenge for employers and employees in all three transportation sectors. If regulations and procedures do not take into account all factors that can contribute to fatigue, there is a risk that employers will not mitigate those factors, leaving employees vulnerable to fatigue.

For example, if transportation operators are not required to implement fatigue management plans, there is a risk that crews will work while fatigued, increasing the likelihood of operational errors. And if crews are not trained in fatigue awareness, there is a risk that they will be unable to prevent, or identify and mitigate, the risks or symptoms associated with fatigue. However, for effective fatigue management, employees must understand the risks of fatigue and feel safe to report their fatigue without fear of adverse consequences.

Ultimately, if employees do not take responsibility for getting adequate rest, or are not provided with opportunities to remove themselves from work when fatigued, there is an increased risk of accidents and adverse consequences for people, property, and the environment.

The call for change

Issues on the Watchlist are complex and difficult to solve, requiring action from many stakeholders, including operators and the regulator. Although some initial steps may have been taken, more needs to be done. Some of the initial steps taken are listed here.

Effective fatigue management and the reduction of associated risks require profound changes in attitudes and behaviours, both at the management and operational levels. This can only be accomplished through generalized and sustained awareness training, and implementation of fatigue management plans that encourage both employers and employees to take responsibility to ensure that no one becomes a casualty of fatigue.

To foster this paradigm shift, the issue of fatigue management in transportation will remain on the Watchlist until several actions are taken within Canada's air, marine, and rail transportation sectors.

Multimodal action taken by Transport Canada

TC, also aware that fatigue is an issue requiring attention, held an international multi-modal forum in June 2018, focusing on measures that can reinforce transportation safety through better recognition and management of fatigue.⁶

In order to guide policy decisions across all modes of transportation, and to ensure a consistent application of fatigue science and fatigue management principles across the sector, TC established the Centre for Fatigue Expertise (CFE) in 2020. A number of initiatives have been assessed through the

⁶ The program from the 2018 Fatigue in Transportation Forum can be found at <https://aqtr.com/association/evenements/forum-fatigue-transportsfatigue-transportation-forum> (last accessed on 26 August 2022).



CFE, including evaluating the need for a general framework for developing and implementing a fatigue risk management system (FRMS).

Air transportation sector: implement flight and duty-time regulations

Flight operations take place around the clock, and sometimes over long distances, which involves crossing multiple time zones. Fatigue-related impairment has a detrimental effect on air transportation safety.

Action taken

In December 2018, TC published new prescriptive requirements for managing flight crew fatigue in the *Canada Gazette*, Part II. The regulations have a staggered implementation period. Air operators subject to *Canadian Aviation Regulations* (CARs) Subpart 705 had until December 2020, two years after the publication of the amendments, to comply with the new requirements.

Air operators subject to CARs subparts 703 and 704 have four years—until December 2022—to comply with the new requirements. Air operators subject to CARs Subpart 702 are not subject to the new flight crew fatigue management regulations (the older requirements still apply).

As an alternative to compliance with the prescriptive requirements, the new regulations include an option for operators (including those subject to CARs Subpart 702) to implement an FRMS to identify and minimize the sources of fatigue and manage fatigue risk in an operation.⁷

Action required

The issue of fatigue management in air transportation will remain on the Watchlist until Canadian air operators that operate under CARs subparts 703 and 704 implement the new regulations on flight crew fatigue management.

The TSB will assess the effectiveness of these new regulations on air transportation operations in Canada through its investigations.

Marine transportation sector: no fatigue awareness training or fatigue management plans

In the marine transportation industry, fatigue is linked to the intensive nature of the business: long and irregular hours of work over extended periods, brief or interrupted sleep, rotating shifts, high workload and social isolation. Fatigue management in this sector currently relies on hours of work/rest regulations, and the master's responsibility to consider the risks of fatigue when establishing work schedules.

⁷ Government of Canada, *Canada Gazette*, Part II, Volume 152, Number 25 (12 December 2018), Regulations Amending the *Canadian Aviation Regulations* (Parts I, VI and VII – Flight Crew Member Hours of Work and Rest Periods).



Enforcement of hours of work/rest regulations on domestic vessels has been problematic. The approach to fatigue management varies substantially from one owner and type of vessel to the next. A strong work ethic, labour shortages, and economic imperatives in the marine industry may encourage individuals to work while fatigued because of a real or perceived obligation to do so. As well, the TSB's safety issues investigation into fishing safety in Canada ([M09Z0001](#)) showed that fish harvesters accept fatigue as a normal part of doing business and generally do not recognize the signs of fatigue or understand its effects.⁸

The work/rest provisions in the *Marine Personnel Regulations* do not apply to approximately 95% of fishing vessels, and there is no requirement at all in the regulations for comprehensive fatigue awareness training or fatigue management plans. Given the long hours and high levels of physical and mental exertion involved in commercial fishing, fish harvesters need greater awareness of the risks associated with fatigue and effective strategies to mitigate its risks. Without a change in the safety culture of the fishing industry, fatigue management plans are likely to be ignored.

Action taken

In 2018, the TSB issued two recommendations⁹ regarding the need for fatigue education and awareness training for watchkeepers, and fatigue management plans for vessel owners.

Although TC launched a fatigue training awareness campaign in 2020, its progress was interrupted by the COVID-19 pandemic. From January to March of 2020, TC officials provided half-day fatigue awareness sessions to authorized representatives, seafarers, and labour organizations in 10 different cities across Canada. TC anticipates continuing these sessions following the resumption of normal operations after the COVID-19 pandemic and is exploring options to have fatigue training and awareness sessions online.

TC is also currently working to ensure that the course curriculums for all seafarer certification programs (including Certificates of Competency) include mandatory training on fatigue. This new requirement will come into effect with the publication of the proposed amendments to the *Marine Personnel Regulations* (expected to advance to the *Canada Gazette*, Part I in mid-2023). These requirements will apply to Canadian vessels of particular sizes, but there are no plans to address fatigue management for small commercial vessel and fish harvesting operations.

In BC, WorkSafeBC has provided fatigue awareness guidance for employers and employees on its website since 2020.¹⁰

In Newfoundland and Labrador, the Fish Harvesters Safety Association has posted a sample fatigue management procedure that helps fish harvesters create a procedure tailored to their operations.¹¹

⁸ TSB Marine Investigation Report M09Z0001, *Safety Issues Investigation into Fishing Safety in Canada*.

⁹ TSB recommendations [M18-01](#) and [M18-02](#).

¹⁰ WorkSafeBC, "Fatigue impairment," at <https://www.worksafefbc.com/en/health-safety/hazards-exposures/fatigue-impairment> (last accessed on 26 August 2022).

¹¹ Newfoundland and Labrador Fish Harvesting Safety Association, "Written Safety Procedures," at <https://www.nlfhsa.com/safety-resources> (last accessed on 26 August 2022).



Action required

The issue of fatigue management in marine transportation will remain on the Watchlist until

- TC requires that watchkeepers whose work and rest periods are regulated by the *Marine Personnel Regulations* receive practical fatigue education and awareness training to help identify and prevent the risks of fatigue;
- vessel owners are required to implement fatigue management plans, including education on the detrimental effects of fatigue and support to mariners in reporting, managing and mitigating fatigue; and
- TC reviews the domestic hours of work and rest provisions in the *Marine Personnel Regulations* in light of the most recent knowledge from fatigue science and, at a minimum, ensures consistency with the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers.

Rail transportation sector: progressing a comprehensive science-based approach to fatigue management

Since the 1986 Foisy Inquiry,¹² there have been a number of government and industry initiatives to address fatigue in the rail sector, through rules and regulations, fatigue management plans and guidelines, and even scheduling algorithms, among others. Yet the risks are still not adequately mitigated. Effective fatigue management has proved challenging, notably because of provisions that are subject to collective bargaining, unpredictable start times in freight operations, long duty hours, and rotating day and night shifts.

Although TC approved revised work/rest rules in 2020, fatigue-management practices for operating crews do not always reflect the latest fatigue science on daily and cumulative work and rest periods.

Action taken

From 2011 to mid-2022, the TSB has directed 16 rail safety advisories and information letters to TC resulting from employee concerns about fatigue.

The *Duty and Rest Period Rules for Railway Operating Employees* were approved and published by the Minister on 25 November 2020, reflecting the latest fatigue science and fatigue management practices. The rules set out the requirements regarding the establishment of, and compliance with, rules governing duty and rest periods for employees in positions designated as critical to safe railway operations. In particular, the new rules establish shorter limits on duty periods, longer minimum rest periods, and new limits on the number of hours that can be worked in a week and per month. The new rules are being phased in from November 2021 to November 2024.

¹² The Honourable Mr. Justice René P. Foisy, *Commission of Inquiry into the Hinton Train Collision* (December 1986), at <http://publications.gc.ca/site/eng/9.818270/publication.html> (last accessed on 25 August 2022).



In May 2022, TC indicated to the TSB its intent to publish the *Fatigue Management System Regulations*¹³ for the Canadian rail industry within the next year.

Action required

The issue of fatigue management in freight rail transportation will remain on the Watchlist until

- TC and the railways fully implement the *Duty and Rest Period Rules for Railway Operating Employees*;
- TC publishes the *Rail Fatigue Management System Regulations*; and
- railway operators demonstrate that they have implemented effective fatigue management plans.

¹³ Transport Canada, Consultation document: Fatigue management system (FMS) requirements (March 2022), at <https://tc.canada.ca/en/corporate-services/consultations/consultation-document-fatigue-management-system-fms-requirements> (last accessed on 22 September 2022).