Pilot Fatigue: how can a fatigue risk management approach help with balancing risks, rosters and resources?

European Maritime Pilots' Association 58th General Meeting

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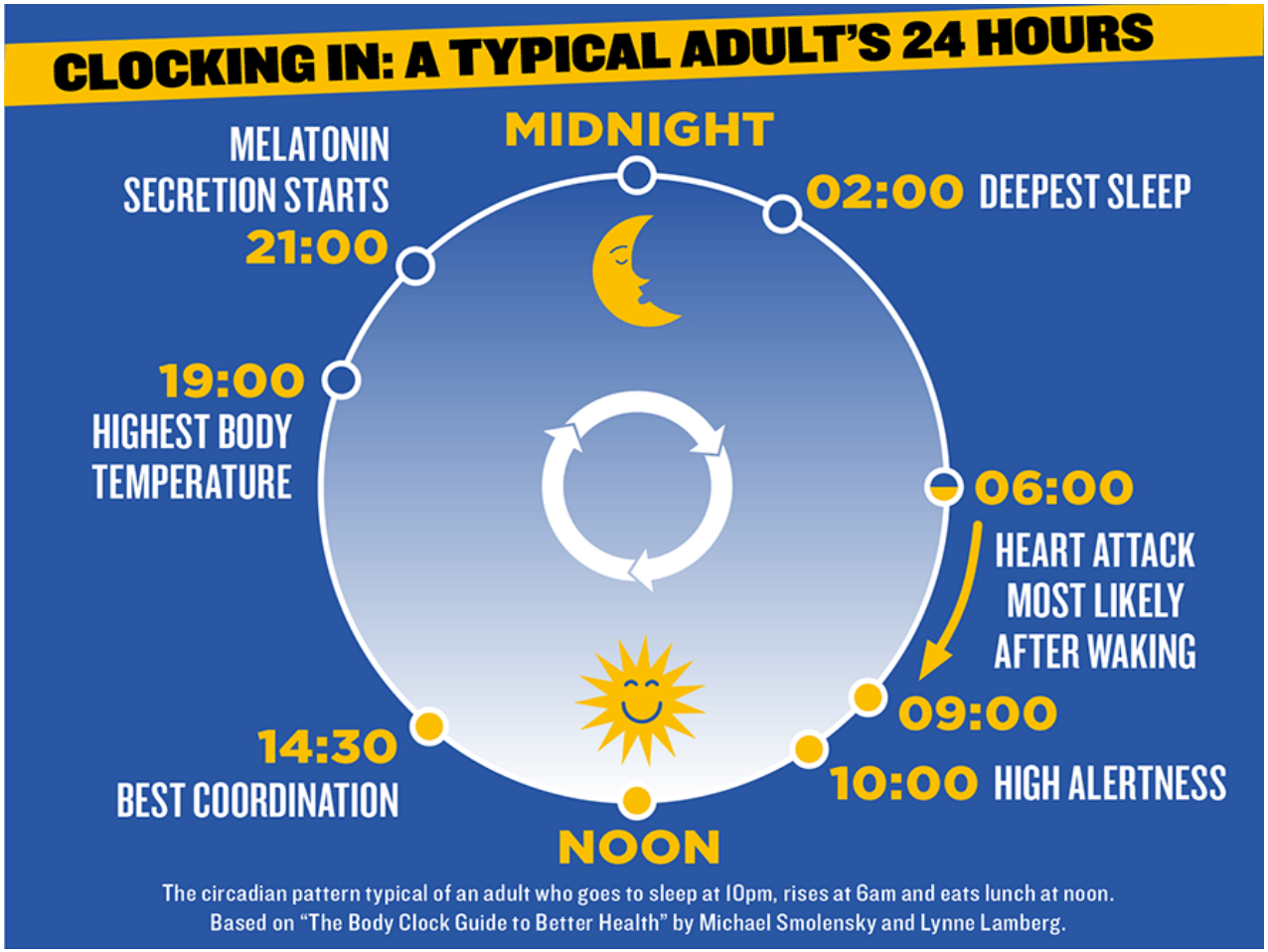
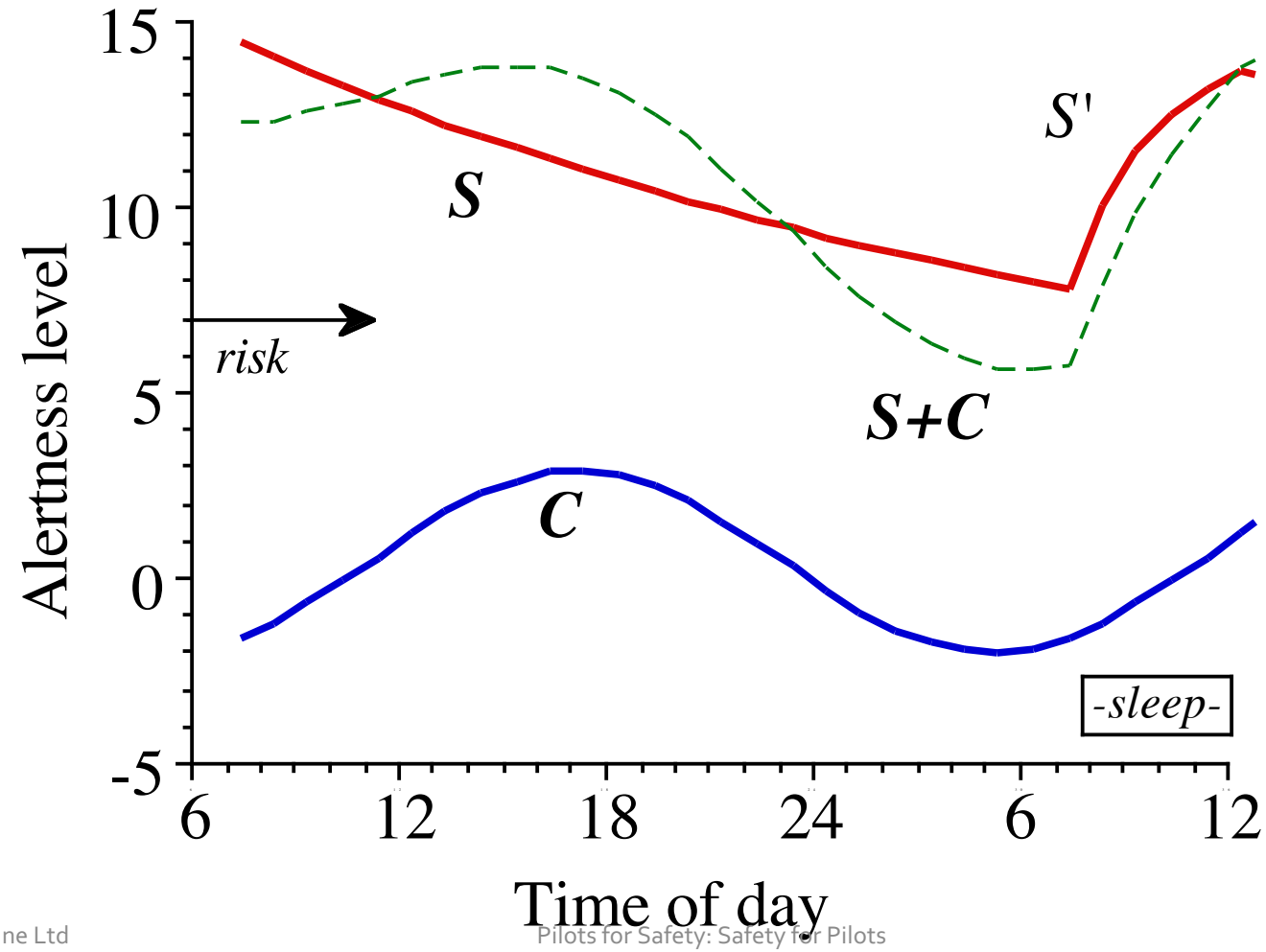
Problem 1: We were not designed for 24 / 7 working



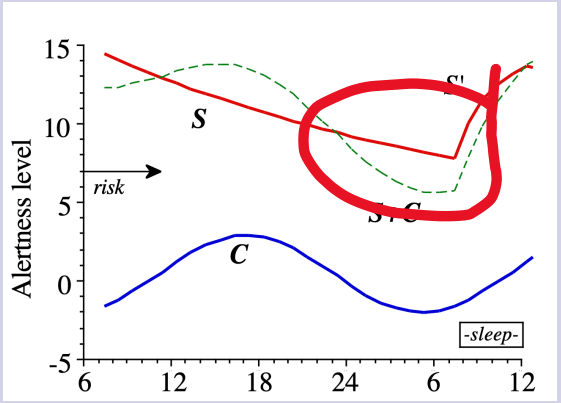
The body's sleep clock



Collision of Tanker and Container, Houston; NTSB 2011

About 0430 on the morning of the accident, the conning pilot received the telephone call to report to the *Elka Apollon*, scheduled to depart at 0630. He left home about 0530, arrived at the ship about 0600, and met the other pilot and the ship's captain on board. In an interview with investigators several days after the accident, the conning pilot said he could not recall when he had slept and when he had been awake during the preceding days. When off duty, he said his routine was to sleep at night between 2230 and 0430, but his on-duty schedule varied:

When I'm working ... I'm up and down all different hours, night and day, so I

Date	Start work	End work	Circadian Zone
Sat 29 Oct	0430	Time of accident (0905)	
Fri 28 Oct	0300	0730	
Thu 27 Oct	1800	2330	
Wed 26 Oct	2100	2330	
Tue-Wed 25-26 Oct	2300	0500	

Are people running on empty?

Average sleep disruption scores for pilots (1=Best; 14 = Worst) [De Vries-Griever, Dutch Maritime Pilots; 1980]				
Age group	**Off-duty**	**On duty (home)**	**On duty (pilot boat)**	**Overall**
29-34	1.0	4.1	9.9	5.0
35-41	1.9	5.9	10.6	6.1
42-48	2.4	6.5	10.8	6.6
49-55	3.4	6.7	10.8	6.9
Pilots' spouses	3.1	5.5		4.3

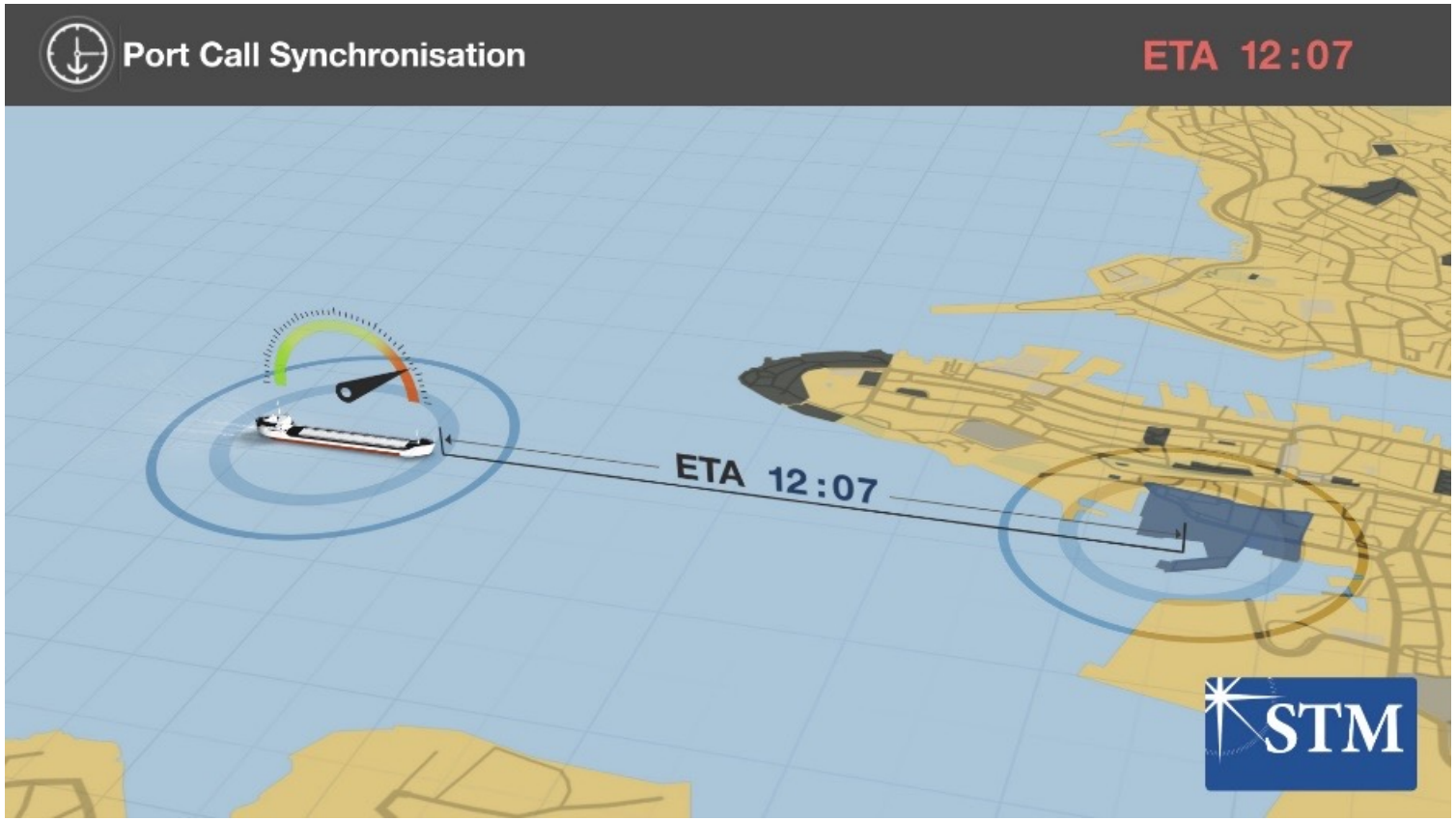
Other Populations' Sleep Quality		
Psychiatric patients	with depression	6.3
Shoreside shift workers	Day shift	1.6
	Night shift	5.9
Bus drivers		3.9

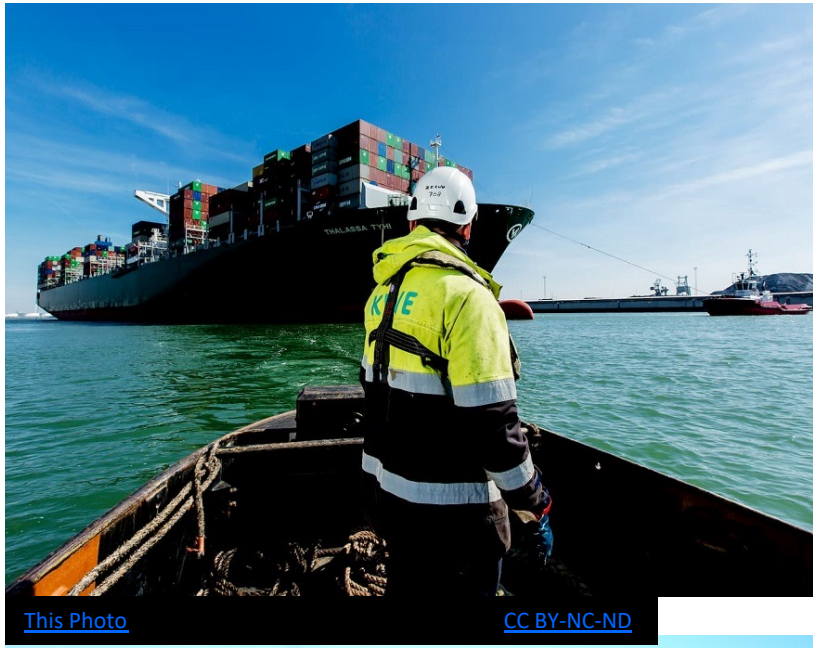
Fatigue-induced Performance Problems

Cognitive problem	Pilotage examples
Decreased vigilance	• Lack of position monitoring • Incorrect reading of navigation equipment
Slowed reaction time	• Failure to respond quick enough to avoid adverse effects
Impaired decision-making	• Inaccurate navigational actions / calculations
Memory problems	• Forgetting to communicate info to crew • Forgetting to check ship's position at critical times
Narrowed attention	• Failure to recognise risk of situation • Perseverance with inappropriate responses
Microsleep	• Delayed response to stimuli
Time on task decrement	• Increased errors in judgement as work period continues
Adoption of simpler but riskier strategies	• Over-reliance on radar and other automated equipment

Source: https://www.amsa.gov.au/sites/default/files/the-work-practices-of-marine-pilots.pdf

Problem 2: The business context is changing…





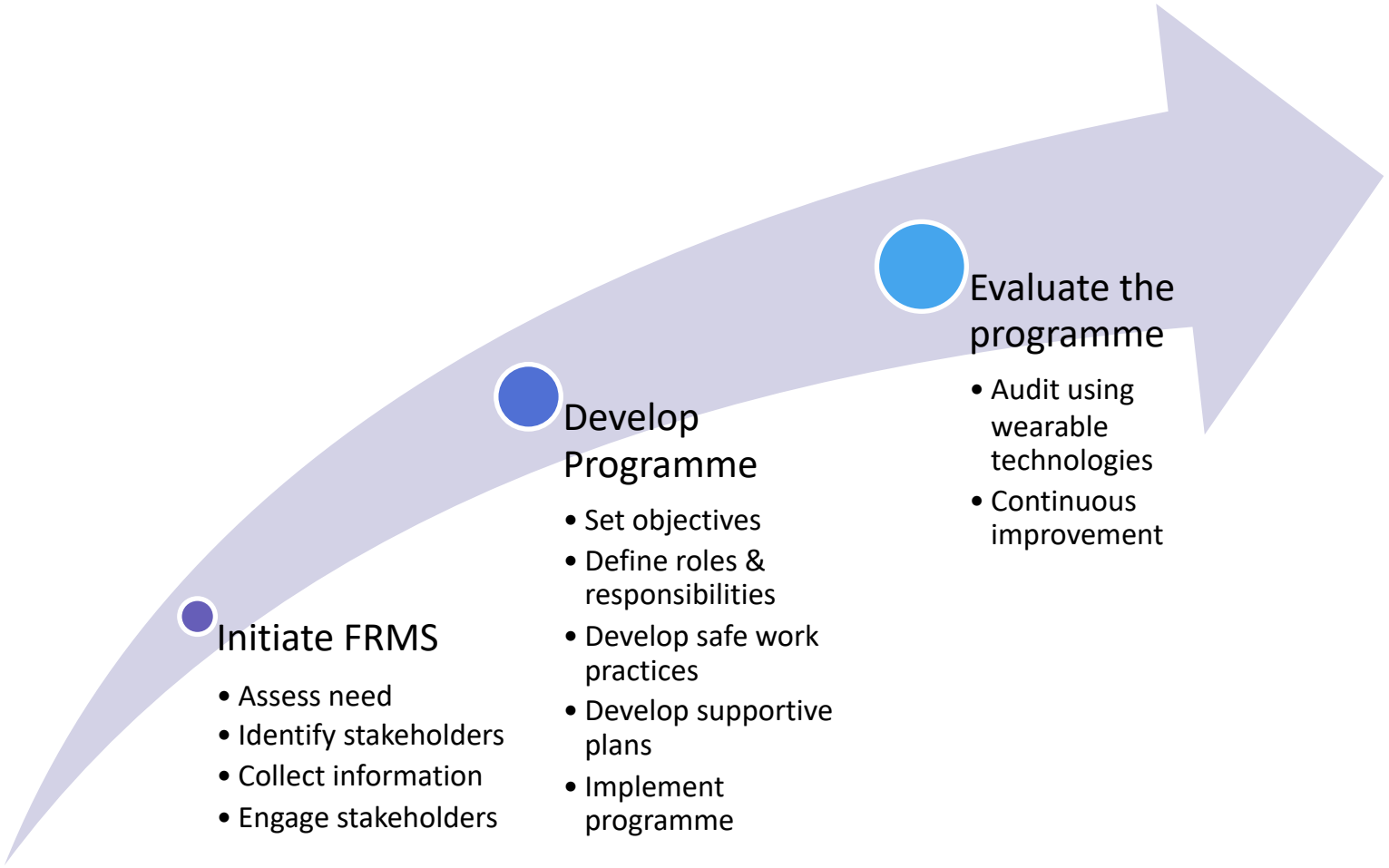
Pilots are becoming rarer, and ships are getting larger …

Two Ways to Regulate the Fatigue Risk:

- "Hours of rest" – STCW and MLC
- Prescriptive
- Socio-economic contract
- Compliance culture: minimum standards
- Reactive
- Control
- Inspection and audit

- FRMS within the ISM framework
- Goal-based approach
- Scientific evidence
- "Best practice": aspiring to excellence
- Pro-active
- Empowerment
- Flexibility through self-regulation

Fatigue Risk Management



A Supportive Culture

- Promote and communicate importance of FRM
- Recognise individuals who apply FRM strategies
- Include FRM planning as a measure of job performance and job evaluation
- Manage people who are deemed unfit for work because of fatigue with fairness
- Do not penalise workers who refuse to work due to work-related fatigue

Responsibilities

Employers' responsibilities:

- Safe work practices
- Adequate resources to sustain a Fatigue Risk Management programme
- Work shift design that allows for adequate recovery periods
- Adequate assessment, control and monitoring of fatigue related hazards and risks
- Policies and procedures that support fatigue risk management, e.g., overtime, napping, commuting, etc.
- Building competency and disseminating information regarding fatigue risk management
- Stop work when the activities are unsafe due to fatigue

Employees' responsibilities:

- Arriving at work fit for duty by obtaining adequate sleep
- Managing lifestyle to minimize fatigue
- Reporting all fatigue-related near misses and incidents
- Maintaining an awareness of fatigue supporting and participating in risk mitigation strategies
- Stopping work when the activities are unsafe due to fatigue

Best rostering practices

- No more than 7 days rostered in a row (ideally 5)
- No more than 4 consecutive night shifts
- 3 sleeps after nights (if less than 3-night shifts, 2 sleeps off)
- Call rosters should be considered as if duty rosters.
- Two consecutive days off a week
- Forward rotating shift patterns
- Fewer shift changes as possible
- One work period per 24 hours – no split shifts

Source: https://apex.org.nz/wp-content/uploads/2019/07/Guidelines-to-Best-Rostering-Practices1.pdf

Fatigue Management for Pilots

Before duty

- 9 hours rest between 2200 and 0600

On duty

- Period not to exceed 12 hours in 24
- When extended due to delays, not to exceed 16 hours
- Min of 4 hours recorded irrespective of hours worked

Roster duration

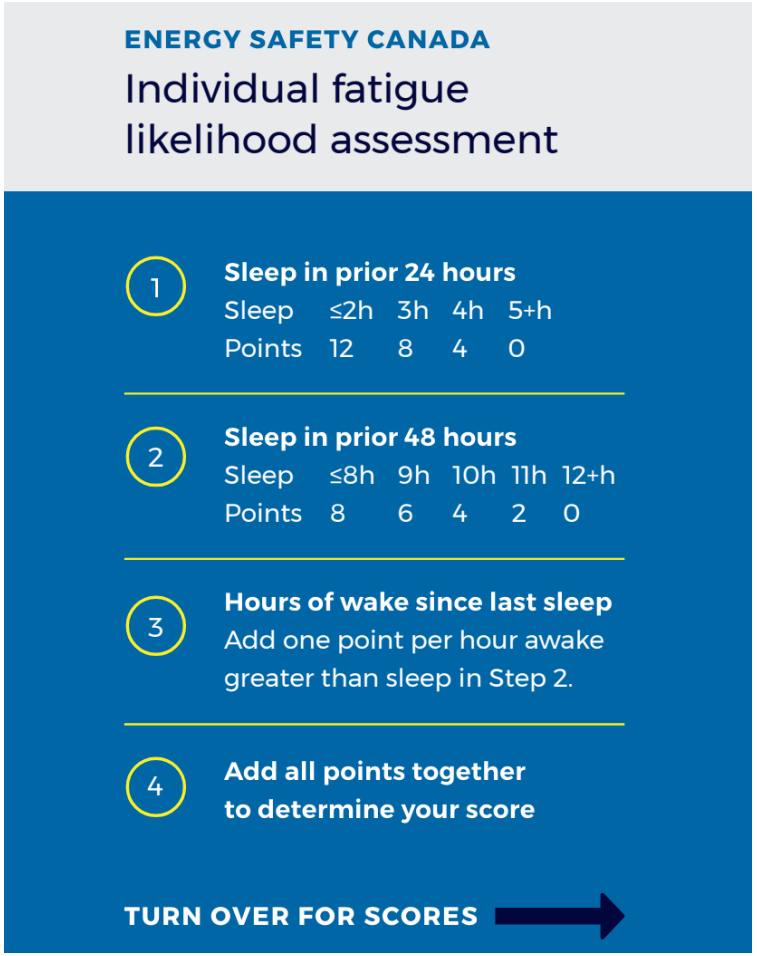
- No more than 7 consecutive days
- Not to exceed 120 hours in any 3-week period
- Rest period of not less than 2 days for each 7 days worked
- Duty roster no longer than 15 days

Annual

- No more than 200 days per annum

Source: https___aphref.aph.gov.au_house_committee_cita_manfatigue_submissions_mfsub21.pdf

Fatigue Self-Assessment



Barriers and Benefits

Barriers

- Workforce issues
- Financial issues
- Skills sets and specialisation
- Reluctance to change
- Ability of the roster maker
- Individual preferences

Benefits

- Increased health and safety of employees
- First line of defence against fatigue
- Easier to attract and retain good employees
- Increased productivity and work quality
- Promotes a healthy work life balance

Don’t be caught napping…manage your fatigue risk

- Fatigue prediction modelling for evaluating risk (eg MARTHA)
- Fatigue awareness training and cultural change programmes
- Fatigue reporting system within a ”just” culture
- Best practice rostering
- Corrective action (by the organization)
- Supervision by a national authority

Thank you for listening

Any questions?

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