You can’t always get what you want
but if you try some time
you just might find
you get what you need

-Mick Jagger/Keith Richards
(WHS specialists)

Fatigue Risk Management

You can't always eliminate fatigue…

but you <u>can</u> figure out how to work safely… whilst fatigued

The Challenge

- Now Its a safety issue not just an industrial one
- Compliant doesn't mean safe
- Long hours of work are an entrenched work practice
- flexible working times can be unpredictable and hard to manage
- non-work causes of fatigue are difficult to identify and manage
- Prescription can be paradoxical
- One size does NOT fit all!!!!!!

The new regulatory context

- Fatigue identified as a specific workplace hazard
- Organisations required to implement a system to manage the hazard

- Shared responsibility framework
- Risk-based framework (e.g. ISO_31000)
- one element of the Safety Management System (e.g. ISO_45000)

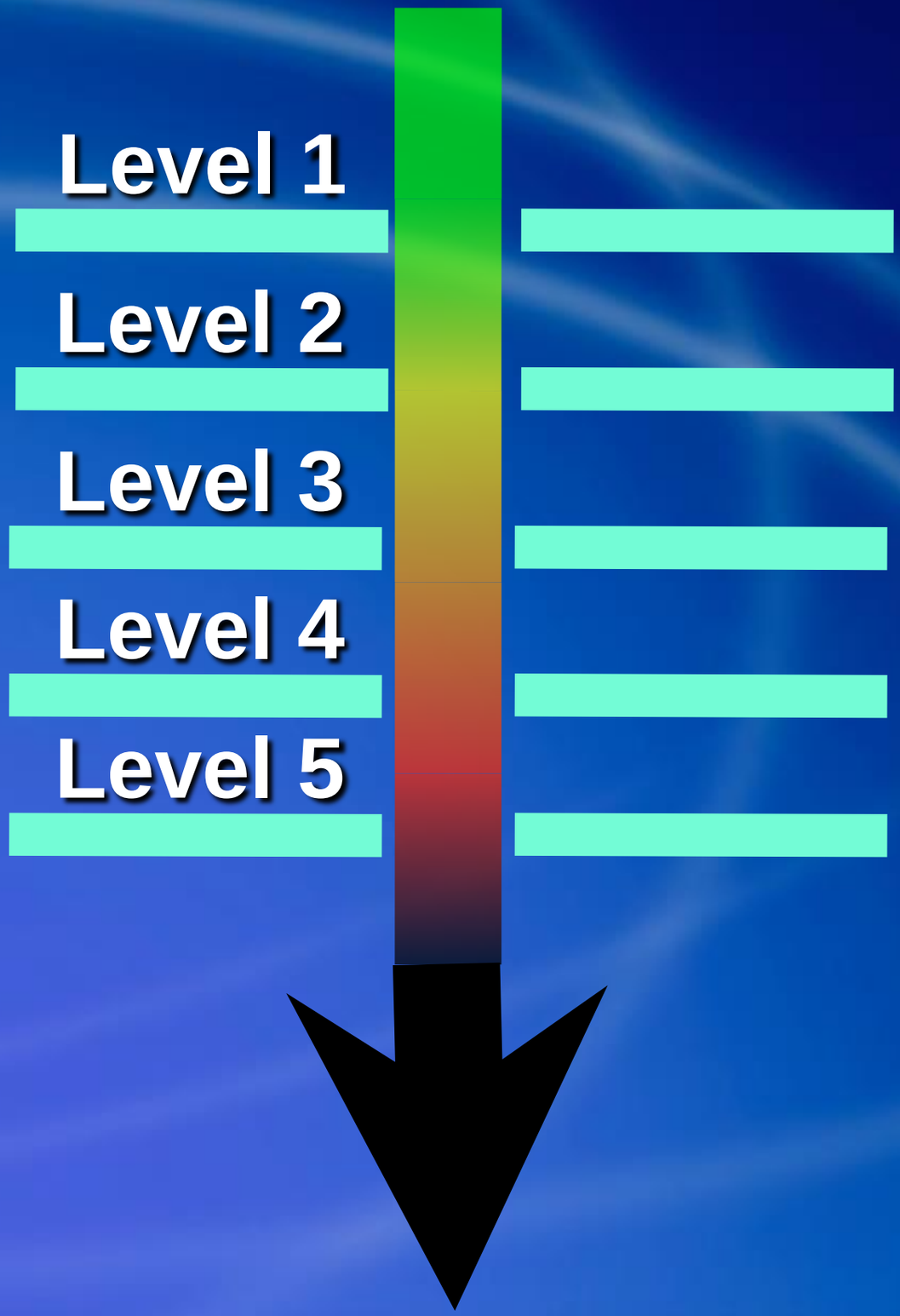
Key elements of an FRMS

- FRMS policy and governance
- Competency-based training and education program based on risk
- Risk assessment and mitigations methodology for ensuring employees are fit-for-duty
- ‘Monitor and review’ process to ensure the FRMS is operating as specified ***and*** effective

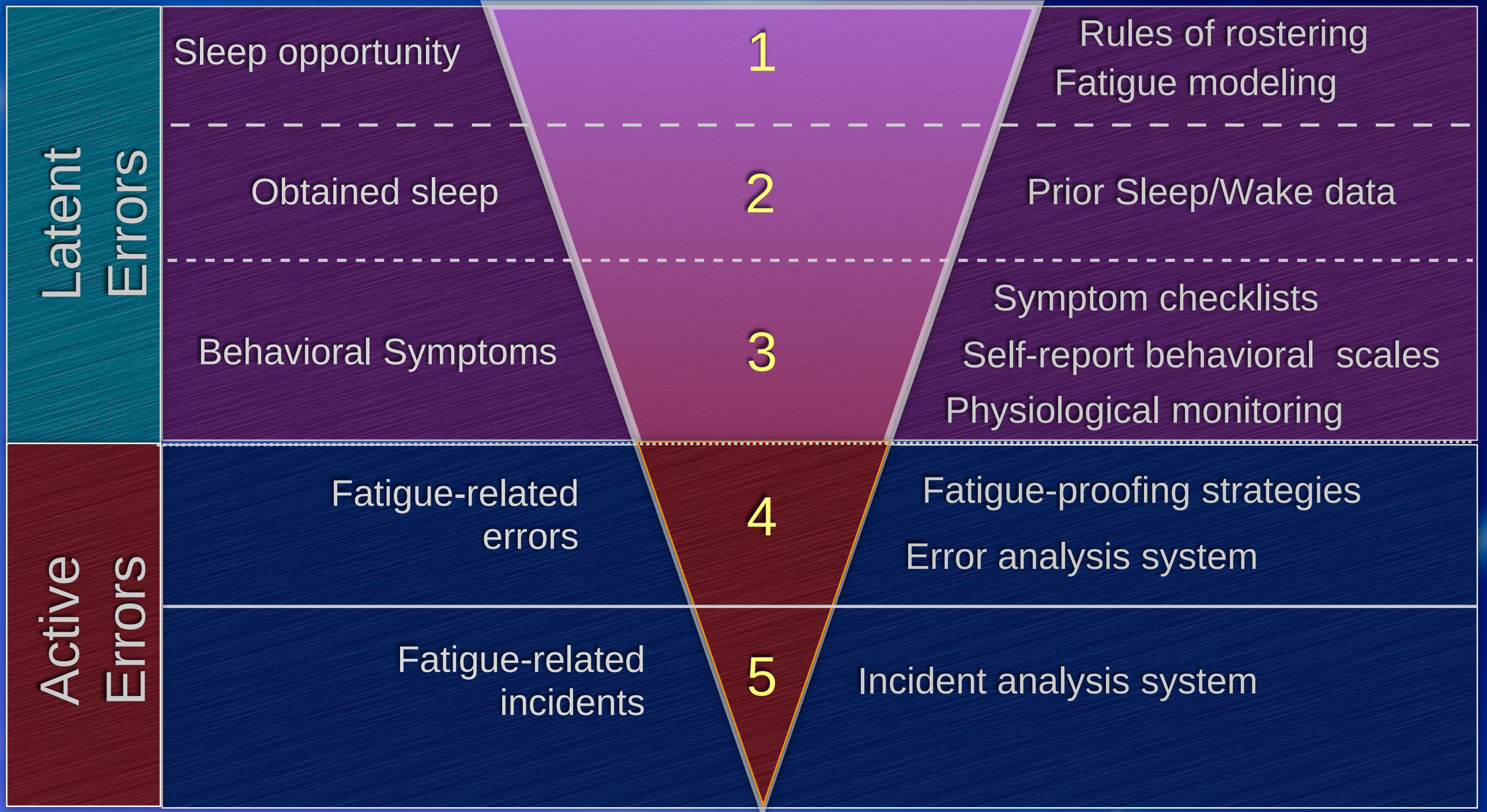
‘Shared responsibility’ model

- **Management is responsible for ensuring working arrangements provide a sleep opportunity sufficient to recommence ‘fit-for-work’.**
- **Employees are responsible for using a sleep opportunity to obtain sufficient sleep in order to be fit-for-work. Employees must notify line manager when this does not occur.**
- **Management is responsible for providing clear guidelines on how to manage an employee who is not ‘fit-for-work’.**

Defenses-in-depth approach



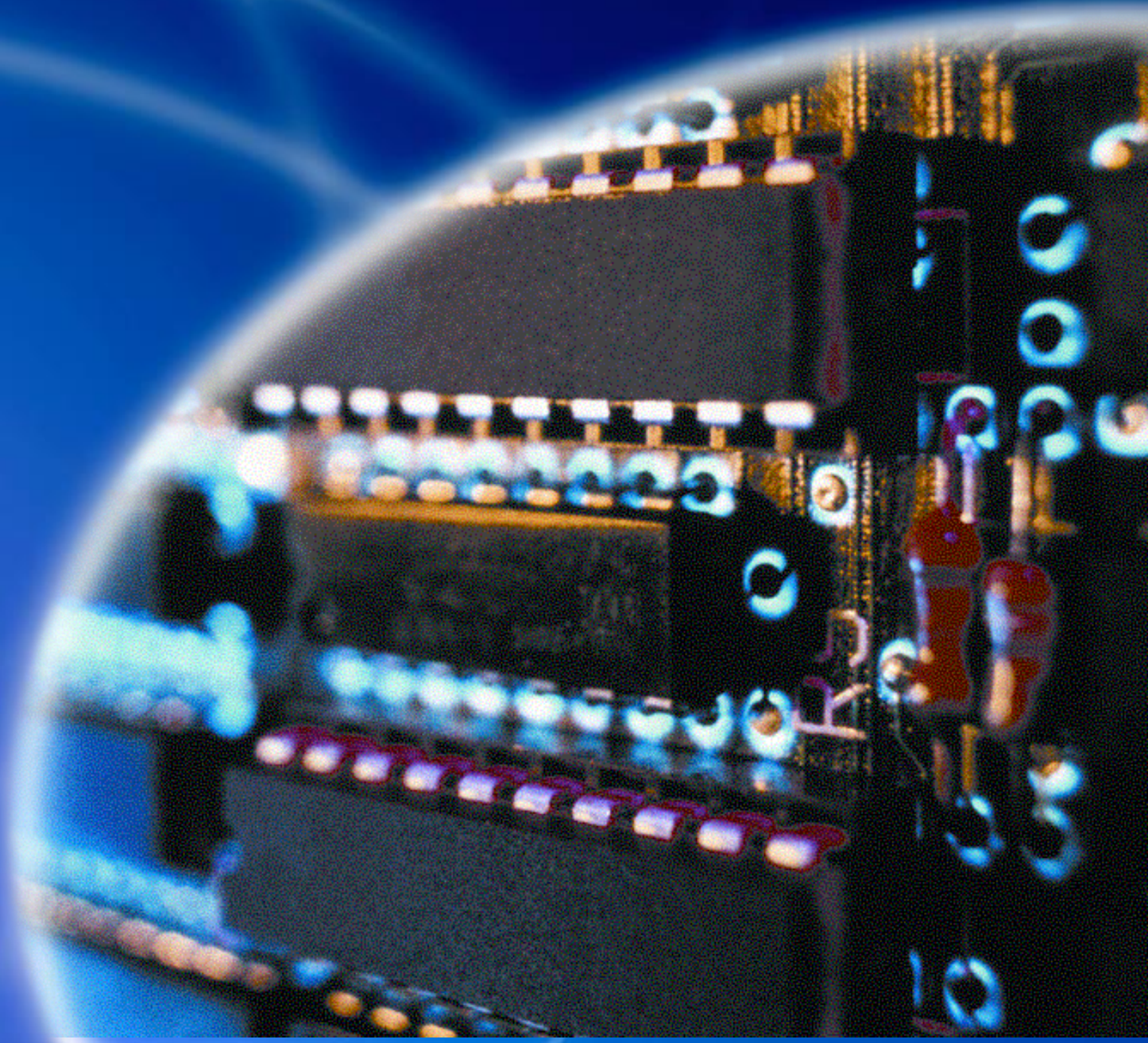
Risk assessment and mitigation



Level 1 Controls

Primary purpose is a risk assessment to ensure sleep opportunities are adequate

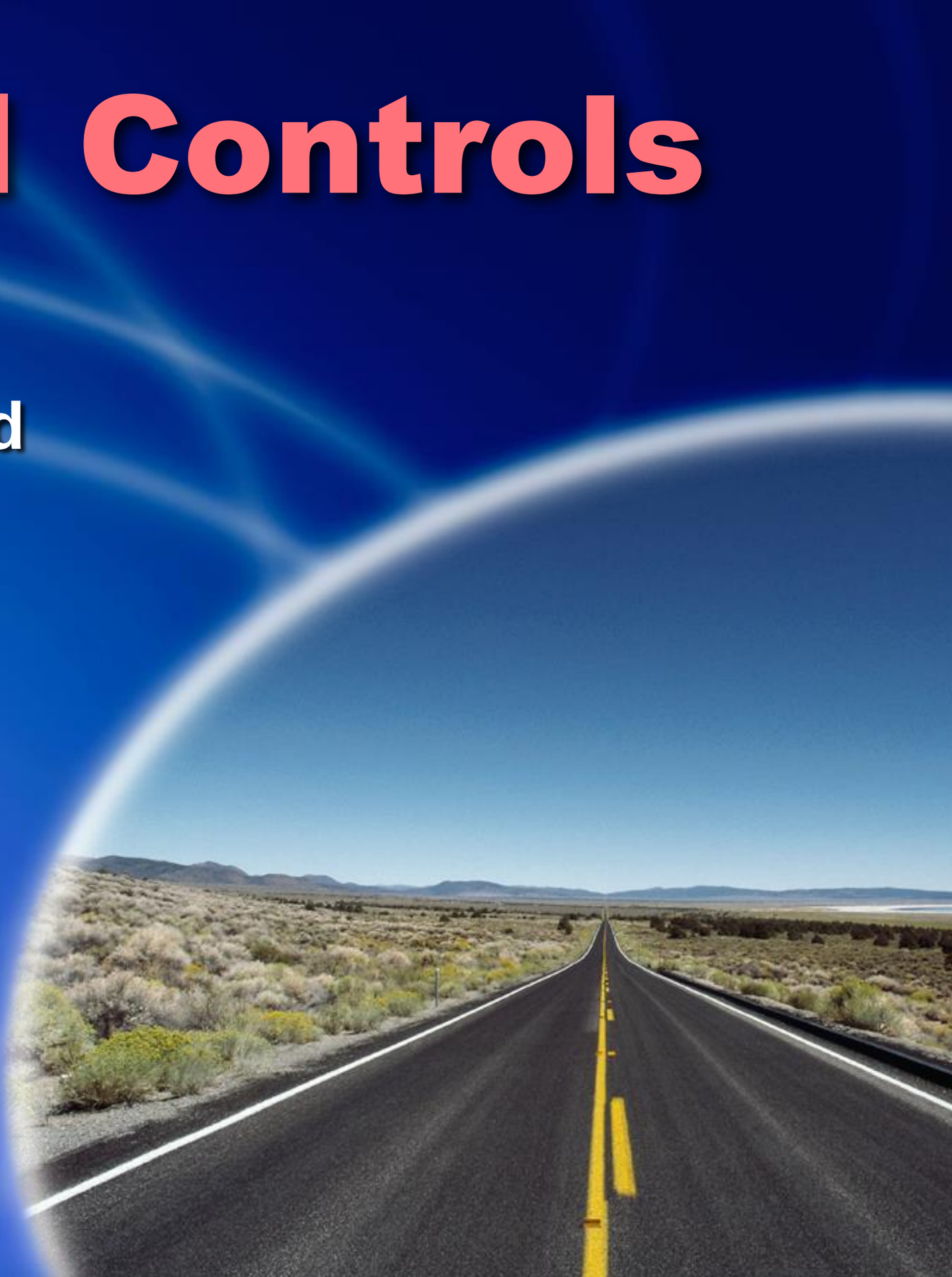
- **rules of rostering**
- **fatigue modelling**



Level 1 Controls

5 key dimensions of the roster can be used to risk assess the sleep opportunities

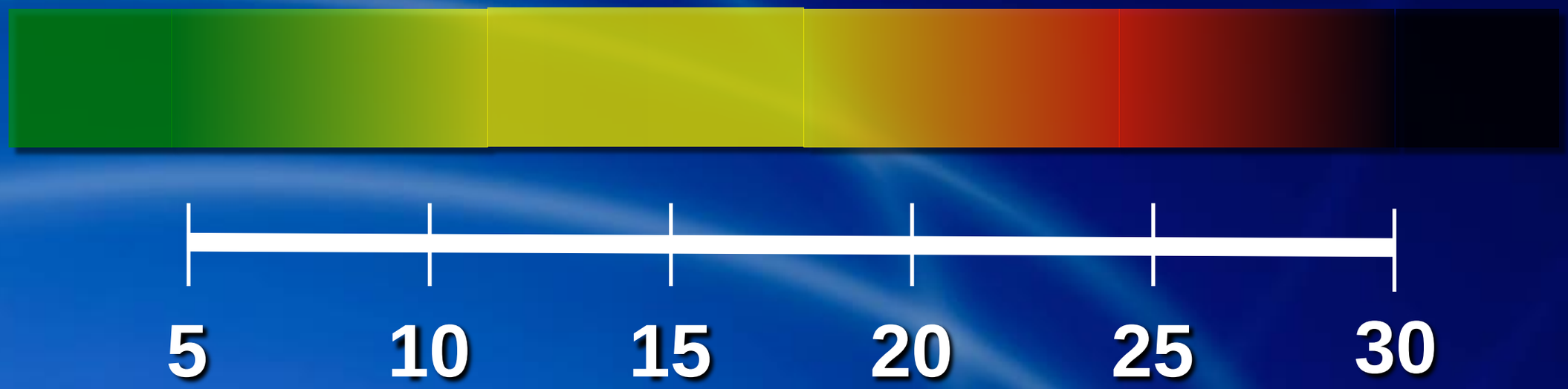
- ✶ weekly hours
- ✶ shift duration
- ✶ break duration
- ✶ night work hours
- ✶ ‘reset’ breaks



Assessing fatigue likelihood

Roster dimension	0	1	2	4	8
Max hours per 7 days	≤ 36h	36-43h	44-47h	48-54h	55+
Shift duration	≤ 8h	8-10h	10-12h	12-14h	≥14h
Short break’ duration	≥16h	16-13h	12-10	10-8h	≤ 8h
Max hours of night work per 7 days	0h	1-8h	8-16h	16-24h	≥24h
days between resets	<6	6	7-10	11-12	12+

Likelihood assessment

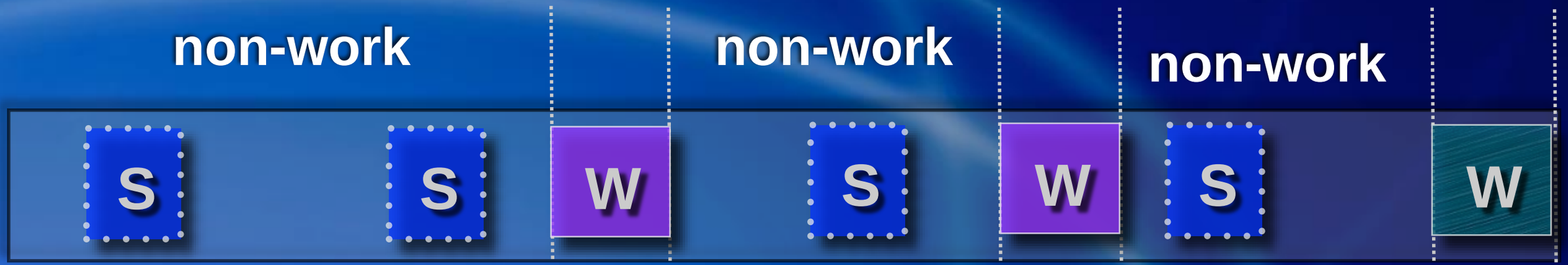


As the sleep opportunity is reduced, the likelihood that an employee will be fatigued goes up as does the extent of the hazard controls required to control the risk

Likelihood (ISO31000)	Level 1 (5 dimensions)	Level 1 FAID	Level 2 (pFLS)	Level 3 (KSS)
1	**0-5**	**<40**	**0**	**1-2**
2	**6-11**	**40-60**	**1-4**	**3-4**
3	**12-20**	**60-79**	**4-8**	**5-6**
4	**21-25**	**80-100**	**9-12**	**7-8**
5	**25+**	**100+**	**12+**	**9**

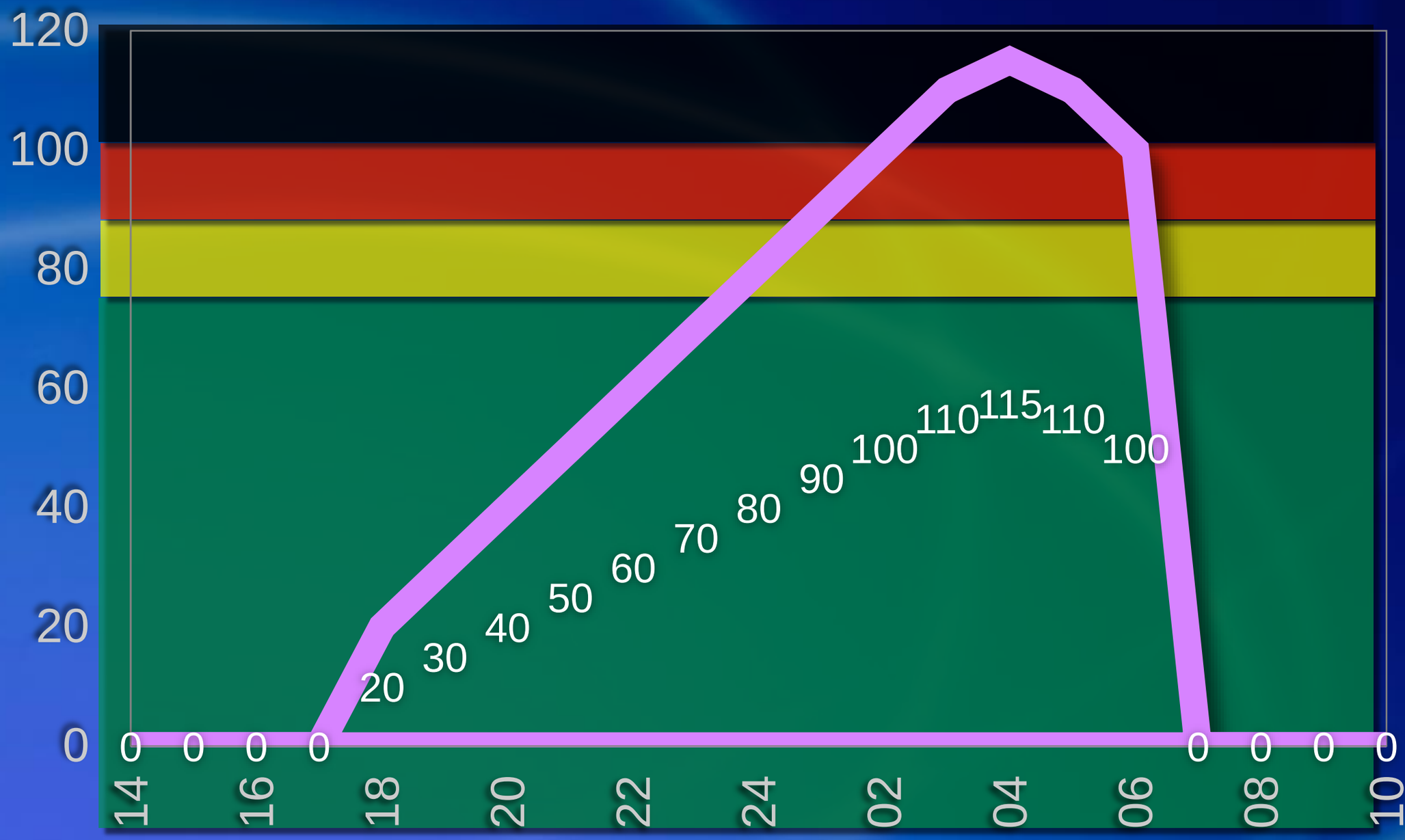
Likelihood Consequence	1	2	3	4	5
1	Low	Low	Mod	Mod	Mod
2	Low	Mod	Mod	Mod	High
3	Mod	Mod	Mod	High	High
4	Mod	Mod	High	High	Extreme
5	Mod	High	High	Extreme	Extreme

Fatigue modeling



Timing and duration of work and non-work periods are used to ‘estimate’ the most likely sleep-wake patterns and then the consequent level of work-related fatigue

Likelihood assessment using FAID



FAID scores across 12h night shift 1800-0600

Risk assessment using FAID model

Risk	Score	Plan	Actual	Action
Low	<80	>97.5%	>95%	None unless otherwise indicated
Moderate	80-90	>99%	>97.5%	Investigate and correct where high chance of reoccurence
High	90-100	100%	>99%	Investigate and correct if moderate chance of recurrence
Extreme	100+	0%	>1%	Notify regulator and provide corrective action within 14 days

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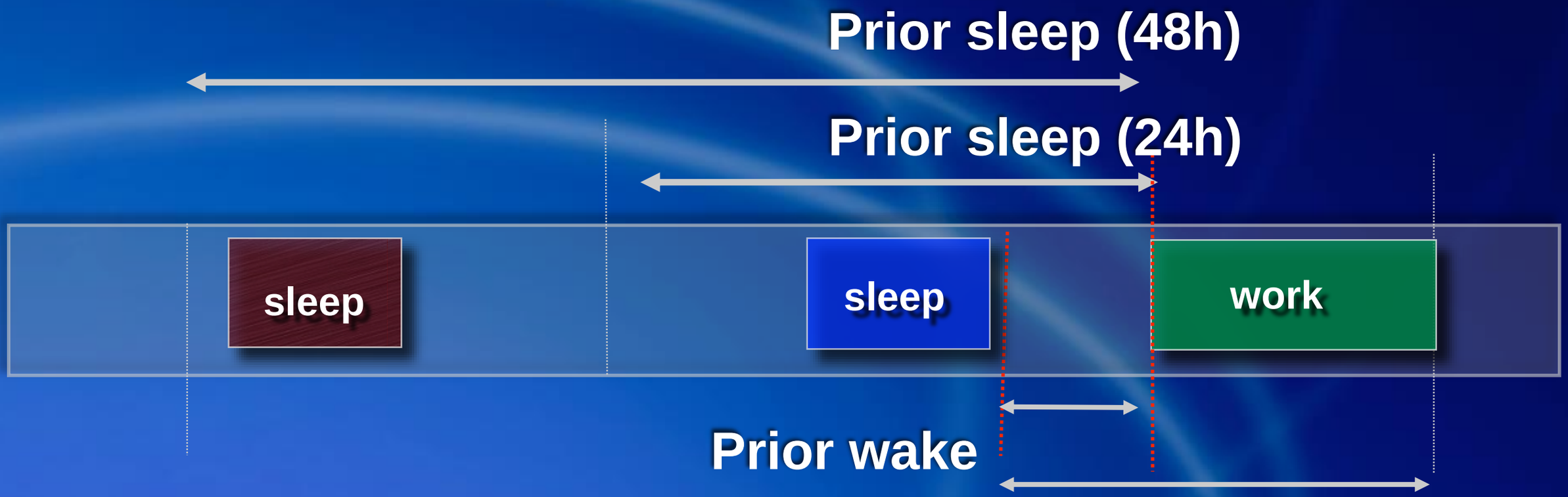
Risk	Action
Low	Do nothing unless indicated otherwise by higher level control
Moderate	Minor increase in likelihood of fatigue. Notify co-workers and supervisors Self management controls usually sufficient. Typical controls, self-monitoring, caffeine, task rotation, self paced work load.
High	Moderate increase in likelihood of fatigue. Notify co-workers and supervisors Team and process management controls usually sufficient. Increased supervision, task re-assignment.
Extreme	Signifiant increase in likelihood of fatigue. Notify co-workers and supervisors Document a SMS incident report. Do not continue in any safety critical task without 1-up approval based on pre-existing risk assessment. Controls unlikely to be sufficient. Typically only used where risk of continuing to work is less than risk associated with stopping. i.e. Exceptional circumstances

Level 2 Controls



X = the amount of sleep in the prior 24h

Y = the amount of sleep in the prior 48h

Z = the amount of wake since last sleep longer than 2h

The less sleep and/or the greater wake the greater the likelihood you will exhibit signs and symptoms of fatigue

Calculate personal fatigue likelihood score

(X score) For every hour of sleep less than 5h in 24 add 4 points

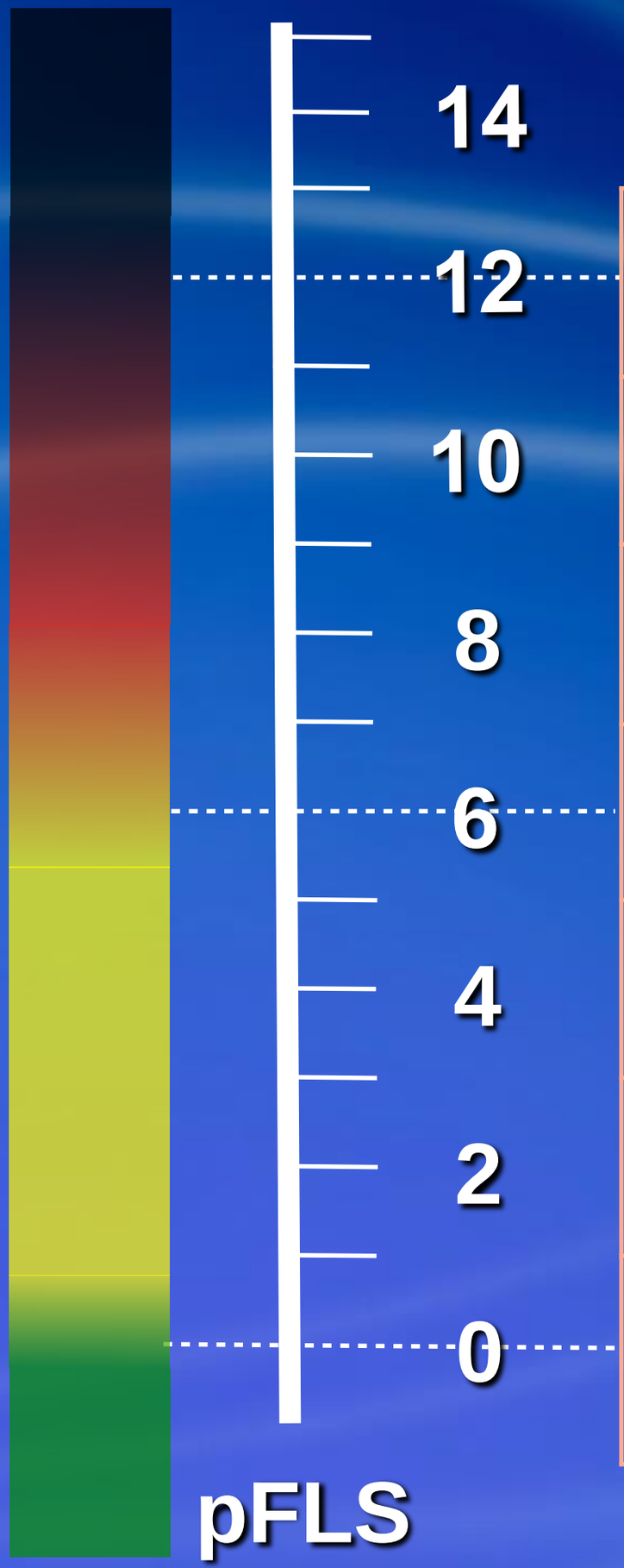
(Y score) For every hour of sleep less than 12h in 48 add 2 points

(Z score) For every hour of wake greater than the hours of sleep in the last 48h add 1 point

Personal fatigue likelihood score = (5-X)*4 + (12-Y)*2 + (Z-Y)

where X<5, y<12

pFLS calibration



12	Struggling to stay focussed on tasks, difficulty concentrating, micro-sleeps likely
10	Clear loss of motivation. Sig. loss of situational awareness. Task performance impaired
8	Clear evidence of behavioural impairment. Difficulty sustaining attention on simple tasks
6	Difficulty concentrating. Occasional lapses of attention. Poor judgement on complex tasks
4	Difficulty in maintaining extended concentration for complex tasks
2	Slowed cognition. Occasional minor fatigue behaviours. Minor mood changes observable
0	Not fully alert but able to perform tasks safely. Few external signs of fatigue

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LEVEL 3:
KAROLINSKA SLEEPINESS SCALE

KSS	Descriptor
1	**Extremely alert**
2	**Very alert**
3	**Alert**
4	**Rather alert**
5	**Neither alert nor sleepy**
6	**Some signs of sleepiness**
7	**Sleepy but no difficulty remaining awake**
8	**Sleepy some effort to keep awake**
9	**Extremely sleepy - fighting sleep**

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What to do with conflicting ‘levels’?

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		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 & Evaluation		Induction training about non-work causes of fatigue and reporting when not FFW	TLIF PFMS training without assessment Basic awareness of PSW rules around FFW	TLIF-PFMS with assessment PSW rules competence KSS competence	Fatigue-proofing training Authority gradient challenge training for employee/Supervisor
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 quarterly L2 informal L3 informal	Documented L1 formal quarterly L2 formal L3 informal	Documented L1 quarterly L2 formal L3 formal	Documented- Pre-incident modelling Post-incident review Corrective action review

Please think of 3 reasons why this will not work in your workplace

Questions?