

Fatigue

Presented by Dan Basacik 16 November 2018

How big an impact does fatigue have on railway operations?





Available on the RSSB website

Fatigue



Fatigue special topic report

Factor type	% of sample
Causal or contributory factor	6%
Performance shaping factor	15%
Percentage of fatigue-related incidents in full sample	21%





"...whilst the driver has worked two more days than he would if following his own roster pattern he is still within the **Hidden guidelines** for maximum number of shifts permitted to be worked without taking a day off duty."

Excerpt from an incident investigation report, within the rail industry in the UK



Fatigue causes

Organisational factors:

- Culture
- Fatigue risk management system
 - Policies and processes
 - Training
 - Risk assessment
 - Risk controls
 - Monitoring and control
- Pressures
- Resourcing

Job and workplace factors:

- · Physical workload
- Mental workload
- Working environment
 - Lighting
 - Air quality
 - Noise
 - Temperature
 - Weather
- Task familiarity
- Commuting
- Workplace ergonomics

Working pattern

- Start time
- Shift length
- Rotation
- Rest period
- Recovery time
- Breaks
- Predictability

Individual factors:

- Age
- Body clock
- Personality
- Physical fitness & health
- Mental health
- Domestic arrangements
- Lifestyle
 - Diet
 - Alcohol and drugs
 - Actual sleep

Impaired vigilance, decision-making, concentration, alertness, reaction times, memory, mood & motivation, poor health

FATIGUE



"The fatigue index shows that the driver should not have been suffering from any fatigue issues."

Excerpt from an incident investigation report, within the rail industry in the UK

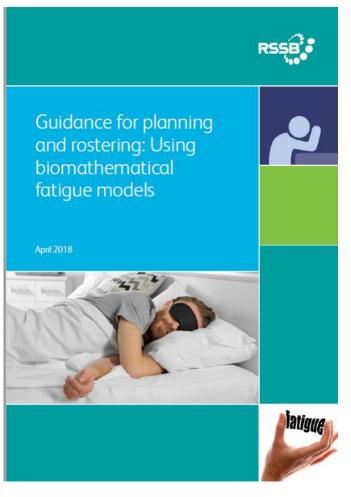


What do the scores mean?

FRI score = 20

If 100 people worked that shift, 20 would probably experience fatigue to the extent that they struggle to stay awake.

So is a score of 20 safe?



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Fatigue



Using biomathematical models

- Understand fatigue and fatigue management
- Use to compare work patterns against one another (relative comparison) rather than for a 'pass/ fail' evaluation of a schedule (absolute evaluation)
- A shift below a threshold is not a green light in terms of safety.
- If using thresholds:
 - Validation
 - Single vs multiple



Modelling the full picture?

Organisational factors:

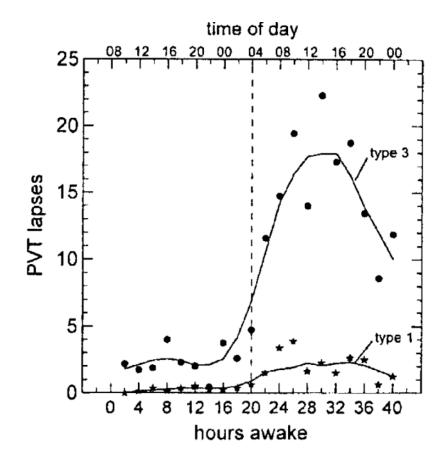
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Job and workplace factors: · Physical workload Mental workload Working environment Working pattern Lighting Start time Individual factors: Air quality Shift length • Age Noise • Rotation Body clock Temperature Rest period Personality Weather • Recovery time Physical fitness & health Task familiarity Breaks Mental health Commuting Predictability Domestic arrangements Workplace ergonomics Lifestyle • Diet Alcohol and drugs Actual sleep FATIGUE

Impaired vigilance, decision-making, concentration, alertness, reaction times, memory, mood & motivation, poor health



Individual differences



Van Dongen HP, Maislin G, Dinges DF. Dealing with inter-individual differences in the temporal dynamics of fatigue and performance: importance and techniques. Aviation, Space, and Environmental Medicine. 2004;75(3 Suppl):A147–54.



Fatigue



Modelling some of it, more accurately

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Individual factors:

- Physical fitness & health
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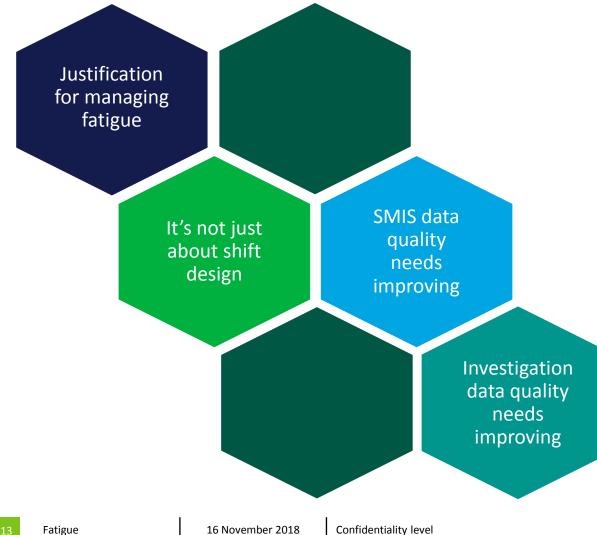
What else did we learn from this report?



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What did we learn from reading the investigation reports?

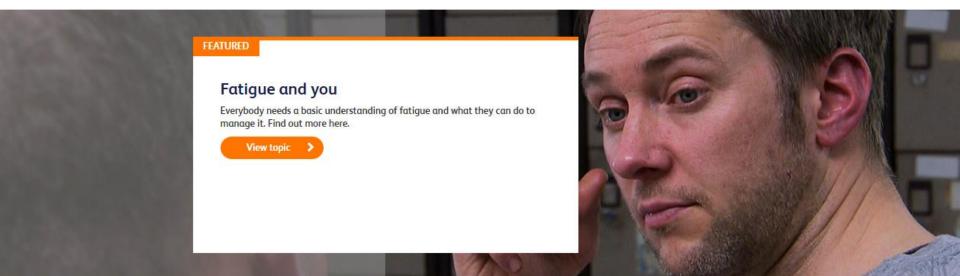








Fatigue and Alertness topics



Planning and rostering

Planning and rostering is a key aspect of managing fatigue risk. 'View topic' to see our guidance.



Supervision and line management

People who have supervision and management duties play an important role in managing fatigue risk. "View topic' to see our guidance and resources.



Fatigue risk management systems

This topic area is about setting up and running a fatigue risk management system. It is mainly aimed at senior managers.

Incident investigation

Incident investigations provide companies with information about whether its fatigue risk management arrangements are working. 'View topic' to see our guidance on investigating fatigue here.







Incident Investigation

An investigator's role in managing fatigue

Learn about fatigue

Investigate – consider fatigue

Causes of fatigue

Consider all fatigue controls

Address underlying causes

Promote a fair culture

Positive behaviours



Managing fatigue: an investigator's role



Lead Human Factors

It's important to manage fatigue risk because people need to be awake and alert to do their jobs safely and efficiently. The effects of serious fatigue are comparable to being over the drink driving limit for alcohol. Fatigue can seriously affect our safety. Long-term fatigue is also bad for our physical and mental health.



Why does fatigue matter? 00:02/02:21 CC

An investigator's role in managing fatigue risk

Confidentiality level



Incident Investigation

An investigator's role in managing fatigue

Positive behaviours

Prepare (language and behaviour)

Make yourself available

Encourage discussion



Managing fatigue: an investigator's role



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Dan Basacik Lead Human Factors Specialist



An investigator's role in managing fatigue risk



Incident Investigation





Managing fatigue: an investigator's role



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An investigator's role in managing fatigue risk

Fatigue

Guidance on investigating fatigue



1. Was the individual likely to have been experiencing fatigue at the time of the incident? Sleep opportunity Sleep quantity and quality Other reasons for fatigue / sleep loss Signs of fatigue

2. Were their actions or decisions a factor in the incident?

See RSSB's Accident Investigation Guidance.

3. Were their actions consistent with known fatigue-related performance impairments? Did they show signs of reduced alertness, concentration, increased reaction times, poor memory or decision making, or risktaking?

Confidentiality level

5 2

Guidance on investigating fatigue



1. Was the individual likely to have been experiencing fatigue at the time of the incident?



Example of format

Did the person's working arrangements give them enough of an opportunity to get sufficient sleep?

- Where to start
- Interpretation and rules of thumb
- Factors to investigate (underlying causes)

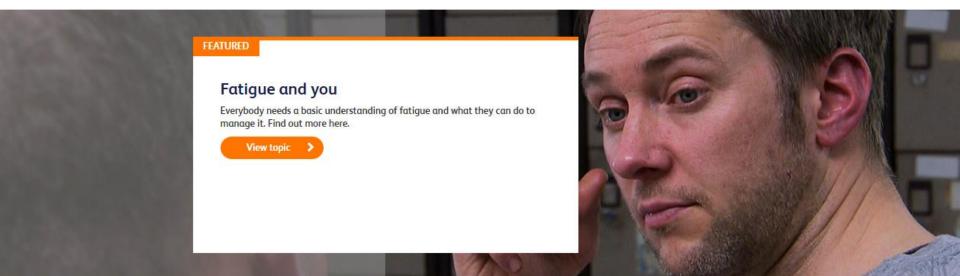








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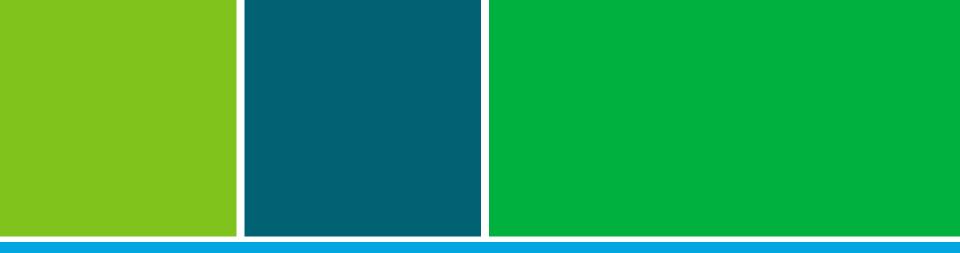












Thank you

