Evidence-based Fatigue Risk Management

Past – Present – Future

Fatigue Risk Management Symposium May 11 – 13, 2010
National Transportation Safety Board & Fatigue

- Operator fatigue on NTSB Most Wanted List since (1990).
Train Accident & Medical Issue(S)

- Accident on November 15, 2001, between two trains resulted in fatalities of two crewmembers and serious injuries to two others.
- NTSB stated that the primarily cause of the accident was the obstructive sleep apnea (OSA) of two crewmembers.*
- Studies awarded by FRA to address fatigue concerns from the perspective of sleep disorders, depression, stress, etc.

*NTSB/RAR-02/04.
Proceedings of the Fatigue and Performance Modeling Workshop*

- Bio-mathematical models of fatigue and performance
  - CHS Chronic Fatigue Model – Spencer & Belyavin
  - Circadian Alertness Simulator – Moore-Ede
  - Fatigue Audit Interdyne – Dawson & Fletcher
  - Interactive Neurobehavioral Model – Jewett & Kronauer
  - Sleep, Activity, Fatigue, and Risk Task Effectiveness – Hursh
  - Sleep/Wake Predictor – Folkard & Akerstedt

Fatigue Avoidance Scheduling Tool

FAST

- On June 28, 2004 a westbound freight train collided with another freight train resulting in a subsequent derailment, etc.
- NTSB determined that the probable cause of the collision was crew fatigue (westbound freight train) and the failure to respond to signals.
- **Initial** use of a bio-mathematical model by FRA to determine that fatigue was a contributing factor.
- NTSB recommendation – require use of **scientifically** based principles when assigning work schedules, consider **sleep/health** issues, etc.
Validation and Calibrate of a Model*

- Use of a bio-mathematical model to permit an objective assessment of fatigue, so that employees and employers may schedule work and rest to minimize the degradation of operator performance by fatigue.
- Partnership with 5 major carriers.
- Study involved 400 human factors and 1,000 nonhuman factors accidents.
- Sleep. Activity, Fatigue, and Task Effectiveness model using the Fatigue Avoidance Scheduling Tool (FAST).
- Relationship between reduce effectiveness and human factors accidents.

Rail Safety Improvement Act - 2008

- Fatigue Management Plan
  - Employee education and training - based on current scientific and medical research.
  - Sleep disorders.
  - Scheduling practices.
  - Alertness strategies – napping.
- Minimize accidents and incidents – scientific and medical research to indicate increased fatigue.
Rail Safety Improvement Act - 2008

- Hours-Of-Service Reform/Regulatory Authority
  - be in any other mandatory service for the carrier in any calendar month where the employee has spent a total of 276 hours.
  - remain or go on duty after that employee has initiated an on-duty period each day for
    - 6 consecutive days, unless that employee has had at least 48 consecutive hours off duty at the employee’s home terminal.
    - Any employee who works a seventh consecutive day – shall have at least 72 consecutive hours off duty at the employee’s home terminal.
    - Waivers & pilot programs.
Regulatory Perspective - Future

- Continue usage of bio-mathematical models, along with increase education and training regarding application. **What does a model really tell us?**
- Linkage of models with **medical issues/concerns**.
- Fatigue mitigation plans.
- Development of more refined evaluation methodology. **How do we measure improvements?**
- Continue use of work/rest diaries/studies.
- Quality of life concerns, how to address?
Evidence-based Fatigue Risk Management

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