National Transportation Safety Board

Fatigue: Lessons Learned from NTSB Accident Investigations

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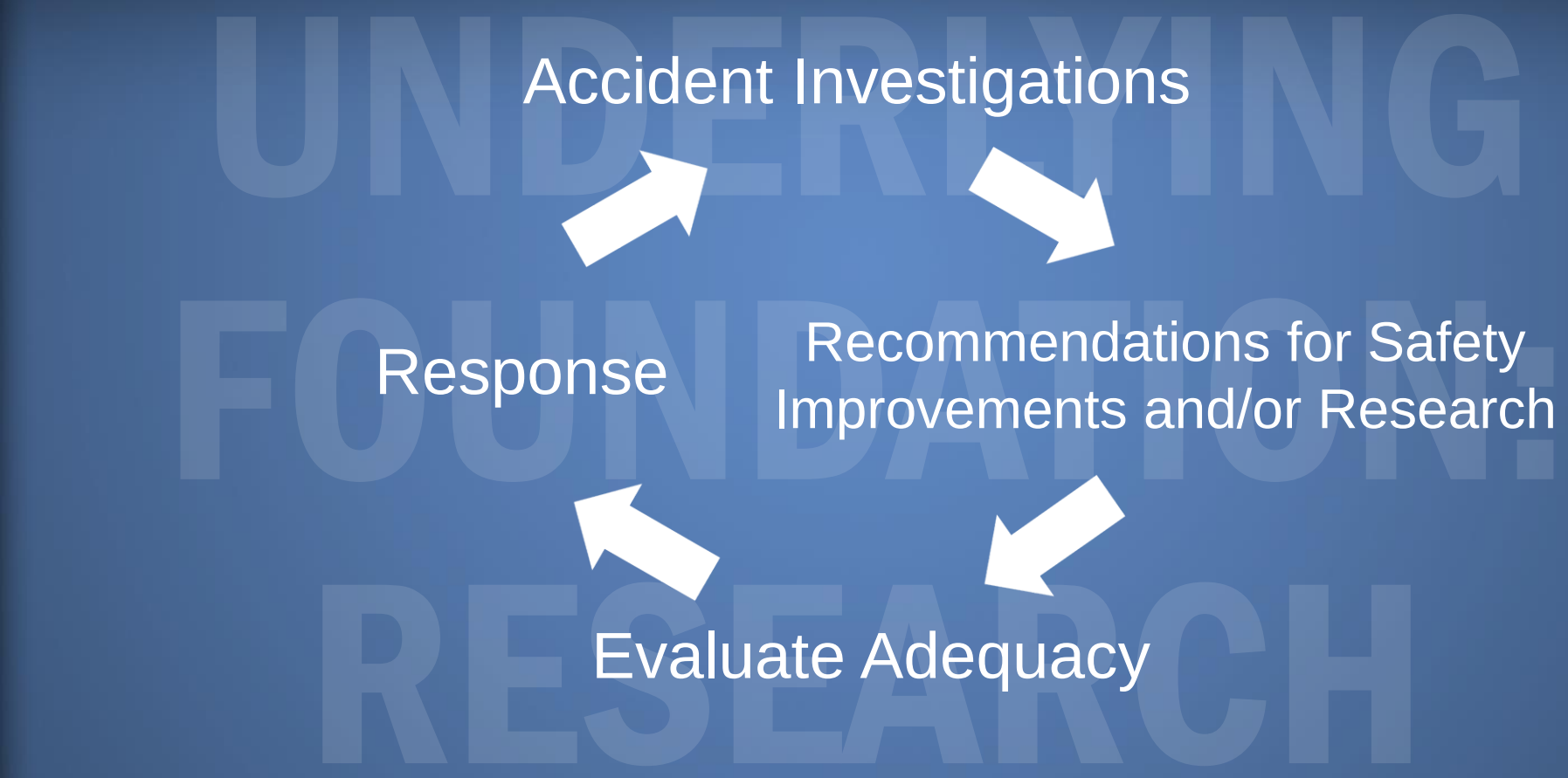
Topics

- NTSB basics
- How NTSB investigations lead to results
- Fatigue successes
- Where we still need to go

NTSB 101

- Independent federal agency, investigate transportation accidents, all modes
- Determine probable cause(s) and make recommendations to prevent recurrences
- Issue safety studies/special investigation reports
- Primary product: Safety recommendations
  - > 80% favorably received, even though implementation is not mandatory
- *SINGLE FOCUS IS SAFETY*

NTSB and Fatigue Research

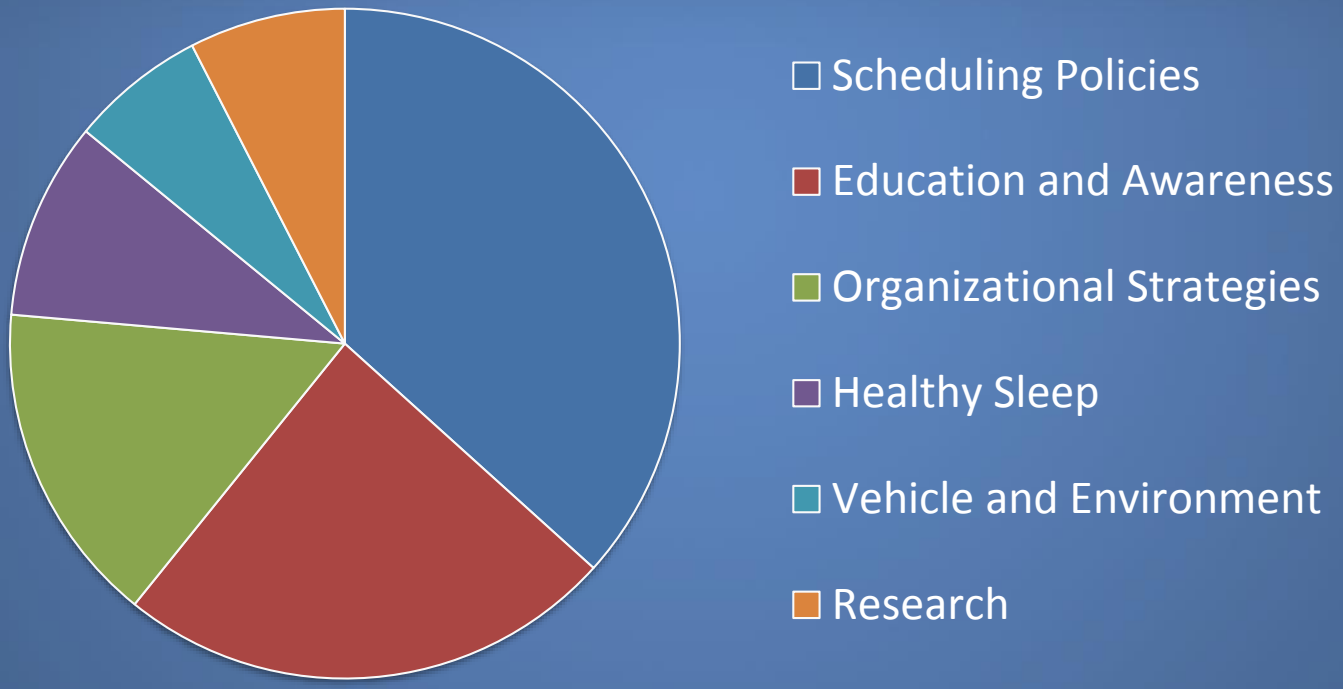


NTSB Recommendations Regarding Fatigue

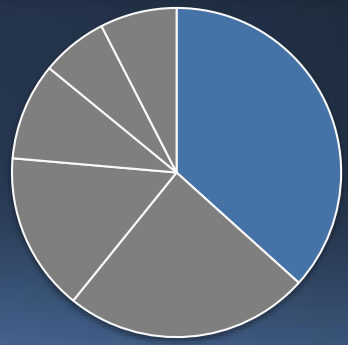
- On 20 out of 26 NTSB Most Wanted Lists
- In 20% of major NTSB investigations, fatigue is a cause, contributing factor, or finding
- >200 recommendations
- ***Only 67% recommendation implementation rate***

NTSB

NTSB Fatigue Recommendations



Scheduling Policies

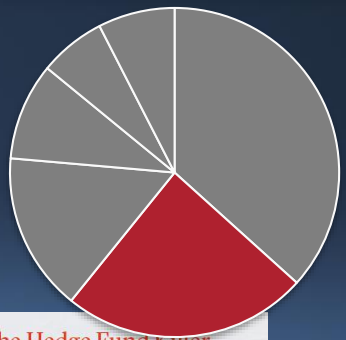


- Progress:
  - 14 CFR Part 117 flightcrew duty and rest requirements
  - Electronic logging device requirement for truck and bus drivers
- Still Needed:
  - Science-based duty hours regulations for all safety-sensitive transportation work
  - Inclusion of cargo pilots in Part 117

The Limits of Scheduling Policies/Rules

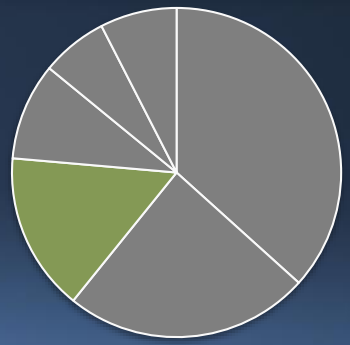
- New Jersey Turnpike
- Truck driver struck limo-van; had been awake for 28 hours
  - Overnight drive from Georgia to the distribution center at which he was based
- On duty for 13 ½ hours of a 14-hour duty – *within rest and duty rules*

Education and Awareness



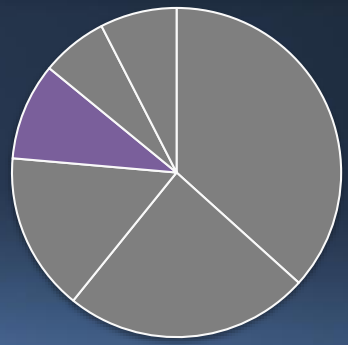
- Progress:
  - More resources available
  - Greater awareness of fatigue in general and fatigue as a safety issue (evolved from “diet and exercise” to “diet, exercise, and sleep”)
- Still Needed:
  - Improved outreach to high-risk populations

Organizational Strategies



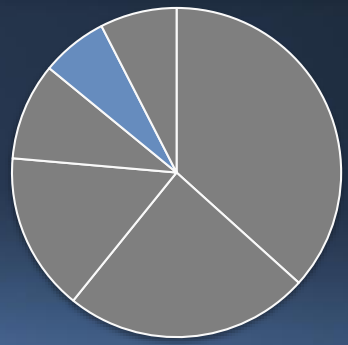
- Progress:
  - More industries/companies adopting fatigue risk management systems (FRMS)
  - Non-punitive call-in fatigued policies
- Still Needed:
  - Increased FRMS adoption
  - Not just creation but actual implementation

Healthy Sleep



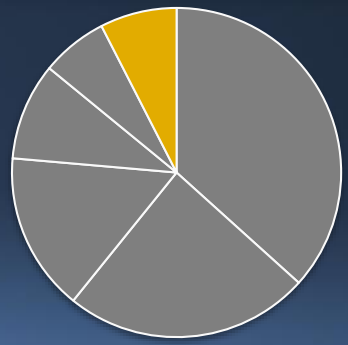
- Progress:
  - Companies with OSA screening and treatment
  - Medical examiner requirements
- Still Needed:
  - Better rules and guidance for screening and treating sleep disorders
  - Guidance on how drugs affect alertness

Vehicle and Environment



- Progress:
  - Rumble strips, lane departure warning systems, collision avoidance systems, positive train control
- Still Needed:
  - Validation of emerging technologies
  - Widespread adoption of technologies that work

Research



- Progress:
  - Well-developed understanding of the issues regarding sleep and sleep disorders
- Still Needed:
  - More research on the efficacy of various countermeasures
  - Better understanding of related issues, e.g., age, weight, diet, exercise, smoking behavior, drinking behavior, stress

Hoxie: Two Faces of Fatigue

- Both conductor and engineer fell asleep
- Conductor worked the “extra board” at UP, resulting in unpredictable sleep schedules
- Engineer had ***diagnosed*** moderate OSA
  - But he was not required to report it
  - OSA was inadequately treated (no CPAP with him, no evidence that he had purchased CPAP)

Hoxie: A Countermeasure Defeated

Horn Sequencer

Alerter

Alerter system, designed to ensure engineer is awake, interpreted automatic horn sequencer as action by engineer

NTSB Urgent Recommendations

- R-15-4 (Urgent) to FRA
  - In regulations and compliance manual, prohibit automated inputs from resetting alerter
- R-15-5 (Urgent) to FRA
  - Notify railroads of this accident and risk posed by automated inputs that reset alerter cycles. Assess systems to identify and eliminate such resets
- R-15-6 (Urgent) to AAR, ASLRRA, APTA
  - Inform your members of this accident and risks automated inputs that reset alerter cycles. Assess systems to identify and eliminate such resets.

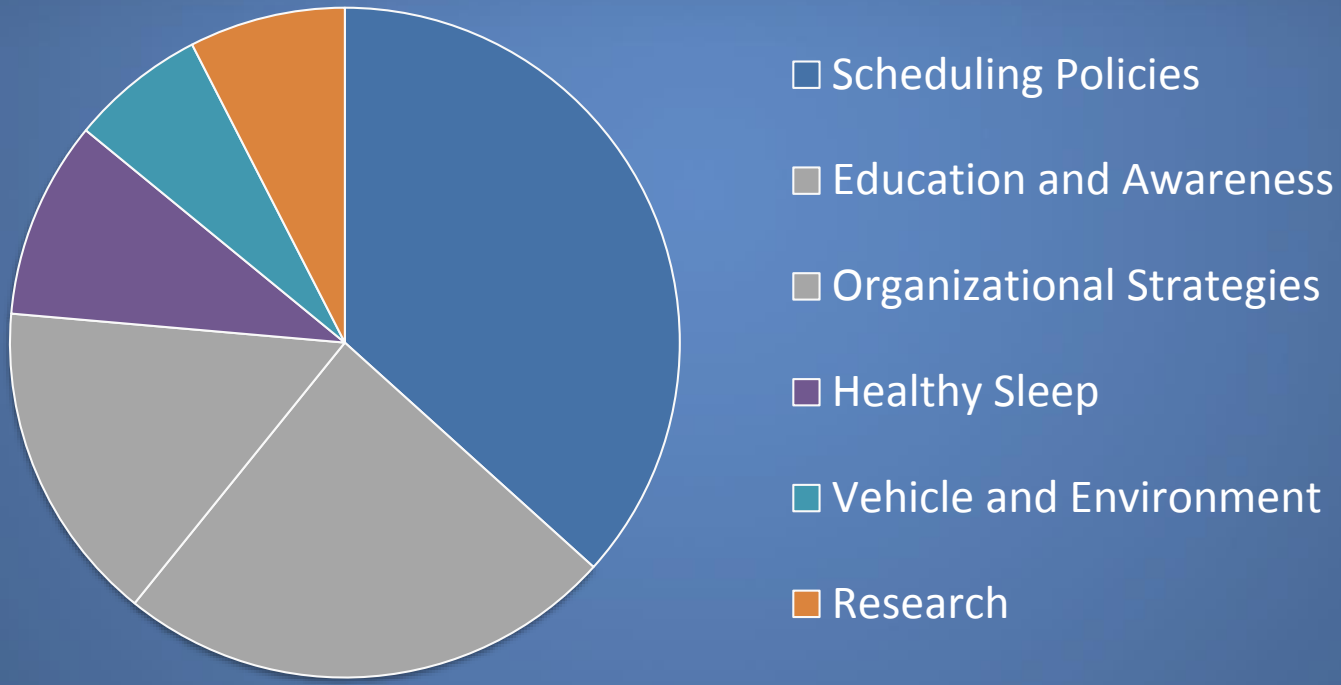
New Recommendations to FRA

- (R-16-043, R-16-044) Require freight railroads to use validated biomathematical fatigue models to develop work schedules
- (R-16-044) Develop/enforce medical standards that railroad employees with sleep disorders must meet to be considered fit for duty

“Where Have I Seen This Before?”

Recommendation R-06-14 to the FRA: Require railroads to use scientifically based principles when assigning work schedules for train crewmembers…. To reduce the effects of fatigue

NTSB Fatigue Recommendations (Hoxie)



Conclusion

- Fatigue: A complex problem in every mode of transportation
- Action on NTSB recommendations is making a difference… although it might take time
- The research community's work helps us to recommend solutions
- More research on the problem, and especially ***more research on solutions!***

Thank You!!

Questions?

National Transportation Safety Board