

Winter Maintenance Operators' and Managers' Opinions and Perceptions of Fatigue



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Project Overview

- Winter maintenance operator susceptibility to fatigue
 - Schedule
 - Shifts
 - Operating conditions
 - Responsibilities
- Goal:
 - Cost-effective recommendations
 - Work and rest schedules
 - Contributing factors
 - Countermeasures

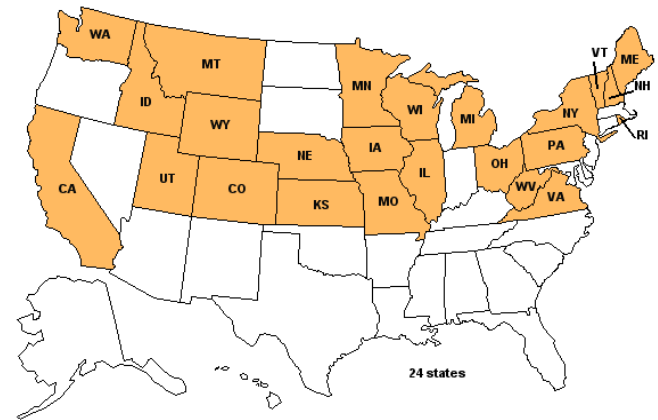


Questionnaire Overview

- Two parallel questionnaires
 - Managers
 - Operators
- Assessed
 - Hours, equipment, refusal to work, breaks, awareness, medical issues, fatigue management

Summary of Results

- 1,043 winter maintenance operators
- 453 maintenance managers
- 24 participating states

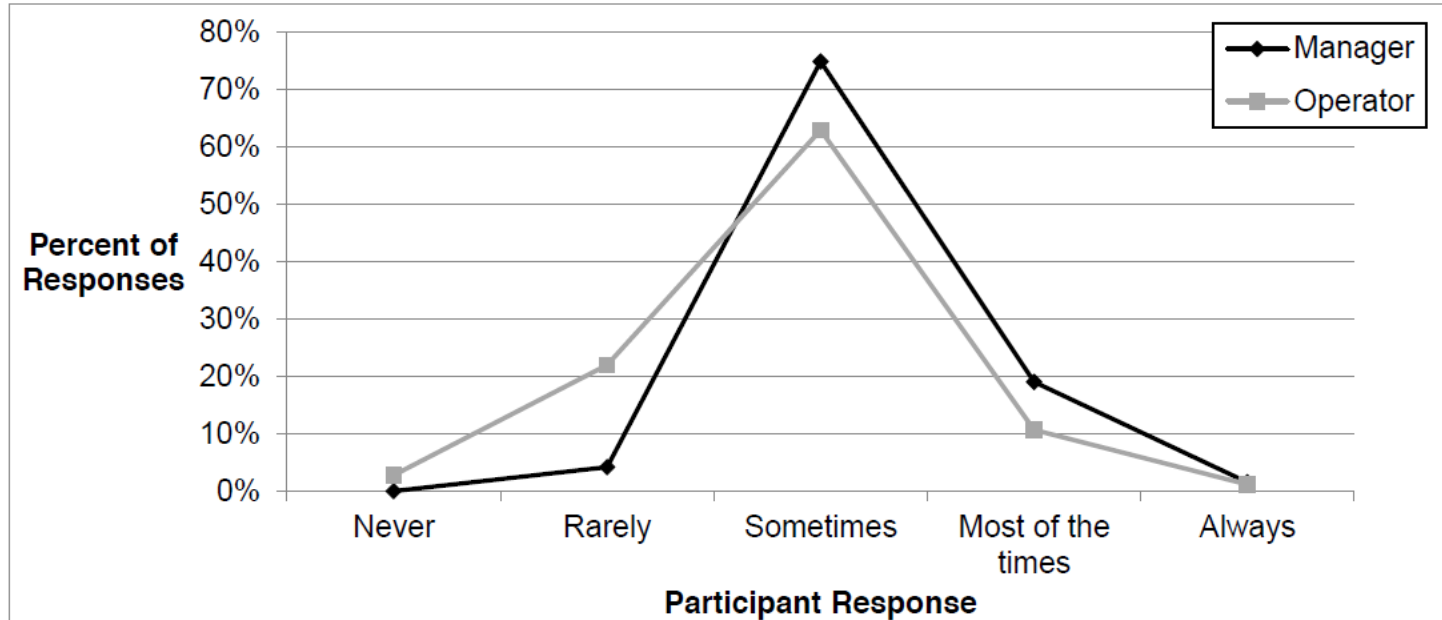


Demographics

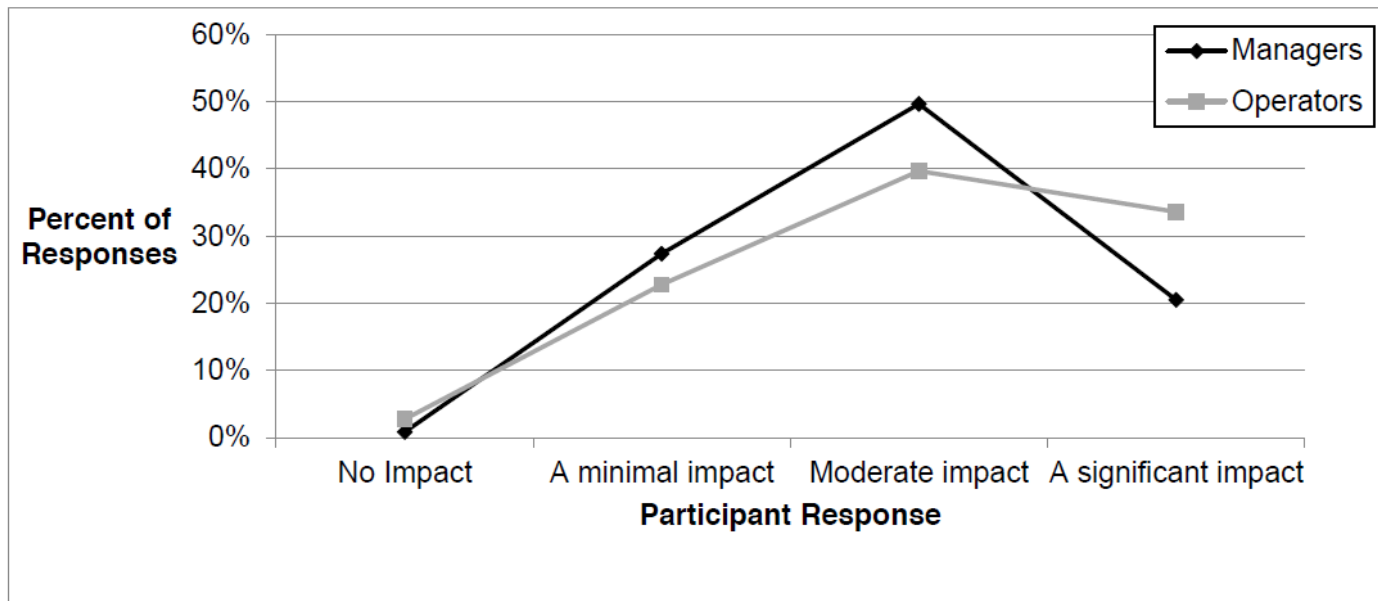
- Age
 - 45-65 years old
- Experience
 - More than 15 years
- Employer
 - State DOTs
- Shift length
 - 12 hours
- Maximum hours
 - More than 15 hours



Prevalence of Fatigue



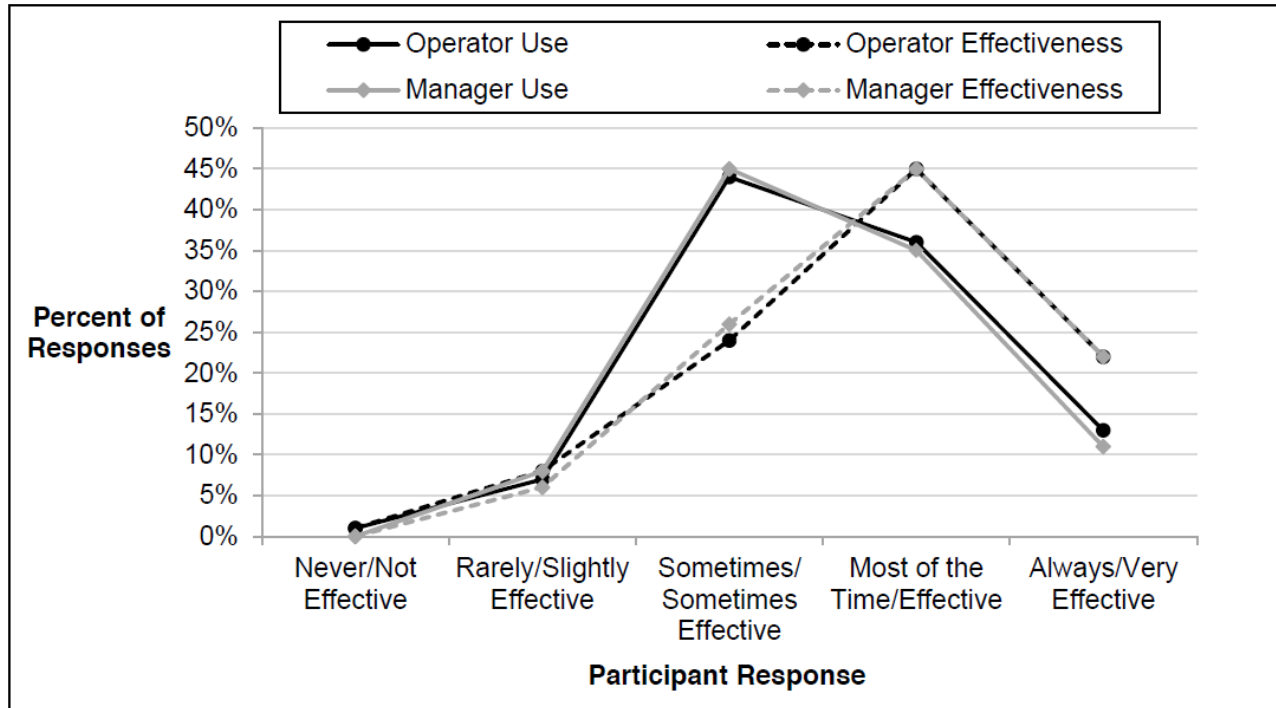
Impact of Fatigue



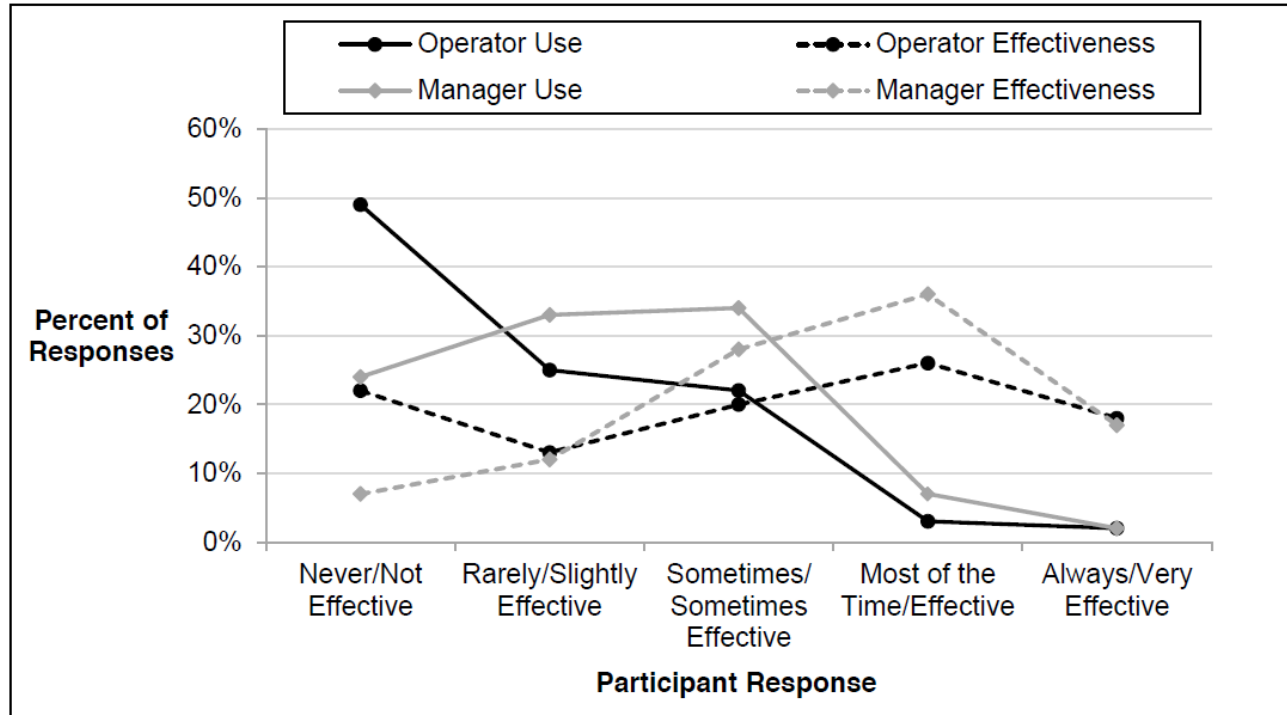
Contributing Factors

Sources of Fatigue (1 = Not Important; 5 = Extremely Important)	Operators (n; σ)	Managers (n; σ)
Type of Seat	4.17 (1,023; 1.01)	3.95 (449; 0.90)
Light from headlamps	4.08 (1,018; 1.13)	4.08 (448; 1.01)
Night time operations	4.03 (1,026; 1.14)	4.28 (450; 0.89)
Heavy traffic	3.89 (1,016; 1.16)	4.00 (449; 1.02)
Too much noise	3.58 (1,005; 1.20)	3.25 (444; 1.07)
Vibration	3.30 (1,004; 1.22)	3.05 (444; 1.04)
Too much technology inside the truck	2.86 (1,015; 1.33)	3.08 (449; 1.14)
Too little technology inside the truck	2.69 (994; 1.29)	2.40 (441; 1.12)

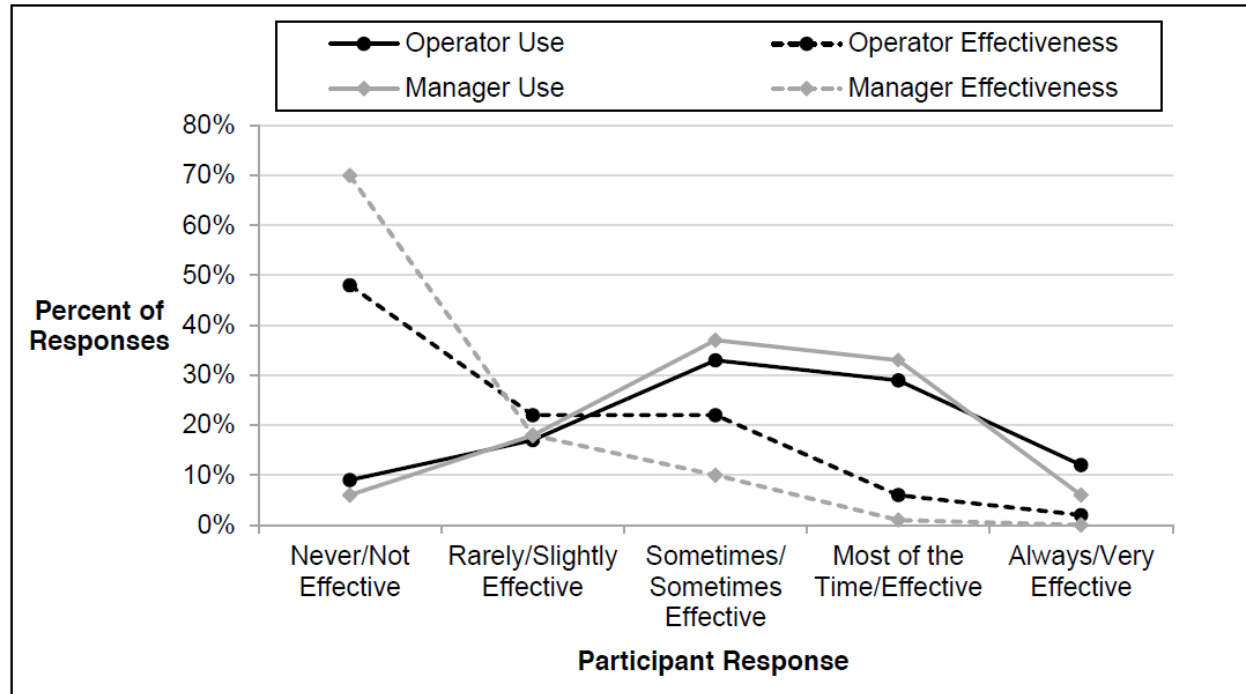
Countermeasures: Moving Around



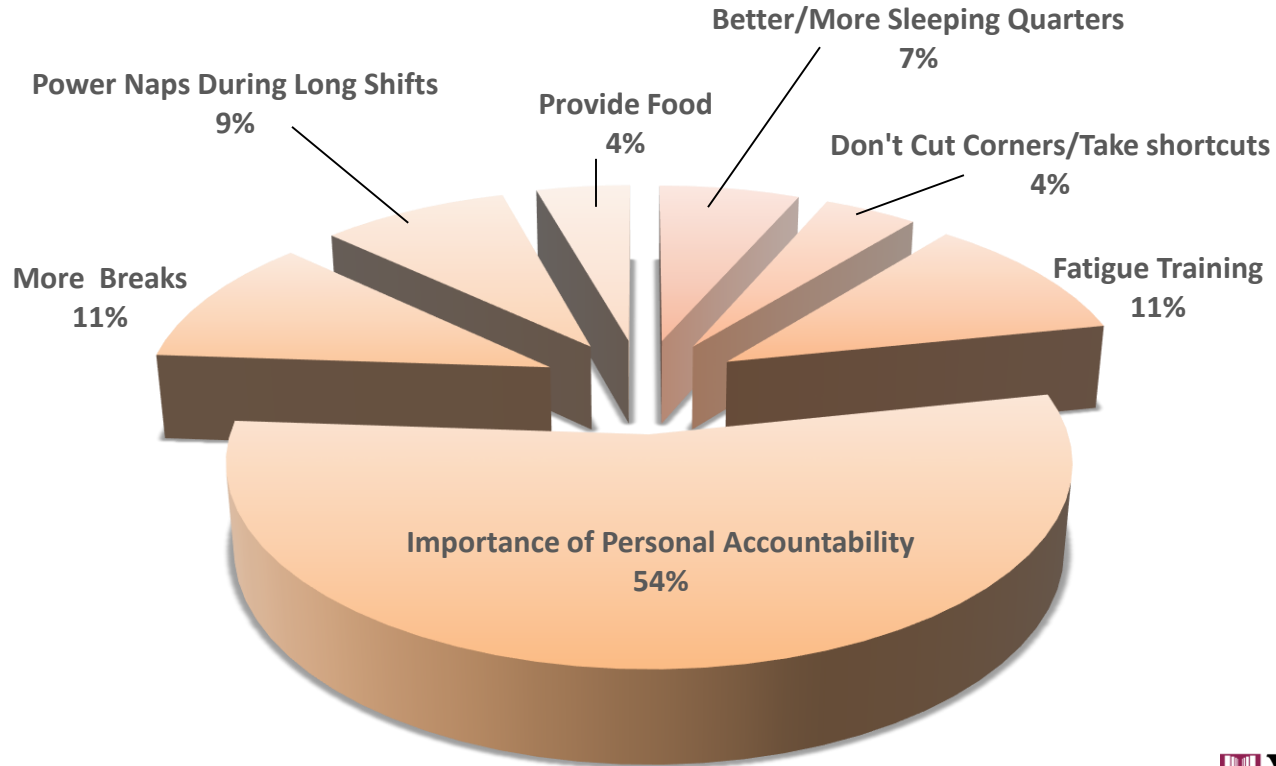
Countermeasures: Nap



Countermeasures: Continuing to Drive



Drivers' Suggestions



Final Recommendations

- Use of breaks/naps
- Operator fatigue reporting
- Increased vehicle maintenance
- Investigate winter emergency shift start/end times (including shift length)
- Offer shift options
- Involvement in decision making process
- Increase personal interactions
- Maximize off duty rest



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