NAFMP
North American Fatigue Management Program

Fatigue Risk Management:
Implementation in the Real World

Eastern CMV Safety Summit

March 12, 2026

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Overview

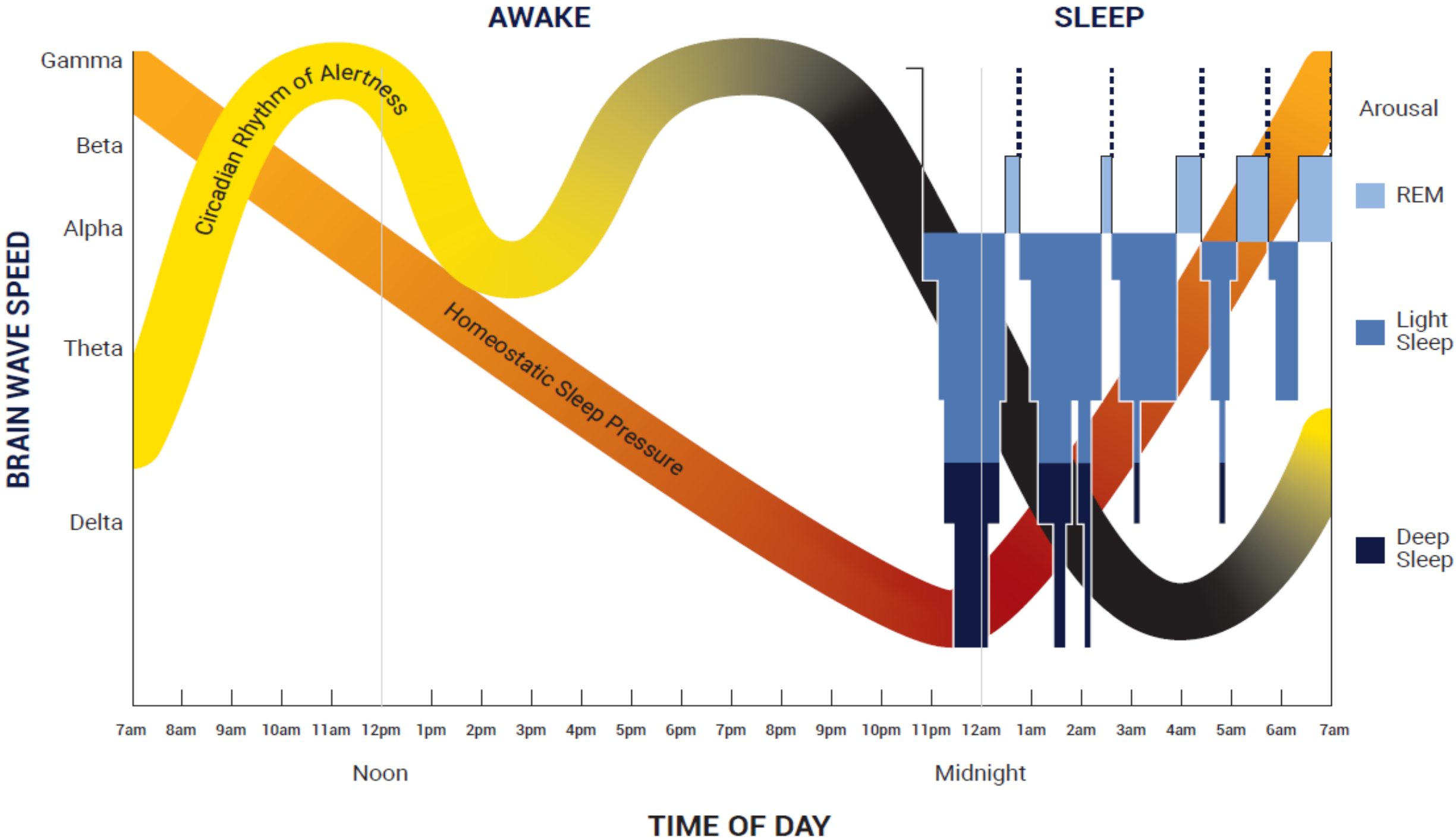
1. Sleep Biochemistry
2. Characteristics of Fatigue
3. Fatigue Management Program
4. Safety Culture
5. Sound Scheduling
6. Detection Technology
7. Sleep Disorders
8. Next Steps

Sleep Biochemistry

Poll

What will kill you faster?

- No Sleep
- No breathing
- Starvation
- Dehydration


AWAKE
SLEEP
Gamma
Beta
Alpha
Theta
Delta
BRAIN WAVE SPEED
Circadian Rhythm of Alertness
Homeostatic Sleep Pressure
Arousal
REM
Light Sleep
Deep Sleep
7am 8am 9am 10am 11am 12pm 1pm 2pm 3pm 4pm 5pm 6pm 7pm 8pm 9pm 10pm 11pm 12am 1am 2am 3am 4am 5am 6am 7am
Noon
Midnight
TIME OF DAY

Characteristics of Fatigue

Poll

Alertness and fatigue are like an on/off switch, you are either awake or asleep

- True
- False

Alertness Spectrum

- **Delta brain waves:** Deep sleep. 1 to 4 Hertz
- **Theta brain waves:** Sleeping or daydreaming when awake. 4 to 8 Hertz
- **Alpha brain waves:** Awake and calm. 8 to 12 Hertz
- **Beta brain waves:** Awake, alert, busy, and focused. 12 to 38 Hertz
  - **Low beta waves:** Thinking. 12 to 15 Hertz
  - **Beta waves:** Performing or focusing. 15 to 22 Hertz
  - **High beta waves:** Excited or anxious. 22 to 38 Hertz
- **Gamma brain waves:** Highly alert and consciousness. 30 to 80 Hertz

Poll

The only cause of fatigue is insufficient sleep

- True
- False

Alertness Has Supply & Demand

- Supply Factors
  - Internal individual susceptibility: circadian rhythm, amount of sleep, time of day, time awake, stimulants, other drugs, health, genes, mood
- Demand Factors
  - Task related: Time on task, task complexity, task monotony
  - Environmental: Road conditions, weather, stress (heat, noise, vibration), vehicle design, social interaction, other stimulation

Poll

In truck/bus crash statistics, driver fatigue is…

- The number 1 cause
- Not a significant cause
- Underrepresented

Crash Causation: 87% Driver Related

- **Non-Performance:** Driver fell asleep, was disabled by heart attack or seizure or physically impaired for another reason
- **Recognition:** The driver was inattentive, distracted by something inside or outside the vehicle or failed to observe the situation adequately for some other reason
- **Decision:** Driver was driving too fast for conditions, misjudged the speed of other vehicles or followed other vehicles too closely
- **Performance:** Driver panicked, overcompensated or exercised poor directional control

Crash Causation Associated Factors

- 14% Inadequate Surveillance
- 13% Fatigue
- 10% Felt Under Work Pressure From Carrier
- 9% Inattention
- 8% External Distraction
- **54% Total: Crashes where diminished vigilance was involved**

FMCSA Large Truck Crash Causation Study

NTSB Report

- The Safety Board believes that the incidence of driver fatigue is underrepresented in FARS in general and in FARS specifically with regard to CMV drivers
- Research has suggested that CMV driver fatigue is a contributing factor in 30 to 40 percent of all CMV crashes

NTSB Report: Factors That Affect Fatigue In Heavy Truck Accidents

- Volume 1: Analysis
- Volume 2: Case Summaries

CMV Driving Worsens Fatigue

- Tight schedule to get enough sleep
- Extended work hours + commuting
- Changing work schedules
- Work/sleep periods conflict with circadian rhythm
- Limited time for rest & naps
- Unfamiliar & uncomfortable sleep locations
- Sleep disruptions
- Difficulty finding nutritious food on the road
- Limited opportunities for exercise
- Personal, work and environmental stressors

Poll

Why manage fatigue?

Fiduciary Duty for Lifetime Earnings and Profits

- Lower Fatigue Related Crashes
- Lower Legal Liability Exposure
- Cost Reduction
  - Driver retention
  - Medical costs
  - Maintenance
- Labor force
  - Safer
  - More productive
  - Healthier & happier
- Articles
  - Nailing the Top Ten Industry Issues through Fatigue Management
    - Part One
    - Part Two

Silent Killer of Drivers and Profits

Fatigue is a physiological state that forces the brain to prioritize survival over demanding cognitive functions

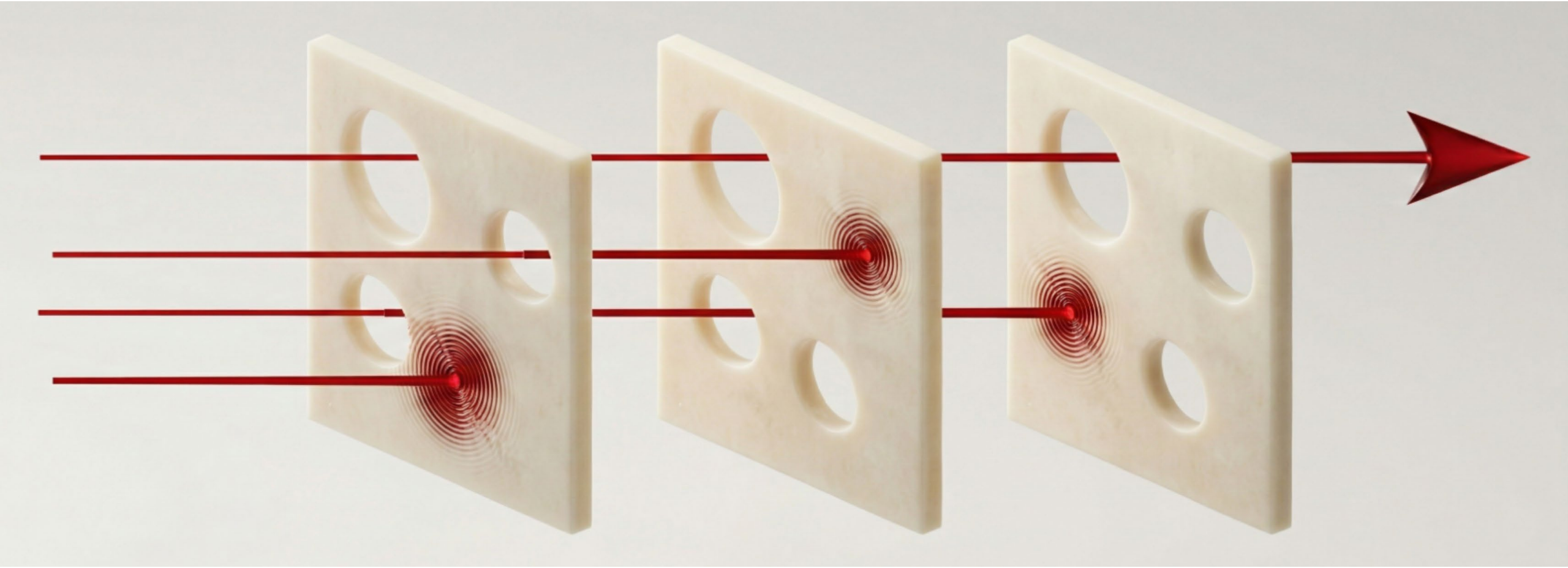
Fatigue Management Program

Fatigue Management Program (FMP)

- Safety Culture
  1) Education
  2) Training
  3) Continuous communications – Including partnerships
- Fatigue Risk Management System
  1) Operations
  2) Identify risks with processes and controls
     - Predictive, proactive, reactive
     - Sound scheduling, sleep disorders management program, fatigue detection technologies
  3) Risk assessment
  4) Measures and countermeasures
  5) Evaluation

FMP Template
Module 2: Safety Culture and Management Practices
Implementation Manual

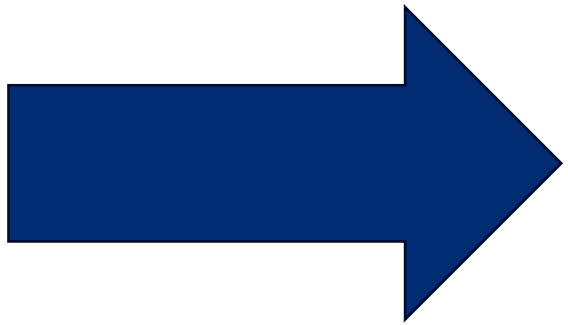
The Swiss Cheese Model



Swiss Cheese Layer: Safety Culture

Safety Culture

- Knowledge
- Skills
- Attitudes



- ✓Behavior Change
- ✓Elimination of Stigmas

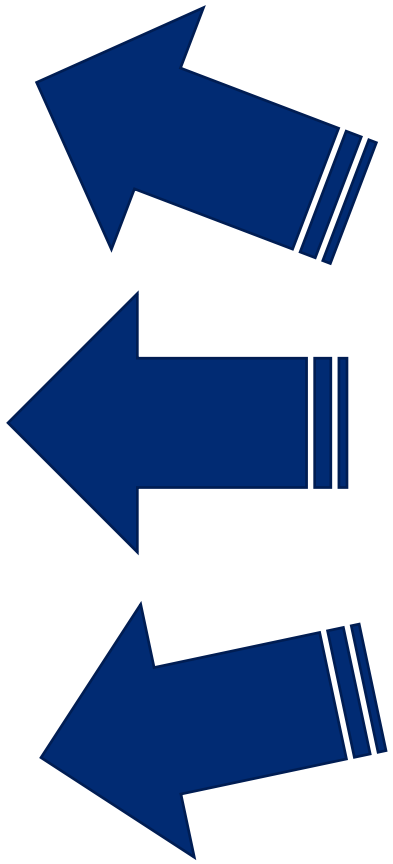
Education & Training Courses

eLearning Platform & PowerPoint Downloads

- Motor carrier executives and managers
  - Module 1 (Intro), 2 (Safety Culture), 7 (Sleep Disorders), 10 (Technologies)
- Motor carrier trainers
  - Module 5 (Train-the-Trainer)
- Motor carrier dispatchers and driver managers
  - Module 9 (Scheduling)
- Freight Shippers, Receivers, Brokers
  - Module 6 (Role of shippers & receivers on driver safety)
- Drivers
  - Module 3 (Driver Ed), 8 (Sleep Disorders) & 9 (Scheduling)
- Driver Families
  - Module 4 (Family Ed)

Wellness Affects All Body Systems

- Messaging
  - Nervous
  - Endocrine
  - Immune
  - Reproductive
- Plumbing
  - Respiratory
  - Cardiovascular
  - Digestive
  - Urinary
- Support
  - Skeletal
  - Muscular
  - Integumentary



- Sleep Hygiene (Webinar)
- Positive Relationships (Webinar)
- Mindfulness (Webinar)
- Nutrition (Webinar)
- Exercise (Webinar)

Objective Signs of Fatigue

- Eyelid drop or loss of focus
- Yawning
- Wandering, scattered or disjointed thoughts, dreamlike visions
- Head movements, gentle swaying, jerking
- Reduced field-of-view (AKA: tunnel vision, highway hypnosis, white line fever)
- Fidgeting, shifting positions, adjusting windows & HVAC
- Progressive weaving, crossing rumble strip, drift and jerk steering
- Delayed or incorrect responses
- Microsleeps

Fatigue Management Strategies

- General
- At home
- On the road
- Night driving
- Changing time zones
- Team driving

Module 3: Driver Education

More on Safety Culture

- Webinar: Safety Culture: Transforming Fatigue Management from a Liability into a Competitive Advantage
- Article: Don’t Stay in the Expensive Blind Spot of Stigmas
- Module 2: Safety Culture and Management Practices

Swiss Cheese Layer: Sound Scheduling and Routing Practices

Scheduling Practices

- Sound scheduling and routing
- Time of day, recent sleep, continuous hours awake, cumulative sleep debt
- Shared responsibility mitigating driver fatigue in work schedules
- Regular schedules
- Forward vs backward scheduling
- Consider travel time to employment location
- Consider rests and naps during work shift
- Maximum of 16 hrs. per day or less
- Maximize benefits of scheduling tools
- Develop customized strategies for managing fatigue

Scheduling

Webinar: The Scheduling Puzzle: Sleep Science and Driver Fatigue

Module 9: Driver Scheduling and Tools

Swiss Cheese Layer: Fatigue Detection Technologies

Fatigue Management Technologies Types

1. Scheduling & Trip Planning
2. Fitness for Duty Testing
3. Performance Monitoring
4. Driver Monitoring

More on Fatigue Detection Technology

- Webinar: The Alertness Toolkit – A Motor Carrier's Guide to Fatigue Management Technologies
- Solution Series Webinars
- Module 10: Fatigue Monitoring and Management Technologies

Technology Catalog Sources

- 2024 Good-Practice Guidance - To support industry uptake of rapidly emerging Fatigue and Distraction Detection Technologies (FDDT)
  - By Australia's National Heavy Vehicle Regulator (NHVR)

- 2020 Review of Commercially Available Devices to Detect Fatigue and Distraction in Drivers
  - By Institute for Road Safety Research in the Hague, Netherlands

- 2019 Commercial Motor Vehicle Operator Fatigue Detection Technology Catalog and Review
  - By National Surface Transportation Safety Center for Excellence

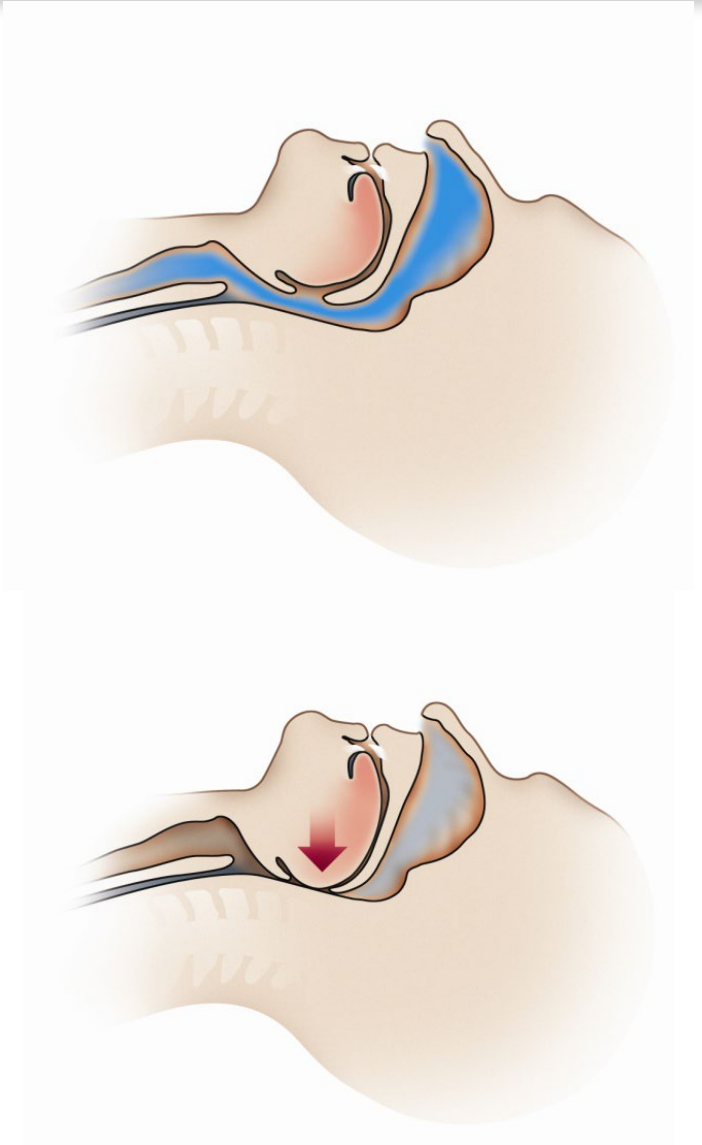
Swiss Cheese Layer: Sleep Disorder Management

Fatigue Susceptibility

- Sleep Deprivation
  - Sleep-related behaviors
  - Sleep hygiene
- Individual Differences
  - Genetic variations
  - Health & fitness
- Medical conditions
  - Medications
  - Sleep disorders
    - Insomnia, narcolepsy, restless leg syndrome, sleepwalking, abnormal circadian rhythms, obstructive sleep apnea (OSA)

Obstructive Sleep Apnea

- **Apnea** = stoppage of breathing lasting 10+ seconds
- OSA = breathing stops repeatedly during sleep due to closures of the upper airway
- Apnea rate per hour:
  - <5 = normal
  - ≥5 = OSA
- OSA severity (mild, moderate, severe) based on rate
- Some people with severe OSA can have 100 per hour



Sleep Disorders Management Program

1. Education
2. Screening
3. Testing
4. Treatment
5. Monitoring

More on Sleep Disorders Management

- Webinar: Guide to Establishing a Sleep Disorders Management Program
- Module 7: Motor Carrier Sleep Disorders Management
- Module 8: Driver Sleep Disorders Management

Next Steps

NAFMP

North American Fatigue Management Program

nafmp.org

NAFMP Website Free Resources

- Tools
  - FMP Template
  - Implementation Manual
  - ROI Calculator
- Courses
  - eLearning Platform
  - PowerPoints with and without audio
  - For carrier's executives, safety managers, dispatchers, instructors, drivers, driver's families, shippers & receivers
- Webinars, Info Sessions & Articles
  - Gallery
  - List
  - Categories
  - Sing up for article notifications
- Podcast
  - The NAFMP Pod
  - Available from eight platforms
- Events
  - Download individual event
  - Subscribe to Calendar of future events

Connect with me to coordinate a free fatigue management session for your organization

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