

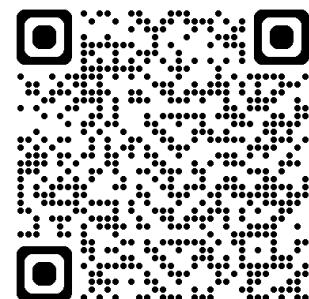


# Fatigue Management: NAFMP Quick Overview

Star Shuttle LLC

January 13, 2026

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# Overview



1. Problem of Fatigue
2. Fatigue Management Program
3. Driver Knowledge
4. Driver Skills
5. Next Steps

**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

**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

## **In truck/bus crash statistics, driver fatigue is...**

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

- Factors That Affect Fatigue In CMV Crashes
  - 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 lethal to the driver CMV crashes.

# 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

## Why manage fatigue?

# 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

# 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 and routing, sleep disorders management program, fatigue detection technologies
- 3) Risk assessment
- 4) Measures and countermeasures
- 5) Evaluation

# More on Safety Culture



- [Webinar: Safety Culture: Transforming Fatigue Management from a Liability into a Competitive Advantage](#)
- [Module 2: Safety Culture and Management Practices](#)

# More on Scheduling



- The Scheduling Puzzle: Sleep Science and Driver Fatigue
- Module 9: Driver Scheduling and Tools

# 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](#)

# More on Fatigue Detection Tech



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

# Reminders, Please



- Not medical professional
- Consult your medical provider before following any lifestyle recommendations or if you feel any discomfort
- You are responsible for any consequences of following any recommendations provided
- Be aware and try to eliminate the stigma associated sometimes with sleeping, metabolic diseases, substance abuse and mental health
- Do not allow any recommendations cause you to worry or become obsessed with a toxic wellness culture

## What will kill you faster?

- No Sleep
- No breathing
- Starvation
- Dehydration

# Importance of Sleep: Biology

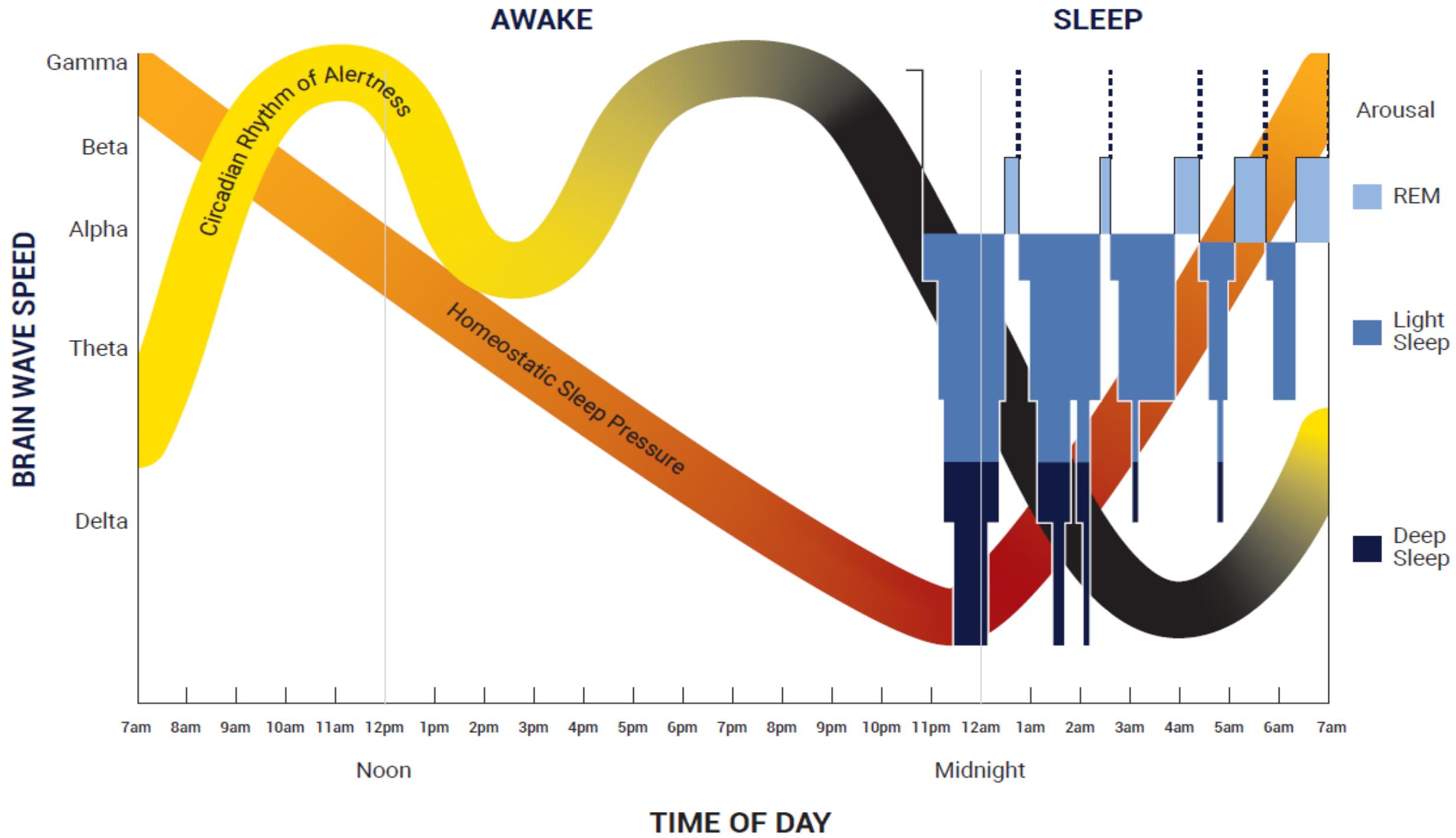


## Sleep Functions

- Energy recharge
- Cellular restoration
- Brain function
- Emotional wellbeing
- Metabolism maintenance
- Immunity enhancement
- Heart health
- [Webinar: Sleep Hygiene](#)

## Sleep Deprivation Effects

- Metabolic Syndrome
- Reduced immune system functioning
- Gastrointestinal problems
- Disrupts relationships
- Worsens psychiatric conditions
- Decreased quality of life
- Increased sick days



# 1. Crash Facts



- At 1:48 a.m. July 12 2023, a motorcoach carrying 21 people veered off Interstate 70 near Highland, Illinois, colliding with three parked combination vehicles
- Three passengers died
- The driver and 11 other passengers sustained injuries of varying severity

Source: NTSB

<https://www.ntsb.gov/investigations/Pages/HWY23MH015.aspx>



▼*Direction of travel*

Mack  
combination unit

Kenworth  
combination unit

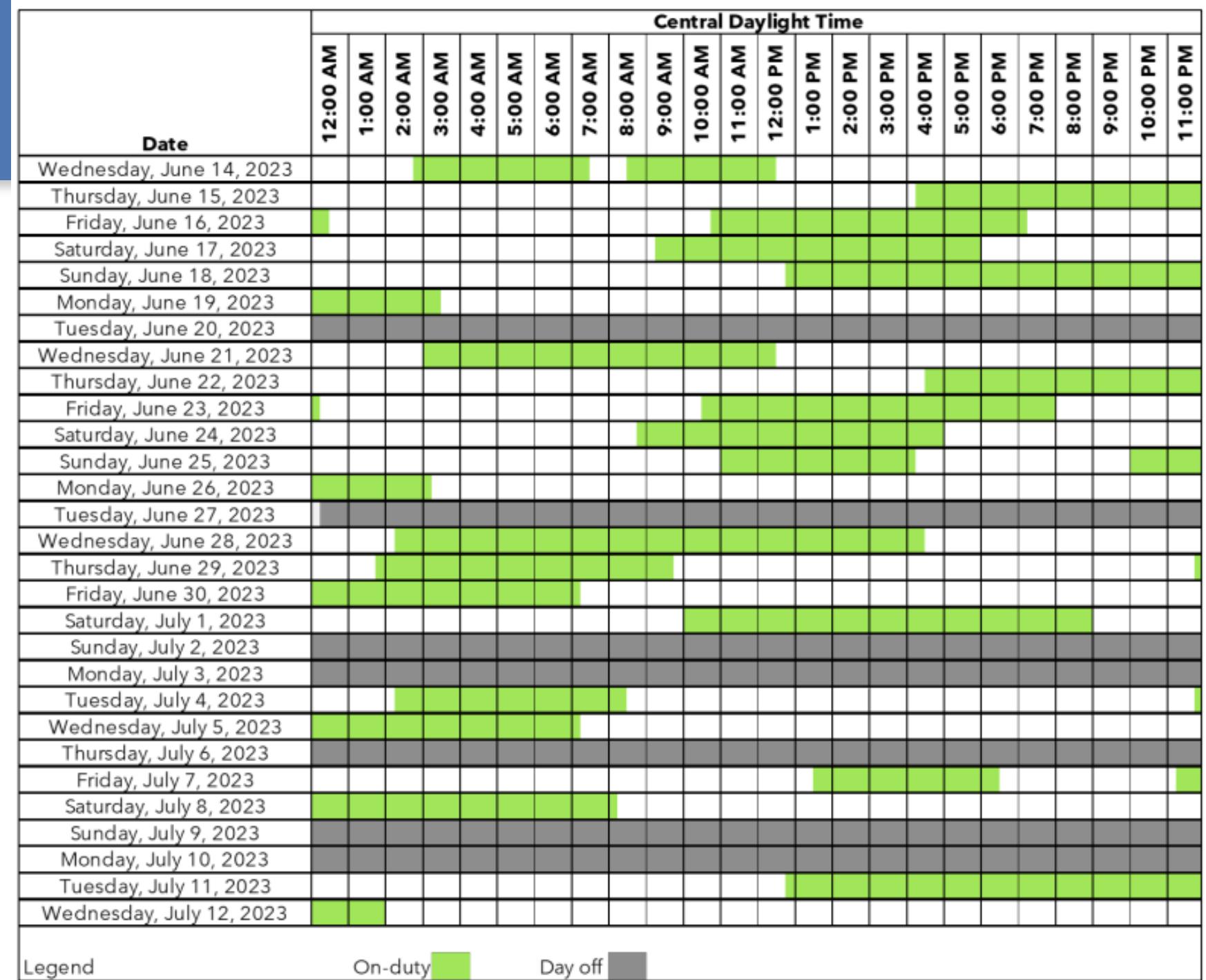
Prevost  
motorcoach

Freightliner  
combination unit

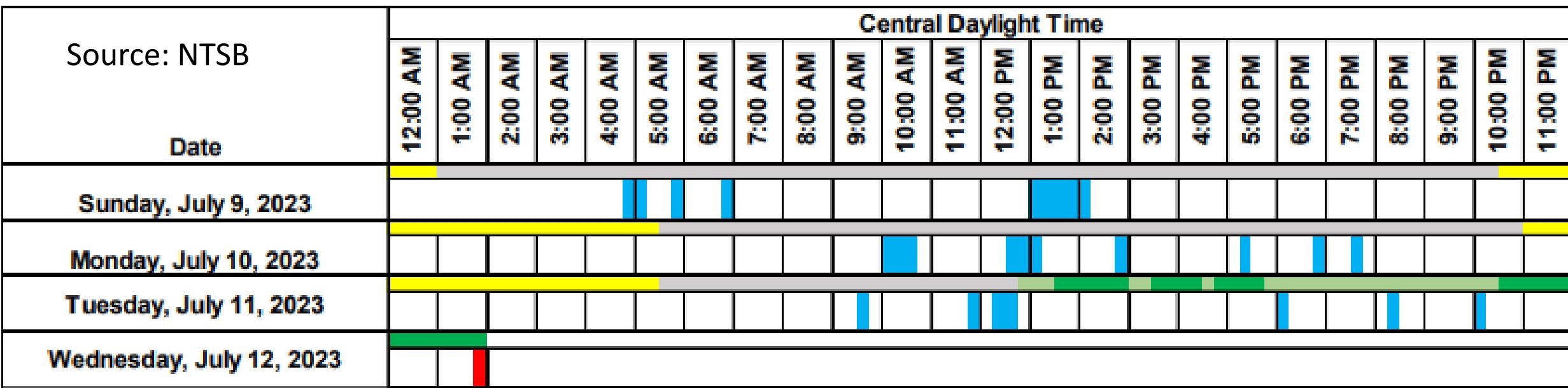
Source: NTSB

# Schedule

Source: NTSB



# Schedule



Legend

- On-duty driving
- On-duty not driving
- CPAP use
- Off-duty
- Phone use
- Crash

# NTSB Probable Cause



- Driver's departure of the motorcoach from the travel lanes onto the shoulder of the exit ramp due to fatigue
- Contributing to the motorcoach driver's fatigue was his irregular work-rest schedule and prolonged time awake (17 hours, 13 on duty)
- Driver medical history
  - High blood pressure treated with one prescription medication
  - Diabetes treated with one prescription
  - High cholesterol treated with one prescription medication
  - Diagnosed with obesity
  - Obstructive sleep apnea (OSA) treated with a CPAP device
  - Diagnosed with confusion due to head injury with concussion sustained in a 2018 crash, documented persistent cognitive and behavioral symptoms and was given instructions for additional testing and neurology follow-up that did not occur

## 2. Crash Facts



- At 6:17 a.m. June 11 2023, a truck-tractor with a tank trailer carrying 8,500 gallons of gasoline crashed while exiting northbound I-95 in Philadelphia, Pennsylvania
- The driver lost control on a curved exit ramp, causing the truck to overturn and strike a concrete barrier
- The resulting fire destroyed the truck, caused the collapse of northbound I-95 lanes and fatally injured the truck driver

Source: NTSB

<https://www.ntsb.gov/investigations/Pages/HWY23FH014.aspx>



Source: NTSB

# Schedule



Source: NTSB

Date

Eastern Daylight Time

12:00 AM	1:00 AM	2:00 AM	3:00 AM	4:00 AM	5:00 AM	6:00 AM	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM	9:00 PM	10:00 PM	11:00 PM
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Thursday, June 8, 2023

Friday, June 9, 2023

Saturday, June 10, 2023

Sunday, June 11, 2023

Legend



On-duty



Off-duty



Phone use



Crash

# NTSB Probable Cause



- Driver's failure to slow the vehicle as he exited the interstate onto the exit ramp well above the posted advisory speed limit due to inattention to the roadway potentially associated with fatigue
- Among the many strategies that a robust fatigue management program can promote, this crash highlights the importance of drivers adopting sleep schedules that do not change substantially between their workdays and their days off
- History of high blood pressure, no medications
- Toxicological testing postmortem detected diphenhydramine, a sedating over-the-counter antihistamine

### 3. Crash Facts



- At 6 a.m. Jan. 28 2023, a bus and a box truck collided head-on on New York State Route 37 in Louisville, New York
- The truck crossed the centerline striking the bus, which was transporting workers to a construction site
- This crash resulted in six fatalities, two serious injuries and five minor injuries among the bus passengers, along with minor injuries to the bus driver and serious injuries to the truck driver

Source: NTSB

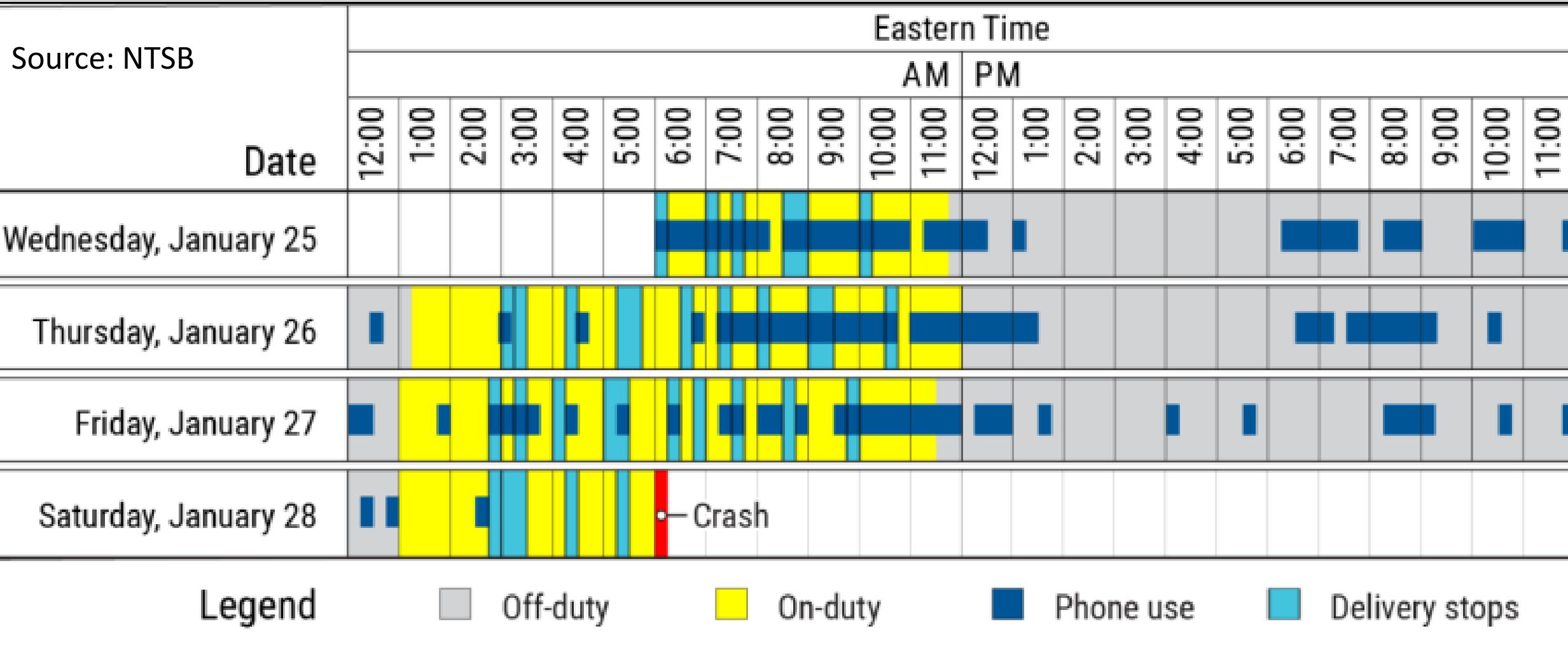
<https://www.ntsb.gov/investigations/Pages/HWY23FH005.aspx>



Source: NTSB

# Schedule

CVSA®



# NTSB Probable Cause



- Driver's fatigue due to insufficient sleep and circadian disruption, which lowered his level of alertness to the driving task and resulted in the truck crossing the centerline of the roadway into the opposing lane of travel and colliding with the oncoming bus
- Fatigue caused by limited and fragmented sleep as well as circadian disruption associated with his shift-work schedule
- No medical conditions

## 4. Crash Facts



- At 1:36 a.m. Dec. 16 2022, a truck-tractor with a semitrailer crashed into the rear of a slower-moving bus on Interstate 64 near Williamsburg, Virginia
- The truck, traveling between 65 and 70 mph with cruise control, did not brake before impact, while the bus was moving at 20 to 25 mph
- The collision resulted in the deaths of three bus occupants, serious injuries to nine bus occupants and the truck driver, and minor injuries to 11 bus occupants

Source: NTSB

<https://www.ntsb.gov/investigations/Pages/HWY23MH004.aspx>

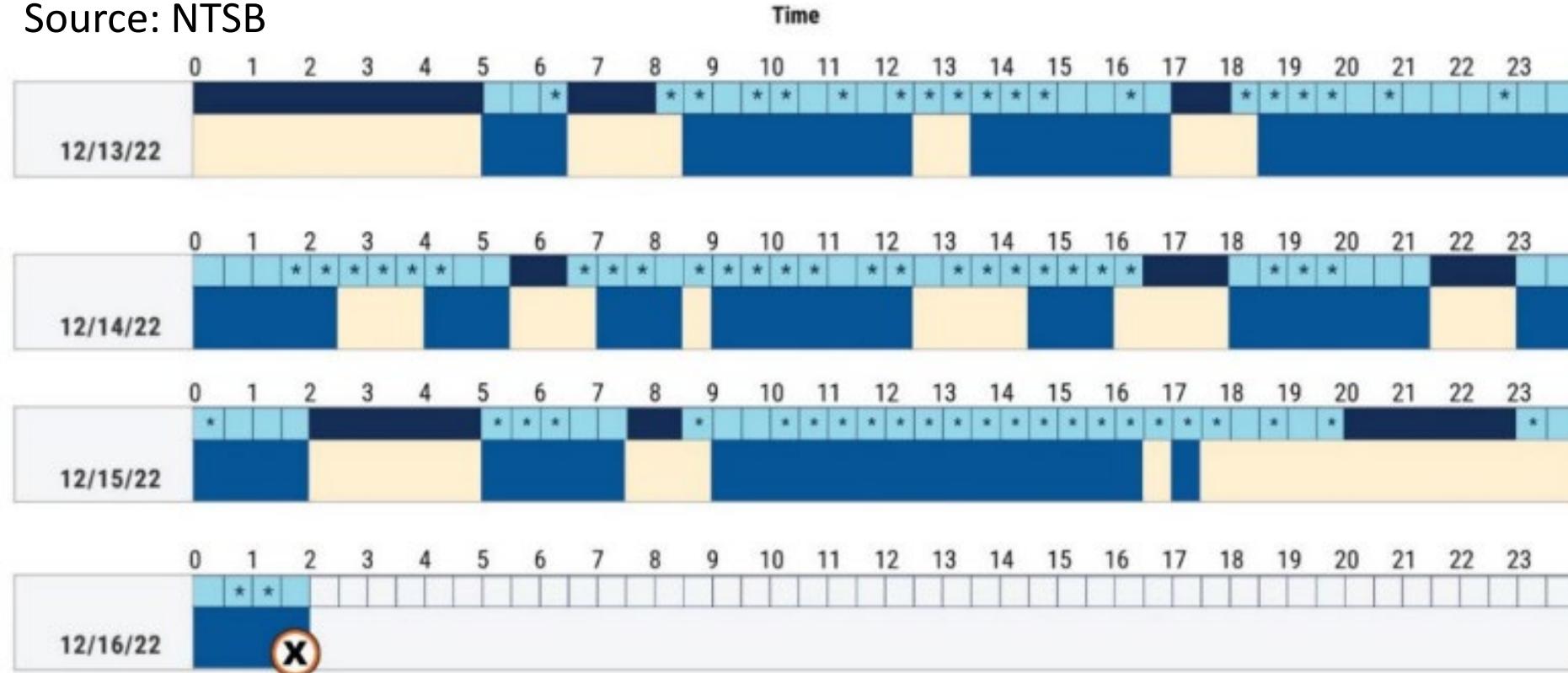


Source: NTSB

# Schedule

CVSA®

Source: NTSB



Key

\* = cell activity in period

= driver activity

= sleeper berth

= sleep opportunity

= awake

Source: NTSB

= CRASH

# NTSB Probable Cause



- Driver's fatigue, due to excessive driving time and limited sleep opportunity, which resulted in his lack of response to the slow-moving bus ahead
- Contributing to the truck driver's fatigue was the motor carrier creation of fictitious driver accounts in the electronic logging device system that enabled drivers to operate their vehicles for hours in excess of federal regulations
- No medical conditions

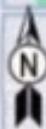
## 5. Crash Facts



- At 10:07 p.m. June 9 2021, a truck-tractor with a tank trailer crashed into a queue of stopped passenger vehicles on SR-202 in Phoenix, Arizona
- Traveling at 62-64 mph without slowing or steering, the truck initiated a chain-reaction collision involving seven other vehicles
- The crash resulted in four fatalities and 11 injuries among passenger vehicle occupants, with the truck-tractor and one car consumed by fire

Source: NTSB

<https://www.ntsb.gov/investigations/Pages/HWY21MH008.aspx>



1 mile

**LAW ENFORCEMENT  
AT PRIEST  
EXPECT TO STOP**



**Dynamic Message Sign**



Source: NTSB



Source: NTSB



Source: NTSB



Source: NTSB



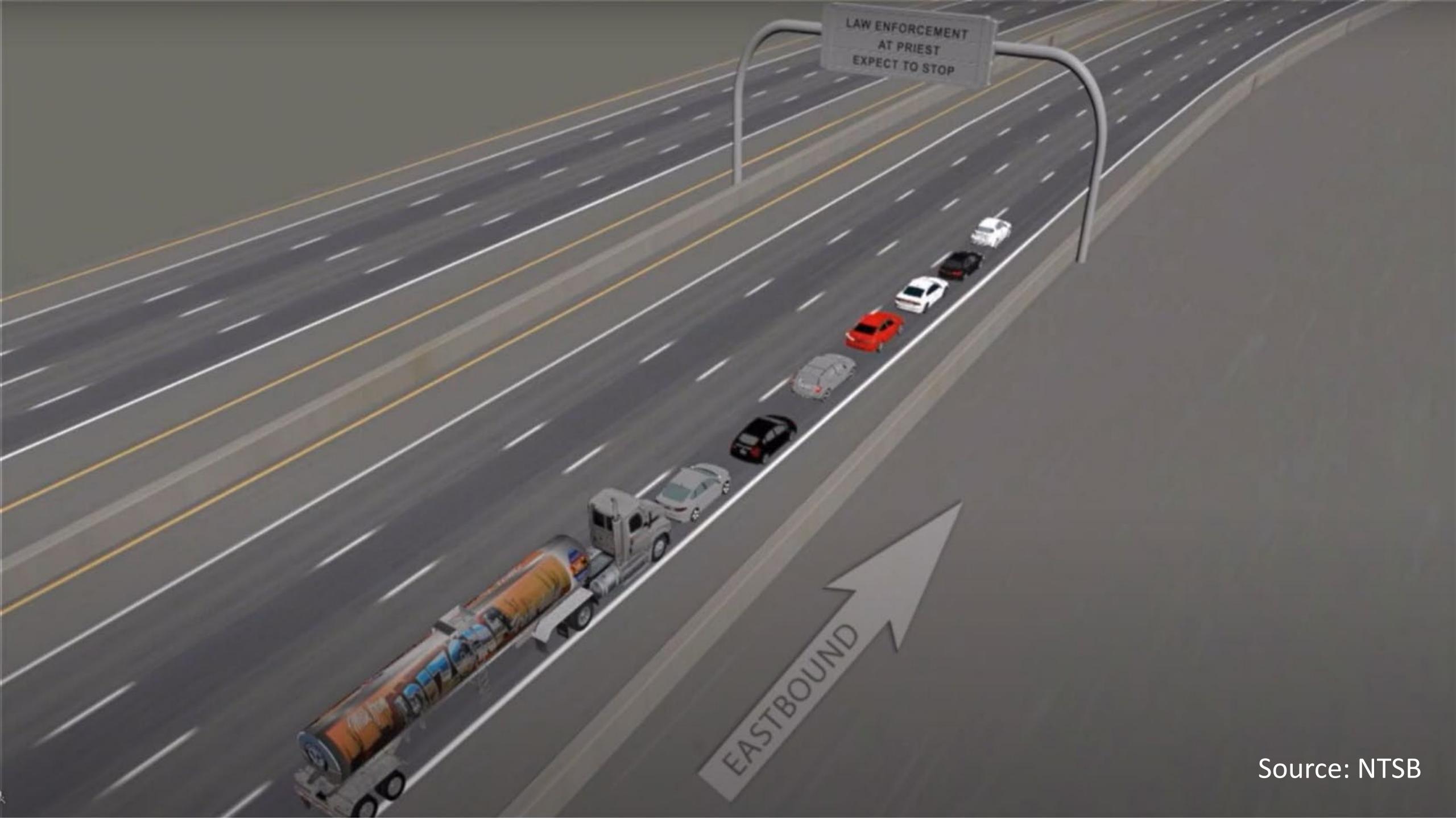
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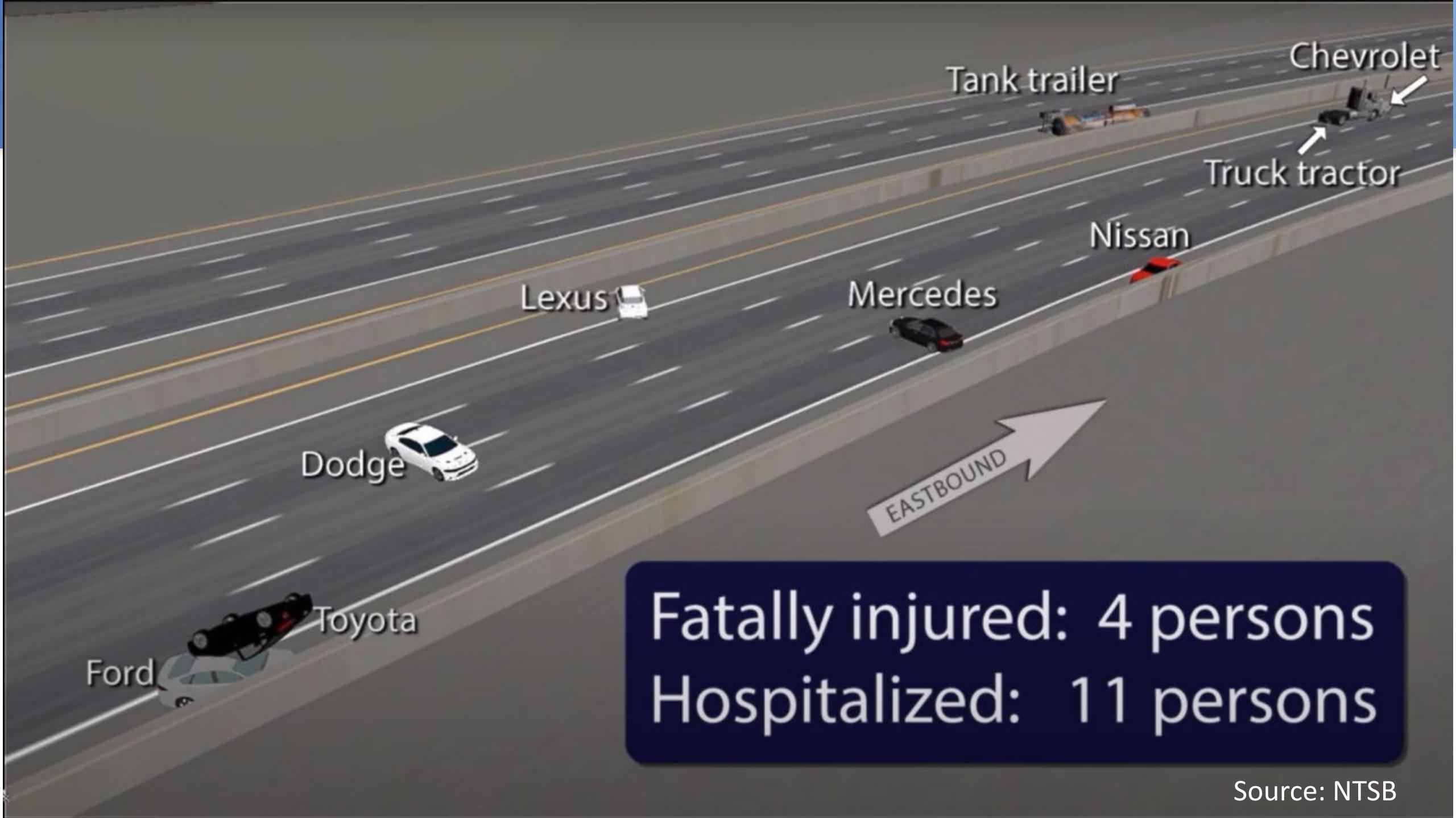
TIME -0.25

62 MPH 100 km/h

Source: NTSB



Source: NTSB

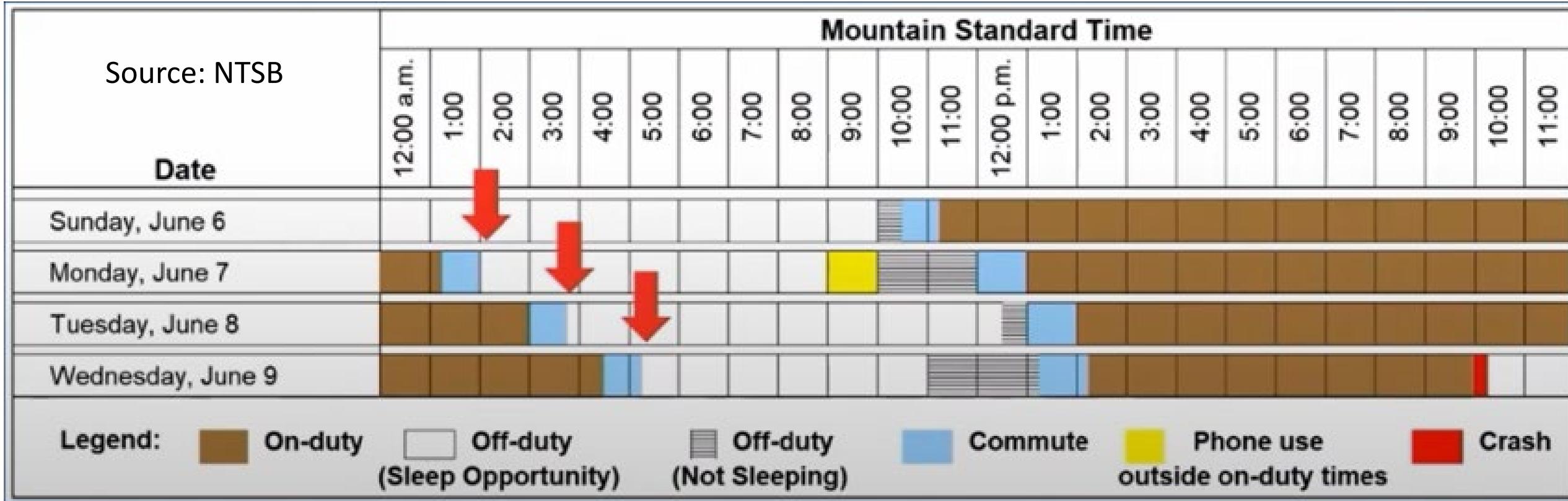


Source: NTSB



Source: NTSB

# Schedule



# NTSB Probable Cause



- Driver's failure to respond to the fully conspicuous traffic queue, likely as the result of fatigue
- Contributing to the crash was the motor carrier's
  - Poor oversight of its drivers
  - Lack of fatigue management program
  - Failure to enforce its own policies, such as those regarding on-duty hours
  - All a consequence of its inadequate safety culture
- No medical conditions

## 6. Crash Facts



- At 6:45 a.m. June 12 2020, a truck-tractor with a semitrailer struck the end of a slowed and stopped traffic queue on Interstate 39 near Arlington, Wisconsin, which had formed due to prior collisions
- This initiated an eight-vehicle crash that resulted in four fatalities and three serious injuries

Source: NTSB

<https://www.ntsb.gov/investigations/Pages/HWY20FH006.aspx>

Peterbilt  
truck-tractor



Mack truck



Freightliner  
truck-tractor



VW sedan



Kia SUV



Source: NTSB

# NTSB Probable Cause (1 of 2)



- Driver's failure to respond to slow-moving traffic due to fatigue
- Insufficient evidence on medical conditions
  - Cardiac disease
  - Diabetes
  - Gabapentin medication
- According to his wife, the driver had been experiencing ongoing fatigue for which he was scheduled to be evaluated by his doctor the day after the crash

# NTSB Probable Cause (2 of 2)



- Contributing to fatigue was his undiagnosed obstructive sleep apnea
  - High BMI (48 kg/m<sup>2</sup>). The truck driver's BMI corresponds to severe obesity, which alone placed him at high risk of significant OSA
  - Large neck circumference. This factor is even more strongly associated with OSA risk than BMI
  - Men are two to three times more likely to have OSA than nonpostmenopausal women
  - The truck driver was 55 years old. OSA risk in adults increases with age until about the sixth or seventh decade of life
  - The truck driver had high blood pressure and diabetes. OSA is more prevalent among people with those conditions
  - The truck driver smoked which increases OSA risk

## **What is the single most important predictor of wellbeing and longevity?**

1. Low cholesterol
2. Not smoking
3. Warm relationships
4. VO2max
5. Mindfulness
6. Normal blood pressure

# Relationships Affect Wellness



- Stress with isolation from family & friends
- Finding and sustaining network of family, friends & coworkers
- Keep in touch, communicate
- Value and foster each relationship
- Do fun things together
- Be positive
- Show support
- Have family take Module 4 (Family Ed)

[Webinar: Nurturing Positive Relationships](#)

# Positive Behaviors



- Positive outlook and behaviors
- Balance between work and personal life
- Pursue personal interests
- Support network
- Try to improve job environment
- Get serious about relaxing
  - Relaxation breathing
  - Short walks
  - Meditation
  - Reading
  - Find method that works best for you

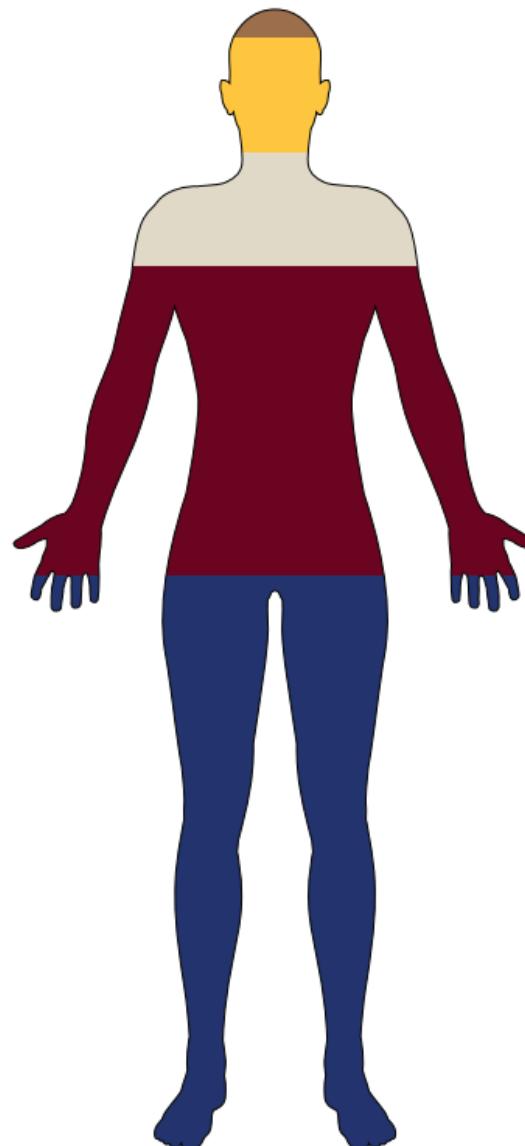
[Webinar: Mindfulness](#)

Where does weight come from in the body (heaviest to lightest)?

- Visceral fat
- Bones
- Subcutaneous fat
- Liquids
- Muscle

# What Makes Up Body Weight?

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- LIQUIDS
- MUSCLE
- BONES
- SUBCUTANEOUS FAT
- VISCERAL FAT

- Essential Macronutrients
  - Carbs with Fiber (veggies, fruits, whole grains)
  - Fats except artificial trans fats (fatty fish, nuts, seeds, avocado, milk products)
  - Proteins (fish, seafood, chicken, beef, pork)
  - Water
- Essential Micronutrients
  - Vitamins
  - Minerals
- Nutritious food
  - No ingredients list
  - No nutrition label
  - No health claims

[Webinar: Nutrition](#)

# Malnutrition



- Ultra processed food
  - Lack of fiber
  - Excess sugar, salt, oils, fats and other additives
  - Engineered to taste good
  - Cheap & convenient
  - Aggressively marketed
  - Addictive
- Liquid candy
  - Soda
  - Juice
  - Any caloric drink
- Toxic to the liver and brain
  - Excess sugar
  - Excess protein
  - Drugs

# 10 Types of Snacks for the Road



1. Unsweetened drinks: Water, sparkling water with lime/lemon, coffee, tea, herbal infusions
2. Any seeds: Pumpkin, sunflower, cacao nibs, flax, chia, hemp
3. Any nuts: Almonds, walnuts, pecans, cashews, pistachios
4. Any veggies: Romaine hearts, celery, carrots, cucumber, cherry tomatoes, bell peppers
5. Any fruits: Berries, apples, oranges, clementines, bananas, plums, pears, pineapple
6. Spreads: Guacamole, hummus, plain yogurt/Greek, plain nut butters, cheese, pesto
7. Not so smooth smoothies (keep the fiber): Made with any of those above
8. Any protein: Boiled eggs, rotisserie chicken, ribs, lamb/steak skewers, sashimi, fish fillet
9. Beans: Pinto, black, kidney, edamame, chickpeas
10. Minimally processed cereals: Steel cut oatmeal, barley, bulgur, brown rice, plain popcorn

# Sample Food Choices on the Road



- Breakfast
  - Eggs any style with veggies instead of fries, veggie omelet
  - Fruit with nuts, plain yogurt, or cheese
  - Drop at least one side of the bread on egg sandwich
  - Avoid cereals
- Lunch & Dinner
  - Any protein with cooked veggies
  - Any protein with uncooked veggies (salads, bare burger/sandwich loaded w/veggies)
  - Order steak or ribs with collard greens, spinach or other veggies
  - Drop ultra processed sides: fries, mashed potatoes, mac & cheese and other
  - Have the burrito bowl without the tortilla
  - Make fruits your go to dessert alone or with nuts, plain yogurt, or cheese
- Don't feel guilty when deviating into wrong lane, just don't stay there

# Caffeine



- Alerting effects:
  - Begin in ~20 minutes
  - Peak in 60-90 minutes
  - Can last for hours
- Caffeine content in coffee varies widely
- Tea has about  $\frac{1}{2}$  the caffeine of coffee
- Large individual differences in the time required to metabolize caffeine
- Drink in small sips to “nurse” the cup over a longer period
- Like any stimulant, caffeine makes sleep more difficult
- Generally, avoid caffeine within 6-8 hours of main sleep period
- Effects vary - some people are even more sensitive
- Reduce caffeine intake
- Increase time between last dose & bedtime

# Alcohol



- Not permitted in CMVs
- Some drivers may use alcohol as a sleep aid at home.
- Alcohol may make you sleepy, but it actually *disrupts* sleep:
  - Disrupts REM sleep
  - Causes “rebound” awakening after a few hours
- Disruptive effects increase with age
- Performance impairment effects greater when you are also sleepy
- Alcohol makes OSA worse

# Smoking & Tobacco Use



- Leading preventable cause of disease, death, and disability
- ~20% of Americans smoke, but nearly **half** of CMV drivers do
- Causes lung cancer, COPD and other lung diseases, heart disease, and many other medical conditions
- >\$1,000 per year in medical costs for each smoker
- Reduces oxygen flow to the brain; worsens OSA
- Strategy: ***QUIT!!!***
  - See your doctor
  - Call 1-800-QUIT-NOW
  - Click [www.smokefree.gov](http://www.smokefree.gov) or
  - Click [www.hc-sc.gc.ca](http://www.hc-sc.gc.ca)

# Amphetamines



- Illegal or available only with a prescription
- Too strong for general use
- Increase activity level but do not improve performance reliably
- Increase heart rate and metabolism, sometimes dangerously
- Often you “crash” several hours after use

# Sleeping Pills



- Hypnotics = drugs used to induce sleep
- Some also used to treat anxiety and stress disorders
- General categories:
  - Non-prescription Over-The-Counter (OTC); e.g., Tylenol PM, Benadryl
  - Prescription:
    - Benzodiazepines (e.g., Halcion, Restoril)
    - Nonbenzodiazepines (e.g., Ambien, Lunesta)
- No sleeping pill provides 100% natural sleep
- Most have side effects
- Most are habit-forming
- Some cause withdrawal symptoms
- Must allow full time for drug to leave your body before driving

# Other Medications



- Common side effects:
  - Drowsiness
  - Other fatigue
  - Insomnia
- Accordingly, many prescriptions specify when the drug should be taken (e.g., at bedtime)
- Follow dosage instructions carefully
- Safety regulations restrict driver on-road use of medications with stated fatigue side effects

1. Cardiopulmonary
2. Strength bearing
3. Stretching & balancing

- Enhances alertness
- Promotes better sleep
- Lowers stress
- 10-minute walks twice or more per day
- Work out more vigorously on weekends
- Take exercise equipment with you on trips
- Keep a record of your exercise
- Set daily and weekly goals
- Find out what you like and do it

# Fatigue Susceptibility

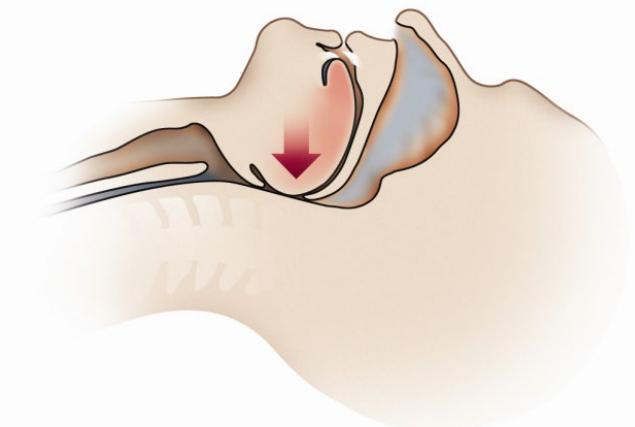
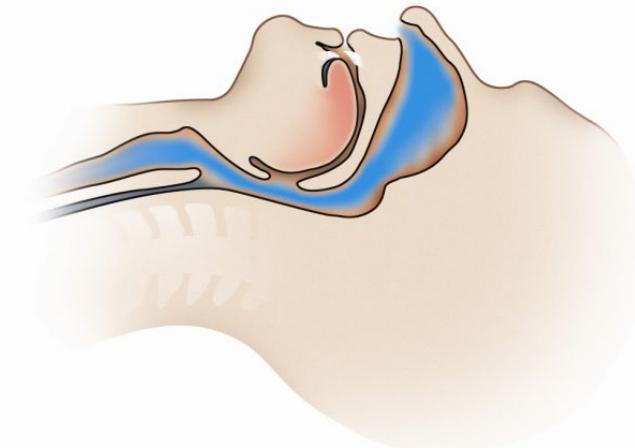


- Sleep Deprivation
  - Sleep-related behaviors
  - Sleep hygiene
- Individual Differences
  - Genetic variations
  - Health & fitness
- Medical conditions
  - Medications
  - Sleep disorders
    - Insomnia, narcolepsy, restless leg syndrome, sleepwalking, abnormal circadian rhythms, obstructive sleep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

# Obstructive Sleep Apnea

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- **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



# OSA Risk and Warning Signs



- OSA higher risk
  - Obese individuals, male, 40+ years old, large neck size, recessed chin, small jaw, large overbite, family history
- OSA warning signs
  - Reduced performance, loud and irregular snoring especially with gasping, high blood pressure, diabetes

## **Drivers can tell when they are fatigued...**

1. Always, based on their perception
2. When trained to recognize it
3. Rarely; that's why it's a problem

# 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

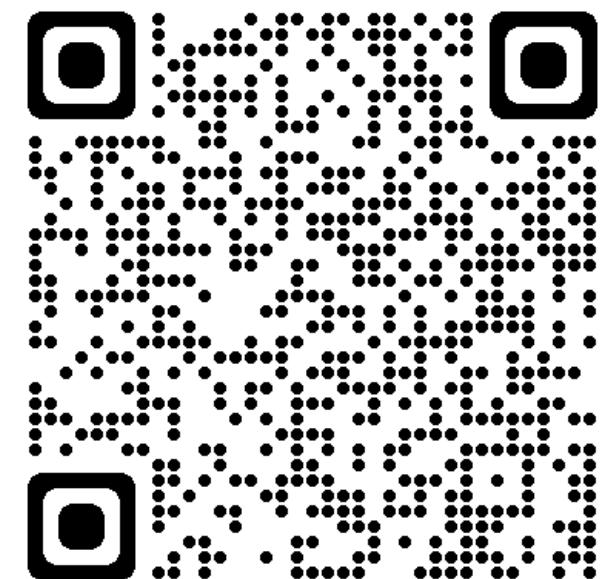
Module 3: Driver Education



# NAFMP

North American Fatigue  
Management Program

[nafmp.org](http://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

# Contact Info for Questions or Other Sessions



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