NAFMP
North American Fatigue Management Program

Fatigue Related Factors in the Highland IL Crash NTSB Investigation

COMMERCIAL VEHICLE SAFETY ALLIANCE
CVSA®

UMA Safety Management Seminar

Maritime Conference Center

December 3, 2025

Get this slide deck at NAFMP.org/events

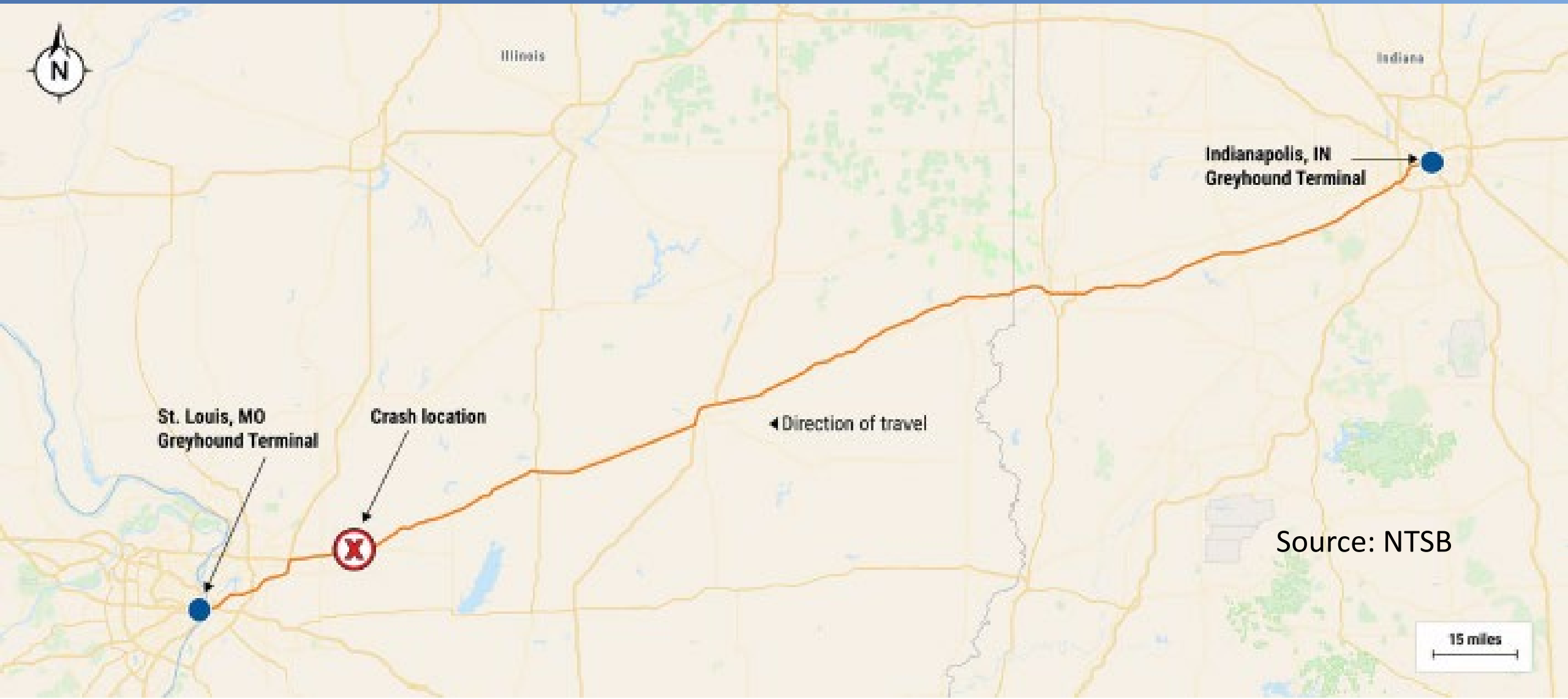
Overview

1. NTSB Investigation
    1. Facts
    2. Probable Cause
    3. Safety Issues
    4. NTSB Lessons and Recommendations
2. FMP Main Components
3. Physiological Fatigue factors
4. NAFMP Resources
5. Questions and Contact

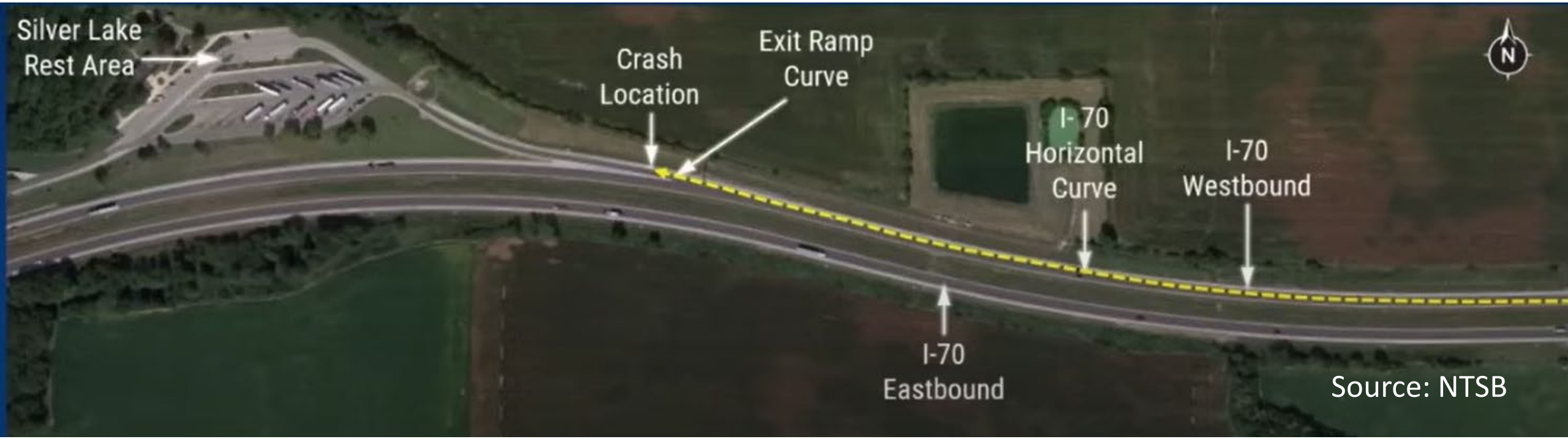
Facts

- 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

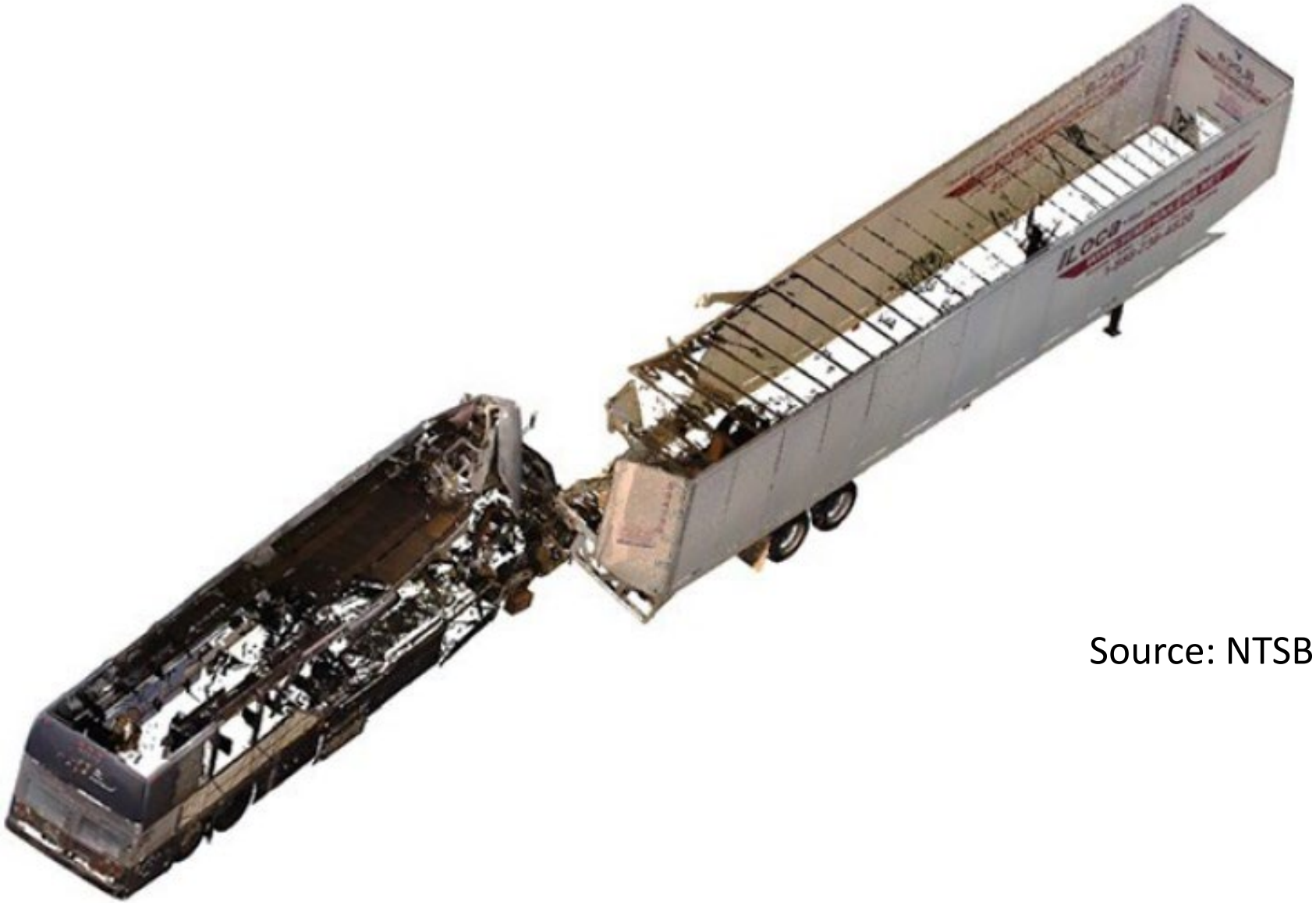

N
Illinois
Indiana
Indianapolis, IN
Greyhound Terminal
St. Louis, MO
Greyhound Terminal
Crash location
Direction of travel
15 miles

Source: NTSB


Silver Lake
Rest Area
Crash
Location
Exit Ramp
Curve
I- 70
Horizontal
Curve
I-70
Westbound
I-70
Eastbound
N
Source: NTSB


Mack
vehicle
Kenworth
vehicle
Source: NTSB
N
Prevost
motorcoach
Freightliner
vehicle

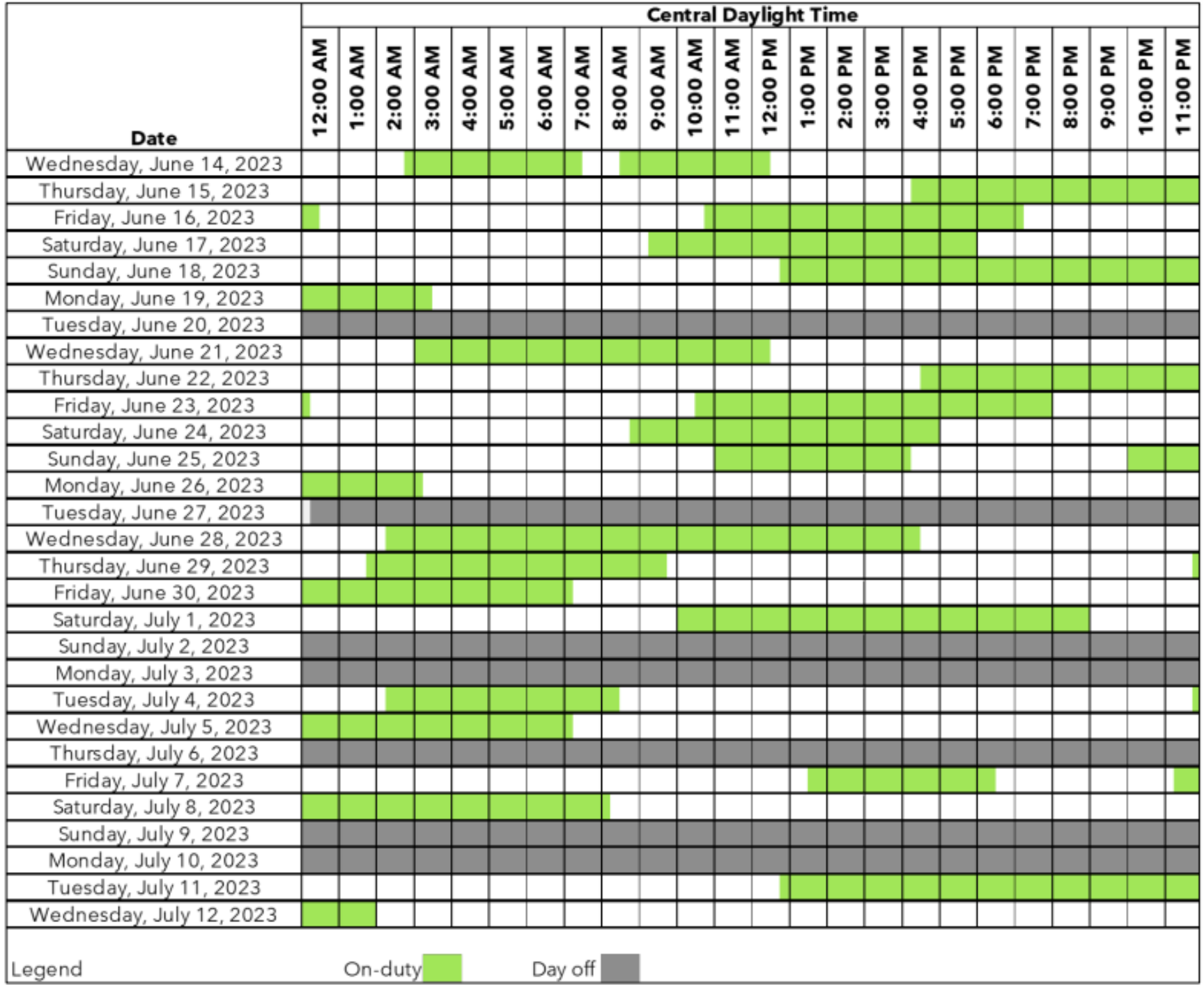

Mack combination unit
Kenworth combination unit
Prevost motorcoach
Freightliner combination unit
Direction of travel
N
Source: NTSB



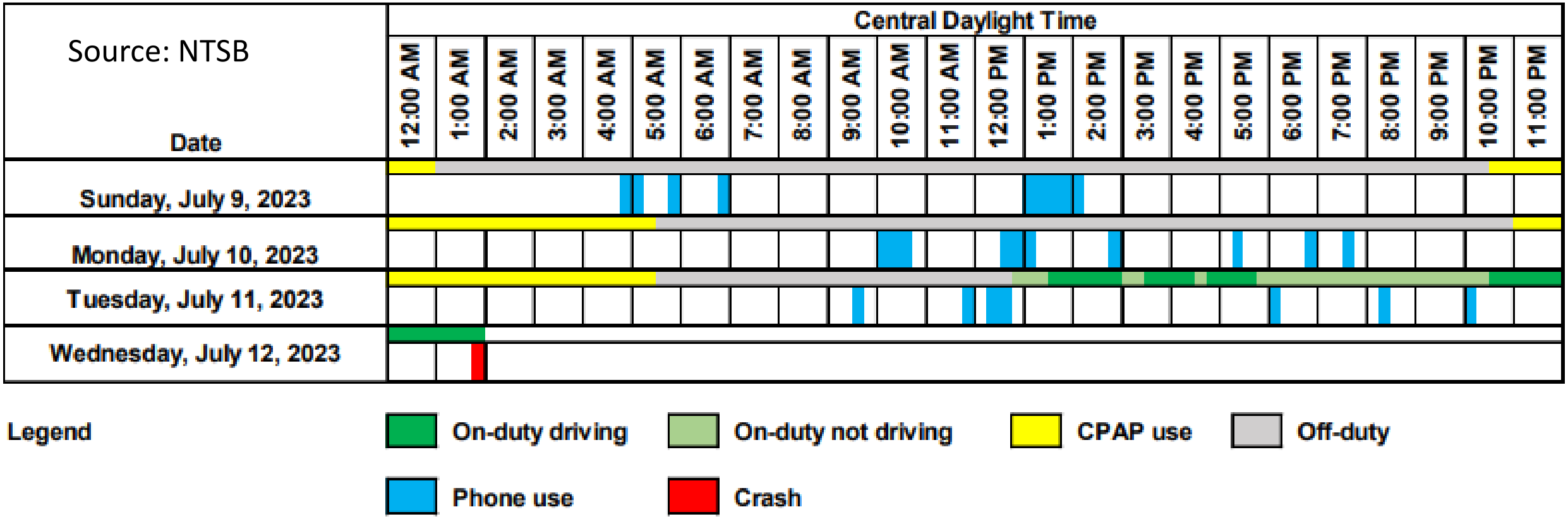
Source: NTSB

Schedule

Source: NTSB



Schedule


Source: NTSB
Central Daylight Time
Date
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
Sunday, July 9, 2023
Monday, July 10, 2023
Tuesday, July 11, 2023
Wednesday, July 12, 2023
Legend
On-duty driving
On-duty not driving
CPAP use
Off-duty
Phone use
Crash

Driver Company Policy Violations

Source: NTSB

Driver violation (as listed in the DMS report provided by Greyhound)	Number of occurrences	Assigned score (set by Greyhound)
Posted speed violation, speed policy violation	7	10
Speed policy violation	4	5
Posted speed violation	2	5
Failed to stop [at stop sign or light]	13	5
Failed to stop, other communication device	1	5
Following distance: < 1 second	5	5
Red light [braking response]	1	5
Following distance: ≥ 1 sec to < 2 sec	20	4
Late response [braking]	1	4
Incomplete stop [at stop sign or light]	5	3
Incomplete stop, other comm device	1	3
Late departure	1	3
Handheld device	1	3
Other concern [lane departure]	1	3
Other communication device	2	0
Lens obstruction	4	0
Near collision - unavoidable	1	0
Collision	1	0

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
  - Diagnosed with chronic cerebral small vessel disease
  - Unresolved 2018 worker compensation dispute regarding permanent disability status

Safety Issues

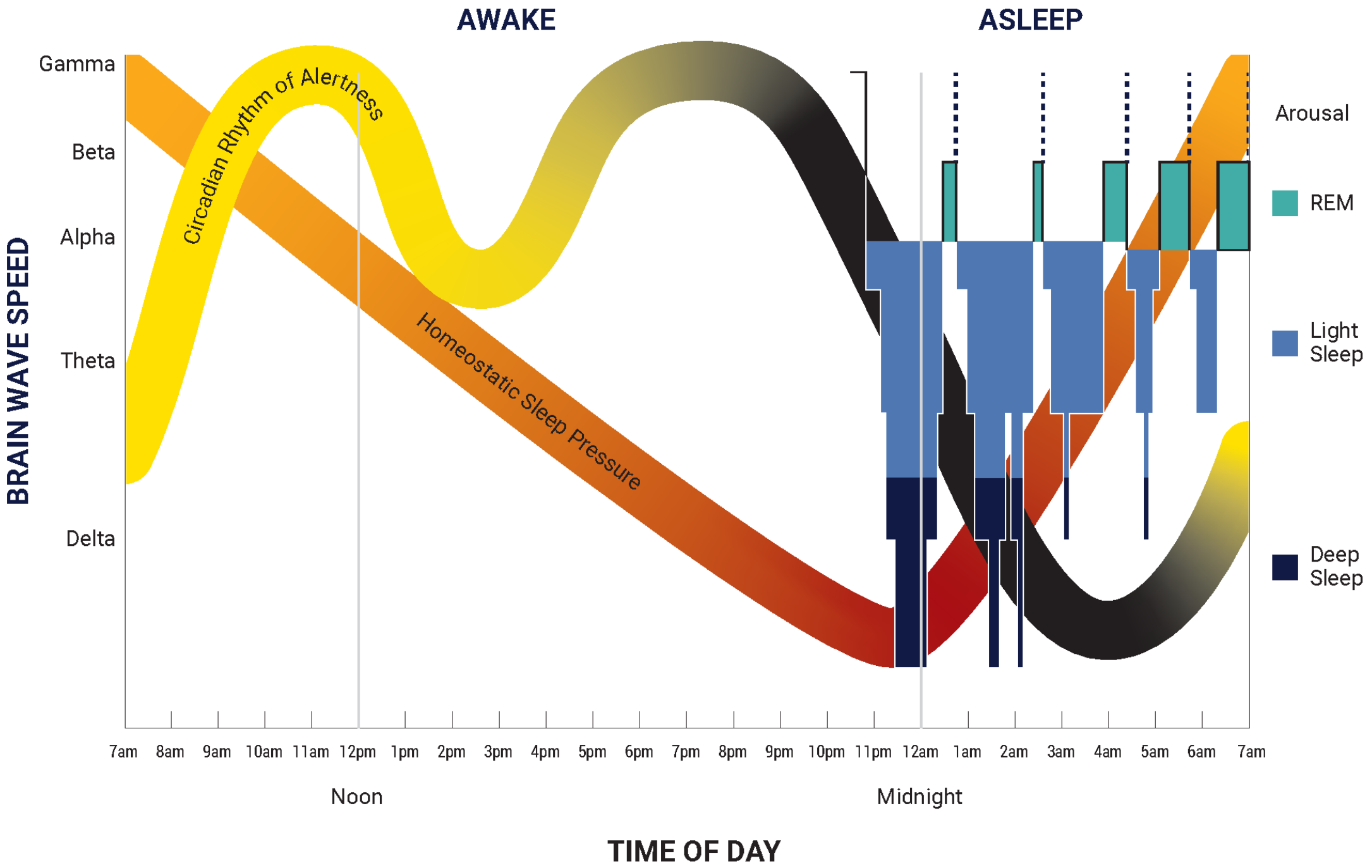
- Operator fatigue due to the driver's work schedule
- Inadequate carrier oversight of its drivers, which included a lack of a progressive discipline policy, inadequate record-keeping, and the absence of a policy for monitoring systems
- Insufficient federal guidance on safety management, driver training, and fatigue mitigation
- Lack of seatbelt use by passengers, which contributed to the severity of injuries
- Increased risk of collisions due to the shortage of truck parking along the National Highway System

NTSB Lessons and Recommendations

- Implement a fatigue management program per NAFMP guidelines
  - Educate drivers and staff on fatigue and its countermeasures
  - Adjust schedules to reduce irregular work-rest cycles
  - Use data from monitoring systems to detect and prevent fatigue
  - Assess the effectiveness of new safety policies and technologies after adoption
- Establish an electronic system for personnel files to improve access to driver records, including disciplinary actions
  - Define an acceptable number of safety violations and implement disciplinary measures for underperforming drivers
- Mandate a safety briefing before each departure, driver change, and when new passengers board

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


AWAKE
ASLEEP
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

Time of Day

- The body's clock promotes daytime alertness and nighttime sleep
- Fatigue significantly increases when driving between midnight and 7 a.m., counteracting natural sleep cycles
- Extensive night driving leads to poorer quality daytime sleep, causing accumulated fatigue and reduced alertness
- Disregarding the body's clock impairs cognitive function, slows reactions, and raises crash risk

Recent Sleep

- Most individuals require 6 to 9 hours of sleep for optimal function
- Insufficient sleep in the last 24 hours is a significant contributor to fatigue
- Scheduling practices that consistently reduce sleep opportunity directly lead to this deprivation, impacting driver alertness

Continuous Hours Awake

- Being awake for more than 16 consecutive hours since the last major sleep period significantly increases fatigue
- This prolonged wakefulness is due to mounting homeostatic sleep pressure, dramatically impairing a driver's ability
- Poorly planned schedules often result in long hauls without adequate breaks, pushing drivers into this dangerous zone and increasing crash risk

Cumulative Sleep Debt

- Accumulated sleep debt must be repaid for optimal function
- More than eight hours of accumulated sleep debt since the last full night of sleep, including disrupted sleep, is a significant fatigue factor
- Schedules that offer inconsistent rest periods or force drivers to constantly "catch up" on sleep contribute to this chronic and dangerous fatigued state

Gradual Schedule Changes

- The body's circadian rhythm adapts slowly to changes in sleep-wake patterns
- When altering work schedules, it's ideal to do so gradually, by no more than 1-2 hours per week
- Drastically changing sleep-wake times overnight can cause significant desynchronization between the internal clock and the external environment
- This desynchronization exacerbates fatigue and impairs performance for several days until the body fully adjusts, highlighting the need for careful schedule transitions

Forward Schedule Changes are Easier

- The body generally adapts more easily to schedules that shift forward (e.g., going to bed and waking up later)
- Shifting forward allows homeostatic sleep pressure to accumulate, making it easier to fall asleep at a later time
- Conversely, shifting schedules backward (going to bed and waking up earlier) fights against existing sleep pressure, making it harder to fall asleep and potentially leading to accumulated sleep debt

Monotonous or Complex Task

- The nature of the driving task significantly influences fatigue levels
- Highly monotonous driving (e.g., long, straight highways) can lead to under-stimulation and boredom, increasing drowsiness
- Overly complex or demanding conditions (e.g., heavy traffic, adverse weather, intricate routes) can increase mental workload and cognitive fatigue
- Both extremes—monotony and complexity—require careful consideration in scheduling and rest planning to mitigate fatigue

Underlying Sleep Disorders

- Undiagnosed or untreated sleep disorders are significant contributors to chronic fatigue, even when sleep opportunities seem adequate
- Conditions like obstructive sleep apnea (OSA), characterized by repeated stops and starts in breathing during sleep, severely disrupt sleep quality
- This disruption leads to excessive daytime sleepiness, regardless of the time spent in bed
- Drivers with unmanaged sleep disorders face a heightened risk of fatigue-related incidents and require proper diagnosis and treatment to ensure road safety

NAFMP

North American Fatigue Management Program

nafmp.org

New NAFMP Website

- 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 nitrifications
- 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

Rodolfo Giacoman
Fatigue Management Specialist
Commercial Vehicle Safety Alliance

Rodolfo.Giacoman@CVSA.org
202-998-1830

Scan vCard and add me to your contacts