



**NTSB** National Transportation Safety Board

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*Office of Railroad, Pipeline and  
Hazardous Materials Safety*

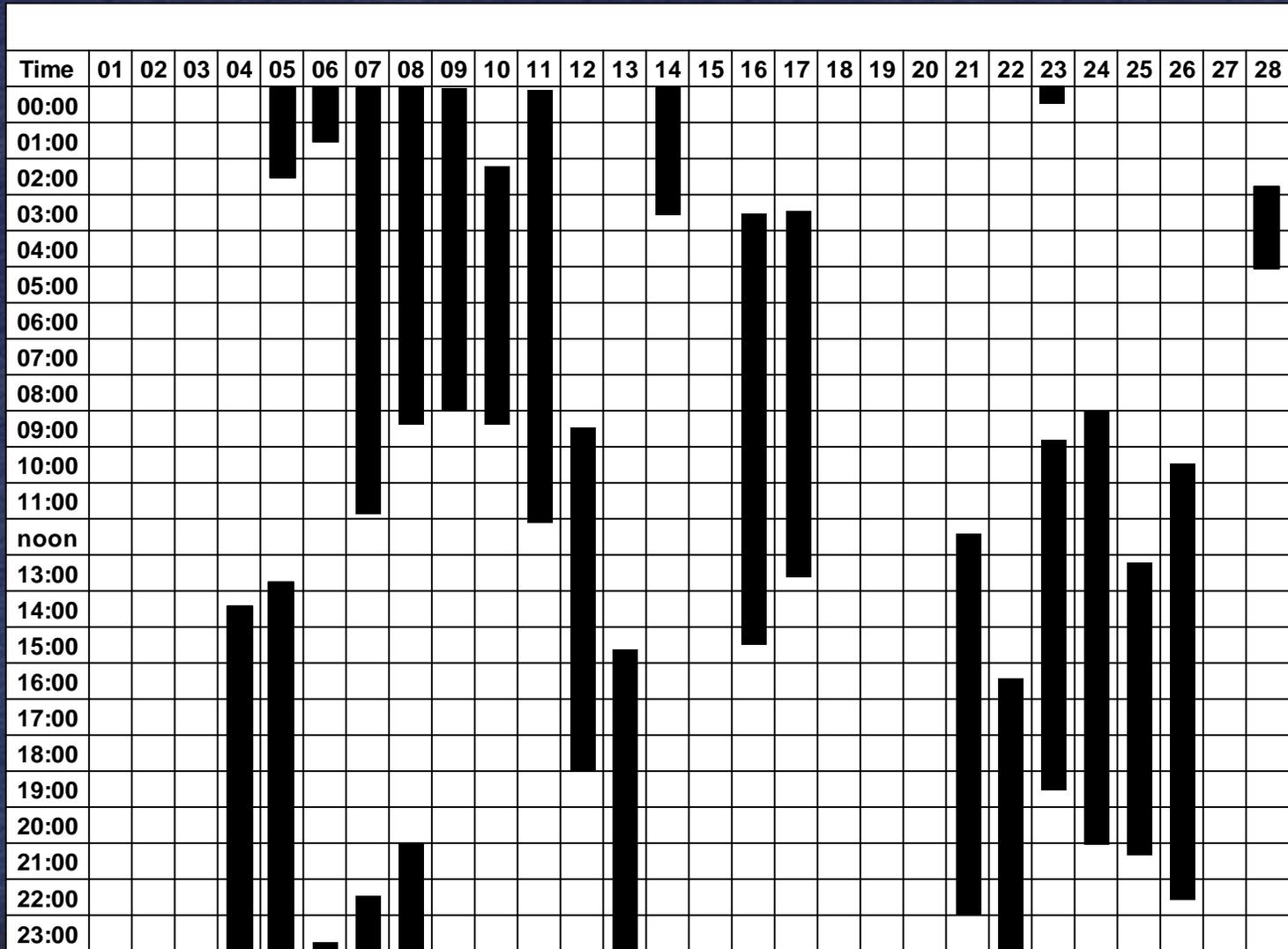
# Performance of the UP Train Crew

# UP Crew Fatigue

- Work schedules, rest, and activities prior to the accident trip
- Performance during the accident trip

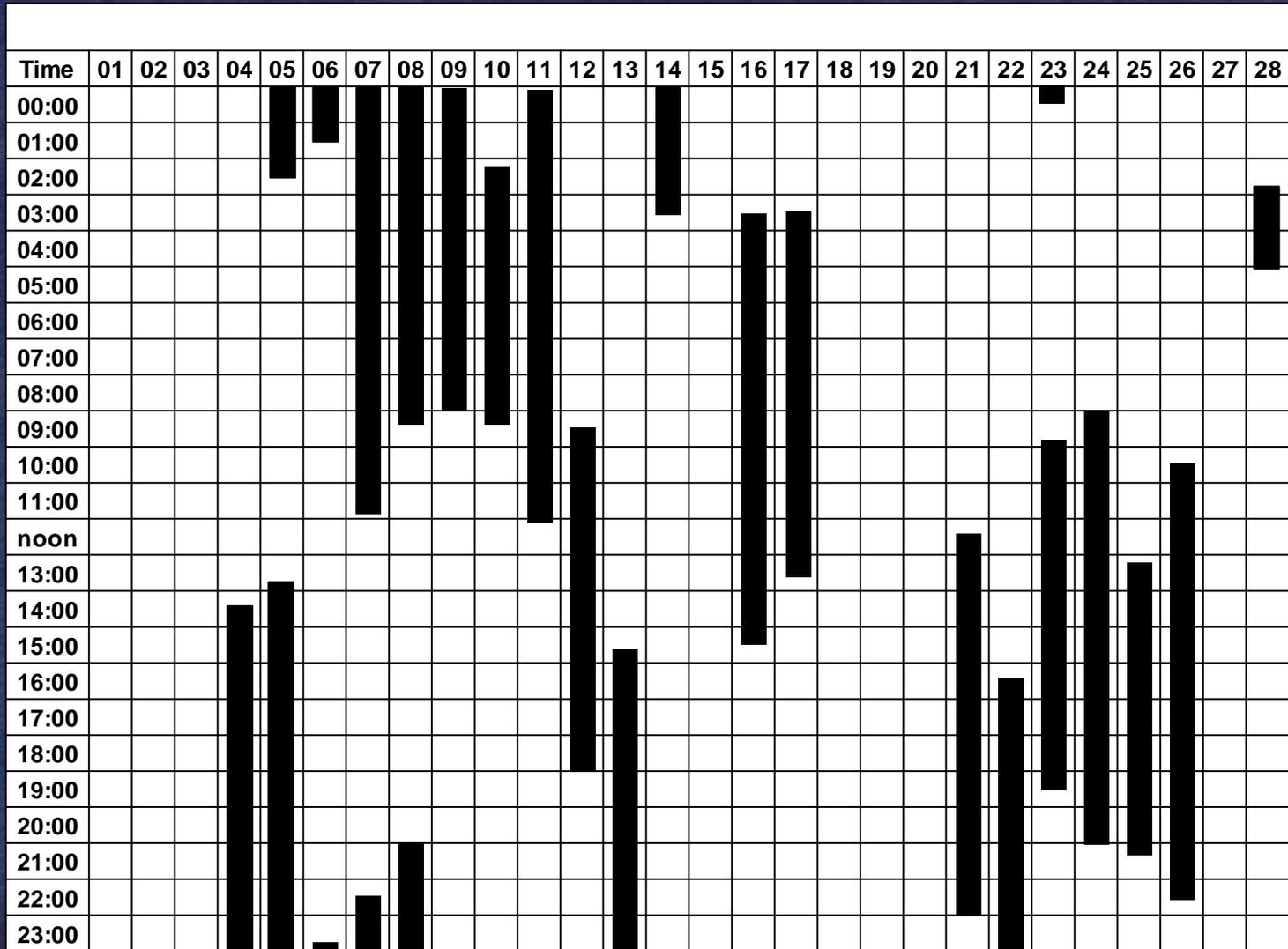
# UP Conductor's Work Schedule

## June 2004



# UP Conductor's Work Schedule

## June 2004





# UP Conductor's Activities

## June 26-27, 2004

11:15 PM -- Arrived home

1:00 AM -- Watched movie

4:00 AM -- Retired to bed

1:00 PM -- Got up; went out to dinner

# UP Conductor's Activities

## June 27-28, 2004

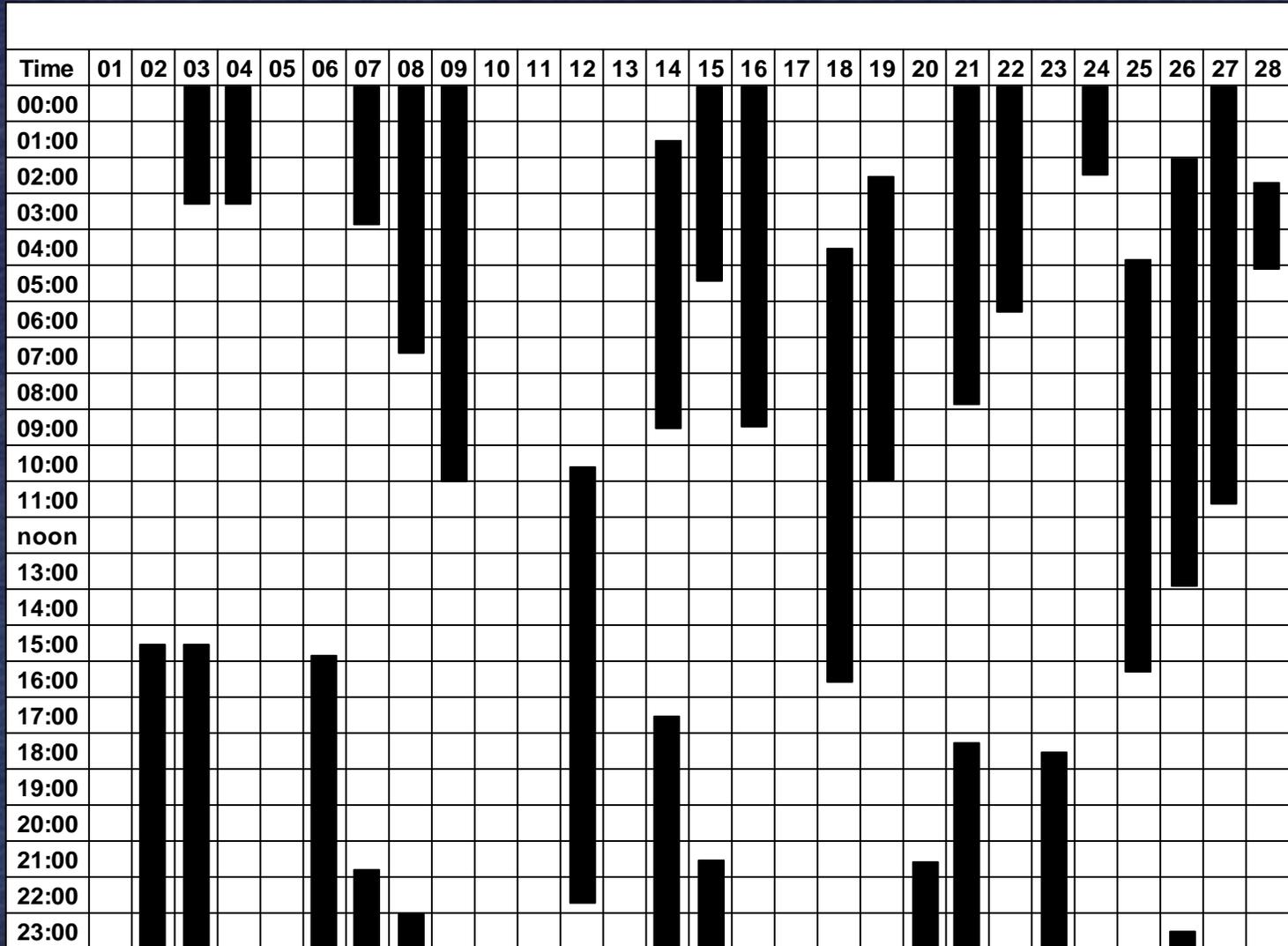
- 3:00 PM -- Called CMS; watched TV
- 6:00 PM -- Went to friend's home
- 9:00 PM -- Returned home; called CMS and went to bed
- 12:40 AM -- Called for the Del Rio trip
- 2:45 AM -- Reported for duty

# Conclusion

- The Union Pacific Railroad conductor's lack of sufficient rest before reporting to work, the disruption to his previous work/rest pattern that resulted from his change in work schedule, and his alcohol consumption on the evening before the accident likely combined to reduce his capacity to remain awake and alert during the accident trip.

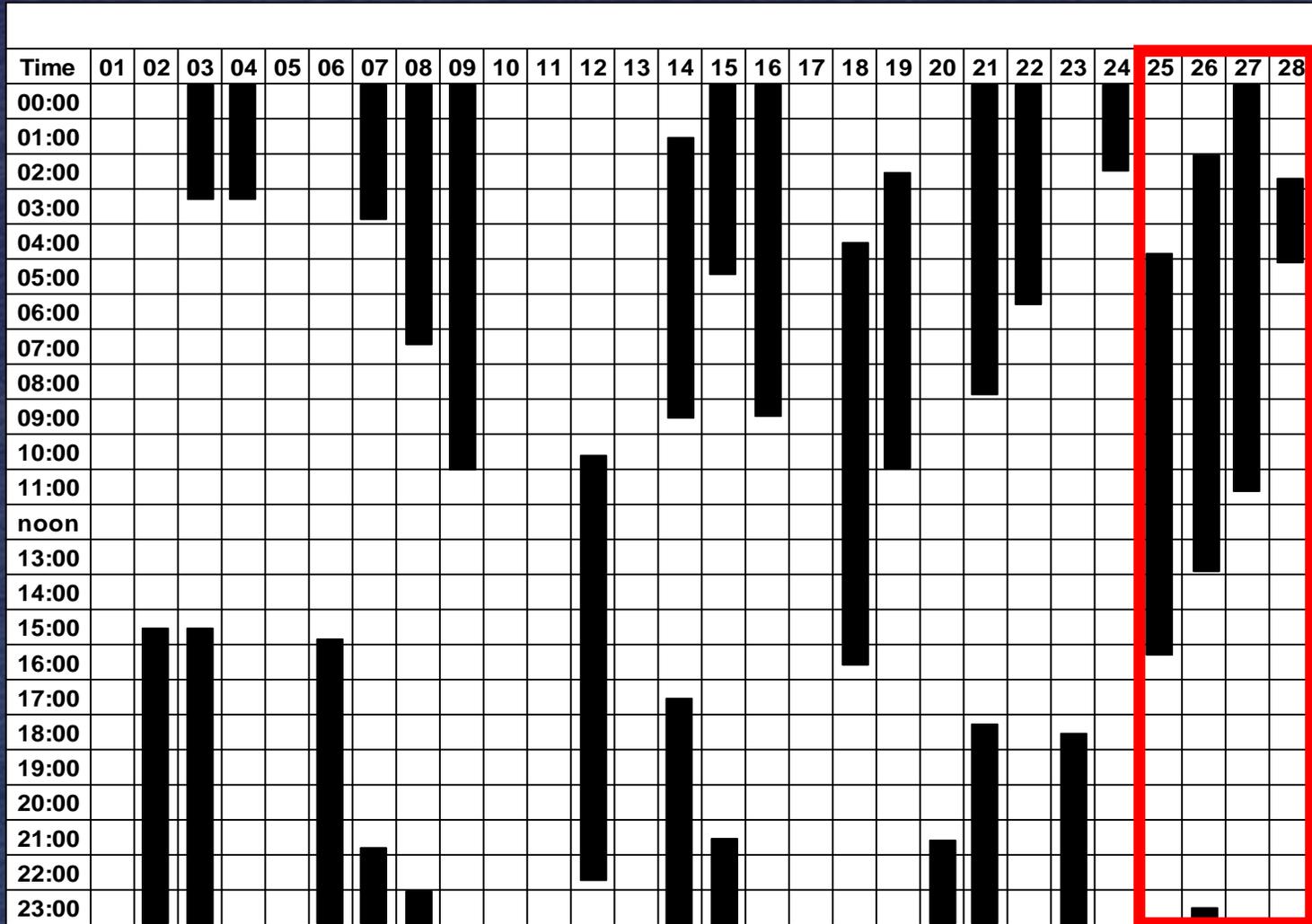
# UP Engineer's Work Schedule

## June 2004



# UP Engineer's Work Schedule

## June 25-28, 2004



# UP Engineer's Activities

June 27-28, 2004

12:30 PM -- Requested 12 hours undisturbed rest

1:00 PM -- Drove to wife's home to wait for daughter's arrival at airport

6:00 PM -- Picked up daughter and took her back to wife's home for dinner

8:30 PM -- Left and went to cousin's home to play cards

# UP Engineer's Activities

## June 27-28, 2004

11:00 PM -- Returned to an engineer's home and went to bed

12:35 AM -- Accepted call to step-up for a trip to Del Rio

2:30 AM -- Talks with a fellow engineer at Kirby Yard

2:45 AM -- Reported for duty

# Conclusion

- The Union Pacific Railroad engineer's combination of sleep debt, disrupted circadian processes, limited sleep through the weekend, and long duty tours in the days before the accident likely caused him to start the accident trip with a reduced capacity to resist involuntary sleep.

# Conclusion

- Neither the engineer nor the conductor of the Union Pacific Railroad train made effective use of the time that was available to them, between the time they were released from their previous assignments and the time they were called for the accident trip, to obtain rest.

# Freight Crew Work Schedules

- Violate established scientific principles of scheduling
- Unpredictability of work schedules has unintended consequences

# Conclusion

- The unpredictability of their work schedules may have encouraged the Union Pacific Railroad engineer and conductor to delay obtaining rest in the hope that they would not be called to work until later on the day of the accident.

# UP Crew's Performance During the Accident Trip

- Train not operated in compliance with signal indications and operating rules
- Evidence that neither crewmember was consistently attentive to his work

# The Conductor's Performance

- Failed to make any entries on the Conductor's Report Form
- Should have prompted the engineer after *approach* signal passed at 45 mph
- Failed to intervene when *stop* signal came into view
- “What happened?”

# Conclusion

- The conductor of the Union Pacific Railroad train was most likely asleep during much of the accident trip.

# The Engineer's Performance

- Anomalous speed reduction after the *clear* signal at Alamo Junction
- Proceeded over grade crossings without sounding the horn
- Did not slow to 30 mph after passing the *approach* signal
- Failed to dim his headlight
- Did not place the brakes in emergency

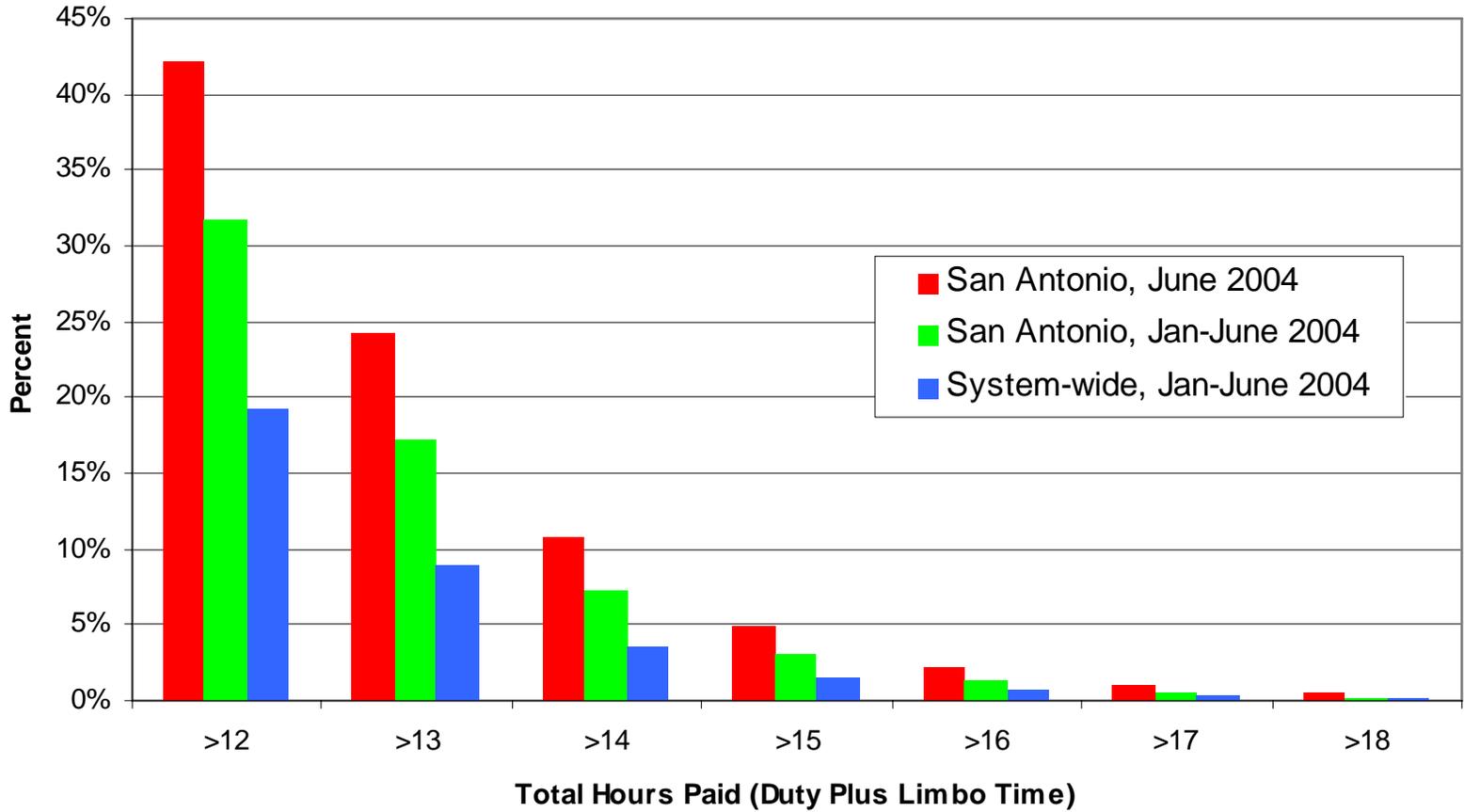
# Conclusion

- The engineer of the Union Pacific Railroad train likely experienced one or more periods of microsleep early in the accident trip, and these were probably followed by a deeper descent into sleep as the train traveled past the signal at the east end of the Macdona siding.

# Limbo Time

- Time spent awaiting transportation or in transit
- Neither on-duty nor off-duty time
- Rest period does not begin until limbo period ends
- Investigation examined records

**Union Pacific Railroad  
Percent of Time Train Crews in Extended Pay Status**



# Conclusion

- Limbo time, which is limited neither by Federal regulation nor railroad operating rules, could be a factor in crewmember fatigue in that required rest periods do not take into account the extended hours of wakefulness before the rest period begins.



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# Maximum Hours per Month by Mode

