# National Transportation Safety Board

*Washington, D.C. 20594*

## Safety Recommendation

Date: OCT 7, 1999
In reply refer to: R-99-61

Mr. Charles Little
International President
United Transportation Union
14600 Detroit Avenue
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About 2:15 a.m., July 2, 1997, westbound Union Pacific Railroad (UP) freight train MKSNP-01, operating on a siding track, proceeded past a wayside stop signal at the end of the siding and collided with the side of eastbound UP freight train ZSEME-29, which was operating on a mainline track on the UP railroad near Delia, Kansas. The MKSNP-01 train engineer was killed, and the MKSNP-01 train conductor sustained minor injuries.[1]

Based on its investigation findings, the National Transportation Safety Board determined that the engineer of the striking train probably fell asleep sometime after his train entered the siding. When the engineer of MKSNP-01 failed to dim his train's headlight, the operating crew of train ZSEME-29 responded by flashing their train's headlight and repeatedly attempting to contact him by radio. However, he did not respond at all to repeated radio calls from the on-coming train's crew and did not respond timely to the flashing headlight beam. He possibly awoke upon hearing the eastbound train's horn sounding and dimmed his train lights and extinguished his ditch lights in reaction to meeting an oncoming train, but was either not sufficiently alert or too startled or disoriented to realize that he needed to apply the brakes.

The Safety Board determined that the engineer's continuous hours of wakefulness, together with the time of his work shift likely affected his behavior. His wife stated that he awoke about 8:00 a.m. on July 1, 1997, and did not nap before reporting for work at 8:30 p.m. The collision occurred about 2:15 a.m. on July 2, 1997, meaning that he had been continuously awake for about 18 hours at the time of the accident.

Sleep research suggests that whenever an individual goes without sleep beyond a normal waking day of 14 to 16 hours, he likely will suffer degraded performance, including attention

[1] For additional information, read *Collision between Union Pacific Freight Trains MKSNP-01 and ZSEME-29 near Delia, Kansas, July 2, 1997*, Railroad Accident Report NTSB/RAR-99/04 (Washington, D.C.: National Transportation Safety Board, 1999).

lapses. Moreover, the human body maintains a day-night cycle known as circadian rhythm,[2] which affects, among other biological processes, sleep-wake patterns. The circadian cycle has two periods of nadir, between about 1:00 a.m. and 7:00 a.m., and between about 1:00 p.m. and 5:00 p.m., during which workers typically experience diminished capacity.

The MKSNP-01 engineer had been on vacation for 17 days before returning to work on June 30. His spouse told Safety Board investigators that he had retired each evening between 9:00 p.m. and midnight and awoke each morning between 5:00 a.m. and 7:00 a.m. while on vacation. The accident therefore occurred on the first day after an extended period during which he had firmly established a regular sleep-wake pattern.

When individuals change their work-rest schedules, their bodies do not adjust immediately. They normally require from several days to weeks to adapt to work-rest schedule changes. In the interim, as their bodies adjust to the new schedule, they can experience impaired performance, diminished alertness, and increased reaction time. In this case, the engineer likely had not had the necessary period of adjustment for his circadian rhythm to match his new sleep-wake cycle. As a result, he probably was not prepared to stay awake all night.

UP officials indicated that in September 1990, the carrier mailed a fatigue-awareness handbook and video to all of its train service and mechanical service employees and their family members. The Safety Board reviewed the fatigue-awareness handbook and video, which address such topics as the body's need for rest, rotating shift work, body rhythms, the beneficial effects of a nutritious diet and exercise, and lifestyle considerations, including family and social life considerations within the context of shift work, and concluded that both the handbook and video provided by the UP to employees are valuable information resources for helping railroad personnel and their families understand fatigue issues.

In testimony, the conductors of both trains recalled that they had received the fatigue-related material; the ZSEME-29 engineer and the MKSNP-01 engineer's spouse said that they were unaware that such information or such a company-sponsored program existed. The personnel and training records of the crewmembers involved in the accident contain no reference or documentation indicating that the material had been sent to them.

The fact that some crewmembers and family members had not heard of the UP's fatigue management program indicates that the carrier's action, although laudable, was not effective. The Safety Board thinks that a railroad safety program needs the combined support of management and labor to be effective.

Therefore, the National Transportation Safety Board recommends that the United Transportation Union:

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[2] Circadian rhythm is a term used to describe cyclical biological processes that occur at approximately 24-hour intervals in approximate synchrony with the earth's day-night cycle. Sleep-wake patterns, body temperature, hormone levels, and metabolism are some of the processes that have recurring and predictable variations throughout a 24-hour period.

In conjunction with other operating unions and with the Union Pacific Railroad, discuss the circumstances of this accident with your members and advise them about the operating danger of working while fatigued. (R-99-61)

Also, the Safety Board issued safety recommendations to the Federal Railroad Administration, the Union Pacific Railroad, and the Brotherhood of Locomotive Engineers.

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility "to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations" (Public Law 93-633). The Safety Board is interested in any action taken as a result of its safety recommendations. Therefore, it would appreciate a response from you regarding action taken or contemplated with respect to the recommendation in this letter. Please refer to Safety Recommendation R-99-61 in your reply. If you have any questions, you may call (202) 314-6436.

Chairman HALL, Vice Chairman FRANCIS, and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in this recommendation.

*Original Signed*

By: Jim Hall
Chairman