



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: February 26, 1999

In reply refer to: H-99-4a through -8

Honorable Rodney E. Slater
Secretary
U.S. Department of Transportation
Washington, D.C. 20590

The National Transportation Safety Board investigated two accidents in 1995 and 1997 that are typical of the motorcoach accidents that it has investigated over the years.¹ On October 15, 1995, a 1989 Eagle motorcoach operated by Hammond Yellow Coach Line, Inc., (Hammond) and occupied by a driver and 39 members of a high school booster club overturned when it entered an Interstate (I)-70 exit ramp in Indianapolis, Indiana. Two passengers sustained fatal injuries, 13 sustained serious injuries, and 26 received minor injuries.

On July 29, 1997, a 1985 TMC (Transportation Manufacturing Corporation) motorcoach operated by Rite-Way Transportation, Inc., (Rite-Way) and occupied by a driver and 34 members of the Pathways to Freedom tour group drifted off the side of I-95 near Stony Creek, Virginia, and down an embankment into the Nottoway River, where it came to rest on its left side. One passenger sustained fatal injuries, the driver and 3 passengers sustained serious injuries, and 28 passengers sustained minor injuries.

These accidents involved factors that the Safety Board has repeatedly identified as issues in accidents and that have the potential for catastrophic consequences, namely driver fatigue and poorly maintained or out-of-adjustment brakes. The Stony Creek accident also highlighted the need for motorcoach passengers to receive pretrip safety information, such as the emergency evacuation briefing presently required for commercial air passengers.

The motorcoach drivers in both of these accidents had exhibited signs of fatigue. The Safety Board identified several factors that probably put the Hammond busdriver at risk for fatigue, primarily the time of day and the length of time that he had been awake, on duty, and driving. The accident occurred at a time of day when he normally was asleep or preparing to go to sleep. At the time of the crash, he was nearing the end of his allowable duty cycle. He had been awake for 16.5 hours and on duty for about 11 hours, during which he had driven for 7.5 hours. Had he completed his trip, he probably would have exceeded the hours-of-service rules.

¹For addition information, refer to Special Investigation Report—*Selective Motorcoach Issues* (NTSB/SIR-99/01).

In the case of the Rite-Way busdriver, his duty-sleep periods were constantly inverted as he alternately drove or slept on successive nights during the extended tour. On July 26 and 27, he slept during the evening. On July 28, he arose about 7 a.m. and took a local area tour during the day. He began driving Monday night about 8 p.m. He took two 1-hour naps, the last one ending about ½ hour before the accident, which occurred about 7 a.m. the next morning. The busdriver therefore had not had any bed rest and probably had obtained only 2 hours of “split sleep,” that is, rest that is accumulated in short blocks of time, during the 24 hours before the accident.

Split sleep, such as that experienced by the driver in the Stony Creek accident, has been associated with driver fatigue and a resulting decrease in performance. Research has shown that the sleep accumulated in short time blocks is less refreshing than the sleep accumulated in one long time period.² Other research indicates that “the more sleep is disturbed or reduced, for whatever reason, the more likely [that] an individual will inadvertently slip into sleep.”³

For a variety of reasons, tour organizers sometimes create schedules that alternate nights of travel with nights at a hotel. Such a schedule can adversely affect the busdriver’s ability to acquire proper rest. Based on its findings in the Stony Creek investigation, the Safety Board concluded that the Rite-Way driver became fatigued because the Pathways to Freedom tour schedule imposed inverted duty-sleep periods and because additional well-rested drivers were not provided for relief.

According to agency officials, the Federal Highway Administration (FHWA) has a stated goal of educating all 7 million commercial drivers license (CDL) holders on recognizing fatigue and on the importance of adequate rest and healthy work and lifestyle choices. The FHWA is planning a two-phase project to specifically address busdriver fatigue. In the first phase, the FHWA intends to study the differences between motorcoach operations and truck operations as they relate to operator fatigue. The second phase is the development of a fatigue awareness and countermeasure video for motorcoach drivers, which will be distributed through the National Technical Information Service to industry. The Safety Board believes that the FHWA video being developed should discuss the dangers of inverted duty-sleep periods.

The Safety Board is aware that the Transportation Efficiency Act for the 21st Century (TEA-21), enacted June 9, 1998, provides for the DOT to assess how the operations of shippers, brokers, freight forwarders, consignees, or others, such as tour or charter operators, encourage violations of the hours-of-service rules. The Safety Board believes the inverted work schedules of motorcoach tours and charters should be included in the TEA-21 assessment.

At the time of their respective accidents, the Hammond and Rite-Way drivers were within the hours-of-service rules; however, had they completed their scheduled trips, they probably

² Dinges, D.F., 1989, “The Nature of Sleepiness: Causes, Contexts, and Consequences,” in Stunkard, A.J.; Baum, A, *Perspectives in Behavioral Medicine: Eating, Sleeping, and Sex*, Hillsdale, NJ: Lawrence Erlbaum Associates: 147-179, Chapter 9 (p. 147).

³ (a) Mitler, M.; Carskadon, M.A.; Ceisler, C.A.; and others, 1988, “Catastrophes, Sleep and Public Policy: Consensus Report,” *Sleep*. 11(1): 107. (b) Rosekind, M.R.; Gander, P.H.; Connell, L.J.; Co, E.L., 1994, “Crew Factors in Flight Operations X: Alertness Management in Fight Operations,” NASA/FAA Technical Memorandum DOT/FAA/RD-93/1.

would have exceeded the hours-of-service rules. In postaccident mechanical examinations, Safety Board investigators determined that the condition of the brakes on both accident vehicles met the Commercial Vehicle Safety Alliance (CVSA) criteria to be placed out of service for deficiencies requiring repair. In addition, the Safety Board concluded that the inoperative speedometer on the Hammond bus contributed to the driver's lack of speed control, the condition of the brakes probably contributed to the busdriver's inability to slow down on the exit ramp, and the faulty air conditioner may have contributed to the driver's fatigue and resulted in the passengers opening the windows, which may have contributed to the partial ejection and fatal injury of two occupants.

As part of its investigation, the Safety Board reviewed the history of oversight reviews for the two carriers. Before the accident, the Office of Motor Carriers (OMC) had conducted reviews of Hammond nine times between 1987 and 1995. Hammond received conditional ratings in three reviews and an unsatisfactory rating in one review. On September 14, 1994, the OMC conducted a follow-up compliance review of Hammond as a result of enforcement actions stemming from a compliance review on September 30, 1993. The OMC used findings from an Indiana State police inspection conducted earlier in the month, which had placed 63 percent of the vehicles reviewed out of service. The high number of vehicles meeting out-of-service criteria resulted in the OMC giving Hammond a conditional rating for the vehicle-factor portion of the compliance review. The OMC rated all other factors satisfactory; therefore, Hammond's overall rating for the 1994 compliance review was satisfactory.

Before its accident, Rite-Way had received compliance reviews from the Michigan Department of Transportation in 1993, 1995, and 1996. In each of the reviews, Rite-Way was fined for violations, several of which were deficiencies related to driver factors. The carrier received conditional ratings in 1993 and 1995 and a satisfactory rating in 1996.

The ratings that both carriers received in the compliance reviews were in accordance with Federal guidelines. Concerned that carriers with significant regulatory violations received satisfactory ratings, the Safety Board looked at the Federal standards for determining the safety fitness of carriers. The FHWA has developed a performance-based ranking system to target for evaluation those carriers presenting risks. The OMC compliance review rating methodology, however, considers safety management controls and performance-based elements within six factors, which are then weighted equally.

Since 1968, the Safety Board has investigated many fatal motorcoach accidents caused by fatigued drivers and by loss of speed control because of poorly maintained brakes, conditions that would put a driver or vehicle out of service. Further, in its 1992 safety study report, *Heavy Vehicle Airbrake Performance*,⁴ the Safety Board determined that available data do not allow the role of braking deficiencies in accidents to be evaluated readily. The Safety Board stated that its investigations suggested that deficient brakes on heavy vehicles are a factor in more accidents than statistics currently reveal. The Board found that in 9 of 15 brake-related accidents that it had investigated, State and local investigating agencies had failed to identify deficient brakes as a factor in their final reports. The Safety Board also determined that the accidents in the study resulted from a variety of deficiencies, the most common being out-of-adjustment brakes.

⁴ NTSB/SS-92/01.

The Safety Board is convinced that it is important to give more weight to the performance data in the driver and vehicle factors in passenger carrier compliance reviews. Deficiencies in these factors have been shown to be directly related to accidents. Considering the number of unrated carriers, Hammond and Rite-Way received above average attention from the OMC and the States of Indiana and Michigan. Yet the OMC's rating methodology enabled those carriers that had repeatedly received conditional or unsatisfactory ratings in either the vehicle or driver factor of the compliance review to operate, potentially placing school children and other passengers at risk. Hammond had received conditional and unsatisfactory ratings for 3 years, yet still was allowed to operate. The public rightfully expects motorcoaches to be safe. The Hammond, Rite-Way, and other accidents demonstrate that greater Federal oversight of passenger carrier operations is needed. Therefore, the Safety Board believes that the safety fitness rating methodology should be changed so that adverse vehicle or driver performance-based data alone are sufficient to result in an overall unsatisfactory rating for the carrier.

In many of the bus accidents investigated by the Safety Board, passengers have described a general sense of panic because they did not know what to do or how to get out of the bus. In the case of the Stony Creek accident, many passengers, some of whom were as young as 11, indicated that they had difficulty evacuating the vehicle, which was overturned and partially submerged in 5 to 6 feet of water. To escape, they had to stand on the seats, push up on the emergency windows, and climb out and onto the top of the bus. Their heavy water-soaked clothing encumbered the passengers, and they had trouble lifting themselves up through the windows. Other passengers said that they had trouble wading through the water or keeping themselves above the water, which nearly filled the bus. One passenger experienced difficulty opening an emergency window when she could not see through the murky water to read the instructions. She said that she began to panic when other passengers began shoving her.

Before the Pathways to Freedom 97 trip began, Rite-Way did not provide passengers with instructions on the use of emergency exits onboard the bus. Many passengers stated that they felt a briefing from the driver on the emergency exits would have been beneficial to them. The Safety Board determined that Rite-Way had not trained the driver to provide passengers with a safety briefing before or during the trip. Such training was not required. The Safety Board concluded that emergency instructions can be crucial to a safe and expedient evacuation in the event of a motorcoach accident or emergency.

Motorcoach operators have a variety of opportunities to provide passengers with emergency evacuation information. Depending on the size of the carrier or the scope of its operation, safety materials could include all or any number of the following: videos, briefings, pamphlets, or cards attached to seatbacks. The bus involved in the Stony Creek accident was equipped with a public address system, a videotape player, and television monitors, which Rite-Way could have used to tell passengers what to do in the event of an accident, vehicle fire, or submersion in water.

As part of this special investigation, the Safety Board discussed the availability of safety briefing videos with industry representatives for the two major trade associations, the American Bus Association (ABA) and the UMA, and for a marketing and tour brokering organization, the National Motorcoach Network (NMN). The ABA, UMA, and NMN representatives said that

passenger safety videos similar to those shown on aircraft are available, but are not widely used throughout the motorcoach industry. The Safety Board is aware that the UMA has produced a 4-minute safety video, which includes such topics as obeying the driver's instructions, locating the fire extinguisher, escaping during an emergency, and using the handholds while the motorcoach is moving.

The NMN representatives said that their company had produced customized video and audio tapes providing passengers with emergency and general safety information as part of a commercial project from 1994 through 1996. The NMN found that carriers did not enforce the showing of the video because they reportedly "did not like to tell their drivers what to do when on the road." The NMN encountered other barriers. Some carriers did not wish to pay for the video. To continue the program, the NMN solicited funding from outside sources, who frequently were mentioned in the information items. According to the NMN, carriers objected to the identification of the sponsors in the films because they "did not like to help promote the business of the outside sources on their trips."

The Safety Board has stressed the importance of passenger safety education in all modes of transportation. Federal regulations governing aviation safety presently provide minimum requirements for conveying safety information to plane passengers. Amtrak uses signs and placards, as well as briefings, to inform passengers about safety features on its trains. U.S. Coast Guard regulations require safety drills on all cruise ships embarking passengers from U.S. ports. The Safety Board believes that Federal regulations should require motorcoach operators to provide pretrip safety information to their passengers. In addition, Federal guidance should be provided to motorcoach operators on the minimum information to be included in safety briefing materials.

Therefore, the National Transportation Safety Board recommends that the U.S. Department of Transportation:

Require that the Federal Highway Administration fatigue video for motorcoaches include the dangers of inverted duty-sleep periods. (H-99-4a)

In the assessment that is mandated by the Transportation Efficiency Act for the 21st Century, include the inverted work schedules of motorcoach carriers in the study of how the operations of shippers, brokers, freight forwarders, consignees, or others, such as tour or charter operators, encourage violations of the hours-of-service rules. (H-99-5)

Change the safety fitness rating methodology so that adverse vehicle and driver performance-based data alone are sufficient to result in an overall unsatisfactory rating for the carrier. (H-99-6)

Provide guidance on the minimum information to be included in safety briefing materials for motorcoach operations. (H-99-7)

Require motorcoach operators to provide passengers with pretrip safety information. (H-99-8)

Also, the Safety Board issued Safety Recommendations H-99-9 to the National Highway Traffic Safety Administration, H-99-10 through -14 to the American Bus Association, and H-99-15 through -18 to the United Motorcoach Association..

Please refer to Safety Recommendations H-99-4 through -8 in your reply. If you need additional information, you may call (202) 314-6484.

Chairman HALL, Vice Chairman FRANCIS, and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in these recommendations.

By: Jim Hall
Chairman