National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: February 26, 1999

In reply refer to: H-99-15 through -18

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As a result of its findings in two fatal motorcoach accidents in 1995 and 1997, the National Transportation Safety Board conducted a special investigation of motorcoach safety. The report of the investigation addresses, among other safety issues, busdriver fatigue, emergency egress, and passenger safety briefings.[1] The first accident occurred on October 15, 1995, when 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 as 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.

The second accident occurred on July 29, 1997, when a 1985 TMC (Transportation Manufacturing Corporation) motorcoach operated by Rite-Way Transportation, Inc., (Rite-Way) and occupied by a driver and 34 members of a 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, partially submerged in 5 to 6 feet of water. One passenger sustained fatal injuries, the driver and 3 passengers sustained serious injuries, and 28 passengers sustained minor injuries.

The motorcoach drivers in both of these two accidents had exhibited signs of fatigue. In the Rite-Way accident case, the tour schedule called for the group to travel one night and then stay in a hotel the following night. Consequently, the busdriver's duty-sleep periods were constantly inverted as he alternately drove or slept on successive nights. On July 26 and 27, the busdriver slept during the evening at a Charleston hotel. 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. The accident occurred about 7 a.m. 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.

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

Split sleep, such as that experienced by the driver in this 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]

Extended bus tours such as the Pathways to Freedom tour impose unique fatigue-inducing conditions on drivers. By their very nature, "extended" bus tours (longer than 2 or 3 days) are likely to entail inverted duty-sleep periods for the busdriver. For a variety of reasons, tour organizers sometimes create schedules that alternate nights of travel with nights at a hotel. If no rested relief driver is provided, such a schedule can adversely affect a busdriver's ability to acquire proper rest.

Based on its findings in the Stony Creek accident, 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. The Safety Board determined that the major industry trade associations should alert their members to the dangers of inverted duty-sleep periods and encourage their members to revise their scheduling practices to avoid inverted duty-sleep periods or to provide a well-rested relief driver if the schedule requires alternate night driving.

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

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[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 Erblaum 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.

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 for the UMA, and 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 topics such 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 determined that Federal guidance should be provided on the minimum information to be included in safety briefing materials for motorcoach operations. As an interim measure, the motor carrier associations should encourage their members to provide pretrip safety information to motorcoach passengers.

Therefore, the National Transportation Safety Board recommends that the United Motorcoach Association:

Alert your members to the dangers of inverted duty-sleep periods. (H-99-15)

Encourage your members to revise their scheduling practices to avoid inverted duty-sleep periods or to provide a well-rested relief driver if the schedule requires alternate night driving. (H-99-16)

Encourage your members to provide pretrip passenger safety briefings. (H-99-17)

Encourage your members to develop training programs for their drivers on how to make pretrip passenger safety briefings. (H-99-18)

Also, the Safety Board issued Safety Recommendations H-99-4 through -8 to the U.S. Department of Transportation, H-99-9 to the National Highway Traffic Safety Administration, and H-99-10 through -14 to the American Bus Association.

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 vitally 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 recommendations in this letter. Please refer to Safety Recommendations H-99-15 through -18 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.

Original Signed

By: Jim Hall
Chairman