National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: June 1, 1999

In reply refer to: I-99-1

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

During the 1980s, the National Transportation Safety Board investigated several accidents that involved operator fatigue.[1] Following completion of these accident investigations, the Safety Board in 1989 issued three recommendations to the U.S. Department of Transportation (DOT):

> Expedite a coordinated research program on the effects of fatigue, sleepiness, sleep disorders, and circadian factors on transportation system safety. (I-89-1)
>
> Develop and disseminate educational material for transportation industry personnel and management regarding shift work; work and rest schedules; and proper regimens of health, diet, and rest. (I-89-2)
>
> Review and upgrade regulations governing hours of service for all transportation modes to assure that they are consistent and that they incorporate the results of the latest research on fatigue and sleep issues. (I-89-3)

[1] (a) National Transportation Safety Board. 1985. *Collision of Tuba City School District Schoolbus and Bell Creek, Inc., Tractor-Semitrailer, U.S. 160 Near Tuba City, Arizona, April 29, 1985*. Highway Accident Report NTSB/HAR-85/06. Washington, DC. (b) National Transportation Safety Board. 1986. *Grounding of the Panamanian-Flag Passenger Carferry M/V* A. Regina, *Mona Island, Puerto Rico, February 15, 1985.* Marine Accident Report NTSB/MAR-86/02. Washington, DC. (c) National Transportation Safety Board. 1986. *China Airlines, Boeing 747-SP, N4522V, 300 Nautical Miles Northwest of San Francisco, California, February 19, 1985*. Aircraft Accident Report NTSB/AAR-86/03. Washington, DC. (d) National Transportation Safety Board. 1987. *Trailways Lines, Inc., Intercity Bus Collision With Rising Fast Trucking Company, Inc., Interstate Highway 40 Near Brinkley, Arkansas, July 14, 1986.* Highway Accident Report NTSB/HAR-87/05. Washington, DC. (e) National Transportation Safety Board. 1988. *Collision Between the* USS Richard L. Page *(FFG-5) and the U.S. Fishing Vessel* Chickadee, *the Atlantic Ocean, April 21, 1987*. Marine Accident Report NTSB/MAR-88/04. Washington, DC. (f) National Transportation Safety Board. 1988. *Collision Between U.S. Passenger/Car Ferries M/V* North Star *and M/V* Cape Henlopen *on Long Island, Orient Point, New York, July 9, 1987*. Marine Accident Report NTSB/MAR-88/06. Washington, DC. (g) National Transportation Safety Board. 1989. *Head-End Collision of Consolidated Rail Corporation Freight Trains UBT-506 and TV-61 Near Thompsontown, Pennsylvania.* Railroad Accident Report NTSB/RAR-89/02. Washington, DC.

Fatigue has remained a significant factor in transportation accidents since the Safety Board's 1989 recommendations were issued. Although generally accepted as a factor in transportation accidents, the exact number of accidents due to fatigue is difficult to determine and likely to be underestimated. The difficulty in determining the incidence of fatigue-related accidents is due, at least in part, to the difficulty in identifying fatigue as a causal or contributing factor in accidents. There is no comparable chemical test for identifying the presence of fatigue as there is for identifying the presence of drugs or alcohol; hence, it is often difficult to conclude unequivocally that fatigue was a causal or contributing factor in an accident. In most instances, one or more indirect or circumstantial pieces of evidence are used to make the case that fatigue was a factor in the accidents. This evidence includes witness statements, hours worked and slept in the previous few days, the time at which the accident occurred, the regularity or irregularity of the operator's schedule, or the operator's admission that he fell asleep or was impaired by fatigue.[2] Despite the difficulty in identifying fatigue as a causal factor, estimates of the number of accidents involving fatigue have been made for the different modes of transportation; the estimates vary from very little involvement to as high as about one-third of all accidents.

Although the data are not available to statistically determine the incidence of fatigue, the transportation industry has recognized that fatigue is a major factor in accidents. Further, the Safety Board's in-depth investigations have clearly demonstrated that fatigue is a major factor in transportation accidents.

In the 10 years that have passed since the three intermodal safety recommendations were issued, the Safety Board has issued an additional 70 fatigue-related safety recommendations,[3] which were the result of major accident investigations, special investigations, or safety studies that identified operator fatigue as a factor. This includes 11 accident reports or studies in aviation regarding air tours and operations conducted under Parts 91, 121, and 135; 7 in highway regarding busdrivers and truckdrivers; 3 in marine regarding passenger vessels and tankships; 4 in railroad regarding freight trains, passenger trains, and rail transit operations; and 1 in pipeline regarding pipeline controllers.

Operator fatigue has been on the Safety Board's list of Most Wanted Transportation Safety Improvements since the list's inception in 1990.[4] Had the DOT acted more aggressively on the three intermodal recommendations issued in 1989, the need for the 70 additional recommendations to the States and industry may have been minimized.

In November 1995, the Safety Board and the National Aeronautics and Space Administration (NASA) cosponsored a symposium to discuss fatigue countermeasures and to

[2] The Safety Board recognizes that people have a limited ability to predict the onset of sleep and to determine their level of sleepiness. (Itoi, A.; Cilveti, R.; Voth, M.; and others. 1993. *Can Drivers Avoid Falling Asleep at the Wheel? Relationship Between Awareness of Sleepiness and Ability To Predict Sleep Onset*. Washington, DC: AAA Foundation for Traffic Safety. p. 25.)

[3] Thirty-four of these recommendations were issued to the DOT or modal administrations. The remainder of the recommendations were issued to the States, industry, or industry associations.

[4] In October 1990, the Safety Board adopted a program to identify the "Most Wanted" transportation safety improvements. The purpose of the Board's Most Wanted list, which is drawn up from safety recommendations previously issued, is to bring special emphasis to the transportation safety issues the Board deems most critical.

demonstrate how they can be applied to prevent accidents in all modes of transportation.[5] The symposium was designed to practically illustrate the intent of one of the Safety Board's 1989 intermodal recommendations (I-89-2): to develop and disseminate educational material. More than 500 people from 16 countries representing all the modes of transportation attended the symposium, which attests to the magnitude and interest in the fatigue problem. As part of the symposium, the participants were divided into modal-specific groups to discuss scheduling, countermeasures, and education. All of the groups indicated that education was needed for the operators as well as for the management of transport companies. While the groups believed there was a need for additional technological countermeasures, they also believed there were some steps that could already be taken or could easily be implemented. For example, both an aviation group and the railroad group discussed the need for quality sleeping areas while away from home, pointing out that many hotels do not have rooms that are adequate for daytime sleeping. There was broad support voiced regarding a need for changes to the hours-of-service regulations. The participants wanted these regulations to be updated and based on scientific research.

The Safety Board recently completed a safety report that provides an update on the activities and efforts by the DOT and the modal administrations to address operator fatigue and, consequently, the progress that has been made in the past 10 years to implement the actions called for in the three intermodal recommendations and other fatigue-related recommendations.[6]

The various Secretaries of the DOT and modal Administrators over the years have expressed their concerns about operator fatigue. In a 1995 summary of the DOT's fatigue safety effort, Federico Peña, then Secretary of the DOT, stated that "fatigue among transportation operators remains a critical safety problem."[7] In a 1999 update, Secretary Rodney Slater stated, "We know that alertness is a key to safe vehicle operation. To reduce crashes and accidents and their personal and financial consequences, we need to ensure that vehicle operators are ready and capable of operating their vehicles or other transportation equipment."[8] Despite the many statements made by the DOT about the importance of addressing fatigue in transportation, only one of the three intermodal recommendations issued to the DOT more than 10 years ago has been fully implemented (I-89-1).

Safety Recommendation I-89-1

Safety Recommendation I-89-1 asked the DOT to expedite a coordinated research program on the effects of fatigue, sleepiness, sleep disorders, and circadian factors on transportation system safety. In its August 1989 response, the DOT stated that coordinated

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[5] National Transportation Safety Board; NASA Ames Research Center. 1996. *Fatigue Symposium Proceedings, November 1–2, 1995*. Washington, DC: National Transportation Safety Board.

[6] National Transportation Safety Board. 1999. *Evaluation of U.S. Department of Transportation Efforts in the 1990s To Address Operator Fatigue*. Safety Report NTSB/SR-99/01. Washington, DC.

[7] U.S. Department of Transportation. November 1995. *Sharing the Knowledge: Department of Transportation Focus on Fatigue*. Washington, DC.

[8] U.S. Department of Transportation. March 1999. *Managing Fatigue: A Significant Problem Affecting Safety, Security, and Productivity*. Washington, DC.

research efforts on human factors—including the effects of fatigue, sleepiness, sleep disorders, and circadian factors—on transportation safety was a top priority. The Human Factors Coordinating Committee, formed in 1988 and comprising representatives from each of the DOT administrations, serves as a means to share research information. A subcommittee has been created to focus on fatigue-related issues. In addition, the DOT briefed the Safety Board about the various ongoing fatigue-related projects several times over the years. Safety Recommendation I-89-1 was classified "Closed—Acceptable Action" on July 19, 1996, because the DOT had generally made Department-wide research efforts on operator fatigue. At the time this recommendation was closed, the Federal Aviation Administration (FAA), the Federal Highway Administration (FHWA), the National Highway Traffic Safety Administration (NHTSA), the Federal Railroad Administration (FRA), and the United States Coast Guard (USCG) all had fatigue-related research projects underway.

The Safety Board is disappointed, however, that more research efforts have not been made by the Research and Special Programs Administration (RSPA) in the pipeline mode. In 1998, the Board asked RSPA to assess the potential safety risks associated with rotating pipeline controller shifts and to establish industry guidelines for the development and implementation of pipeline controller work schedules that reduce the likelihood of accidents attributable to controller fatigue (Safety Recommendation P-98-30).[9] The RSPA responded to the recommendation on May 4, 1999.

The DOT's efforts to coordinate operator fatigue research have generally been responsive, with the exception of the RSPA regarding pipeline operations. The Safety Board encourages the DOT to continue its research, particularly on technology and in the pipeline mode, and to share information across the modes and with industry.

Safety Recommendation I-89-2

Safety Recommendation I-89-2 asked the DOT to develop and disseminate educational material for transportation industry personnel and management regarding shift work; work and rest schedules; and proper regimens of health, diet, and rest. In its 1989 response, the DOT acknowledged the unique demands placed on transportation workers such as shift-work, long-haul operations, and nighttime duty and that it would review its current policy on developing educational materials. In a more detailed response in 1996, the DOT indicated that it had published its 1995 report *Sharing the Knowledge: Department of Transportation Focus on Fatigue* and produced two videotapes that addressed fatigue: one on human factors and one entitled *Fatigue Busters—How to Survive Fatigue in the '90s*. In addition, the FAA also published a fatigue buster brochure. The Safety Board replied that it was pleased that information had been produced for aviation and highway, but it was concerned that similar information had not been developed for railroad, marine, and mass transit. On May 4, 1999, the DOT provided the Safety Board with an update of FRA education activities. Safety Recommendation I-89-2 is currently classified "Open—Acceptable Response."

[9] National Transportation Safety Board. 1998. *Pipeline Rupture and Release of Fuel Oil Into the Reedy River at Fork Shoals, South Carolina, June 26, 1996*. Pipeline Accident Report NTSB/PAR-98/01. Washington, DC.

In the early 1990s, NASA developed an education and training module entitled "Alertness Management in Flight Operations." It contains information about fatigue with an emphasis on aviation. The module has three primary objectives: to explain (1) the current state of knowledge about the physiological mechanisms that underlie fatigue; (2) misconceptions about fatigue; and (3) fatigue countermeasures. The NASA and the FAA have cosponsored many courses to educate pilots for a large segment of the major U.S. air carriers as well as for corporate management. The FRA, the Federal Transit Administration (FTA), and the FHWA along with industry organizations have used the NASA countermeasures training module as the basis for training modules in the other modes of transportation.

In addition to Safety Recommendation I-89-2, the Safety Board has issued other recommendations to the individual modal administrations calling for increased educational efforts regarding the effects of fatigue. In 1995, the Safety Board asked the FHWA to develop and disseminate, in consultation with DOT's Human Factors Coordinating Committee, a training and education module to inform truckdrivers of the hazards of driving while fatigued (Safety Recommendation H-95-5).[10] The FHWA and the American Trucking Associations, Inc., adapted the NASA module for use with the commercial driving industry and developed a train-the-trainer course on fatigue and fatigue countermeasures. To date more than 2,000 people have been trained; 16 seminars are being offered in 1999. Safety Recommendation H-95-5 to the FHWA was classified "Closed—Acceptable Action" on July 7, 1998.

In 1996, the Safety Board also asked the FTA, in cooperation with the American Public Transit Association, to develop a fatigue educational awareness program and to distribute it to transit agencies to use in their fitness-for-duty training for supervisors and employees involved in safety-sensitive positions (Safety Recommendation R-96-20).[11] The FTA has developed a seminar, available in four different formats, for a variety of attendees including employees, managers, and persons involved in scheduling. The Safety Board is pleased with this effort of the FTA and is aware that more than 600 persons have attended the seminars. As a result of these efforts, the Safety Board has classified Safety Recommendation R-96-20 "Closed—Acceptable Action."

In aviation, the Safety Board asked the FAA to require U.S. air carriers operating under 14 CFR Part 121 to provide educational programs for pilots (Safety Recommendation A-94-5),[12] to require 14 CFR Part 135 air carriers to provide fatigue countermeasure information to air crews in initial and recurrent training (A-94-73),[13] and to provide fatigue information to the

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[10] National Transportation Safety Board. 1995. *Factors That Affect Fatigue in Heavy Truck Accidents*. Safety Study NTSB/SS-95/01 and NTSB/SS-95/02. Washington, DC.

[11] National Transportation Safety Board. *Collision Involving Two New York City Subway Trains on the Williamsburg Bridge in Brooklyn, New York, June 5, 1995*. Railroad Accident Report NTSB/RAR-96/03. Washington, DC.

[12] National Transportation Safety Board. 1994. *A Review of Flightcrew-Involved, Major Accidents of U.S. Air Carriers, 1978 through 1990*. Safety Study NTSB/SS-94/01. Washington, DC.

[13] National Transportation Safety Board. 1994. *In-Flight Loss of Control, Leading to Forced Landing and Runway Overrun, Continental Express, Inc., N24706, Embraer EMB-120 RT, Pine Bluff, Arkansas, April 29, 1993*. Aircraft Accident Report NTSB/AAR-94/02/SUM. Washington, DC.

general aviation community (A-97-20).[14] The FAA revised Advisory Circular 120-51B to include fatigue as one of the topics discussed in crew resource management training. The FAA also developed educational materials to address the hazards of fatigue for use in safety meetings. These three recommendations have been classified "Closed—Acceptable Action."[15]

In 1997, the Safety Board asked the USCG to advise marine pilots about the effects of fatigue on performance and about sleeping disorders such as sleep apnea (Safety Recommendation M-97-41).[16] In a letter dated November 11, 1998, the USCG indicated that it has discussed the effects of fatigue and sleeping disorders with the American Pilots Association and independent pilot associations, requesting that they inform their members of the dangers of sleeping disorders such as sleep apnea through their internal media. Further, Navigation and Vessel Inspection Circular No. 2-98, *Physical Evaluation Guidelines for Merchant Marine's Documents and Licenses*, contains guidelines for use by physicians performing physical examinations of mariners and includes sleeping disorders as conditions to be evaluated for original and renewals of marine pilots' licenses and for the required pilots' physicals. Safety Recommendation M-97-41 was classified "Closed—Acceptable Action" on April 6, 1999.

The Safety Board is aware that the USCG has developed a research and educational program on crew endurance. The Board is also aware that the USCG held a workshop on fatigue on April 6, 1999, aimed at masters and safety management personnel of tugs and barges, passenger vessels, and fishing vessels as well as USCG personnel. The Board encourages the USCG to add more workshops to its agenda. Such programs could be promoted through the USCG's Prevention Through People program. The USCG has not developed any brochures on operator fatigue for the mariner community.

The Safety Board also issued a recommendation to the FHWA asking that educational materials be developed for commercial truckdrivers (H-90-21, classified "Closed—Acceptable Action"). The FHWA has developed and disseminated the brochure *Awake at the Wheel* and fatigue videos; it has also developed courses to educate truckdrivers about the dangers of driving while drowsy. In February 1999, the Board asked the FHWA to ensure that the dangers of inverted sleep periods are discussed in the fatigue video being developed for motorcoaches (Safety Recommendation H-99-4A).

The Safety Board is pleased to see the increase in educational efforts on fatigue among the DOT modal administrations, particularly the current activities within the FTA. The Safety Board would like to see more efforts in marine and pipeline to develop and disseminate educational materials on fatigue and will continue to monitor these activities. The FAA, FHWA, FRA, and

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[14] National Transportation Safety Board. 1997. *In-Flight Loss of Control and Subsequent Collision With Terrain, Cessna 177B, N35207, Cheyenne, Wyoming, April 11, 1996.* Aircraft Accident Report. NTSB/AAR-97/02. Washington, DC.

[15] Safety Recommendations A-94-5 and A-94-73 were classified "Closed—Acceptable Action" on January 16, 1996; Safety Recommendation A-97-20 was classified "Closed—Acceptable Action" on June 11, 1997.

[16] National Transportation Safety Board. 1997. *Grounding of Liberian Passenger Ship* Star Princess *on Poundstone Rock, Lynn Canal, Alaska, June 13, 1995.* Marine Accident Report NTSB/MAR-97/02. Washington, DC.

FTA have satisfactorily met the intent of this recommendation; however, the Board urges these modal administrations to continue their efforts in this area. Pending further efforts by the RSPA and the Coast Guard to develop and disseminate educational information on fatigue in marine and pipeline operations, respectively, Safety Recommendation I-89-2 remains classified "Open—Acceptable Response."

Safety Recommendation I-89-3

Safety Recommendation I-89-3 asked the DOT to review and upgrade regulations governing hours of service to assure that they are consistent and that they incorporate the results of the latest research on fatigue and sleep issues. In 1989, the DOT stated that it was reviewing the regulations pertaining to hours of service. It had not found research to suggest that the regulations should be consistent across all modes of transportation and that it would continue with research efforts to determine what changes might be made.

The Board has been very disappointed in the DOT's lack of progress in revising the hours-of-service regulations. Subsequently, the Safety Board made specific recommendations to the FAA and FHWA to revise the hours-of-service regulations. In conjunction with its investigation of the crash of American International Airways at Guantanamo Bay, Cuba, in August 1993,[17] the Safety Board recommended that the FAA

> Revise the applicable subpart of 14 CFR Part 121 to require that flight time, accumulated in noncommercial "tail end" ferry flights conducted under 14 CFR Part 91 as a result of 14 CFR Part 121 revenue flights, be included in the flight crewmember's total flight and duty time accrued during those revenue operations. (A-94-105, classified "Closed—Acceptable Action/Superseded" by Safety Recommendation A-95-113)
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> Expedite the review and upgrade of Flight/Duty time limitations of the Federal Aviation Regulations to ensure that they incorporate the results of the latest research on fatigue and sleep issues. (A-94-106, classified "Closed—Acceptable Action/Superseded" by Safety Recommendation A-95-113)

[17] National Transportation Safety Board. 1994. *Uncontrolled Collision with Terrain, American International Airways Flight 808, Douglas DC-8-61, N814CK, U.S. Naval Air Station, Guantanamo Bay, Cuba, August 18, 1993.* Aircraft Accident Report NTSB/AAR-94/04. Washington, DC.

In its report of the accident involving an Air Transport International DC8-63 at Kansas City International Airport in February 1995,[18] the Safety Board recommended that the FAA

> Finalize the review of current flight and duty time regulations and revise the regulations, as necessary, within 1 year to ensure that flight and duty time limitations take into consideration research findings on fatigue and sleep issues. The new regulations should prohibit air carriers from assigning flight crews to flights conducted under 14 CFR Part 91 unless the flight crews meet the flight and duty time limitation of 14 CFR Part 121 or other appropriate regulations. (A-95-113, currently classified "Open—Acceptable Response")

In its study of aviation safety in Alaska,[19] the Safety Board asked the FAA to

> Develop appropriate limitations on consecutive days on duty, and duty hours per duty period for flight crews engaged in scheduled and nonscheduled commercial flight operations, and apply consistent limitations in Alaska and the remainder of the United States. (A-95-125, currently classified "Open—Acceptable Response")

On June 15, 1992, the FAA announced the establishment of the flight crewmember flight/duty rest requirements working group of its Aviation Rulemaking Advisory Committee (ARAC). In its final report submitted to the FAA on June 30, 1994, the working group indicated that although it had not reached consensus on the specific issues, it did agree on four major areas that should be addressed in FAA rulemaking: absence of a duty time limitation, reserve scheduling, back-side-of-the-clock operations, and scheduled reduced rest.

The FAA issued a notice of proposed rulemaking (NPRM) on December 20, 1995,[20] 6 years after the Board issued Safety Recommendation I-89-3. Comments on the NPRM were originally due on March 19, 1996; however, the comment period was extended to June 19, 1996. The Board commented on the rulemaking on June 19, 1996, noting several favorable aspects to the NPRM:

- elimination of the ability of carriers to schedule flight crewmember duty during scheduled rest periods, inclusion of standby reserve time, deadheading time, and all duties performed for the airline as duty time in the determination of flight and duty time requirements;

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[18] National Transportation Safety Board. 1995. *Uncontrolled Collision With Terrain, Air Transport International, Douglas DC-8-63, N782AL, Kansas City International Airport, Kansas City, Missouri, February 16, 1995.* Aircraft Accident Report NTSB/AAR-95/05. Washington, DC.

[19] National Transportation Safety Board. 1995. *Aviation Safety in Alaska.* Safety Study NTSB/SS-95/03. Washington, DC.

[20] *Federal Register*, Vol. 60, No. 244, dated December 20, 1995.

- inclusion of ferry, instructional, maintenance, check, and other flights in the determination of flight and duty time requirements, requirements of minimum daily rest periods of at least 10 consecutive hours, and 36 consecutive hours of rest within 7 consecutive calendar days of duty, for flight crewmembers and flight engineers;
- establishment of explicit standards for approving on-board flight crew rest areas;
- permit extensions of daily flight and duty intervals to periods of no more than 2 hours and only for operational reasons beyond the control of the airline; and
- limits of duty periods for crewmembers on reserve assignments depending on the amount of advance notification of reporting time.

In its comments on the rulemaking, however, the Board also expressed concern that the proposed rule did not include effective mechanisms to address flight operation during the circadian night and circadian trough, and it lacked recognition of the fatiguing aspects of multiple takeoffs and landings. There were mixed industry reactions to the NPRM. In general, air carriers and air carrier organizations opposed the NPRM[21] whereas pilot associations supported the proposal with some reservations, primarily a concern with loss of income from reduced flying hours and a desire for a more thorough discussion of back-side-of-the-clock flying time. According to the FAA, it received about 2,000 comments on the NPRM.

With no action since 1996 and the rulemaking effectively abandoned, on July 9, 1998, the ARAC on air carrier operations was assigned to provide a review and analysis of industry practice with regard to reserve duty for flight crewmembers, which is only a small part of the flight and duty time issue. A working group was formed and ultimately delivered recommendations to the FAA on February 9, 1999.[22] The pilots and air carriers on the working group were able to agree on the following:

1. A pilot should be scheduled by the operator to receive a protected time period as an opportunity to sleep for every day of reserve duty. The operator may not contact the pilot during this period.
2. An operator should limit the movement of the pilot's protected time period during consecutive days of reserve duty to ensure circadian stability.
3. A reserve pilot's availability for duty should be limited to prevent pilot fatigue as a result of lengthy periods of time-since-awake.
4. Sufficient advance notice of a flight assignment can provide a reserve pilot with a sleep opportunity.

[21] Batelle Memorial Institute. March 1998. *A Review of Issues Concerning Duty Period Limitations, Flight Time Limitations, and Rest Requirements as Stated in the FAA's Notice of Proposed Rulemaking 95-18.* Washington, DC: Federal Aviation Administration.

[22] Aviation Rulemaking Advisory Committee, Reserve Rest Working Group. January 8, 1999. *Pilot Members Submission: Proposal of 77,955 Airline Pilots.*

The pilots and the air carriers, however, could not reach agreement about how to meet these goals. The Safety Board understands the difficulty in reaching an agreement on the issue of reserve duty and rest; nevertheless, it remains deeply concerned and disappointed that no further rulemaking action has been taken on the overall issue of hours of service and that duty and rest requirements continue to be different for Part 121 and Part 135 operations. According to the FAA, rather than proceed to a final rule with the NPRM, it will likely issue a supplemental NPRM, which, in the Safety Board's opinion, will only further delay any resolution to this important safety issue.

In its 1995 study on factors that affect fatigue in heavy truck accidents,[23] the Safety Board asked the FHWA to

> Complete rulemaking within 2 years to revise 49 CFR 395.1 to require sufficient rest provisions to enable drivers to obtain at least 8 continuous hours of sleep after driving for 10 hours or being on duty for 15 hours. (H-95-1, currently classified "Open—Unacceptable Response")
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> Complete rulemaking within 2 years to eliminate 49 CFR 395.1 paragraph (h), which allows drivers with sleeper berth equipment to cumulate the 8 hours of off-duty time in two separate periods. (H-95-2, currently classified "Open—Unacceptable Response")

In November of 1996, the FHWA issued an advance notice of proposed rulemaking (ANPRM) that requested additional fatigue research.[24] Rather than proposing any changes to the current hours-of-service regulations, the ANPRM was a general solicitation for comments on hours-of-service regulations. The comment period closed on March 31, 1997. The FHWA received about 1,600 comments to the ANPRM. An expert panel was convened in the summer of 1998 to review and evaluate, based on selected scientific criteria established by the panel, a series of hours-of-service proposals. None of the proposals met the scientific criteria established. The expert panel also developed an additional proposal intended to meet the scientific criteria established.

Currently, the FHWA has reported that it is pursuing two different avenues of rulemaking—traditional rulemaking and negotiated rulemaking.[25] In a letter dated November 3, 1998, the FHWA indicated that it intended to publish an NPRM in early 1999, was contracting with the University of Michigan Transportation Research Institute to perform a cost/benefit analysis, and was considering negotiated rulemaking to expedite the process. In a response dated February 25, 1999, to the FHWA, the Safety Board expressed disappointment that it had taken

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[23] National Transportation Safety Board. 1995. *Factors That Affect Fatigue in Heavy Truck Accidents.* Safety Study NTSB/SS-95/01 and NTSB/SS-95/02. Washington, DC.

[24] *Federal Register*, Vol. 61, No. 215, dated November 5, 1996.

[25] Basically, a procedure by which representatives of all interests affected by a rulemaking are brought together to discuss fully the issues under conditions conducive to narrowing or eliminating differences and to negotiating a proposed rule acceptable to each interest.

more than 18 months since the ANPRM comment period closed to reach the NPRM stage and that the FHWA expected that a 120-day comment period on the NPRM would not be sufficiently long to receive comments, thus prolonging activity to issue a final rule. The Safety Board also indicated that it would support a negotiated rule if it would expedite the process. In testimony at the Safety Board's April 14, 1999, public hearing on truck and bus safety,[26] an FHWA representative indicated that a decision on negotiated rulemaking was expected to be made within 2 weeks. The FHWA representative also indicated that development of an NPRM through the traditional process was taking place simultaneously with the discussions on a negotiated rule to avoid any further loss of time.

In a May 4, 1999, letter to the Safety Board, the DOT indicated that "FRA submitted legislation to Congress last year, and may again this year, to require railroads to submit fatigue management plans designed to reduce fatigue experienced by railroad employees." The letter further stated that "should we be successful in gathering support and passage of such a legislative initiative, we believe fatigue will be greatly reduced in railroad operations."

Although the DOT and the modal administrations have taken positive steps in the area of education and research, they have not acted decisively to revise the antiquated hours-of-service regulations. In fact, as outlined above, little regulatory action has been initiated. The DOT believes that countermeasures to fatigue are preferred over regulation because sleep during a rest period cannot be enforced.[27] The Safety Board points out that hours-of-service rules exist to set limits on allowable scheduling practices, not to prescribe those schedules, and while the Board agrees that sleep cannot be regulated, it also believes that time for adequate sleep must be guaranteed by any Federal regulation related to hours of service.

The Safety Board is aware that the FHWA, and others, are looking at onboard devices to test fitness-for-duty and monitor impairment of operator performance. Although the Safety Board supports pre-duty testing for performance as a result of fatigue, alcohol, drugs, or other condition, it does not believe that operators should be driving up to the point that they fail a valid fitness-for-duty test as a result of fatigue, which could occur in the middle of a trip.

In 1998, DOT Secretary Slater launched the ONEDOT program. This program is to build on collaborative efforts among the various transportation agencies to reduce duplication and save resources. One of the goals of ONEDOT is to develop a common, positive framework relating to work hours, overtime, and incentives. Within the concept of ONEDOT, the DOT Safety Council works toward development of a safety policy for the Department. Fatigue is one of the areas on which the Council intends to act. The Safety Board acknowledges this as yet another initiative to address fatigue and revisions to hours-of-service regulations; nevertheless, the Board remains extremely disappointed in the lack of rulemaking by the DOT.

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[26] The hearing was held April 14–16, 1999, in Washington, D.C. Discussion panels included representatives from the DOT, highway transportation industry, and public safety groups.

[27] U.S. Department of Transportation. 1999. *Managing Fatigue: A Significant Problem Affecting Safety, Security, and Productivity*. Washington, DC.

Scientific research has shown that certain sleep factors can affect fatigue and performance: insufficient sleep, irregular and unpredictable schedules, working during low points in the circadian rhythm. The current hours-of-service regulations do not accommodate these concerns. The Safety Board believes these factors should be considered when revising the hours-of-service regulations. Therefore, the Safety Board recommends that the DOT require the modal administrations to modify the appropriate *Codes of Federal Regulations* to establish scientifically based hours-of-service regulations that set limits on hours of service, provide predictable work and rest schedules, and consider circadian rhythms and human sleep and rest requirements. The Safety Board also recommends that the DOT seek Congressional authority, if necessary, for the modal administrations to establish these regulations. Based on the issuance of this new recommendation, Safety Recommendation I-89-3 is being classified "Closed—Unacceptable Action/Superseded." The Safety Board is also recommending separately that each modal administration—the FAA, FHWA, FRA, USCG, and RSPA—establish, within 2 years, scientifically based hours-of-service regulations that set limits on hours of service, provide predictable work and rest schedules, and consider circadian rhythms and human sleep and rest requirements. Further, because the FAA's efforts have not resulted in any changes to the flight and duty time regulations, the Safety Board is reclassifying Safety Recommendations A-95-113 and A-95-125 "Open—Unacceptable Response." These recommendations are being reiterated in conjunction with the Board's safety report. For the FHWA, the revised regulations, at a minimum and as recommended by the Safety Board in 1995, should also (a) require sufficient rest provisions to enable drivers to obtain at least 8 continuous hours of sleep after driving for 10 hours or being on duty for 15 hours, and (b) eliminate 49 CFR 395.1 paragraph (h), which allows drivers with sleeper berth equipment to cumulate the 8 hours of off-duty time in two separate periods. As a result of this new recommendation to the FHWA, Safety Recommendations H-95-1 and -2 are being classified "Closed—Unacceptable Action/Superseded."

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

> Require the modal administrations to modify the appropriate *Codes of Federal Regulations* to establish scientifically based hours-of-service regulations that set limits on hours of service, provide predictable work and rest schedules, and consider circadian rhythms and human sleep and rest requirements. Seek Congressional authority, if necessary, for the modal administrations to establish these regulations. (I-99-1) (Supersedes I-89-3)

As a result of the safety report, the Safety Board also issued recommendations to the Federal Aviation Administration, the Federal Highway Administration, the Federal Railroad Administration, the Research and Special Programs Administration, and the U.S. Coast Guard.

Please refer to Safety Recommendation I-99-1 in your reply. If you have any questions, you may call (202) 314-6517.

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

Original Signed

By: Jim Hall
Chairman