



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

SP-20
Log R-558

Date: September 2, 1986

In reply refer to: R-86-16 through -28

Mr. Joseph M. Fletcher
Executive Director
Metro-Dade Transportation
Administration
111 North N.W. 1st Street
Miami, Florida 33160

About 11:35 p.m. on June 26, 1985, Metro-Dade Transportation Administration (MDTA) nonrevenue test train No. 172-171 struck the rear of MDTA revenue train, No. 141-142, which was stopped on track No. 2 about 1,927 feet south of the Northside Station interlocking in Miami, Florida. Neither train was derailed. Test train No. 172-171 was returning northbound after completing a southbound test run. Twelve passengers and four MDTA employees were taken to nearby hospitals where they were treated and released. The MDTA estimated the damage to be \$1.6 million. 1/

Between June 3, 1985, and June 26, 1985, rail attendants 2/ of Metro-Dade Transportation Administration (MDTA) two-car set No. 171-172 reported eight times that the car set had brake problems. The trouble reports indicated that an undesired emergency application of the brakes on the car set would occur and cause the car set to stop. Technicians in the MDTA shop facilities at Palmetto Yard, Miami, Florida, tried to locate and correct the trouble, but they could not determine whether the trouble was in the automatic train protection system (ATP), 3/ in the F-2 brake control unit 4/, or other on-board equipment. Instrumented static tests did not provide the technicians with all the information they required, and test facilities were not available at Palmetto Yard for the cars to be operated at a speed high enough for the technicians to make the desired tests. For the car set, or any car set or equipment not in scheduled revenue service to be tested on the main track, it would have to be operated as an unscheduled train. Operating Rule 4055 states that unscheduled trains must receive train orders before being operated on the main track.

1/ For more detailed information, read Railroad Accident Report--"Rear End Collision of Metro Dade Transportation Administration Train Numbers 172-171, 141-142, Miami, Florida, June 26, 1985" (NTSB/RAR-86/03).

2/ In the Metro-Dade system, the train operator is called a rail attendant.

3/ ATP is a signal/speed control system that forces the rail attendant to observe speed command signals transmitted by the wayside signal equipment.

4/ The F-2 unit is a solid-state electronic control that monitors the various train braking functions.

About 6 p.m. on June 26, maintenance supervisors at Palmetto Yard asked the rail traffic controller (controller) on duty at MDTA central control for permission to test car set No. 171-172 on the main track. The maintenance supervisors identified the problem with car set No. 171-172 to the controller only as excessive "dumping." They did not mention any suspected faults with the ATP on the car set. The controller authorized the test to be performed on the main track, which was in accordance with MDTA policy.

About 9:45 p.m., train No. 171-172 departed Palmetto Yard to Okeechobee Station where it would enter onto track No. 1. On the test train were a rail attendant, who was operating the train from the control compartment of car No. 171, a rail vehicle electrician (train control electrician), who was skilled in the ATP equipment, and two friends of the train control electrician 5/ who were not authorized by MDTA rules to be on the car set. The yard dispatcher instructed the rail attendant to pick up a rail vehicle technician who was skilled in the train's electronic braking control system at Okeechobee Station.

When train No. 171-172 arrived at Okeechobee Station about 10 p.m., the brake technician boarded the train. The rail attendant said that he requested train orders from the controller via radio channel 1. The request for train orders is not in the transcript of conversations recorded on channel 1 on June 26 and there is no record of the request. However, the controller confirmed in testimony that he had told the rail attendant sometime before train No. 171-172 departed Okeechobee Station that written train orders were not required.

The controller said he believed that, since train No. 171-172 belonged to the MDTA, it could be operated on the main track along with revenue trains without written train orders because it was equipped with ATP. When the rail traffic controller was able to release train No. 171-172 to go south he issued instructions to the rail attendant. The transcript of conversations made on radio channel 1 revealed that at 10:22 p.m. 6/ the controller told the rail attendant to "proceed on signal sir. You will proceed all the way to Dadeland South while you make your station stops or whatever shop personnel wants you to do." According to MDTA's operating officers, this verbal instruction satisfied the requirement of operating rule 4055, which requires unscheduled trains to be given a train order.

The rail attendant said that while train No. 171-172 was stopped at Northside Station, he, the train control electrician, and the brake technician agreed that, for the train to proceed to Dadeland South Station without the intermittent stopping caused by the undesired emergency brake applications, they would have to change the mode of operation from the manual mode to the yard mode, bypassing the ATP. The brake technician cut and removed the lead wire seal from the ATP bypass switch locking pin, removed the pin, and operated the two-position toggle switch from the "ATP-In-Service" position to the "OFF" position which bypassed the ATP.

5/ The train control electrician expected to be off duty about 9 p.m. after which she and the two friends were going to dinner. When the train control electrician was assigned to test car set 171-172 she invited the friends, who had arrived at Palmetto Yard, to go with her.

6/ Times shown on the tape monitor were not synchronized to an MDTA system time base.

Neither the rail attendant, the train control electrician, nor the brake technician asked the controller, as required by rules 3026 and T-4029, for authority to bypass the ATP, nor did they advise the controller that train No. 171-172 was being operated in the yard mode with the ATP bypassed between Northside Station and Dadeland South Station.

At 11 p.m., revenue train No. 141-142 departed Dadeland South Station on the No. 2 northward track en route to Okeechobee Station. At the same time, train No. 171-172 arrived at Dadeland South Station. The controller 7/ met train 171-172 at the platform. The controller said that he did not remember seeing any external indicator lights (mounted on the outside of the car at the upper left side of the operating compartment) illuminated to indicate that the train was being operated with the ATP bypassed. The controller said that he told the rail attendant of train No. 172-171 8/ that the train could proceed northbound on signal indications and speed commands. He said he told the rail attendant to watch out for revenue train No. 141-142, which probably would be standing south of the Northside Station interlocking when train No. 172-171 arrived, and to be careful in that area.

At 11:08 p.m., train No. 172-171 departed Dadeland South Station northward on the No. 2 track en route to Palmetto Yard. The rail attendant and the on-board technicians said that the train was being operated in the manual mode with the ATP operative.

The rail attendant said that when the train arrived at either Vizcaya Station or Brickell Station, the brake technician told him to stop, and that the technician, just as he had done earlier in car No. 171, removed the lead wire seal from the ATP bypass switch locking pin, removed the pin, and operated the switch that bypassed the ATP.

Then, according to the rail attendant, he continued operating the train northward. The rail attendant said that, after the train left Dr. Martin Luther King, Jr. Plaza Station, the speed commands shown on the operator's console changed from "58 to 25" to zero mph. 9/ The speed commands were still presented on the operator's console with the ATP bypassed, but they did not affect the speed of the train. He then said, "As I got into the turn, I hollered out to him [the brake technician], 'There's a train in front of us. . .'" The rail attendant testified that he believed the train's speed at this time was about 35 to 38 mph. He said that as he was calling an alarm about the train to those onboard, he moved the master control handle to the position for a full service brake application. He said that the train did not appear to be slowing so, in an almost continuous movement, he moved the master control handle into the emergency brake position.

About 11:35 p.m., train No. 172-171 struck the rear of standing train No. 141-142, about 1,927 feet south of the Northside Station interlocking. Train No. 141-142 was moved forward about 68 feet, and train No. 172-171 moved about 52 feet beyond the point of impact. After initially contacting train No. 141-142, train No. 172-171 separated from car No. 142 and stopped about 20 feet from the rear of that car. The emergency lights for train No. 141-142 failed to remain illuminated after the impact because of damage to the wiring system.

7/ The central control facility was located in a temporary office on the Dadeland South Station platform.

8/ Trains are identified by the lead car number. Southbound, the lead car in the car set was No. 171, hence train No. 171-172. Northbound, the lead car would be No. 172, from which the rail attendant would be operating the train, hence train No. 172-171.

9/ Speed commands are indicated on the operator's console as one of the following: 0, 15, 28, 38, 46, 58, or 70 mph. There is no 25 mph speed command.

The design of the MDTA System allows for the safe operation of a number of trains on close headway on the same track through the automatic train protection (ATP) system. This system is designed to force the rail attendant to comply with the displayed maximum allowable speed since the train will stop automatically if the rail attendant ignores either an overspeed or a zero speed command. A functioning ATP system would have provided protection for the trains being diverted from the No. 2 track to the No. 1 track between Northside Station and Okeechobee Station. However, the ATP system can provide protection only if it is used properly.

When the ATP system is inoperative, the controller's role becomes critical because he must implement manual block operation and ensure that the necessary distance between trains for them to operate trains safely is maintained; on these occasions, the controller must issue train orders. The controller would have had to follow this procedure if the rail attendant had reported to him that the ATP has been bypassed. However, the rail traffic controller was not informed of the ATP system bypass. The rail attendant explained that he did not report that trains No. 171-172 /172-171 were being operated in the yard mode with the ATP bypassed, as required by rule T-1007, because he thought the controller had told him to take his instructions from the on-board technicians. While the two technicians knew that the controller was required to authorize operation of the train in the yard mode with the ATP bypassed, it was not their responsibility either to request permission from the controller to execute the bypass or to report the fact to him afterward. According to the MDTA operating rules, the rail attendant is responsible for the operation of the train.

Since the ATP system must be operative to safeguard train operations, especially when more than one train is on the same track, and the ATP system was, along with the F-2 brakes system, the object of the testing for car set 171-172, the Safety Board believes it was not a good operating decision to allow the testing of a train suspected of having these problems during revenue service. (On July 2, 1985, Special Order No. 19 was issued by MDTA operating officers, which prohibited testing of trains during times of revenue service.) When the yard supervisors were making arrangements with the controller to test car set 171-172 on the main track, they should have informed the controller that the trouble might be in the ATP or F-2 brake equipment. This might have caused the controller to delay the testing until after revenue service was discontinued for June 26.

Power for the MDTA train operation is provided from a 700-volt d.c. third rail. The third rail is positioned beside the operating rails and is covered by a protective fiberglass shield. At stations with side loading platforms, a red emergency trip station (ETS) power removal button is located at the north and south ends of each platform. At stations where center loading platforms are provided, an ETS button is located at the north and south ends of the platforms. The locations of the ETS buttons are marked by blue lights.

There is no information provided to the operator of the ETS button that power has been removed from the section for which the button is operated, and there is no diagram at the ETS location to indicate the power section limits. Diagrams of the power section limits are provided to certain MDTA supervisory personnel and to fire/rescue personnel.

When this accident occurred, the rail attendant of train No. 141-142 and the rail attendant assigned to operate the Northside Station interlocking local control panel each operated separate ETS buttons at Northside Station to remove power from the third rail through the accident site. They believed this action removed the power at the location where the collision occurred, but they were not certain. Rescue forces, however, were

told by MDTA personnel that power was off at the accident site when they arrived there about 11:48 p.m. Train No. 132-131 northbound arrived at Dr. Martin Luther King, Jr. Plaza Station on track No. 2 about 11:58 p.m. using propulsion power obtained from power section No. 5. Track maintenance personnel did not remove power from section No. 5 until shortly after 11:58 p.m.

After the accident, while the rail attendant of train No. 141-142 was attempting to open the end door at the R-end of car No. 142 to check the condition of the passengers, two male passengers came up to the door from inside the car seeking a way out. Through the closed door, the rail attendant warned them that they should not touch anything because they might be electrocuted. The two passengers later stated that after receiving this information they panicked and opened a small ventilator window over the top of a side car window and dropped to the Guideway.

During emergencies, the electric distribution systems for electrically powered rail vehicles are a cause of safety concern, whether in the rapid transit or rail industries. The MDTA has worked with the Miami/Dade Fire and Police Departments to develop procedures to follow when an emergency requires emergency personnel to work near the electrified system. There is an ongoing program designed to educate the Miami/Dade emergency forces personnel on the use and control of the MDTA third rail power system. On June 26 however, the emergency personnel who responded to the emergency call accepted the word of various MDTA personnel that the power was off. Those persons who operated the ETS buttons were not certain how far south of the Northside Station the third rail was deenergized by the ETS buttons. There is no indication that any of the operating personnel referred to the power section limits diagram provided to them by their operating officers. As a result, the third rail was not deenergized until about midnight, and in the meantime, passengers, employees, and rescue personnel were present in and around the area of the collision with the third rail still energized.

Fortunately, no one was injured as a result of the confusion about the third rail power system. However, the MDTA should provide some means of indicating to a person in the field who may be operating an ETS button, the area for which an ETS button deenergizes the third rail.

The Safety Board believes rail attendants should be trained in how to inform passengers properly that there is a danger in leaving an electrified car and especially if it is derailed. Comments were received from passengers that they were afraid of fire and of being electrocuted. The rail attendant of train No. 141-142 should have been instructed not to suggest that passengers might be electrocuted because of the derailment without giving valid reasons. Passengers should be encouraged to remain in the car until the propulsion power is removed from the third rail. The manner in which the rail attendant of train No. 141-142 made the announcement concerning the electrical danger caused the two panic stricken passengers, who used the ventilation window, to risk escaping by that route.

When the accident occurred, the brake technician on test train No. 172-171 used a portable radio to contact the rail traffic controller and report the collision. The controller immediately notified emergency response forces via the 911 emergency number. Shortly after the brake technician had reported the accident, the rail attendant on the Budd test train (No. 189-190) on track No. 2, who had overheard some of the radio conversations relative to the accident at Northside Station, called the controller and reported that her train had not been involved in an accident and that the call was obviously a hoax. Based on this report, the controller was preparing to cancel the

emergency call, but a rail supervisor, who was operating southbound train No. 104-103 on track No. 1, arrived at the accident site opposite the wrecked trains moments after the accident occurred and confirmed to the controller that there had been an accident. As a result, the 911 call was completed and emergency forces began arriving at the accident site by 11:48 p.m.

The MDTA's radio rules and procedures do not address specific uses of radio communications. The guidelines provided are general and the occurrences or situations that should be reported by radio are left to the discretion of the employees based on their interpretation of a general rule. Employees are expected to exercise their judgment as to what constitutes an emergency and requires a radio report to central control. The Safety Board believes that the MDTA should issue and enforce radio rules and procedures that provide specific guidance as to when and how the radio should be used. For example, since radio is the principal means of communication between a train and central control, all communications should be made by radio so a record can be maintained, and not by a face-to-face communication such as occurred at Dadeland South Station between the controller and the rail attendant. UMTA should require that rail rapid transit companies equip with operable radios all trains operating in revenue service.

The rail attendant of the Budd test train (No. 189-190) mistakenly believed that the accident report she heard on the radio referred to her train, and, therefore, she reported that her train was not involved in an accident. This caused confusion and could have caused an unacceptable delay in the controller's calling for the assistance of emergency forces. The MDTA should instruct its employees in proper radio discipline. UMTA should develop and promulgate a Uniform Code of Radio Operating Rules and Procedures for use by the rail rapid transit industry.

Although the rail attendant denied having taken any medication or drugs before or after the accident, the results of the laboratory tests indicated the presence of a metabolite of Valium in his blood and traces of benzoylecgonine (cocaine) and THC (marijuana) in his urine. The findings were verified by two separate and independent laboratories. Based on these independent findings, the Safety Board concludes that the rail attendant had used cocaine and marijuana within the 24 hours before the urine sample was taken, and that he had taken Valium within the 48 hours before the blood sample was taken. Since the samples were taken about 15 1/2 hours after the accident, the rail attendant could have consumed cocaine and/or marijuana anytime from 8 1/2 hours before to 15 1/2 hours after the accident. Any such use of drugs before the accident would have been in violation of rule 1037.

The time between the accident and the taking of the blood and urine samples in this accident complicates the interpretation of the results. The Safety Board believes that those employees subject to testing after an accident should be under surveillance until they are tested and that testing should be done immediately. Total urine THC metabolite concentrations greater than 100 ng/ml measured by the EMIT technique represent marijuana consumption within the previous 24 to 36 hours. The toxicological results from gas chromatography-mass spectrometry showed a 240 ng/ml concentration of THC metabolites in the rail attendant's urine (equivalent to a reading of 350 to 750 ng/ml by the EMIT technique), indicating a heavy use of marijuana. Experimentally, it has been shown that the urine of a subject who smokes one marijuana cigarette does not reach a THC concentration of 100 ng/ml as measured by the EMIT technique.

Although the rail attendant's actions at the time of the accident suggest that he may have been affected by these drugs, the Safety Board cannot positively attribute his actions to the use of these drugs. How frequently or extensively the rail attendant used drugs, either licit or illicit, is not known; the laboratory test results only confirmed that he had taken or used a variety of drugs sometime before or after the accident. The Safety Board is unable to determine the extent to which the use of drugs may have played any role in this accident because of the extensive period of time that elapsed between the accident and the testing.

Although the Board sees the use of illicit drugs, such as marijuana and cocaine, to be a major safety problem, it also has investigated accidents in which the operator's performance may have been affected by prescription drugs apparently being taken in compliance with physicians' orders.

On December 3, 1984, in Atlanta, Georgia, Metropolitan Atlanta Rapid Transit Authority (MARTA) train No. 103, consisting of four multiple-car units, ran off the end of the track, approximately 1,000 feet west of MARTA'S Hightower Station. The lead car traveled at approximately 25 mph through a sandpile placed at the end of the track to stop runaway trains. As a result of this accident, two cars derailed. Fortunately, all of the passengers on the train had disembarked at Hightower Station. Property damage was estimated at \$420,000. The operator of MARTA train No. 103 had evidence of dimetane, a prescription drug that should not be taken when operating machinery or vehicles.

On August 17, 1984, in Chicago, Illinois, southbound Chicago Transit Authority's (CTA) eight-car "A" train No. 135 struck CTA train No. 143. The motorman had stopped train No. 135 on a 3.1-percent grade and stepped out of the cab into a car. While the motorman was out of the cab, the train began to roll backward down the grade. The motorman reentered the cab and attempted to stop the train, but his efforts failed, and train No. 135, moving at about 20 mph, struck train No. 143. One passenger was killed, and 46 passengers and 3 crewmembers were injured. For a period of time prior to the accident, the operator of CTA train No. 135 had been given a combination of chemotherapy agents under the care of a physician, including vincristine, prednisone, cytoxan, and tagamet. The Safety Board concluded that "the medications the motorman of train 135 was taking for his illness had side effects that could have adversely affected his ability to perform his duties." The Safety Board further concluded that evidence does not indicate that this occurred.

The Safety Board believes that the findings of both licit and illicit drug involvement in these and other accidents indicate the need for prompt action by the rail rapid transit industry, labor unions, and government to evaluate licit drug use and to curb substance abuse by rail rapid transit operating employees.

The investigators of human performance aspects for rail rapid transit accidents are hampered because toxicological tests for drug use (licit or illicit) are not made immediately after serious rail rapid transit accidents in which the operator is not fatally injured. For example, the operator of MDTA train No. 172-171 was not tested for drugs until nearly 15 1/2 hours after the accident. The Safety Board believes that rail rapid transit safety would be improved if employees knew that toxicological tests would be administered immediately after an accident that involved (1) a fatality, (2) an injury, or (3) any property damage. Results of such toxicological tests could be reported to the Urban Mass Transportation Administration (UMTA), and disciplinary action could then be taken by the involved transit property.

The use of pre-employment drug screening may be useful for applicants for rail rapid transit safety-sensitive 10/ positions. This precaution would prevent the employment of some people with illicit drug problems, or others using licit drugs which may affect their ability to perform their duties safely. The Safety Board is aware through informal discussion that pre-employment screening has been used by one large transit system and results have indicated that 6 of 10 applicants for the first half of 1986, have tested positive for substance abuse. Pre-employment screening can also work with alcohol abuse problems. Although simple medical tests are not available, driver records can be checked for evidence of alcohol abuse. The Safety Board believes that rail rapid transit systems should check with their State Department of Motor Vehicles to obtain driver record information as a pre-employment screen for alcohol abuse. Further, the National Driver Register (NDR), maintained by the National Highway Traffic Safety Administration, can provide additional driver records; however, information from this system can be made available to transit systems only through the individual applicant's request to the NDR for such information. The applicant would then provide the transit system with the NDR report.

The MDTA management selects potential rail attendants from bus operators in accordance with an agreement with the Transport Workers Union of America (TWU), which represents the operating employees. Preference is given to employees with the most service, and selection is based on the TWU agreement and guidelines provided by the MDTA's Office of Equal Employment Opportunity (EEO). However, on the MDTA, the guidelines provided by MDTA's Office of EEO are subordinated by the contractual agreement with the TWU.

The selection criteria for rail attendant trainees are as follows:

- o seniority - (agency date in TWU)
- o physical examination - (individuals who fail are temporarily bypassed until their medical problem is under control)
- o reading comprehension test 11/ (individual must pass test with a score of at least 37 out of 50 to participate in the training)
- o affirmative action goals to be established by EEO (the fiscal year 1984 goal was 14 percent women).

Both the rail attendant and the controller failed to apply the operating rules properly. When the rail attendant requested train orders at Okeechobee Station, for example, he was complying with operating rule 4055. However, his action seemed to be based on his knowledge of the method of operation before the ATP system became operational (on May 19). Had he understood that, although it is unnecessary to issue train orders to ensure the safe movement of the train with the ATP system operative, and that the safety of this type of operation is totally dependent on an operative ATP system, he should have understood that the ATP system should not be taken out of service without the controller's knowledge. Apparently, operations officers did not emphasize the fact

10/ Positions charging the incumbent with the safety of traveling public based on his/her response to job functions and the discharge of duty thereto.

11/ The MDTA first administered this test to the tenth (10) class, which began December 10, 1984, and to all classes thereafter. An NTSB staff member, who has a background in Human Performance, reviewed the validation process used by the MDTA and believes the test has reasonable validity as a selection instrument to measure minimum reading comprehension of applicants for the Rail Attendant training program.

that, even though the use of train orders in conjunction with manual block operation was discontinued for the normal operation of trains, train orders were still required for nonscheduled trains and unusual occurrences.

The rail attendant and rail traffic controller further displayed their inability to interpret the operating instructions properly by not requesting or issuing train orders at Dadeland South, which would have been consistent with their earlier actions at the Okeechobee Station. Apparently, the rail attendant did not realize that train No. 171-172 had completed its run when it arrived at Dadeland South Station and that the instructions he had received relative to the operation of train No. 171-172 were not valid for the trip north as train No. 172-171. He and the rail traffic controller should have known train No. 172-171 would have needed new orders and instructions for the return trip, although his verbal instructions to the rail attendant, if given, would have satisfied this requirement in the controller's mind.

All of the personnel interviewed during the investigation of this accident believed that their training was adequate. However, the responses to some of the questions asked of the rail attendants during the investigation, as well as the way the rail attendant of train No. 172-171 interpreted the controller's instructions, cause the Safety Board concern. Part of this concern is that MDTA's rail attendants and controllers are unable to discuss the rules fluently or correctly interpret their meaning. These concerns raise major doubts about MDTA's training and evaluation programs for rail attendants and rail traffic controllers.

After many railroad accident investigations, the Safety Board has become increasingly aware that a number of railroad employees seemingly know the company's operating rules in that they can quote them, but they do not know how to use those rules when an occasion arises.^{12/} The Safety Board believes that more emphasis should be placed on practical applications of rules, whether in classroom exercises or on-the-job simulations. This concept is needed in the rail rapid transit industry as well. As a result of investigations in the railroad industry, the Safety Board has made safety recommendations to the railroad companies and to the Association of American Railroads (AAR) to encourage the named railroads (involved in the investigations) and the industry as a whole to correct this situation. Individual railroad properties have made some effort to improve such training, but much remains to be done.

One of the most recent recommendations issued by the Safety Board on training stemmed from the Board's investigation of the head-on collision of Amtrak trains at Astoria, Queens, New York, on July 23, 1984. As a result of that investigation, the Board issued the following Safety Recommendation, R-85-84, to the AAR:

Review member railroads' current methods of conducting operating rules classes and administering tests for deficiencies and develop model instruction and testing procedures that will require employees to demonstrate that they not only know the wording of the operating rules but that they understand how the rules are to be applied both in normal and emergency operating conditions. Disseminate the model program to member railroads and encourage them to adopt the program.

^{12/} Railroad Accident Reports—"Head-on Collision of Amtrak Trains Extra 769 East and No. 195, Bristol, Pennsylvania, March 29, 1982" (NTSB/RAR-82/05); "Rear-end Collision between Conrail Trains OIPI-6 and ENPI-6X, near Saltsburg, Pennsylvania, February 26, 1982" (NTSB/RAR-85/02); "Head-on Collision of Burlington Northern Railroad Freight Trains Extra 6760 West and Extra 7907 East, Near Motley, Minnesota, June 14, 1984" (NTSB/RAR-85/06).

The AAR's October 2, 1985, response indicated that it believed that the different typical characteristics of each property and the various types of operations precluded the development of model instruction and testing procedures. The Safety Board pointed out, in its letter of January 24, 1986, that the recommendation addresses a systematic approach or methodology of rules instruction which would apply throughout the industry regardless of the physical characteristics of the individual properties. The Safety Board urged the AAR to reconsider the full intent of Safety Recommendation R-85-84, which has been placed in an "Open--Unacceptable Action" status. The June 26, 1985, accident in Miami again highlights the need for the railroad industry to conduct systematic job/task analyses for the development of training requirements, operating procedures, and performance standards to measure employee job performance.

The same characteristic exhibited by railroad employees relative to the operating rules is evident with rail rapid transit employees. The Safety Board is aware that the current procedures for instructing and testing railroad and rail rapid transit employees are not criterion-referenced to job performance standards and consequently do not predict how an employee will respond when an occasion requires him or her to apply a rule. The Safety Board believes that greater emphasis should be placed on monitoring employee performance on the job as a means to identify deficiencies in current training programs. One way to improve current training programs would be to add practice drills in simulated emergencies which would measure an employee's understanding and application of operating rules.

The interpretation and the knowledge of the application of the operating rules displayed by the rail attendant of train No. 172-171 in the June 26, 1985, accident in Miami is not adequate. His poor showing here may be due to inadequate training (i.e., by the fact that he did not know the operating rules and/or he did not know how to apply the rules), because he was under the influence of the drugs that he had ingested, or a combination of both factors. According to the results of training tests and quiz records, the rail attendant satisfactorily passed all phases of his training, which included the operating rules. The average 90 percent grade he received on tests during his training is average for his class. However, based on this rail attendant's performance and other rail accidents noted earlier, the Board is concerned that a test of knowledge of the operating rules during training is not sufficient to predict an employee's ability to interpret and apply the operating rules during a given task, especially if it is an emergency.

It is essential that provisions are made for the passengers to get out of the cars. Both end doors of car No. 142 were inoperable. It seems that passengers considered these doors to be their avenue of escape, and they paid little attention to the six side doors. On March 19, 1982, following its investigation of a derailment on the Washington Metropolitan Area Transit Authority (WMATA) on January 13, 1982, 13/ the Board issued Safety Recommendation R-82-18 to the WMATA:

Implement a continuing program to educate passengers on the procedures to be followed when it is necessary to evacuate a disabled train.

Also, following the same accident, on October 15, 1982, the Board issued Safety Recommendation R-82-72 to WMATA:

13/ Railroad Accident Report—"Derailment of Washington Metropolitan Transit Authority Train No. 410 at Smithsonian Interlocking on January 13, 1982" (NTSB/RAR-82/4).

Post emergency information inside Metrorail cars at locations near the doors regarding the location and method of operation of the manual emergency door handle.

To eliminate any possible confusion in escape routes, the MDTA should mark the emergency doors more clearly, publicize the manner in which the doors operate, and include instructions for use of the emergency ladders available for descending to the ground or Guideway levels. Also, a warning should be included about leaving the car by a side door because someone in excitement may step off on the field side of the aerial structure where there is no walkway and fall to the ground. Finally, the MDTA should ensure that emergency lighting is provided in passenger compartments when the main lights are lost.

Therefore, the National Transportation Safety Board recommends that the Metro-Dade Transportation Administration :

Designate, when an incident requires that the third rail be deenergized, one individual on the scene as the power director through whom all information concerning the status of the third rail is disseminated to on site personnel and to Central Control. (Class II, Priority Action) (R-86-16)

Instruct all rail attendants and supervisory personnel on electrical hazards in and around derailed or damaged electrically propelled equipment, including the proper manner of informing passengers of the hazard and how to protect them. (Class II, Priority Action) (R-86-17)

Provide a diagram at each Emergency Trip Station button location so that persons who operate the button will know the boundaries of the third rail deenergization controlled by that button. (Class II, Priority Action) (R-86 -18)

Instruct rail attendants in the significance of observing the speed commands displayed on the operator's console, especially when the automatic train protection system is bypassed. (Class II, Priority Action) (R-86-19)

Develop radio rules and procedures that provide specific guidance on the timely and appropriate use of radio communications and instruct rail attendants and other employees in radio discipline. (Class II, Priority Action) (R-86-20)

Expedite the development and implementation of a plan to screen potential employees for drug and alcohol abuse. (Class II, Priority Action) (R-86-21)

Require toxicological tests for employees involved in an accident or suspected of being impaired in the performance of their duties because of drug or alcohol use. (Class II, Priority Action) (R-86-22)

Conduct a systematic job/task analysis of the job functions for the positions of rail traffic controller and rail attendant to identify the respective duties, responsibilities and qualifications for these positions. (Class II, Priority Action) (R-86-23)

Develop and implement, based upon the results of the job/task analysis, a program to train personnel selected for rail traffic controller, rail attendant, or other safety-critical positions to interpret and apply correctly operating rules and instructions. (Class II, Priority Action) (R-86-24)

Develop and implement, based upon the results of the job/task analysis, criterion referenced standards for evaluating and monitoring employees' understanding and application of operating rules and procedures as demonstrated by their performance on the job. (Class II, Priority Action) (R-86-25)

Identify clearly, the emergency features, and mark clearly and provide concise operating instructions for emergency equipment, i.e., fire extinguishers, ladders, exits. (Class II, Priority Action) (R-86-26)

Sponsor a public awareness program to inform the public of the safety features of the rail rapid transit cars and of the procedures to be followed for various types of emergencies. (Class II, Priority Action) (R-86-27)

Provide a reliable emergency lighting source that is independent of the car wiring for its power source. (Class II, Priority Action) (R-86-28)

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 actions taken as a result of its safety recommendations and would appreciate a response from you regarding action taken or contemplated with respect to the recommendations in this letter. Please refer to Safety Recommendations R-86-16 through -28 in your reply.


By: Jim Burnett
Chairman