

Log R-636



National Transportation Safety Board

Washington, D. C. 20594

Safety Recommendation

Date: May 28, 1992

In Reply Refer To: R-92-8

Mr. W. Graham Claytor, Jr.
President
National Railroad Passenger Corporation
60 Massachusetts Avenue, N.E.
Washington, D.C. 20002

About 0309 eastern daylight time on April 12, 1991, National Railroad Passenger Corporation (Amtrak) Extra 390 North struck southbound Conrail mineral train UMP-22B on Amtrak's Northeast Corridor (NEC) at Chase, Maryland, (mile post 79.3) about 16.4 miles north of Baltimore. The accident occurred at a turnout within "Gunpow" interlocking. Four cars of UMP-22B and three units of Extra 390 North derailed; two crewmembers of Extra 390 North were injured.¹

Following the accident, Safety Board investigators examined Amtrak Extra 390 North. They found that the main reservoir hose connection between the lead unit and the second unit had not been made and that both cutout cocks, which control the flow of compressed air to the main reservoir system, were closed. As a result, the airbrake system was not providing full braking capability to the locomotive consist, and Extra 390 North was unable to reduce speed and stop at the "STOP" signal.

Investigators found that the main reservoir hoses between the three trailing E-60 electric units were connected and the cutout cocks were open. The angle cocks on the trainline (brake pipe) connections between these units were also open. The valve for the dead-in-tow engine feature (dead-engine feature)² was in line, that is, in the closed or "normal" position.

¹For more detailed information read "Railroad Accident Summary Report--Collision and Derailment of Amtrak Extra 390 North and Conrail UMP-22B at Chase, Maryland, on April 12, 1991" (NTSB/RAR-92-01/SUM).

²The dead-engine feature on a locomotive unit provides compressed air from the trainline for braking when the engine and compressor are "dead," that is, not running. When in the "dead-in-tow" position, the handle is at a right angle to the pipe and air is supplied from the trainline. Otherwise, the handle is aligned with the pipe.

The airbrake connections on Extra 390 North failed to comply with Amtrak's Air Brake and Train Handling Rule 9.4, which applies to engines in a multiple consist that are dead-in-tow. Interviews with Amtrak shop personnel revealed that they had failed to connect the main reservoir hose between the lead locomotive unit and the second unit and to place the cutout cocks in the proper position for a dead-in-tow movement of a multiple-unit consist.

Extra 390 North had been made up at Amtrak's Ivy City shop, about 1 mile north of Union Station, Washington, D.C., and moved to Union Station by shop personnel. The move itself, as well as the makeup of the consist for the move, was marked by a number of unusual circumstances; collectively, they created conditions that led to the accident.

Personnel responsible for completing the train consist at Ivy City were aware that Extra 390 North would be a "shop move," that is, a move from one Amtrak shop to another, possibly in Wilmington, Delaware, or Philadelphia, Pennsylvania. They testified that diesel light moves headed north were infrequent. According to the diesel shop foreman, "Very seldom do we send diesels light in a consist north; very, very seldom. Everything north goes electric. Everything south goes diesel."

The diesel shop foreman was responsible for ensuring that personnel under his supervision properly prepared the train for the trip. However, the employee who usually would have been assigned to connect the airbrake hoses after the four locomotive units had been coupled together was engaged in other activities, and the diesel shop foreman made the airbrake hose connection himself. He was doing so for a shop move for the first time. The diesel shop foreman noted that "almost always shop moves are motors only [that is, electric rather than diesel units]"; thus, as he testified, he usually had no function in preparing consists for shop moves.

The diesel shop foreman told Safety Board investigators that the general foreman had only instructed him to "trainline" Extra 390 North, that is, to connect the brake pipe hoses. The usual practice when moving engines in the shop area is to do so with a minimum of trainline and airbrake connections because the engines will be traveling a short distance at low speed. The diesel shop foreman stated that although he had started to hook up the main reservoir hoses, he decided not to after noting that those hoses on nearby units were not connected and after remembering that the general foreman had told him to "trainline."

Although the Safety Board agrees that the general foreman should also have instructed the shop foreman to connect the main reservoir lines between all units, the general foreman's failure to do so did not relieve his subordinate of responsibility for ensuring that Extra 390 North was properly prepared for the trip. The Safety Board concludes that both foremen failed to exercise adequate oversight of the train makeup.

The diesel shop foreman stated that even though he was not responsible for performing airbrake tests on the train brake system, he performed one application and release test while at Ivy City, and he said another was performed after the train had been moved to the station. However, the Safety Board believes that the application and release tests were not in compliance with Federal regulations for an

initial terminal brake test³ because they did not include leakage tests carried out under anticipated train operating conditions.

The first application and release test was performed while the E-60 electric units were still under power (pantographs up); the second was made while the pantographs were being lowered at the station and therefore no power was being supplied to the units and the compressors were not working. When E-60 electric units are under power, the air compressor in each unit maintains the required air pressure in the main reservoir of the unit's airbrake system. However, the E-60 electric units in Extra 390 North would not be under power during the accident trip that began in Washington, and a proper initial terminal airbrake test would therefore have to have been performed with no power to the E-60 electric units.

When the operating train crew arrived at Union Station to begin the trip with Extra 390 North, they received neither written nor oral acknowledgment that an airbrake test had been performed. The crew stated that they therefore made an initial terminal brake test, as they were required to do under Federal Railroad Administration (FRA) regulations. The crewmembers told Safety Board investigators that they performed the test three times before they achieved a passing test.

The rules governing an initial terminal airbrake test state: "Train airbrake system must be charged to required air pressure, angle cocks and cutout cocks must be properly positioned, air hose must be properly coupled and must be in condition for service."⁴ However, the crew achieved the passing test with the main reservoir hose uncoupled and with the main reservoir cutout cocks closed between the lead locomotive and the three trailing units. The crew did not, but should have, checked the brake hoses and cutout cocks. The Safety Board concludes that they improperly performed the initial terminal airbrake test.

The crew's description of the cutout cock positions for the third test on the day of the accident agrees with what Safety Board investigators found after the collision and derailment. Regardless of whether the crew achieved a passing airbrake test, however, air to the braking system in the three trailing units was being depleted from the main reservoirs at each application of the train brakes, and the main reservoirs were not being replenished from the lead locomotive air compressor because of the improper connection. The loss of air pressure on the main reservoirs meant that after several brake applications, insufficient air was available to apply the train brakes.

³Title 49 CFR, Part 232, sets forth the rules that govern initial terminal airbrake tests. Part 232.12, "Initial Terminal Road Train Airbrake Tests," requires that qualified personnel inspect each train at the place where it is originally made, that is, at the initial terminal. It states, in part: "A qualified person participating in the test and inspection or who has knowledge that it was made shall notify the engineer that the initial terminal road train air brake test has been satisfactorily performed. The qualified person shall provide the notification in writing if the road crew will report for duty after the qualified person goes off duty "

⁴Title 49 CFR, Part 232.12 (2)(c).

If the operating crew had conducted a proper initial terminal brake test before departure, they should have detected the problem with the airbrake system. During their walkarounds to inspect brake and piston travel, they should have observed that proper air line connections had not been made, and they should have noted the obvious air leak in unit 620. Therefore, the Safety Board concludes that the operating crew of Extra 390 North had not verified that the airbrake system was properly connected and did not conduct an adequate initial terminal airbrake test.

During the investigation, Safety Board investigators expressed concern to Amtrak about the procedures used in connecting and testing airbrake systems on light engine movements. In response, Amtrak took corrective action to address some issues.

As a result of its investigation of this accident, the National Transportation Safety Board recommends that the National Railroad Passenger Corporation:

Develop and implement a plan to monitor and evaluate the effectiveness of the new procedures relating to airbrake systems that were initiated following the accident at Chase, Maryland, on April 12, 1991. (Class II, Priority Action) (R-92-8)

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 Recommendation R-92-8.

COUGHLIN, Acting Chairman, and LAUBER, HART, HAMMERSCHMIDT, and KOLSTAD, Members, concurred in this recommendation.



By: Susan M. Coughlin
Acting Chairman