

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

SP-20  
Rag R-509

ISSUED: May 20, 1985

Forwarded to:

Mr. David Gunn  
President  
New York City Transit Authority  
370 Jay Street  
Brooklyn, New York 11201

SAFETY RECOMMENDATION(S)  
R-85-57 and -58

About 5:27 p.m. on March 17, 1984, a 10-car subway train operated by the New York City Transit Authority (NYCTA) derailed in the Joralemon Street tunnel under the East River about 1,900 feet south of the Bowling Green Station in New York, New York. The train, which was loaded to virtual capacity with about 1,500 passengers, was exceeding the 10-mph speed restriction established because the track section was under repair. The derailment did not result in serious injuries to the passengers or significant damage to the equipment. After extensive delay, the passengers detrained and walked about 700 feet to an emergency exit, where they climbed a staircase from the tunnel to the street. A second train stalled in the tunnel just south of the Bowling Green Station when the derailment interrupted traction power to the train. Passengers from this train were evacuated onto the station platform through another train which was positioned for this purpose. 1/

A general order had been issued on February 27, 1984, alerting traincrews that repairs were being made to certain sections of track No. 2 between the Bowling Green Station and the Borough Hall Station and that a speed restriction would be indicated by slow signs in the repair areas. According to the train operator, he moved out of the Bowling Green Station slowly because of the 15-mph speed restriction over a switch and the grade time sign just beyond the station. The train operator recalled next seeing a 25-mph grade time sign just before seeing a temporary 10-mph slow sign that was displayed on grade time signal No. 492. The 10-mph slow sign was 70 feet in approach to an approximately 80-foot-long section of track from which concrete ballast support had been removed and timbers had been put in place to shore up the track. Although he did not know his exact speed, the train operator immediately applied the brakes. Immediately after the train entered the repair area beyond the slow sign, the train brakes applied automatically in emergency at 5:27 p.m. when the rear four cars were derailed.

1/ For more detailed information, read "Railroad Accident Report--"Derailment of New York City Transit Authority Subway Train in Joralemon Street Tunnel, New York, New York, March 17, 1984" (NTSB/RAR-85/07).

The 10-mph sign on grade time signal No. 492 had been placed there by the contractor performing the track work. The contract inspector had instructed the contractor to put up the 10-mph sign because of the general order that was in effect to protect the track work. The contractor's sign had the legend "10 miles" in black letters on a white background instead of the NYCTA standard black letters on a yellow background. There were no other slow signs north of the derailment to protect the other sections of skeletonized track, and the grade time signs had not been covered as required by NYCTA procedures. Seventeen trains passed over the skeletonized track between the time the contract inspector returned the track to service and the time of the derailment.

The train operator had operated trains over skeletonized track in the tunnel previously. He said that although he knew the various grade time signs were in the tunnel, on the day of the derailment he perceived only 15-mph and 25-mph grade time signs. He recalled the 10-mph slow sign to have been "... almost directly just in front of the 25." He had seen 10-mph slow signs on previous days at different locations. He said that although the signs were not NYCTA standard, he treated them with the same respect.

The contractor-installed slow sign was a non-NYCTA standard sign, but more importantly it was located improperly. The NYCTA requires that a slow sign be located far enough in advance of a restricted area to allow a train operator to decelerate the train to the designated maximum speed. Moreover, all other signs such as the 25-mph and 35-mph grade time signs which were superseded by the slow sign should have been covered. With the slow sign only 70 feet from the restricted area, it is possible that the train operator accelerated to a speed as high as 30 mph before seeing the 10-mph slow sign. The grade time signals which allowed 25 mph and 35 mph successively would not have precluded an acceleration to 35 mph. The signal supervisor should have ensured that a 10-mph slow sign was installed by the NYCTA to protect the entire work area including the two skeletonized sections north of the derailment site.

The track involved in the derailment was undergoing rehabilitation as part of a project in which a contractor was replacing the bolted rail and tieplates with continuous welded rail and container plates. The work in the derailment area had begun on March 13, 1984. Because some of the crossties and supporting concrete ballast were found to be deteriorated, an additional work order had been issued to replace the deteriorated crossties, tie blocks, and concrete at some locations. At these locations, the concrete around and under the crossties had been removed, leaving only the rail and appurtenances fastened to the crossties. The "skeletonized" track was then shored up to the required grade to permit train operations at restricted speed.

The shoring was accomplished by using 4-inch by 4-inch timbers longitudinally spaced 2 to 3 inches apart under the crossties and tie blocks and directly under each rail. To bring the track to proper grade and cross level, wooden wedges had been driven between the bottoms of the ties and the tops of the timbers. The wedges were nailed to the timbers with 10-penny nails. In some places the lateral stability of the track was dependent on pieces of concrete or cinderblocks that were wedged between the ends of the crossties and the sides of the tunnel. In other places the lateral stability of the track was dependent on the lower edges of some of the crossties contacting the sides of the tunnel. In this skeletonized section the spaces between the ends of the crossties and the tunnel wall allowed as much as 1 inch lateral movement. The NYCTA had not advised the contractor that use of wedges to shore up skeletonized track for revenue train use was prohibited by its internal policy.

The track work by the contractor was under the direction of a project engineer from the NYCTA Engineering and Construction Department. Under the direction of the project engineer, two NYCTA contract inspectors provided daily inspection and coordination of the contractor's work. The senior NYCTA contract inspector was responsible for (1) inspecting the track at the end of a work period, (2) advising the desk trainmaster that the work was completed for the day and that the track was available for service as provided by the general order, and (3) assuring that the first revenue train passed over the completed work safely. The NYCTA Engineering and Construction Department procedures were not specific as to how the inspector was to determine this; however, until the accident, it was acceptable for the inspector to remain at the first station beyond the work area until the first train arrived. No one inspected trains as they were passing over the newly skeletonized track. After the accident, instructions were issued requiring the inspectors to observe the first train as it passed over the track.

Before this contract, the Maintenance of Way Department employees (now Track and Structures Department) performed most of the track work which resulted in the operation of revenue trains over skeletonized track. The Maintenance of Way Department developed and implemented NYCTA standards for skeletonizing track over which trains were to operate. Regular maintenance of way trackwalkers also inspected the track, including the skeletonized track, in the Joralemon Street tunnel on alternate days. The trackwalkers were not expected to make judgments about whether the contractor's work met NYCTA standards; however, they were expected to report any track conditions which made a track unsafe for the operation of revenue trains.

The heads of the Engineering and Construction and the Track and Structures Departments reported to two different vice presidents who are responsible to the president of the NYCTA. There were no specific procedures that required either department head to be sure that the skeletonized track was shored up according to the provisions of the Track and Structures Department standards and directives. Although the head of the Engineering and Construction Department was aware that he was responsible for providing standards to the contractor for track that was safe for revenue train operations, no one in his department came to an understanding with the contractor regarding detailed specifications for skeletonizing the track in the Joralemon Street Tunnel.

The senior contract inspector had limited on-the-job experience with skeletonized track over which revenue trains were to operate. He said he depended on the contractor to develop and use acceptable methods. The senior contract inspector and the contractor's supervisors said that the basic document used as guidance for the shoring of the skeletonized track in the Joralemon Street tunnel was a drawing submitted by the contractor as part of a plan for work between Sterling Street Station and Newkirk Avenue Station on another line. The contractor's drawing provided that two (four per track) timbers with a minimum width of 6 inches and spaced a maximum of 6 inches apart and braced to prevent lateral movement be placed under each rail. The NYCTA had approved that drawing in principle in January 1983. The tunnel for which the drawing was made and approved had vertical sides at track level. The drawing showed blocks, tightened by wedges, between the ends of the crossties and the vertical walls in order to secure the track laterally. The tubes in the Joralemon Street tunnel were circular in cross section, and the contractor did not secure the track against lateral movement. The contractor depended upon the lower edges of some of the crossties bearing on the circular tunnel wall to provide lateral securement. The drawing had been revised to include comments by the NYCTA about track support details, but had not been returned to the contractor as an approved plan at the time of the accident. The senior contract inspector had not seen the revised plan and had not established with the contractor the standards to which the contractor would shore up the track and secure it against lateral movement.

As noted earlier, standards for shoring up skeletonized track over which revenue trains would operate had been published by the NYCTA Track and Structures Department. The Superintendent of the NYCTA Track Division had issued a memorandum on November 20, 1981, that reiterated a prohibition against the use of wedges in shoring up track to be used in revenue train operations. Neither of these documents were part of the additional work order under which the track work was being done, and both the contractor and the contract inspectors said that they were not aware of the documents.

Neither the contract inspectors nor the regular trackwalker took exception to or reported the unapproved method of shoring up the skeletonized track. The chief engineer of the Engineering and Construction Department had no track maintenance experience, and there was no one with this expertise on his staff. There were no procedures for coordination between the Engineering and Construction Department and the Track and Structures Department. No one in the Engineering and Construction Department determined whether the NYCTA project engineer and the contract inspectors were familiar with the Track and Structures Department standards for skeletonized track.

The NYCTA's failure to install a proper slow sign for operation over the skeletonized track is an unacceptable operational deficiency. The evidence does not explain how or why procedures had become so lax that train operators and their supervisors passed the improperly installed and missing slow signs numerous times without reporting the deficiencies. Numerous trains passed over the skeletonized track north of the derailment area after the work started on March 13, 1984, without any recorded reports of deficiencies. The NYCTA needs to ensure that inadequate and improper procedures are reported invariably to supervisors. As a first step, operating personnel and their supervisors must be taught the operating rules and procedures and instructed to follow them precisely and conscientiously. The failure of the trackwalker to note the improperly shored-up skeletonized track and to report it is another indicator that employees are not following NYCTA procedures.

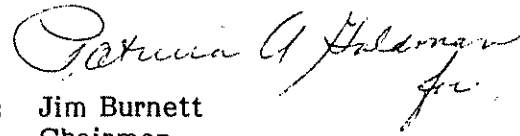
Therefore the National Transportation Safety Board recommends that the New York City Transit Authority:

Develop and enforce procedures to ensure that appropriate signs and signals are displayed to indicate restricted speeds. (Class II, Priority Action) (R-85-57)

Educate contract inspectors, trackwalkers, train operators, and supervisors in the applicable crafts in their responsibilities for reporting discrepancies in track conditions, including lighted and unlighted signals and signs, and establish appropriate measures to promote compliance. (Class II, Priority Action) (R-85-58)

BURNETT, Chairman, GOLDMAN, Vice Chairman, and BURSLEY, Member, concurred in this recommendation.

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.

A handwritten signature in cursive script that reads "Patricia A. Haloman". The signature is written in dark ink and is positioned above the typed name of the signatory.

By: Jim Burnett  
Chairman