Log R-502

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

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Forwarded to:
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Chairman
New York State Public Transportation Safety Board
New York State Department of Transportation
1220 Washington Avenue
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SAFETY RECOMMENDATION(S)

R-85-35

The National Transportation Safety Board has addressed the issue of fire safety in rail rapid transit systems in numerous reports since 1980. On December 17, 1984, the Board completed a 7-day field phase of a special investigation of the large number of fires that occur annually in the New York City Transit Authority (NYCTA) subway system. Investigators examined the relationship to fire safety of track, electrical equipment, car equipment, train operations, emergency response activities, and data collection. Currently, the Board's staff is analyzing the information obtained during the field phase of the investigation. The Board will issue a final report when its analysis is completed. However, based on the investigation to date, the Safety Board believes that there are certain safety issues that need immediate and specific attention from the NYCTA and the New York Fire Department (NYFD) to improve fire safety on the subway system. These issues involve (1) the accumulation of flammable materials in the system, (2) the lack of fire extinguishers in tunnels, (3) the inadequate communications between the NYCTA and the NYFD, (4) the blocking of emergency exits, (5) train operator procedures, (6) the need for standpipes in stations that are deep underground, and (7) training of car department personnel.

The NYCTA has evidenced concern about fires caused by loose combustible and flammable materials. These materials often accumulate on the tracks and under the third rail. These materials include paper and other debris that are ignited easily by arcing from the interaction of the collector shoes on the trains with the third rail. NYCTA procedures and programs for maintaining a litter-free track environment have been largely unsuccessful. In some instances, flammable trash has been collected, bagged, and stacked by the NYCTA in tunnels and other locations rather than being removed. Safety Board investigators found bags of flammable trash stacked in an area beneath an NYCTA sign which prohibited the presence of flammable materials. At another location, cans of paint and solvents, some without lids, were stored in a tunnel close to piles of debris and the third rail. Following the Safety Board's on-site investigation, the NYCTA made an effort to clean the trash from the system, especially from the areas where bagged trash had been observed stored for a considerable length of time. The Safety Board has learned however that, as recently as March 12, 1985, loose and bagged trash again has accumulated in the subway system. Frequent collection and removal of combustible trash and the proper storage or removal of paint and solvents will reduce the fire hazard in the NYCTA system.

Following its special investigation in 1981 of eight NYCTA subway fires, 1/ the Safety Board issued Safety Recommendation R-81-109 on September 22, 1981, recommending that the NYCTA:

> Provide at least two fire extinguishers, one at each motorman and conductor position, in all subway trains.

The NYCTA responded that fire extinguishers were located on subway tunnel walls every 600 feet and that it would not place fire extinguishers onboard its trains. Safety Board investigators found during the recent investigation that in large stretches of the subway tunnels extinguishers were missing or empty. For example, extinguishers were missing in the 3-mile stretch between Astor Place and Grand Central Stations. Fire extinguishers, if used effectively, can control many fires, particularly in the early phase of a fire before firefighters arrive at the scene, and may reduce panic, injury, and death due to the fire. The Safety Board believes that proper firefighting equipment and training in its use would greatly improve the capability of NYCTA personnel to control onboard and tunnel fires and that this equipment should be on transit cars as well as at other locations where it can be obtained quickly when needed. The lack of fire extinguishers on trains and in subway locations should be corrected immediately. The Board has asked the NYCTA to reconsider Safety Recommendation R-81-109, which currently is classified as "Open--Unacceptable Action."

The Safety Board's investigation confirmed that there are misunderstandings in communications between the NYCTA and the NYFD during fire emergencies. This communications problem has three facets: differences in terminology, inadequate maps of the NYCTA system, and vague procedures for shutting off third-rail power.

Previous investigations of accidents indicate that the NYFD has been frustrated in its efforts to respond effectively to fires in NYCTA tunnels and stations because of misunderstandings in communications. One difficulty that should receive immediate attention is the difference in terminology peculiar to the operations of the NYCTA and the NYFD. Clear communication between the NYCTA and the NYFD is essential, particularly in emergency situations.

The investigation revealed a critical need for the development of detailed NYCTA system maps that are correlated with street locations and that can be used to identify the location of disabled trains and emergency exits. Both the NYCTA and the NYFD should have identical maps for employees to use to respond promptly to emergencies. It is imperative that the maps be available to all parties and be kept up-to-date with the status of all emergency equipment and emergency exits.

When responding to an emergency on the NYCTA, the NYFD has found it necessary on occasion to shut off third-rail electrical power. The Safety Board found that a potentially dangerous problem exists because NYFD personnel do not know or follow the NYCTA procedures for shutting off the power and sometimes do not notify the NYCTA of the shutoff. The NYFD understood that pulling the lever of "pull boxes" located along the rail would cause the third-rail power to go off and remain off. However, the NYFD was unaware that the NYCTA command center restores power to the third rail 4 minutes after an emergency pull lever is activated unless a certain procedure is followed or unless other

1/ Special Investigation Report--"Eight Subway Train Fires on New York City Transit Authority with Evacuation of Passengers" (NTSB-SIR-81-5).

communication is received from the area. This situation must be corrected to prevent firefighters from having the third-rail power restored while they are dealing with an emergency. Moreover, a procedure allowing the NYFD to remove third-rail power without knowing the location of all trains on the system could result in a train being stopped near the fire and endangering the persons onboard. Therefore, a procedure that is understood by both the NYCTA and the NYFD for shutting off third-rail power should be established immediately in the interest of the safety of firefighters and passengers. This procedure must clearly establish under what circumstances the NYFD may shut off the power.

The NYFD inspects emergency exits twice each year; however, there apparently are no procedures for the NYFD or for NYCTA maintenance personnel to notify the NYCTA command center or the NYFD when an emergency exit becomes unusable. Investigators found an emergency exit that was barricaded at the street level because a motor vehicle had damaged it. Neither the NYFD nor the NYCTA control center was aware that the exit could not be used in an emergency. If a fire or other emergency were to occur in this area, the potential for trapping persons underground could be substantial and could result in a large number of deaths or injuries.

The NYCTA has a procedure that limits to three the number of times that a train operator is allowed to reset a subway car motor control unit when it shuts down automatically because of a current overload or motor malfunction. This procedure was instituted because of the recognized hazard of continuing to reset a unit with a continuing electrical problem. However, at the end of a run when a relieving operator takes charge of the train, the relieving operator is not notified that the inbound operator may have had a problem with the motor unit and already may have used the reset procedure one or more times. If the relieving operator resets a unit two or three times because of a problem for which the preceding train operator had already reset the unit two or three times, the potential for a fire is greatly increased. The manufacturer of the motor control units has recognized the hazard and has designed the latest units so that they can be reset only twice; however, no such protection has been installed on the older units in service on the NYCTA. The Safety Board believes that alternatives are available to correct this problem, such as providing the relieving operator with documentation of all previous resets or the installation of a counter on the unit that would shut down the unit until it could be inspected and repaired or removed from service.

During the investigation, a fire occurred at the platform level of the 181st Street Station. The NYFD had to use 22 lengths (1,100 feet) of hose to get water to the fire. Since the elevator and air shaft for this 190-foot-deep station currently are being repaired, it may be an appropriate time to install a standpipe system to the platform level and provide connections for firefighting. Ultimately, the NYCTA should increase the number of NYFD-approved standpipe systems in stations and tunnels below street level because of the difficulties encountered in leading hose to fight fires below the street.

Following its special investigation in 1981, the Safety Board issued Safety Recommendation R-81-103 on September 22, 1981, to the NYCTA:

> Establish a systemwide program of initial and recurrent training for car repairmen, car inspectors, maintenance foremen, and quality assurance personnel.

The Safety Board and the NYCTA have discussed NYCTA's recently revised training program and its newly established school, measures which the Board believes will lead to improvement in the performance of the car department personnel. Safety Recommendation R-81-103 has been placed in a "Closed--Acceptable Action" status.

The recent investigation included an examination of the fire problems on car equipment. Safety Board investigators reviewed the intensified training program planned by the NYCTA to improve the performance of personnel engaged in the installation, inspection, and repair of group motor control units. The effort is commendable, and the Safety Board is convinced that the NYCTA car maintenance program will benefit from the institution of this training program. The Board believes, however, that all car maintenance personnel should receive this training before the projected 7 years. The Safety Board recognizes that as each group of car personnel completes the 12- to 14-week course, trained people will be entering the shops to begin working on group motor control units. However, because of the large number of people involved in this work, it may be 2 years before a substantial infusion of trained personnel is made and improvement in the overall system is realized if the planned 7-year program is continued. The Safety Board believes that the NYCTA, without reducing course content, should accelerate the program by adding more classes (perhaps at night) so as to train more employees in a shorter period of time and realize sooner the needed immediate improvement in car maintenance.

The Safety Board has sent several Safety Recommendations to the NYCTA and the NYFD concerning fire safety on the New York City subway system. Therefore, the National Transportation Safety Board recommends that the New York State Public Transportation Safety Board:

> In consultation with the New York City Transit Authority, establish an action plan for the implementation of Safety Recommendations made to the New York City Transit Authority by the National Transportation Safety Board as a result of its special investigation of fires on the NYCTA subway system. Advise the National Transportation Safety Board of the timetable for the implementation of the recommendations, and furnish progress reports of the implementation. (Class II, Priority Action) (R-85-35)

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 recommendation in this letter.

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

By: Jim Burnett
Chairman