12a. SYNOPSIS: Case 8578
At approximately 4:10 p.m., MTA New York City Transit (NYCT) bus #2081 was traveling on Fifth Avenue near the intersection with East 41st Street when the bus driver observed smoke and flames coming from the overhead luggage compartment over his head. The bus driver stopped and called for assistance. The fire department responded and extinguished the fire. The bus driver claimed difficulty in breathing due to smoke inhalation and was transported to a local hospital where he was treated and released. There were no passengers on board the bus at the time of the fire. There was extensive damage to both the interior and exterior of the bus.

12b. SYNOPSIS: Case 8684
At approximately 10:21 a.m. MTA New York City Transit (NYCT) bus #2075 was traveling on Narrows Road near the intersection with Targee Street when the bus driver was informed by a passenger of smoke within the interior of the bus.
The bus driver moved the bus to the curb, safely evacuated the 30 passengers and called for assistance. An off duty NYCT bus driver seated in the vicinity of the fire utilized the on-board hand held fire extinguisher to extinguish the fire which was located within a light fixture over the wheelchair lift. There were no reported injuries and the bus sustained moderate damage to the overhead storage area over the wheelchair lift.

12c. SYNOPTIS: Case 8689
At approximately 6:00 p.m. MTA New York City Transit (NYCT) bus #2018 was standing in the far side bus stop on Fifth Avenue at the intersection with W. 54th Street when the bus driver observed smoke and flames coming from an overhead light fixture located near the wheelchair. The bus driver utilized the on-board hand held fire extinguisher to extinguish the fire and called for assistance. There were no passengers on the bus. The bus sustained moderate damage to the overhead storage area over the wheelchair lift.

The environment played no part in any of the fires.

The driving records of the bus drivers involved in these cases were reviewed by the Public Transportation Safety Board staff. The records showed no concerns regarding the driving record of any of the drivers and all of the Department of Motor Vehicles Article 19A records were complete, in-order and up-to-date. No post incident drug and alcohol testing was performed on any of the bus drivers. The action(s) of the bus drivers did not in any way contribute to the fires or the severity of the fires.

All of the involved buses are 45 foot long over-the-road type DL-3 models manufactured by Motor Coach Industries (MCI) with a seating capacity of 55 passengers. A review of the bus records showed that in all cases Preventive Maintenance Inspections (PMI) are performed at 6,000 mile intervals. A review of the maintenance records all of the buses showed no history of any safety or recurring defects and, additionally, showed no defects which could be considered a causative factor to the fires. However, it should be noted that the maintenance records for bus #2075 did show that on several PMIs interior/exterior lights and dome lights were not functioning (burned out). The records for this bus showed no records of bulb replacement/repair.

Bus #2081
A post fire inspection of bus #2081 was conducted on July 11, 2005 at the Zerega Maintenance/Repair facility (the bus had been towed to this facility after the fire). The inspection showed that the most probable cause of the fire was an electrical failure, short to ground, of one of the three fluorescent light tube ballasts located in the end cap cover of the overhead storage compartment. This area is located over and behind the bus driver’s seat. The ballasts located in this cap supply electrical power to the left side #1 and #2, aisle and window, fluorescent light tubes. The metal cover of the ballast closest to the aisle was partially melted, but the internal components were intact. Due to the extensive fire damage it was not readily apparent what caused the failure of the ballast, but it was determined that this was the starting point of the fire. At the time of the fire it had been raining heavily and that the bus driver had indicated that there had been water leaking from the bus’ ceiling into the end cap area.
In an effort to determine the cause of the fire in bus #2081 several of the same model buses under repair or upgrade within the depot were inspected. Of these buses several had also been involved in fires (non PTSB criteria) similar, but not as severe, as the fire involving Bus #2081. The fires in these buses had all been determined to have been caused by the failure of the ballasts and/or their wiring. Some of the inspected buses had ceiling panels removed and it was observed that all of these buses exhibited corrosion on the aluminum support columns located within the front overhead storage compartments. In addition, one of the buses, which had been severely damaged in an earlier fire, showed severe rust and corrosion from suspected water intrusion throughout the entire ceiling area and the corrosion and rust continued into the other overhead components. There was also evidence of ballast failures and burn marks from grounding of the light wires located within the overhead storage compartments aluminum support rail components. There was also evidence of burn marks, which had not been readily apparent, on areas where ballasts had been removed for repairs.

After it became apparent that there was a problem with water leaking into the interior of the bus, testing was performed on several of the buses within the Zerega facility. These tests confirmed that water was leaking into the ceiling of the bus through the roof escape hatches, the roof mounted transponder housing and through the rivets securing the roof panels to the frame ribs. Although the investigation found that the numerous light ballasts were disbursed throughout the entire length of the overhead storage compartments it was apparent that only the ballasts located in the front of the bus seemed to be affected.

As a result of these findings, on August 18, 2005 the MTA NYCT Department of Buses (DOB) issued a Maintenance Directive requiring maintenance personnel to immediately disconnect and/or disable the six front fluorescent lights (#1 right and left side window and #1 & #2 right and left side aisle lights) on all MCI buses. In addition, the MTA NYCT began discussions with MCI with respect to the findings and concerns regarding water intrusion and wiring for the overhead fluorescent lighting.

**Bus #2075**
The post fire inspection of bus #2075 was conducted on two separate days, October 10th and 12th, 2005. The inspection of the two fluorescent light ballasts located in the #3 overhead storage compartment showed charring of the wire loom (protecting covering) and wire insulation where these light socket wires plug into the ballast. The fluorescent light wires were traced and it was noted that they were routed and secured in the same manner as in Bus #2081. It was found that the wires are tucked into the “U” shaped channel in the upper aluminum support channel of the overhead storage compartment and are held in place by spaced chunks of dense foam rubber. Inspection of the wires showed that both the wires and foam pieces were severely burned. In addition, there was evidence of electrical arcing on the edge of the aluminum support channel where the light socket wire was butt spliced into the main wire. As noted in the inspection of bus #2081, and the other buses at the Zerega facility, there was evidence of water intrusion, and th
It was observed during the inspection of the bus that paper towels were stuffed into areas around the end cap on the overhead storage compartment located directly behind the bus driver’s seat. When the driver of bus #2075 was interviewed he indicated that it was usual for water to drip from this location, and that this was a common occurrence on MCI buses. The driver indicated that this problem was most apparent during or after periods of heavy rain.

**Bus #2018**

The post fire inspection of bus #2018 was again conducted on two days, October 17th & 20th, 2005. Similar to the fire which occurred in bus #2075, this fire occurred within the same #3 right side overhead storage compartment with the same type of fire damage and evidence of water intrusion. As in the two previous fires, this fire occurred either during or directly after periods of heavy rain.

**Additional Facts**

In the course of the PTSB staff’s investigation of these fires the staff attended a meeting with a representative from MCI who explained the interior overhead fluorescent lighting system. The staff learned that the fluorescent lights run on 110 volt A/C current, the current being changed from D/C current provided by the alternator/battery system to A/C current by an inverter. The A/C current travels to the ballast whose main function is to provide the burst of high voltage current, approximately 600 volts, necessary to start the fluorescent light tube. Once the tube lights the voltage drops back to 110 volts. A problem arises when the light tube is not operational as the ballast will continue to try to light the tube continually sending 600 volts to the tube which will eventually cause the ballast to overheat and fail by melting or catching fire. Water intrusion is a problem when water infiltration at the splice, where the socket wire for the light tube branches off from the main wire, will cause the high voltage ignition charge sent by the ballast to the light tube to arc to any grounded metal object close to it, such as the aluminum components of the overhead storage compartments. This arcing, under certain conditions, causes a fire.

The roof panels of the MCI model year 1998 thru model year 2003 buses are built with steel panels which are riveted together onto a supporting roof bow. There is a sticky gasket type of material between the overlapping edges of the panels. The investigation found that the majority of these riveted roof panels are leaking. In late 2003 the roofs of the MCI buses were changed to a molded seamless construction.

The PTSB staff’s investigation also found that water was entering the buses through the roof emergency exit hatches and through holes drilled and improperly sealed, in the roof of the bus by the MTA NYCT for mounting the E-Z Pass transponders.

The PTSB staff, in November 2005, sent a PTSB Safety Advisory, including photos, to all bus properties in New York State describing the problem of water intrusion with MCI motor coaches and the danger of potential fires. The staff did not receive any responses to the advisory of any other properties having the same problem as the MTA NYCT.
During the course of the investigation the PTSB staff learned of a fire experienced by New Jersey Transit (NJT) which was attributed to a defective light socket of an overhead fluorescent window light. MCI advised NJT to disable all of the window fluorescent lights, which NJT subsequently performed. NJT has not had any other fires attributed to the fluorescent lighting.

MCI has redesigned the interior fluorescent lighting and wiring style and has been reconfiguring the newest buses with the new lighting system. The new system includes circuit overload protection in the event of a short to ground. In addition, the MTA NYCT and MCI have agreed to a detailed plan to repair the roof leaks and roof escape hatch leaks in the existing MTA NYCT fleet of 500 MCI buses. Implementation of repairs, starting with the oldest buses, should begin shortly after the agreement is signed, expected in early 2007.

The Public Transportation Safety Board staff finds that the most probable cause of the fires in this combined case was the intrusion of water into the interior of the buses from leaking roof panels, leaking roof escape hatches or improperly sealed E-Z Pass transponders. The moisture entered the splices and connections of the overhead fluorescent lighting causing arcing and/or shorts to ground resulting in the wiring and/or the ballast to overheat and catch fire.

As a result of these fires the MTA NYCT DOB has taken the following actions:

- The disabling of all interior right and left front overhead window fluorescent lighting and the disabling of the interior aisle lighting for the entire MCI bus fleet with old style wiring.
- Issued a Maintenance Directive on September 23, 2005 that requires that all burnt out fluorescent lights on MCI buses with the new wiring style be repaired ASAP due to their safety sensitive nature.
- Taken steps to insure that all roof openings, such as for the E-Z Pass transponder or radio antennas, are adequately sealed. The removal of the E-Z Pass Transponder from the roof of the bus is also being considered.

Based on the actions taken by the MTA New York City Transit regarding these fires, the Public Transportation Safety Board staff makes no recommendation in this case.

INVESTIGATOR: Harry W. Gerham

CHIEF ACCIDENT INVESTIGATION SECTION

DIRECTOR, PCSB, NYSDOT

1/22/07

DATE

2/22/07

DATE