



National Transportation Safety Board  
Washington, D.C. 20594  
Railroad Accident Brief

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Railroad Accident Number:	ATL-00FR-005
Rail System:	Metropolitan Atlanta Rapid Transit Authority (MARTA)
Train:	Unscheduled train 166
Accident Type:	Train striking bucket of self-propelled lift containing two contract workers
Location:	MARTA Lenox rail transit station in Atlanta, Georgia
Date and Time:	April 10, 2000, about 2:30 a.m.
Fatalities/Injuries:	Two fatalities

About 2:30 a.m. on April 10, 2000, an unscheduled MARTA train struck the bucket of a self-propelled lift that was fouling the southbound main track at MARTA's Lenox Station in Atlanta, Georgia. Two MARTA contract workers who were repairing the station ceiling occupied the bucket. Both workers received fatal injuries when they were ejected onto the station platform.

## The Accident

On May 17, 1999, MARTA entered into a contract with The Lions Group, Inc., to repair the ceilings of MARTA rail train stations in the Atlanta area. (See figure 1 for a diagram of the MARTA system.) The work involved the use of a self-propelled lift, which was positioned on the station platforms with the boom extended as necessary.<sup>1</sup> During the course of the repairs, the boom and bucket sometimes had to be positioned over the track in such a way as to foul the track. MARTA assigned a flagman to the project.

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<sup>1</sup> The lift involved in this accident was a Genie Z-34/22N narrowbase, self-propelled, articulating, zero tailswing boom.

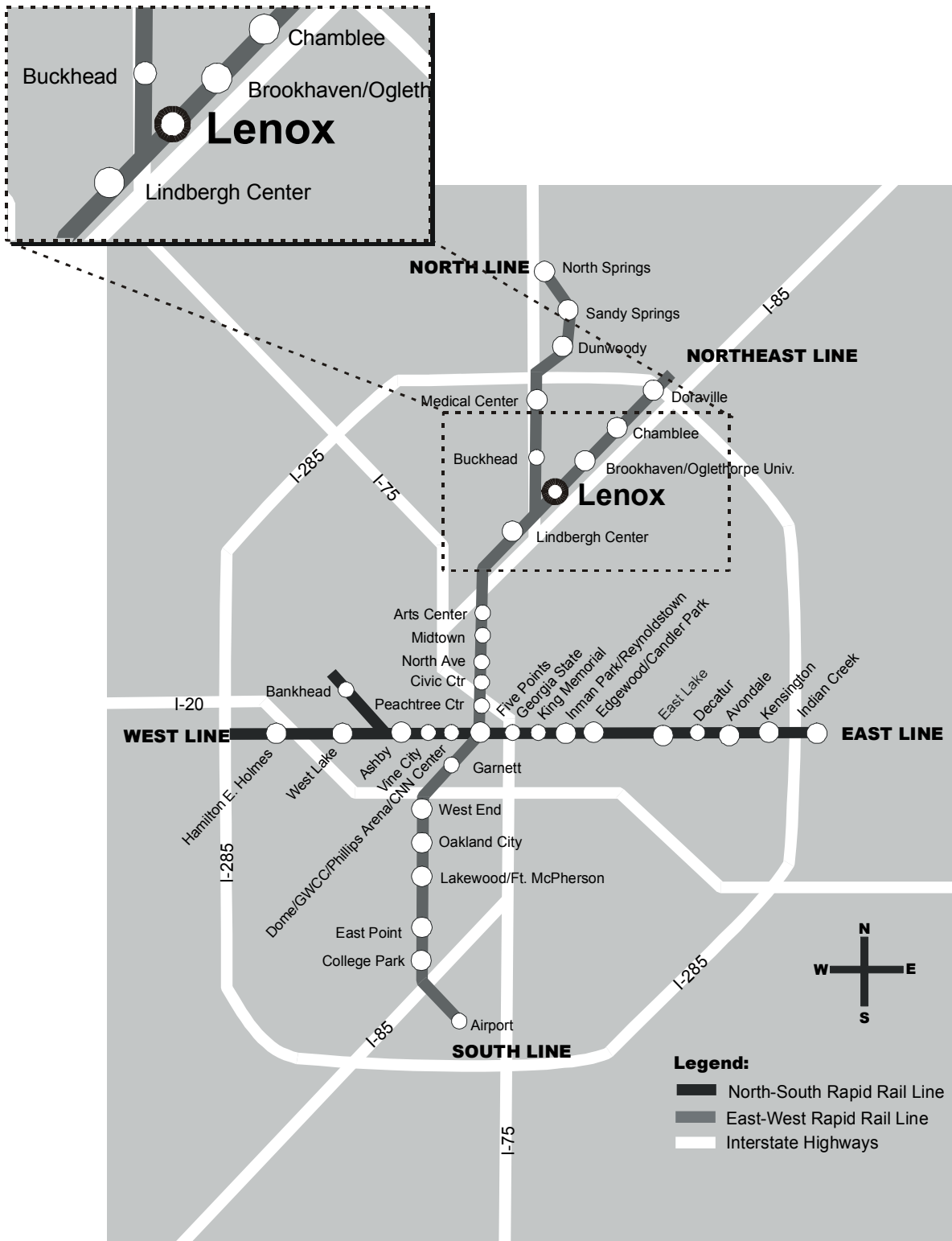


Figure 1. Map of the MARTA system, highlighting Lenox Station.

At the time of the accident, Lions employees had been working on the ceiling of MARTA's Lenox Station for about 4 months. Two Lions employees were scheduled to complete the work on the day of the accident, April 10. As was customary, the work was to be done between 2:00 and 4:00 a.m., when no MARTA trains were scheduled to operate in revenue service.

About 1:35 a.m. on April 10, after the last scheduled train of the previous day's operations (northbound train 166) had passed through the station, the flagman radioed the MARTA rail system control center and requested permission for the Lions workers to start repairs, some of which would require that the bucket of the lift be positioned over the southbound track. (Lenox Station has two tracks, one of which is normally used for southbound trains and the other for northbound trains. The tracks are separated by a 30-foot-wide passenger platform.)

About 2:00 a.m., the rail system control center advised the flagman that a safe clearance restriction, restriction No. 73, was in effect at Lenox Station.<sup>2</sup> The rail system control center assistant superintendent deenergized the high-voltage third rail within the station to protect the workers in case they accidentally touched it during their work. (Because of the length of the trains and the fact that the third rails on either side of the station remained energized, deenergizing the third rail within the station did not prevent a train from obtaining power to enter the station.) He also lined the track away from the work site to the northbound track at Lenox Station. Because he did not place exit prohibits on the track to prevent the track from being re-aligned by mistake, the computerized system could still automatically line the track back through the work site.

About 2:07 a.m., after the MARTA flagman had checked the power on the third rail for the Lenox Station southbound track and confirmed that it was deenergized, Lions workers began working on the station ceiling. The flagman did not set flags to protect the work area. As the work began on April 10, the flagman said, he was on the station platform observing the workers.

Meanwhile, 18 MARTA passengers who had attended a late-night event in downtown Atlanta found themselves stranded at Lindbergh Center Station, south of Lenox Station. The passengers had planned to change trains at Lindbergh Center Station and to take a MARTA train north to Dunwoody Station, but they did not arrive at Lindbergh Center Station until about 2:00 a.m., after the last scheduled train had left the station. MARTA police became aware of the stranded passengers and notified the rail

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<sup>2</sup> Safe clearance requirements will be discussed later in this brief.

system control center. The control center assistant superintendent decided to recall train 166 from Doraville Station to Lindbergh Center Station to serve the stranded passengers.

According to the train operator, the control center assistant superintendent notified him about 2:15 a.m. of the need to return to pick up passengers at Lindbergh Center Station. The train operator said he was not advised of the safe clearance restriction on the track at Lenox Station and he was not aware that any work was being performed at the station. He said that during his trip southbound, he operated the train in manual control, governed by signal indication, moving between 50 mph and the maximum allowed speed of 60 mph.

The control center assistant superintendent stated that he remembered instructing the train to return southbound from Doraville Station to Lindbergh Center Station. He could not recall notifying the southbound train operator of the presence of the workers at Lenox Station by issuing safe clearance restriction No. 73. He did not notify the workers at Lenox Station that a train would be approaching. He stated that as the train moved southward, another controller asked him for assistance, and his attention was distracted. He said that when he again turned his attention to the movement of train 166, he used the public address system to let the stranded passengers at Lindbergh Center Station know that a train was en route to the station. While he was thus engaged, the rail system control center computer system routed the train through Lenox Station on the southbound track.

The train arrived at Lenox Station about 2:30 a.m., while the two Lions workers were in the bucket of the lift positioned over the southbound track, replacing screws in ceiling tiles. The flagman said he heard the Lions workers shouting that a train was approaching. He said that he ran toward the train, attempting to stop it with hand signals.

According to the train operator, the train was moving about 35 mph when it entered the station. He said his first indication of a problem was when he saw someone on the platform gesturing to him. He said that as soon as he realized that the person wanted him to stop, he placed the train brakes in emergency and moved the controller to the "off" position. The train did not stop before it struck the work boom and ejected the two Lions workers from the bucket to the station platform. (See figures 2 and 3.) One of the workers was killed instantly; the other died in the hospital.



**Figure 2.** Damaged self-propelled lift.



**Figure 3.** Lead car of April 10, 2000, Lenox Station accident train; window damaged by contact with work boom of self-propelled lift.

## Rules and Regulations

### ***Safe Clearance Procedures***

Safe clearance procedures are used for slowing or stopping trains moving through areas where workers are present. At the time of the accident, safe clearance restriction No. 73 was in effect for the work that necessitated fouling the track at Lenox Station. The MARTA *Wayside Access Manual* states that safe clearance procedures require that:

All personnel requesting a Safe Clearance, Verbal, or Generic restriction must be accompanied by a qualified MARTA Flagperson or MARTA Supervisor while on the track wayside.

In accordance with this requirement, the flagman had been assigned to the ceiling repair work.

The safe clearance procedures also state that:

The employee will contact the Central Controller or Yard Tower Supervisor by two-way radio requesting the Generic, Verbal, or Special restriction number from the Track Allocation Schedule.

The flagman had obtained a safe clearance restriction (No. 73) from the control center assistant superintendent.

The procedures further require that the controller confirm the restriction number, location, and special instructions with train operators and that he/she repeat the restriction notification hourly to train operators. The control center assistant superintendent did not follow these notification procedures on the day of the accident.

The procedures state that “if the work requires reduced train speed operations, the appropriate flags will be posted at the proper locations.” (Reduced train speed operations are to be observed if the track is being fouled.) The flagman stated that he did not place flags alongside the southbound track on either side of the station because (1) the lift unit was on the station platform, rather than on or near the tracks, (2) the last scheduled train had passed through the station, (3) he believed the track was blocked out by safe clearance restriction No. 73, and (4) flag placement had not been required during the preceding 4 months of work at Lenox Station.

The flagman said that the track supervisor in charge of the work area had told him that flags were not necessary when a safe clearance restriction was in effect. The track

supervisor stated that the flagging rule requirements for the Lenox project were a “gray area” because the lift unit was on the station platform rather than on or near the tracks. He confirmed that he did not require flag protection for the work site.

### ***Single-Tracking Procedures***

Single-tracking procedures reroute trains to prevent them from entering areas where workers are present. MARTA’s single-tracking rules require that the following steps be taken for an area being protected by a single-tracking restriction:

- A schedule for track restrictions is established during the weekly track allocation meeting a week in advance of the restriction’s effective date;
- The flagman is provided a copy of the work order;
- The flagman confirms the order with the rail system control center;
- The flagman places a red tag on the switch to be lined away from the work site; in addition, the flagman places flags, trip stops,<sup>3</sup> and shunt straps on the track;
- The rail system control center lines the switch away from the work site and removes electrical power from the track;
- The rail system control center places exit prohibits on the track section; and
- The rail system control center has the flagman test the track power to ensure that electrical power has been removed from the track.

MARTA did not require the use of single-tracking procedures at the Lenox Station work site. The rail system control center assistant superintendent, who was on duty and acting as a controller in the control center at the time of the accident, stated that he thought the control center was supposed to protect the southbound track at Lenox Station so that a train could not enter the work area. He said he normally lined the crossover switch to route trains away from the work area or required that trip stops be placed on the track north of Lenox Station to stop a southbound train. He also said he normally would have entered an exit prohibit that prevented the train control computer

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<sup>3</sup> A trip stop is a mechanical device that a flagman can manually position at trackside to trip the brake cock of a train so that it initiates an emergency brake application.

from routing trains into the station. He said he did not know why he had not followed these procedures on the day of the accident. His statements indicate that procedures associated with single tracking had been used previously during the ceiling work project to protect the Lenox work site.

## **Contract Between MARTA and The Lions Group**

MARTA's contract with The Lions Group detailed how the ceiling work would be done and how the work area would be protected. The method of flagging and the rules required for that protection were specified in the contract, which stated:

The request and the performance of work during non-revenue service must adhere to the procedures established from single tracking.... Non-revenue service occurs between 0200 hours to 0400 hours daily.

The contract also stated:

[MARTA] shall have the sole authority to determine the need for flagging services to protect its operating rail system.... Flagging services will be needed when the Contractor's [Lion's] personnel and equipment are, or may be, working closer than 15 feet to centerline of a track or over tracks.... Flagging service will be needed if boom-equipped machinery will be working closer to a track centerline than boom lengths plus 15 feet, and if either permanent security fence or other physical barrier acceptable to [MARTA] is not in position between track and area of work.

MARTA's safety director at the time of the accident<sup>4</sup> stated that work plans for the contractors were developed at a weekly work allocation meeting organized by MARTA. The meetings were attended by operations, maintenance, safety, and work project employees. The plans developed at the meetings called for protecting the work site at Lenox Station by safe clearance procedures rather than by the single-tracking procedures that were specified in the contract.

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<sup>4</sup> This manager left MARTA later in 2000.



## **Personnel Training and Experience**

The flagman at the time of the accident had worked for MARTA for more than 2 years and had attended rules classes in 1999. On February 9, 1999, he had passed the wayside access procedure tests, which outlined the proper flagging procedures and the process for obtaining permission to work on the main track. He understood, according to his test results, how to protect a work site with flags, trip stops, and shunt straps. He had also passed the test for wayside access procedures, including correctly answering a question regarding the proper flag placement to protect a work site. According to the flagman, at the time of the accident, he was providing the same level of protection that he had provided during the previous several months of work on the Lenox Station ceiling. The track supervisor had observed him on several occasions and had made no objection to the flagman's not setting flags at the Lenox Station work site.

The control center assistant superintendent had been hired in 1984 as a busdriver. He became a train operator in 1990. In 1994, he received 400 hours of training as a rail system control center operator, and he was certified as a control center operator in 1995. He was recertified in 1995 and 1996, and he was promoted to a supervisory position in the control center in 1997. On March 21 and 22, 2000, he was recertified as a control center operator.

## **MARTA Rules Compliance Program**

According to MARTA's director of operations, supervisors made routine train ride checks and discussed violations with operators who failed to comply with operating procedures. A report was made only if a train operator failed to comply with a bulletin order, make a station stop, or comply with a stop signal. No other records were kept on rules compliance checks.

Before the accident, no MARTA employees except train operators were subject to a formal program of rules compliance checking. MARTA had no compliance program for operations center, maintenance-of-way, or signals employees. In addition, MARTA had no efficiency-testing<sup>5</sup> program under which rail supervisors systematically observed train operations and assessed compliance with selected operating rules.

After the accident, MARTA reviewed its operations and maintenance rules and practices and made the following changes: it improved its training of operations and

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<sup>5</sup> Efficiency tests involve unannounced observations of operating employees, often with a test scenario such as a red signal, to verify that appropriate rules are being followed.

maintenance employees in wayside access procedures, and it added a requirement that its supervisors do daily audits of employees' compliance with rules and safety procedures.

## **State Oversight**

On April 16, 1993, Georgia designated the Georgia Department of Transportation (GDOT) as the State agency responsible for overseeing the MARTA system. This responsibility was delegated to the administrator for GDOT's Office of Intermodal Programs. As well as having the responsibility for the safety oversight of MARTA rail transit operations, the GDOT office is responsible for managing the planning and operations programs in support of the transit, railroad, marine, and aviation systems within the State. GDOT's staff for rail transit operations consists of a single individual.

Federal Transit Administration regulations allow States some flexibility about how actively they fulfill their rail transit oversight responsibilities. State agencies can delegate accident investigation duties to the transit agency and then review the transit agency's reports. State agencies can also hire contractors to perform some of their oversight functions. GDOT contracts with a local urban transportation consulting firm to provide rail transit technical expertise and to supplement its single-member staff for this activity. The consulting firm wrote the GDOT transit safety plan, and the firm conducts all transit oversight investigations for GDOT. The firm also advises GDOT on all inquiries related to transit safety.

The Federal Transit Administration requires GDOT to make an on-site safety review of MARTA every 3 years. The purpose of this review is to evaluate the efficacy and currency of the MARTA system safety plan and to ensure that MARTA is complying with its plan. According to GDOT's management, GDOT conducted its first 3-year audit of MARTA at the end of 2001. The audit found the MARTA program deficient in employee training and certification, adherence to rules and procedures, and system modification review and approval processes. Before 2001, GDOT had not done any independent safety audits at MARTA, nor had it conducted any independent investigations of MARTA accidents. GDOT has the authority to audit and observe all MARTA operations.

As a result of the accident, GDOT audited MARTA's operations. GDOT suggested that MARTA improve its rules testing and audit the performance and rules compliance of its employees. GDOT has accompanied MARTA managers who are doing the daily audits of employees that MARTA now requires and has determined that the audits are effective.

## **Probable Cause**

The probable cause of the accident at the Metropolitan Atlanta Rapid Transit Authority (MARTA) Lenox Station on April 10, 2000, was MARTA's failure to require the use of single-tracking safety procedures to protect the work site and the failure of the rail system control center assistant superintendent and the flagman to follow all MARTA safe clearance procedures for protecting workers fouling the track. Contributing to the accident was MARTA's lack of an effective program to ensure that employees were complying with its safety rules.

**Adopted: August 8, 2003**