



National Transportation Safety Board

Washington, DC 20594

Highway Accident Brief

Fatal Pedestrian Collision with Transit Bus New York City, New York, October 4, 2016

Accident Number:	HWY17SH003
Accident Type:	Fatal pedestrian collision with transit bus
Location:	Avenue D and East Houston Street, New York City, New York
Date and Time:	October 4, 2016, about 9:50 a.m. eastern daylight time
Vehicle:	2012 Nova Bus
Driver:	57-year-old male
Pedestrian:	73-year-old female
Fatalities:	1

Crash Description

About 9:50 a.m. on Tuesday, October 4, 2016, a 2012 Nova Bus articulated transit bus operated by the New York City Metropolitan Transportation Authority (MTA) was traveling south on Avenue D on the Lower East Side of New York City. As the 57-year-old male driver approached the intersection of Avenue D and East Houston Street, the traffic signal for southbound vehicles was red. The bus stopped in the left-turn lane, the second vehicle in line. According to interviews, while the bus was stopped, a passenger walked to the front and, standing forward of the white standee line, began to talk to the driver.

When the traffic signal turned green, the driver pulled the bus into the intersection, then stopped to yield to oncoming traffic. On a WALK signal, a 73-year-old female pedestrian stepped into the crosswalk from the curb on the northeast corner and began walking south across East Houston Street. The bus driver and the passenger continued to talk. The pedestrian crossed the westbound traffic lanes and stepped onto the concrete median. When she stepped off the median to cross the eastbound lanes, the driver executed a left turn onto East Houston Street (figure 1). By that time, the pedestrian signal was flashing DON'T WALK. The right front bumper of the bus struck the pedestrian in the eastbound lane, 77.5 feet from the northeast curb.¹ The pedestrian was dragged beneath the bus a short way before it stopped. The pedestrian was pronounced dead at the

¹ The total distance across East Houston Street was 89.5 feet.

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scene and her body transported to the Manhattan Office of the Chief Medical Examiner of New York City for an autopsy.

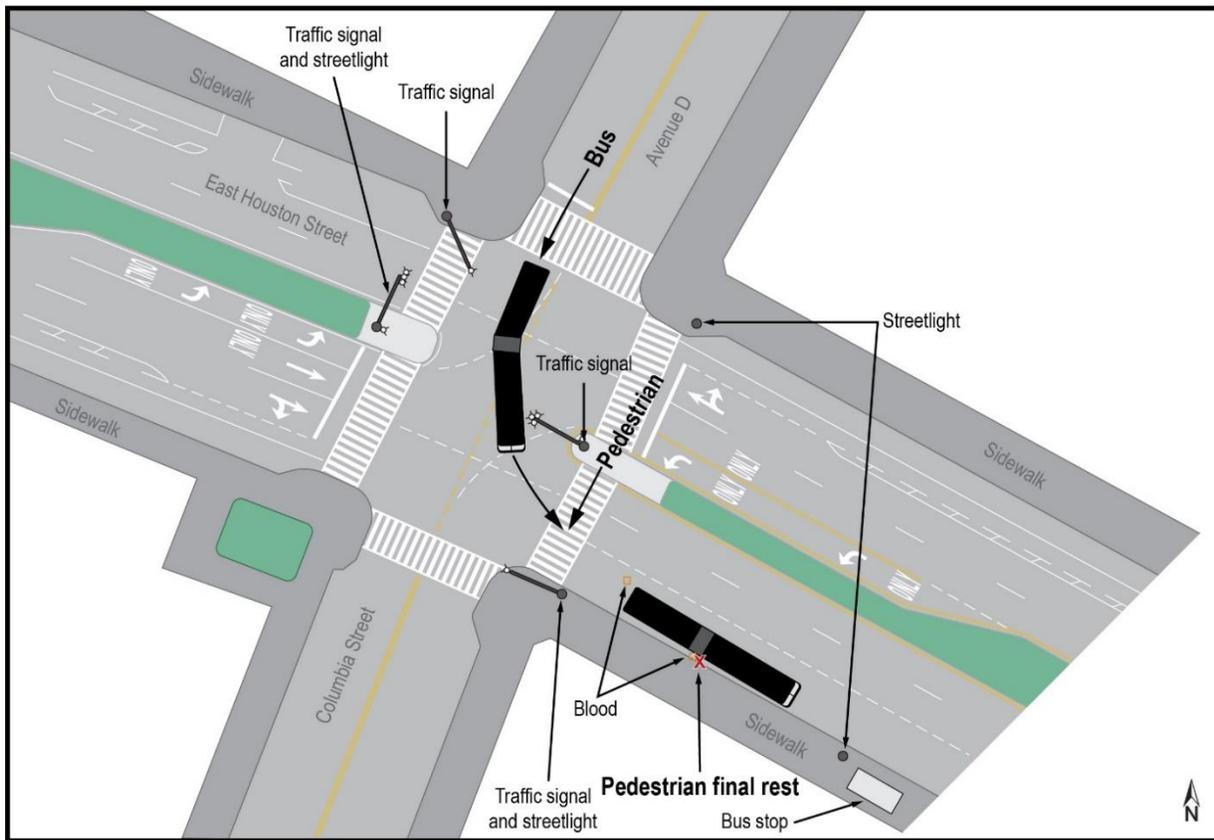


Figure 1. Diagram of crash scene showing path of transit bus through intersection, path of pedestrian in crosswalk, and position of pedestrian at final rest.

The temperature at the time of the crash was 61°F, the wind was from the east-northeast at 9 mph, and the sky was overcast. The sun had risen at 6:57 a.m.²

Crash Location

The crash occurred on a busy thoroughfare in a neighborhood of housing complexes, commercial businesses, churches, and schools (figure 2). Avenue D is a minor collector roadway that runs northeast to southwest. On the north side of the intersection with East Houston Street, Avenue D has two lanes, one a dedicated parking lane and the other a travel lane. South of the intersection Avenue D becomes Columbia Street, which has two travel lanes and one parking lane in each direction. The speed limit for Avenue D north of the intersection is 20 mph. South of the intersection it is 25 mph.

Houston Street is a major arterial roadway that runs east and west, transecting lower Manhattan and connecting Franklin Delano Roosevelt Drive on the east (at the East River) to the

² Weather data from <https://www.wunderground.com/history/>.

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Hudson River on the west. (East Houston and West Houston streets separate at Broadway.) East Houston Street has two travel lanes and one dedicated parking lane in each direction. A raised concrete median separates the eastbound and westbound lanes. The speed limit on East Houston Street is 25 mph.

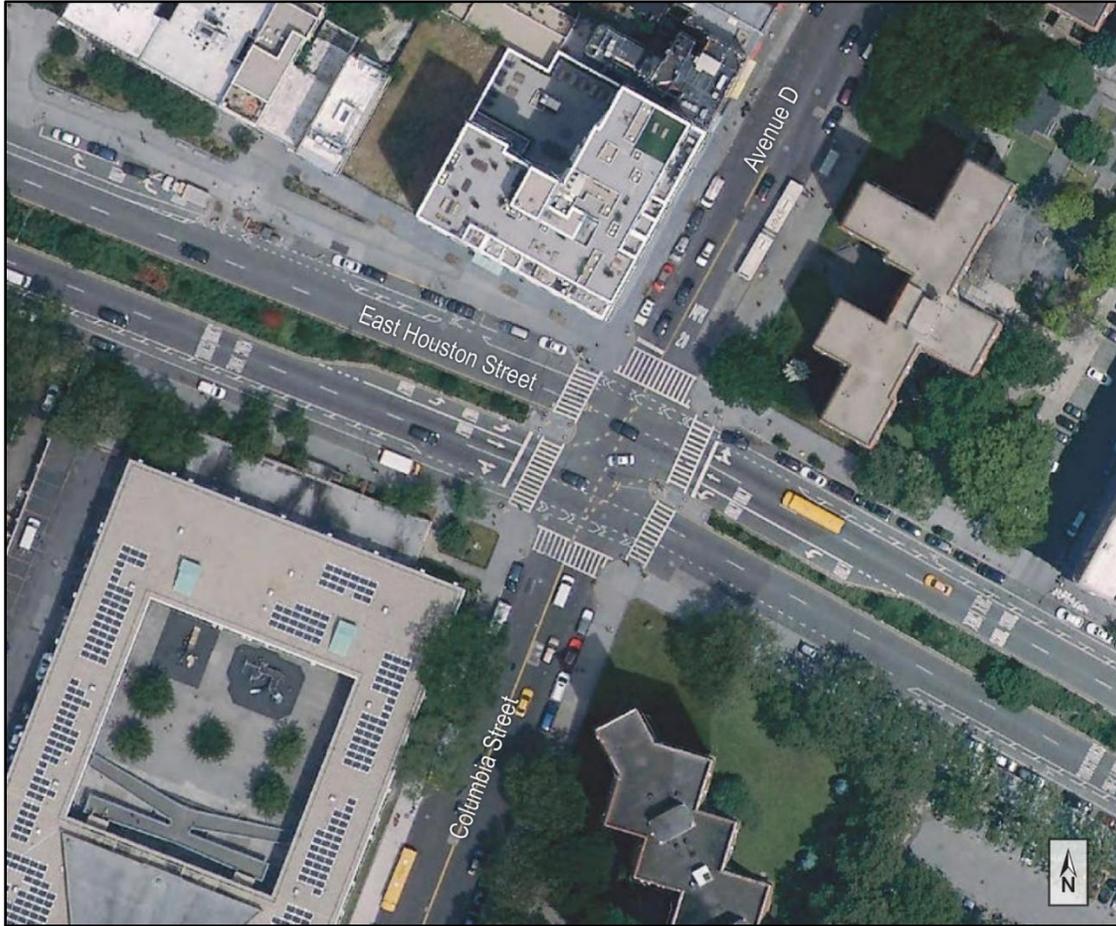


Figure 2. Aerial view of crash location. Pedestrian was crossing from northeast corner to southeast corner and had stopped on median before proceeding across intersection. Bus was turning left from Avenue D onto East Houston Street. (Base photo from New York state global information system)

The intersection of Avenue D and East Houston Street experiences a high volume of pedestrian and vehicular traffic at all hours of the day. According to a 5-year history from the New York City Department of Transportation, 11 pedestrian-related crashes occurred at the intersection from 2010 through 2014. Seven of the struck pedestrians were crossing with the signal. More pedestrians were struck while crossing with the traffic signal at the crash intersection than at any other Manhattan intersection.

Pedestrian

The pedestrian lived in Brooklyn, New York. Her medical history could not be determined. The onboard surveillance camera on a passing MTA transit bus captured the pedestrian walking

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unaided down the sidewalk on the east side of Avenue D. Video from the surveillance camera on the passing bus showed that the pedestrian was not talking or texting on a cell phone while she crossed the intersection.

The pathologist at the Office of the Chief Medical Examiner of New York City who performed the pedestrian's autopsy reported no preexisting medical condition that contributed to her death. The pathologist recorded the pedestrian's height as 5 feet 1 inch and her weight as 114 pounds. Being run over by the transit bus caused two potentially fatal injuries: a severed brain stem and an aortic transection. The autopsy report listed the pedestrian's cause of death as multiple blunt-impact injuries. Toxicological tests of blood samples from the pedestrian were negative for alcohol and other drugs.

Driver

The New York City MTA had employed the 57-year-old driver for 27 years. He had a New York class B commercial driver's license with a passenger and cargo tank endorsement and had complied with the requirements of Article 19-A of the New York state vehicle and traffic laws.³ The license had one restriction: the driver must wear corrective lenses while driving. He was wearing corrective lenses at the time of the crash.

The Federal Motor Carrier Safety Administration exempts MTA transit drivers from its medical certificate requirement; however, drivers are required to undergo an annual physical examination for the New York City transit system. At the driver's last physical examination on December 23, 2015, he was found medically qualified for duty. The physician scheduled the driver for a 6-month follow-up because of preexisting medical issues. The follow-up examination, conducted on June 22, 2016, medically cleared the driver for duty.

The crash driver worked a regular Monday-through-Friday shift, with Saturday and Sunday as his normal days off. The driver's shift schedule provided by the MTA shows that he normally worked from 7:08 a.m. to 7:27 p.m., as he did on the day of the crash. The crash driver's last 2-month work history showed that he regularly worked his normal 12-hour day and did not work overtime on his scheduled days off.

The crash driver underwent seven random rides between January 2015 and the crash. During random rides, MTA training, operations, and safety personnel ride buses to detect unsafe practices and driver deficiencies. The crash driver received four citations for violating regulations during that period. Two of the offenses involved violating internal policies. During a ride on October 28, 2015, the driver was cited for an improper turn, and on November 18, 2015, he was cited for failing to signal when changing lanes. In the 24 months before the crash, the driver was not involved in any crashes the MTA deemed preventable. A postcrash toxicological screening of the driver was negative for alcohol and other drugs.

³ Under Article 19-A, employers of bus drivers must obtain from applicants a current physical exam, an employment background check, and a current abstract of their driving record.

Vehicle

The 2012 Nova Bus Artic model low-floor articulated bus was designed for high ridership transit routes. The bus was 62 feet long and had a maximum occupancy of 112 persons, seated and standing. The MTA documented regular preventive maintenance on the bus. Records listed no recalls for the bus. The MTA's Technical Service Division, in the presence of a representative from the New York State Public Transportation Safety Board, performed a postcrash inspection and brake deceleration test on the bus at the MTA maintenance depot. No mechanical defects were found. Figure 3 shows an exemplar MTA bus at the crash scene.



Figure 3. Exemplar transit bus at crash location. Articulated bus is turning from Avenue D onto East Houston Street, same location and same maneuver crash bus was executing when it struck pedestrian.

The crash bus was equipped with eight surveillance cameras. Seven cameras monitored the passenger compartment, and one forward-facing camera, attached to the upper right of the front windshield, monitored the bus exterior. The bus was also equipped with a device from the Clever Devices company that performed the functions of an engine control module and used the global positioning system to track not only the bus's location but also its speed. According to the device, the bus's speed was 12.2 mph at the time of the crash.

Metropolitan Transportation Authority

The MTA employs over 12,700 transit bus operators and has at least 5,600 buses on the road at any time. The MTA conducts an intensive 6-week training program for all potential bus drivers at its training center in the borough of the Bronx. The course offers classroom instruction, hands-on exercises, the use of simulators, and over-the-road training. The crash driver had completed the course. The MTA periodically tests its drivers' knowledge of company policy and New York state regulations and also provides them with regularly updated operational bulletins. A bulletin dated November 23, 2015, lists a number of rules its drivers "must always adhere to," including the following: "Avoid talking with anyone while the bus is in motion." A memo inserted into the training manual states that company policy requires executing all turns at 5 mph or less.⁴

Members of the MTA training division respond to each crash and gather information to incorporate into the company's training curriculum. In an internal analysis of crashes involving its personnel, the MTA found that operators with 3 to 5 years of service were more likely to be involved in crashes than other drivers. That finding led to the institution of TOPS (Transitional Operators Program), which brings at-risk drivers (3- to 5-year veterans) back to the training center for retraining. The MTA mandates that all operators participate in yearly training that includes fatal accident studies and Vision Zero initiatives.⁵

MTA staff have also initiated a "ghost rider" program in which members of the training division and other staff take random bus rides to identify unsafe drivers, unsafe practices, and system deficiencies. Between November 2014 and the date of the fatal crash, MTA staff had taken over 16,000 random rides. The MTA also initiated a tracking program that alerts MTA divisions each time an operator and a transit bus are involved in a reportable event.

At the time of the subject crash, the MTA had been involved in 62 fatal pedestrian crashes since 2004. In 2015, it was involved in eight fatal pedestrian crashes. In 2016, the company had four fatal pedestrian crashes before the subject crash.

Vehicle-Based Safety Countermeasures

The bus involved in the collision was not equipped with an S-1 Gard system, a danger-zone deflector that can be installed under a bus, immediately in front of the rear wheels, to deflect a fallen body away from them. The system can thus reduce the severity of injuries to a pedestrian who falls under a bus and could be run over by the wheels. The MTA had examined the S-1 Gard system as a possible countermeasure to fatal pedestrian crashes and decided that the best way to improve pedestrian safety was to prevent buses from hitting pedestrians in the first place.

To that end, the MTA is installing and testing two types of pedestrian safety systems on its buses. The first is the TurnWarning™ pedestrian warning system from the Clever Devices company. The system has a built-in turn-recognition component that senses a turn and, based on a

⁴ The MTA determined after the fatal crash that a contributing factor was the driver's failure to adhere to this policy.

⁵ Vision Zero is a nationwide movement to eliminate all traffic fatalities and severe injuries.

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preprogrammed turning angle, audibly warns pedestrians that a bus is turning. A system log maintains data showing the date, time, and locations at which announcements are made.

The second system, developed by Rosco/Mobileye, alerts a bus driver to the presence of pedestrians or bicyclists. Sensors scan the area around a bus and identify potential hazards. The system produces audible and visible warning signals to the driver. The MTA plans to expand the system to include an automatic deceleration/collision detection system. The system will automatically slow a bus and apply low-pressure braking, helping operators avoid collisions or reduce their severity. The system will also warn of unintentional lane departures and imminent forward collisions.

Applicable Traffic Laws

Under Article 27, section 1150 of the New York state vehicle and traffic laws, pedestrians are subject to traffic-control signals. Article 27, section 1151, gives pedestrians the right-of-way in crosswalks where traffic-control signals are not in place or not in operation. Under Article 24, section 1112, traffic-control signals that apply to pedestrians are as follows:

- (a) Steady WALK or walking person. Pedestrians facing such signal may proceed across the roadway in the direction of the signal and shall be given the right of way by other traffic.
- (b) Flashing DON'T WALK or upraised hand. No pedestrian shall start to cross the roadway in the direction of such signal, but any pedestrians who have partially completed their crossing on the WALK or flashing DON'T WALK signal shall proceed to a sidewalk or safety island while the flashing DON'T WALK or upraised hand signal is showing.
- (c) Steady DON'T WALK or upraised hand. No pedestrians shall start to cross the roadway in the direction of such signal, but any pedestrians who have partially completed their crossing on the WALK or flashing DON'T WALK signal shall proceed to a sidewalk or safety island while the steady DON'T WALK signal is showing.

Article 26, section 1146 of the New York state vehicle and traffic law requires drivers to exercise “due care”:

- (a) Notwithstanding the provisions of any other law to the contrary, every driver of a vehicle shall exercise due care to avoid colliding with any bicyclist, pedestrian or domestic animal upon any roadway and shall give warning by sounding the horn when necessary.

Subdivisions 1146(b) and 1146(c) of Article 26 lay out fines and other punishments, including imprisonment, for injuring a pedestrian or bicyclist while failing to exercise due care under 1146(a).

New York City administrative code 19-190 (the Right of Way Law) states that it is unlawful (a misdemeanor) for a driver to kill or seriously injure a pedestrian or cyclist resulting from the driver's failure to yield right-of-way or the driver's failure to exercise due care (as required by Article 26, section 1146, of the state laws).⁶

⁶ The Right of Way Law was enacted in August 2014 as part of the mayor's Vision Zero initiative.

Roadway Design

Pedestrians crossing East Houston Street have 26 seconds to cross during the WALK phase of the pedestrian traffic signal. The next phase, a flashing DON'T WALK, displays for 10 seconds, followed by a solid DON'T WALK that illuminates for 5 additional seconds. The traffic light timing sequence for the intersection incorporates a 7-second all-red clearance phase for vehicles.

A study in Sweden found that the average (comfortable) walking speed for an elderly person is about 2.2 feet per second.⁷ The total distance across East Houston Street is 89.5 feet, which would require at least 40.6 seconds to traverse. The traffic light timing sequence for the intersection allows 41 seconds before the start of the all-red (DON'T WALK) phase.

Probable Cause

The National Transportation Safety Board determines that the probable cause of the crash in New York City, New York, was the bus driver's failure to yield the right-of-way to the pedestrian in the marked crosswalk. Contributing to the crash was distraction caused by a passenger on the bus and the driver's failure to adhere to the company policy that prohibits drivers from talking to passengers while a bus is in motion.

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Adopted: September 5, 2018

For more details about this accident, visit the [NTSB public docket](#) and search for NTSB accident ID HWY17SH003. The accident dockets include such information as police reports, photographs, driver and witness statements, data on previous crashes, highway engineering reports, and timing of traffic signals.

⁷ S. Dahlstedt, *Walking Speeds and Walking Habits of Elderly People* (Stockholm: National Swedish Road and Traffic Research Institute, undated).

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties . . . and are not conducted for the purpose of determining the rights or liabilities of any person.” 49 *Code of Federal Regulations*, Section 831.4. Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report. 49 *United States Code*, Section 1154(b).
