MECHANICAL GROUP CHAIRMAN'S FACTUAL REPORT

Grade Crossing Accident
Valhalla, New York

DCA15MR006
(6 Pages)

NATIONAL TRANSPORTATION SAFETY BOARD
OFFICE OF RAILWAY SAFETY
WASHINGTON, D.C. 20594

MECHANICAL FACTUAL REPORT

1. ACCIDENT

Location:	Commerce Street Grade Crossing on the Metro-North Harlem Line, Valhalla, Westchester County, New York
Vehicle #1:	2011 Mercedes ML350
Vehicle #2:	Metro-North passenger train 659
Operator #2:	Metro-North Railroad
Date:	February 3, 2015
Time:	Approximately 06:26 p.m. EST
NTSB #:	**DCA15MR006**

2. MECHANICAL GROUP

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3. CRASH SUMMARY

For a summary of the crash, refer to the *Crash Summary Report* in the docket for this investigation.

4. TRAIN CONSIST

Northbound MNR train 659 consisted of 8 cars mechanically and electrically coupled together. The "A" car weighs about 125,300 lbs., the "B" car weighs about 128,300 lbs., and are about 85 feet in length. The total estimated weight of the train is about 1,014,400 lbs. with a total estimated length of 680 feet.

The cars were designated as follows:

1. 4333 (B) – lead car
2. 4332 (A)
3. 4197 (B)
4. 4196 (A)
5. 4175 (B)
6. 4174 (A)
7. 4309 (B)
8. 4308 (A) – trailing car

All Metro North Bombardier M-7 revenue cars operate in a multiple unit arrangement that are semi permanently coupled married pairs with an operating cab at each end. Cars are electrically powered and are supplied by a 700 volt direct current (DC) third rail system. They are equipped with friction and electric brakes, a low voltage system, automatic HVAC control, and air actuated automatic couplers.

5. CRASH SEQUENCE

NTSB's review of event recorder data showed that train 659 was traveling Northbound at 59 miles per hour (mph) prior to emergency braking. The data also showed proper horn operation on the approach to the crossing. The engineer initiated the emergency brake about 230 feet before the collision. The data also showed one long horn blast upon initiation of the emergency brake. For more information refer to the *Locomotive Event Recorder and Diagnostic Systems Factual Report* located in this docket.

6. Pre-Departure Inspections

On February 4, 2015, investigators met with MNR maintenance personnel and requested pre-departure inspection records for train 659 for February 3, 2015. MNR stated that they conduct their pre-departure inspections pursuant to 49 CFR Part 238 Passenger Equipment Safety Standards. This regulation consists of 238.303 Exterior Calendar Day Mechanical Inspection, 238.305 Interior Calendar Day Inspection, and 238.313 Class I

Brake test. On February 9, 2015, the pre-departure inspection records for train 659 were received by investigators.

An Exterior Calendar Day Mechanical Inspection consists of examination of the following components and systems:

- Battery venting
- Coupler systems
- Suspension systems
- Wheels
- Grounding and jumper cables
- High voltage markings
- Air compressor
- Rescue access markings

An Interior Calendar Day Mechanical Inspection consists of examination of the following components and systems:

- Moving parts and electrical system safety guards
- Floors and passageways
- Manual door releases
- Emergency equipment and signage
- Doors
- Public address and intercom

A Class I Brake test consists of the following inspections and tests:

- Friction brakes apply and release as intended
- Brake shoes and pads are properly seated and aligned
- Piston travel
- Communicating signal system
- Operation of the engineers brake controller
- Brake pipe leakage
- Emergency brake application and deadman pedal
- Brake shoe and pad thickness
- Air valves are properly aligned
- Brake rigging operation
- Brake disc inspection
- Communication of the brake pipe pressure to the rear of the train

In addition to these pre-departure inspections, the cab signal system receives a Departure Test using a test circuit to verify operation pursuant to 49 CFR 236.587 prior to departing the initial terminal.

7. Equipment Post Accident Inspections

On February 5, 2015, investigators met with MNR personnel at their maintenance facility in North White Plains, NY, to inspect train 659. Train 659 consisted of 8, from a fleet of 336, Bombardier M7 EMU Cars. The leading car 4333 and second car 4332, which received most of the damage were placed separately inside of the paint shop and secured for the investigation. Due to damage, the electric and pneumatic systems could not be tested, so a general exterior and interior examination was completed. During the exterior inspection of the damaged cars, investigators examined brake systems and running gear, draft components, glazing, signage, electrical components, and car body general condition. During the interior inspection of the damaged cars, investigators examined signage, emergency tooling, glazing, seating, hand holds, and general condition. Refer to the *Railcar Crashworthiness Group Chairman's Factual Report* for more detailed information of interior conditions.

The remaining 6 cars were placed outside on track 8A for examination. The remaining consist included cars 4197, 4196, 4175, 4174, 4309, and 4308. The right side third rail current collector shoes were applied to energize and recharge the equipment. For safety reasons only the left side of the equipment was examined due to the right side being applied to the third rail.

On February 6, 2015, the remaining 6 cars received third rail current collector shoes on the left side by MNR personnel and moved to track 9 for examination of the right side. Along with MNR personnel, the external and internal examinations were completed.

The following tests and examinations were successfully completed:

- Class I Air Brake Test - Pass
- Standing power self-test - Pass
- Public address and intercom system (normal and emergency power) – See Below
- Emergency lighting systems – See Below
- Door emergency egress levers on incident used doors - Pass
- Door emergency access levers located below the side sill on each door - Pass

The following conditions were observed:

- Car 4174 middle speaker on the engineer's side had clear tape over the speaker.
- Car 4308 middle speaker on the conductor's side had clear tape over the speaker.
- Car 4196 L1 exterior door indicator lamp was inoperative.
- Car 4197 R2 interior indicator lamp was inoperative.

On February 6, 2015, the horn from car 4333 was recovered. Upon inspection of the horn, it was deemed untestable due to the diaphragms being destroyed in the fire. Only the bell portion of one of the chimes remained.

Figure 1 Horn from lead car 4333 destroyed in the fire.

On February 10, 2015, an emergency window zip strip functional test was performed at MNR's Croton Harmon car shop by MNR personnel. A representative car (4295) was used. The R1 (small window) zip strip was pulled and after full removal the rubber was inspected for damage, a tear was identified on the right side of the red pull handle. Window rubber was deemed as defective by the mechanics. A new zip strip rubber was installed with the use of a can of (Brand name TRIZOL) all-purpose silicone lubricant.

Also, an under car inspection at MNCW North White Plains Repair Facility was conducted. All ground brushes along with the visible portion of the axle were examined for signs of overheating and electrical arcing. No evidence of loose, worn, or electrical pitting on the brushes or axle was observed.

Mechanical group members conducted a review of equipment maintenance records and discovered deviations regarding compliance with Federal Railroad Administration regulations. On June 10, 2015, Federal Railroad Administration investigators cited Metro-North Railroad for failing to meet 49CFR Part 238.113.e which states:

Periodic testing. At an interval not to exceed 184 days, as part of the periodic mechanical inspection, each railroad shall test a representative sample of emergency window exits on its cars to determine that they operate as intended. The sampling method must conform with a formalized statistical test method.

More specifically, Metro-North was cited for failing to use a formalized statistical test method to determine that their fleet of cars with emergency window exits operates as intended during periodic testing as required. In response to the citation, MNR submitted a response on July 31, 2015 that is currently being reviewed by the Federal Railroad Administration.

END OF REPORT