



June 22, 2011

# Fact Sheet

## Washington Metropolitan Area Transit Authority (WMATA) Metrorail Train Collision

### Background

On Monday, June 22, 2009, about 4:58 p.m., eastern daylight time, inbound Metrorail train 112 was travelling in a curve when it struck the rear end of train 214 before reaching the Fort Totten station just outside Washington, DC. As a result of the collision, the lead car of train 112 telescoped and overrode the rear car of train 214, resulting in a loss of about 63 feet of occupant survival space in the lead car (about 84 percent of its total length). The District of Columbia Fire and Emergency Medical Service reported 9 fatalities and transported 52 persons to local hospitals. Damage to train equipment was estimated at \$12 million.

### Probable Cause

After a thorough investigation of the accident, the National Transportation Safety Board (NTSB) determined that the probable cause of the collision was (1) a failure of the track circuit modules, built by GRS/Alstom Signaling Inc., that caused the automatic train control system to lose detection of train 214 (the struck train) and thus transmit speed commands to train 112 (the striking train) up to the point of impact, and (2) WMATA's failure to ensure that the enhanced track circuit verification test was institutionalized and used system-wide, which would have identified the faulty track circuit before the accident.

Contributing to the accident were:

- WMATA's lack of safety culture,
- WMATA's failure to effectively maintain and monitor the performance of its automatic train control system,
- GRS/Alstom Signaling Inc.'s failure to provide a maintenance plan to detect spurious signals that could cause its track circuit modules to malfunction,
- Ineffective safety oversight by the WMATA Board of Directors,
- The Tri-State Oversight Committee's ineffective oversight and lack of safety oversight authority, and
- The Federal Transit Administration's (FTA) lack of statutory authority to provide federal safety oversight.

Contributing to the number of fatalities and the severity of passengers injuries was WMATA's failure to replace or retrofit the 1000-series railcars after these cars were shown in a previous accident to exhibit poor crashworthiness. As a result, the NTSB has issued 34 recommendations in connection with this accident. Eight of these recommendations were urgent. Fourteen of these recommendations are now closed.

## NTSB Safety Recommendations

On July 13, 2009, the NTSB issued the following two recommendations:

- 1 urgent recommendation to **WMATA**

| Recommendation  | Status             |
|---|--------------------|
| R-09-006 (urgent) - Enhance the safety redundancy of the train control system | Open -- Acceptable |

- 1 urgent recommendation to **FTA**

| Recommendation   | Status             |
|--|--------------------|
| R-09-007 (urgent) – Advise rail transit operators to assess safety redundancy of train control systems | Open -- Acceptable |

On September 22, 2009, the NTSB issued the following nine recommendations:

- 2 recommendations to **WMATA** (one urgent)

| Recommendation  | Status                           |
|---|----------------------------------|
| R-09-015 (urgent) – Examine track circuits to identify parasitic oscillation and spurious signals                             | Closed -- Superseded by R-10-008 |
| R-09-016 – Periodically determine that electric components of the train control system are performing within design standards | Open -- Acceptable               |

- 3 recommendation to **FTA** (two urgent)

| Recommendation  | Status                            |
|---|-----------------------------------|
| R-09-017 (urgent) – Advise all rail transit operators of the spurious signal created by parasitic oscillation   | Closed – Acceptable on 4/27/2010  |
| R-09-018 (urgent) – Advise rail transit operators to examine track circuits susceptible to parasitic oscillation  | Closed -- Acceptable on 4/27/2010 |
| R-09-019 – Advise rail transit operators to Periodically determine that electric components of the train control systems are performing within design standards | Closed – Acceptable on 5/18/2011  |

- 3 recommendations to **FRA** (two urgent)

| Recommendation   | Status                           |
|--|----------------------------------|
| R-09-020 (urgent) – Advise railroads of the spurious signal created by parasitic oscillation | Closed – Acceptable on 5/18/2011 |
| R-09-021 (urgent) Require railroads to examine track   | Open --Acceptable                |

|  |                    |
|--|--------------------|
| circuits susceptible to parasitic oscillation  |                    |
| R-09-022 – Require railroads to periodically determine that electric components of the train control system are performing within design standards | Open -- Acceptable |

- 1 urgent recommendation to **Alstom Signaling**

| <b>Recommendation</b>  | <b>Status</b>                             |
|--|---|
| R-09-023 (urgent) – Assist WMATA and other rail systems in examining train control systems susceptible to parasitic oscillation and spurious signals | Closed -- Superseded by R-10-023, R-10-25 |

At the NTSB's July 27, 2010 Board Meeting, the NTSB issued the following 23 recommendations in its final accident report:

- 1 recommendation to **U.S. Department of Transportation**

| <b>Recommendation</b>  | <b>Status</b>      |
|--|--------------------|
| R-10-003 - Seek safety oversight authority for fixed rail guideway systems | Open -- Acceptable |

- 2 recommendations to the **FTA**

| <b>Recommendation</b>   | <b>Status</b>      |
|---|--------------------|
| R-10-004 - Facilitate the development of non-punitive reporting programs for all transit systems          | Open -- Acceptable |
| R-10-005 Seek authority to require toxicological specimens from covered employees who are fatally injured | Open -- Acceptable |

- 1 recommendation to the **Tri-State Oversight Committee**

| <b>Recommendation</b>   | <b>Status</b>      |
|---|--------------------|
| R-10-006 – Work with WMATA to address the FTA's recommendations in its March 4, 2010 report | Open -- Acceptable |

- 1 recommendation to the **WMATA Board of Directors**

| <b>Recommendation</b>  | <b>Status</b>                    |
|--|----------------------------------|
| R-10-007 - Elevate the safety oversight role of the WMATA Board of Directors | Closed – Acceptable on 3/17/2011 |

- 15 recommendations to **WMATA**

| <b>Recommendation</b>   | <b>Status</b>                   |
|---|---------------------------------|
| R-10-008 - Remove Generation 2 General Railway Signal Company circuit modules | Open -- Acceptable              |
| R-10-009 - Establish inspection and maintenance                               | Closed – Acceptable on 4/5/2011 |

|   |                      |
|---|----------------------|
| procedures to monitor circuit modules   |                      |
| R-10-010 - Review how safety information is disseminated to Metrorail employees   | Open -- Acceptable   |
| R-10-011 - Remove wayside maintenance communication systems   | Open -- Acceptable   |
| R-10-012 - Conduct a comprehensive analysis of the automatic train control system   | Open -- Acceptable   |
| R-10-013 - Incorporate findings of recommendation R-10-12 into the automatic train control system   | Open -- Acceptable   |
| R-10-014 - Implement cable insulation resistance testing  | Open -- Acceptable   |
| R-10-015 – Work with the Tri-State Oversight Committee to address the FTA’s recommendations in its March 4, 2010 report   | Open -- Acceptable   |
| R-10-016 - Collectively review recorded operational data to identify safety issues and trends and share this information throughout the organization  | Open -- Acceptable   |
| R-10-017 - Develop and implement a non-punitive safety reporting system and share the results throughout the organization   | Open -- Acceptable   |
| R-10-018 - Ensure the automatic train control system and its subsystem components are assigned appropriate levels of risk in light of the issues in this accident   | Open -- Acceptable   |
| R-10-019 - Develop a process for the general manager and operations, maintenance, and engineering managers, and the chief safety officer to conduct periodic review of safety audits and corrective action plans and act as necessary | Closed -- Acceptable |
| R-10-020 - Remove all 1000-series railcars from service   | Open -- Acceptable   |
| R-10-021 - Equip lead car sets with onboard event recorders   | Open -- Acceptable   |
| R-10-022 - Monitor onboard event recorders to ensure proper functioning   | Open -- Acceptable   |

- 2 recommendations to **Alstom Signaling**

| <b>Recommendation</b>  | <b>Status</b>      |
|--|--------------------|
| R-10-023 - Develop and implement testing for rail systems equipped with General Railway Signal Company audio frequency track circuit modules | Open -- Acceptable |
| R-10-024 - Conduct a review of your audio frequency track circuit modules  | Open -- Acceptable |

- 1 recommendation to the **Massachusetts Bay Transportation Authority, the Southeastern Pennsylvania Transportation Authority, and the Greater Cleveland Regional Transit Authority, the Metropolitan Atlanta Regional Transportation Authority, the Los Angeles County Metropolitan Transportation Authority, and the Chicago Transportation Authority**

| Recommendation   | Status   |
|--|--|
| R-10-025 - Establish periodic inspection of General Railway Signal Company audio frequency track circuit modules | MBTA – Closed -- Acceptable on 1/10/11<br>SEPTA – Closed - - Acceptable on 12/30/10<br>MARTA – Open -- Response Received<br>LA County – Closed -- Acceptable on 12/29/10<br>CTA – Closed -- Acceptable on 1/31/11<br>Greater Cleveland – Closed -- Acceptable on 1/31/2011 |