Washington Metropolitan Area Transit Authority

Board Action/Information Summary

○ Action ◉ Information	MEAD Number: 201831	Resolution: ○ Yes ◉ No

TITLE:

Derailment near East Falls Church Metro Station

PRESENTATION SUMMARY:

WMATA Safety Department will provide the Committee with the final investigation report and follow up actions on the interlocking derailment near East Falls Church Metro Station (K05) on July 29, 2016.

PURPOSE:

The Committee will be briefed on the final investigation report on the East Falls Church interlocking derailment that resulted in three non-life threatening injuries. The report will include a review of the incident, a summary of findings, actions taken since the derailment, and recommendations to prevent recurrence.

DESCRIPTION:

The WMATA investigation is complete and a final report is prepared for submission to the Federal Transit Administration (FTA) for its review and acceptance as is the requirement. The Department of Safety and Environmental Management's (SAFE) investigation of this incident indicates that the immediate cause of the derailment was lateral movement of track fasteners caused by deteriorated ties at the Point of Derailment (POD), which were unable to restrain the dynamic lateral forces transferred to the track by Train 602. Additional contributing factors can be found further in this document.

Key Highlights:

• Preliminary analysis indicates that the causal factor was the condition of the ties at the point of derailment, which were deteriorated to the point that they were no longer adequate to restrain the dynamic lateral forces transferred to the track by train 602.

• All passengers were safely evacuated; three reported injuries, one was transported for medical treatment with non-life threatening issues.

• The FTA and National Transportation Safety Board (NTSB) were notified consistent with our procedures. FTA and NTSB staff were on-scene working with WMATA staff to conduct preliminary investigation.

• Immediate safety actions were taken to ensure the reliability of the track and interlockings, which included a new requirement for supervisory pre-inspection of all interlockings that may be used during SafeTrack and special supervisory inspection of

all interlockings, curves ≤1425' and defects rated as severe (P1).

• The NTSB released its Railroad Accident Brief (RAB-16/06) on November 29, 2016. The report presents no recommendations/corrective actions and supports the probable cause identified in WMATA's investigation report.

Background and History:

On the morning of July 29, 2016, outbound Silver Line Train 602 derailed within the confines of the East Falls Church interlocking (K05). At the time of the incident, the lead car of Train 602 was traversing track switch 3B, which was laying in the reverse position and had previously received a proceed signal in approach to the switch. As the Operator was crossing from Track K1 to Track K2 in approach to East Falls Station, he said he felt a jolt and brought the train to a stop. The third rail power simultaneously de-energized due to an unrequested activation of the circuit breakers controlling this portion of track. This was the result of damage to the third rail components by the derailed trucks of the affected cars. The Operator identified that the train was not in proper alignment on the track and updated the Rail Operations Control Center (ROCC) of the incident.

Following this incident, 63 passengers were evacuated from the lead car of the train to the roadbed and were escorted approximately 100' to the station platform by Arlington County Fire Department (ACFD) and Metro Transit Police Department (MTPD) personnel. Three individuals reported injuries. One person was transported to the hospital with non-life threatening injuries.

As part of post-incident investigation, it was observed that the affected trucks of car 3238 and 5134 had all four wheels of each truck derailed to the south. Track gauge measurements were taken beneath the stationary train at the Point of Derailment (POD), which identified a wide gauge track defect of 58". Standard gauge for this track is 56 ½". A measurement of 57 ¾" requires that portion of track be removed from service. This condition resulted in the #4 wheel of the trailing truck of car 3238 to drop into the gauge of the track. This action caused car 3238 and 5134 to derail, climb the opposite running rail, and come to rest in a ballast pile after causing significant damage to the third rail, crossover tracks, and running rail on track 2. As Train 602 continued its forward progress toward East Falls Church station, the derailed trucks were redirected back towards their intended route on Track K2 and damaged the track, third rail and vehicle components in its path. Costs to repair the track and rail cars were approximately $860,000.

The commencement of vehicle removal and track repairs was purposely delayed to permit a detailed inspection of the incident site by internal track experts, external consultants, Department of Safety and Environmental Management (SAFE), NTSB and FTA Safety Oversight personnel to ensure that this incident was given the appropriate level of scrutiny for the purpose of surfacing causal and contributing factors and developing strategies to address identified concerns in a permanent and effective manner. Track & Structures Department (TRST) personnel took appropriate action to bring the track back to a state of good repair.

Discussion:

SAFE's investigation found that the immediate cause was the condition of the ties within the crossover tracks, which were deteriorated to the point where they were no longer effective in restraining the dynamic lateral forces transferred to the track by Train 602. The investigation reviewed all areas of the derailment and the passenger evacuation; however it became apparent that the track maintenance and inspection areas required an in-depth assessment. Additional causal and contributing factors were identified and are listed below:

- Deficient inspections of special track work
- Poor management of work assignments (e.g., switch inspections)
- Poor management of supervisory staff
- Ineffective track maintenance prioritization
- Lack of documentation of required tasks
- Lack of responsiveness to SAFE audit findings
- Failure to adhere to established standards and requirements for track inspections and maintenance
- Lack of in-depth global quality assurance assessment of the track inspection and maintenance programs

As the investigation progressed, WMATA took immediate safety actions to ensure the reliability of the track and interlockings which included a new requirement for supervisory pre-inspection of all interlockings that may be used during SafeTrack, special supervisory inspection of curves with a radius ≤ 1425' and Priority 1 (P1) or potentially severe defects, as well as follow-up quality assurance audits of the inspections. Refresher trainings and meetings were conducted with the Track Inspectors to review their responsibilities in performing their assigned duties and to review a new track inspection form. WMATA has also engaged a team of Federal Railroad Administration-trained (FRA) track inspectors to validate the current inspection schedule. The following actions are completed or are in progress at this time:

- At WMATA's request, external subject matter experts responded to the derailment site to assist with the initial investigation.
- Six FRA-trained track inspectors provided by an external consultant reported to WMATA on August 22, 2016. The inspectors are providing the following:
    - Proposed improvements to the inspection schedule to include walking and automated inspections.
    - Field-level compliance assessments of track inspections.
    - Mentoring of track inspectors while embedded within the groups.

o Weekly written reports to Executive Leadership.

• Personnel affiliated with the University of Tennessee provided refresher-level training to Track Inspectors, including supervisory and management personnel, for three weeks in September-October.

• A contract (ten-month duration) for the redevelopment of the track walker training program was awarded in October 2016.

• A contract was awarded on August 5, 2016, to conduct system wide track asset condition survey. Completion is expected by mid-year 2017.

• A contract was awarded on July 21, 2016, to rewrite the WMATA track inspection manual. Completion is expected in the Spring of 2017.

• TRST was restructured to align the inspections and maintenance Groups together by region to enhance collaboration.

• Several Work Instructions were created or updated to enhance track walker inspections and clarify ambiguity in the track inspection manual. These procedural documents were distributed and discussed at “Toolbox Talks” at the direction of the Assistant General Superintendent of Track Inspections. The topics were as follows:

o Speed Restriction Procedures (SOP #30), and TRST’s “Speed Restriction Good Faith Challenge.”

o Track Defect Reporting and Prioritization.

o Mainline Track Inspection. The walking track inspection procedure was updated to include specific language directing inspectors to include “switches, tracks between switches, tracks leading up to diamonds, diamond crossovers, and pocket tracks” in their daily inspections.

o Yard Track Inspection. This instruction was updated with similar language to the mainline inspection.

• The Assistant General Superintendent of Inspections revised the mainline, yard and switch inspection forms and included them in the revised Work Instructions. The new forms will be reflected in the revised track inspection manual.

• The Assistant General Superintendent of Administration Policy and Support developed SOP 108-03, Audit of Track Inspection Documentation, which went into effect on November 2, 2016. This SOP requires a biannual audit of Track Inspections documentation as well as additional responsibilities for field verifications by Assistant Superintendents and participation in Interlocking Inspections by Supervisors.

The Quality Assurance and Internal Compliance Operations (QICO) department is revising the WMATA Quality Management System (QMS) Manual, to effectively outline

structure, policy, procedures and programs to ensure in-depth global quality assurance and quality control responsibilities are clearly defined and implemented to proactively identify quality concerns and promote actions to address them. Completion is expected by March 2017.

Additionally, SAFE identified several concerns with the scheduling and recording of monthly switch inspections. Based on these concerns, the General Manager requested that the Police Department conduct an investigation separate from SAFE's work or administrative matters.

At the conclusion of SAFE's investigation, SAFE developed and issued fourteen recommendations to multiple offices within WMATA, including Track and Structures, Rail Transportation, Quality Assurance, and Engineering. The FTA's Track Integrity Investigation Report, issued in August, mirrored many of WMATA's findings and issued 12 Findings requiring action as part of FTA Safety Directive 16-4. SAFE will work with QICO and the Operational groups to ensure corrective actions are developed, implemented, and monitored for effectiveness.

FUNDING IMPACT:

Define current or potential funding impact, including source of reimbursable funds.	
Project Manager:	CSO - Pat Lavin
Project Department/Office:	SAFE

No additional funding is necessary at this time. Staff may need to return when a comprehensive mitigation strategy is developed that includes all related expeditures.

TIMELINE:

Previous Actions	• Briefed Safety Committee on interlocking derailment on August 25, 2016
Anticipated actions after presentation	• Implement all corrective actions • Monitor for effectiveness • Continue to strengthen the safety culture

RECOMMENDATION:

To inform the Board's Safety Committee of the final investigation report conducted by SAFE of the interlocking derailment near East Falls Church.

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Washington Metropolitan Area Transit Authority

Interlocking Derailment Near East Falls Church Metro Station

Safety Committee
December 15, 2016

Details

- Occurred at 6:14 AM on Friday, July 29, 2016
- Outbound Silver Line train #602
  - Six car consist
    - Four 3000 series
    - Two 5000 series
- Derailed at East Falls Church interlocking
  - Train was crossing from Track 1 to Track 2
  - Rear truck of car #4 and front truck of car #5 derailed

Details

- 63 passengers safely evacuated to the roadbed
- Three passengers reported injuries, one transported
- Damage cost approximately $860,000

Investigation Findings

- No causal factors related to:
  - Signaling systems
  - Rail vehicles
  - Power distribution
  - Train operation
  - Rail Operations Central Control
  - Fatigue

Findings – Immediate Cause

- Wide Gauge track defect
- Track ties deteriorated and unable to restrain lateral forces

Findings – Causal Factors

- Failure to maintain the interlocking to Track and Structures standards
- Failure to effectively assign and supervise special trackwork inspections
- Failure to properly classify and escalate defects

Actions Completed since Derailment

- Special inspections of 66 mainline interlockings performed by a multi-disciplinary team
- Track Supervisor verification of Priority One Defects (Red – may require a restriction)
- Supervisory inspection of curves ≤1425’

Actions Completed since Derailment

- Walking track inspection process review meeting held with all track inspectors
  - new inspection form
  - reinforced the requirement to inspect interlockings on a two times weekly interval

- Reinstruction on monthly detailed interlocking inspections

Actions Completed since Derailment

- New track inspection requirements:
  - Track supervisors must inspect any new speed restrictions immediately
  - Assistant Superintendent inspect at least 30 top priority defects per month
  - Superintendent inspect three top priority locations per week

Actions In Progress

Expert Process Review

- Six FRA-trained track inspectors provided by an external consultant reported on August 22
  - Building high level inspection schedule to include walking and automated inspections
  - Documenting frequency and quality compliance as they walk with WMATA teams in the field
  - Providing weekly written reports to Executive Leadership
  - Remaining embedded with teams for at least four months

Other Relevant Actions

- APTA Peer Review held at WMATA to assess Track Inspection Program based on recognized shortcomings – April 2016
- Track Inspection Training - University of Tennessee provided three refresher-level training courses - September-October 2016
- Ten-month contract for track walker training program rebuild awarded:
  - Pre-testing for position
  - Certification
  - Refresher training
  - Supervision and quality controls
  - Instructor certification
  - Auditing of First Training Course

Other Relevant Actions

- Contract awarded on August 5 to conduct systemwide track asset condition survey, scheduled for completion in mid-year 2017
  - FRA-trained inspectors will inspect 100% of mainline track
  - Inspection results will be used to rebuild the track inspection database and drive future maintenance planning
- Contract awarded on July 21 to rewrite the WMATA track inspection manual with expected completion in Spring of 2017

SAFE Recommendations

Recommendation Number	Description	Responsible Party
SAFE-K05Derail-16-01	Evaluate creation of a blanket "SAFE Dispute Resolution" Policy.	COO, SAFE
SAFE-K05Derail-16-02	Notify SAFE when a draft TRST-1000 revision is complete.	TRST, TSFA
SAFE-K05Derail-16-03	Reaffirm that installation of speed restrictions and other mitigations performed in accordance with the TRST-1000 revision are not grounds for disciplinary action.	TRST
SAFE-K05Derail-16-04	Notify SAFE when the system-wide track asset condition survey is complete.	TRST
SAFE-K05Derail-16-05	Require that all Priority 1 defect reports are accompanied by an immediately prescribed mitigation.	TRST
SAFE-K05Derail-16-06	Provide a copy of the most recent Labor Force analysis that identifies staffing needs related to track inspections and maintenance activities.	TRST
SAFE-K05Derail-16-07	Document all special trackwork inspections in Maximo. Scan and attach paper records to the electronic record.	TRST
SAFE-K05Derail-16-08	Provide SAFE with copies of the first two audits conducted in accordance with SOP 108-03.	TRST

SAFE Recommendations

Recommendation Number	Description	Responsible Party
SAFE-K05Derail-16-09	Notify SAFE when reorganization is complete and provide revised copies of department descriptions and responsibilities	TRST
SAFE-K05Derail-16-10	Evaluate the current tie scanning schedule and scope of work to ensure that crossover moves are performed.	CENI/TSFA
SAFE-K05Derail-16-11	Review and evaluate ROCC Procedures Manual, focusing on Major Incident Checklists.	RTRA/ROCC
SAFE-K05Derail-16-12	Evaluate performance of audits and assessments of Track Inspections and Maintenance departments and take corrective action.	QICO
SAFE-K05Derail-16-13	Review and evaluate updates to TRST policies and procedures to ensure compliance and effectiveness.	SAFE
SAFE-K05Derail-16-14	Perform semiannual reviews of closed defect reports to ensure compliance and accuracy.	SAFE

Next Steps

- Implement all corrective actions
- Monitor corrective actions for effectiveness
- Revise and reassess plans as needed