750 First St. NE • Ste. 900 • Washington, D.C. 20002

Office: 202-384-1520 • Website: www.wmsc.gov

WMSC Commissioner Brief: W-0043 – Serious Injury (Employee) on Red Line on October 19, 2019

Prepared for Washington Metrorail Safety Commission meeting on August 4, 2020

Safety event summary:

Two Metrorail Track and Structures Rail Production Renewal Crew employees were injured on October 19, 2019 at approximately 2:49 p.m. while the crew was replacing a section of running rail on the Red Line between Dupont Circle and Woodley Park stations.

Part of a 1,200 foot-long section of stringer rail they had just removed tipped over and fell on the feet or ankles of the two workers. The workers had left a place of safety to begin clipping the new rail without any radio communication with the vehicle operator once the vehicle adjusting the position of the old rail moved around a curve approximately 900 feet away.

Recordings showed no radio communication between the equipment operator and the Roadway Worker In Charge.

The vehicle operator was continuing to adjust the old rail around wood that had been left around grout pads due to prior concrete work when the rail flipped on its side, wedging the feet of the two workers. The equipment operator indicated he had noticed the wood forms before starting work, but did not say anything as the operator did not believe they would pose a risk.

Coworkers used sledgehammer handles to free one of the workers and the crew physically lifted the rail to free the other.

One of the employees suffered four broken bones in the foot, while the other had minor bruising. Both were wearing required footwear.

Probable Cause:

The length of the section of rail workers cut was not manageable. The work crew also began to clip the new rail in place when the vehicle moving the old rail was out of sight without any positive confirmation that it was safe to return to the area of the running rails. Also contributing to the event was the equipment operator's failure to communicate knowledge of a safety hazard.

Corrective Actions:

As corrective actions, Metrorail's Track and Structures Department (TRST) distributed a maintenance bulletin emphasizing safety measures that must be taken during the removal and threading of stringer rail. TRST is also reviewing and assessing work instructions to ensure hazards are identified and mitigated and that instructions cover in detail the roles and responsibilities of supervision.

Staff recommendation: Adopt final report.

FINAL REPORT OF INVESTIGATION A&I E19557

SMS 20191019#83739

Date of Event:	10/19/2019
Type of Event:	Serious Injury
Incident Time:	14:00 hrs.
Location:	Between Woodley Park and Dupont Stations
Time and How received by SAFE:	14:49 hrs., SAFE On-Call Phone
Safety Officer Response:	Yes
Time of Safety Officer Arrival:	19:30 hrs.
Time of Safety Officer Departure:	21:00 hrs.
Rail Vehicle:	N/A
Injuries:	Four (4) Broken Bones in Left Foot
Damage:	None
Emergency Responders:	TRST, DCFD, and SAFE

Executive Summary

On Saturday, October 19, 2019, at 14:49 hrs., the Rail Operations Control Center (ROCC) notified SAFE that at 14:00 hrs., a Track and Structure Department (TRST) Rail Production Renewal Crew (RPRC) Supervisor #1, located between Woodley Park and DuPont Stations reported two employees were injured as a result of a piece of stringer rail falling on their feet. The RPRC employees were subsequently transported to MedStar Georgetown University Hospital for further medical evaluation. After further medical evaluation, at approximately 18:00 hrs. one of the two injured employees reported to their Supervisor that medical personnel determined they sustained four broken bones in the left foot as a result of the event. The other employee involved in suffered minor bruising. Therefore, SAFE reclassified this event from an I-2 to an A-2 event. There were no additional injuries reported as a result of this incident. The RPRC Supervisors and injured employees were transported to SAFE for an interview after receiving medical attention.

Drafted By: SAFE 704 – 02/04/2020
Reviewed By: SAFE 701 – 02/22/2020
Approved By: SAFE 701 – 02/22/2020

Notification

Title	Time	Comment:
WMSC	15:01 hrs.	Email

Incident Site

Between Woodley Park and DuPont Circle Stations

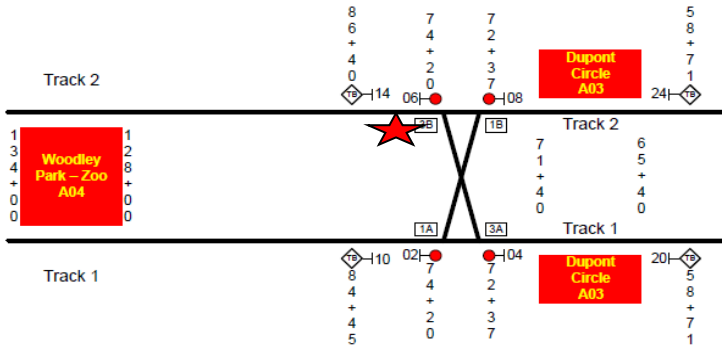
Working Limits: Chain Marker (CM) A2-74+34 - A2-193+96

Protected Work Zone: CM A2-74+34 - A2-193+96

RPRC Work Zone: CM A2-74+34 - A2-100+00

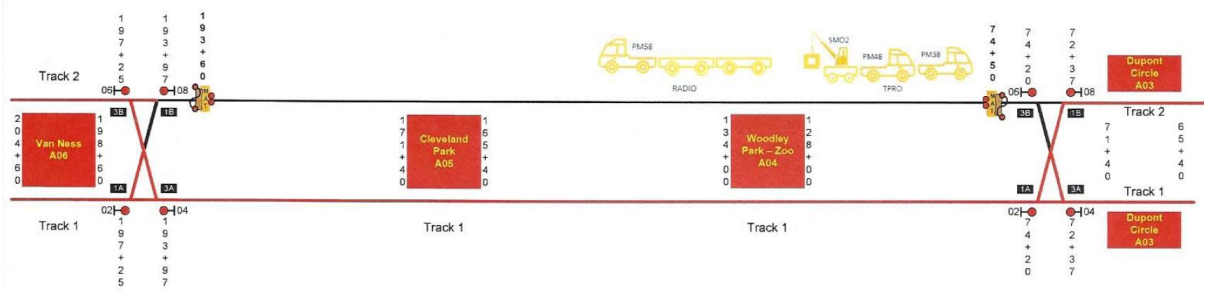
RPRC Location at time of Incident: CM A2-74+50 - A2-86+00

Field Sketch/Schematics



Department	Location of Work	Description of Work
RADIO	A2 (74+50 to 193+60)	Installing struts, standoffs, and radiating cable
TPRO	A2 (74+50 to 92+70)	Replacing 6 stringers (both rails)

Department	Units	Location of Units
RADIO	PM58 + 2 flats (out of A99)	A2 131+00 (facing A99)
TPRO	PM49+PM39+SM02	A2 76+00



Drafted By:	SAFE 704 – 02/04/2020
Reviewed By:	SAFE 701 – 02/22/2020
Approved By:	SAFE 701 – 02/22/2020

Investigation

On Saturday afternoon, October 19, 2019, at approximately 14:00 hrs., the RPRC Supervisor #1, located between Woodley Park and DuPont Circle Stations working within established Working Limits (CM A2-74+34 - A2-193+96), reported Two (2) employees sustained injuries as a result of a section of stringer rail falling on their feet. **Refer to photo 1.**

Prior to the event, the RPRC Supervisor #2 acting as the Roadway-Worker-In-Charge (RWIC) performed a Job Safety Briefing (JSB) and identified safety hazards related to the work being performed. Based on the RPRC Supervisor #2 interview, the personnel were tasked with installing a new stringer rail approximately 390 feet in length. Once within the work location, the RPRC personnel cut a 1200-foot section of old rail and began removing clips and fasteners from the rail for removal. After personnel removed all the clips and fasteners, the SM04 (equipment used to move stringer rail), which was later determined as the cause of the rail tipping over on the employees' feet in the affected area, moved the old rail in close proximity of the third rail, so the new rail could be threaded into position.

After employees began installing clips and fasteners on the newly placed rail, SM04 operated in the opposite direction threading the old piece of cut rail (positioned between the newly installed running rail and third rail) over to the center of the roadway closer to the newly installed rail. **Refer to Photo 2.** During this process, personnel moved to a place of safety until the unit passed their respective locations. Based on interviews, the injured RPRC personnel stated they began the clipping processes once the SM04 was out of their line of sight, which was later determined to be around a restricted view curve approximately 900 feet away from the injured employee location.

The RPRC Supervisors #1 and #2 stated communicating with the SM04 operator and the RPRC personnel to inform them when to resume work and when stop work (move to a place of safety) prior to and after the SM04 movement. **Note:** This does not demonstrate whether the SM04 was finished with threading the 1200-foot and was clear of the affected area before personnel resumed installation processes of the newly installed rail. Based on Audio Recording Playback (ARS), there was no communication regarding a work stoppage for personnel clipping or to resume the work when the unit was finished with rail stringer threading processes.

While the two RPRC personnel were installing fasteners, the old rail positioned near the newly installed rail, flipped on its side toward the RPRC crew, wedging their feet beneath the old rail. The RPRC personnel in the affected area assisted their

counterparts by using sledgehammer handles to pry the rail off one employees' foot. Thereafter, the second employee fell to the ground on his side due to the rail landing further up his foot near the ankle area. The RPRC personnel assisted with lifting the section of rail for the employee to remove his foot. The SM04 Equipment Operator (E/O) transported injured personnel to the platform for medical transport.

The E/O stated while threading the old stringer rail from in between the third rail and newly installed rail; RPRC personnel were clear of the affected area prior to the unit moving from tangent track into the curve. The E/O stated, while threading the rail, he had difficulties in the curve due to "form" (wood) positioned beside the grout pads throughout the work area previously left by another work crew performing cement work. This contributed to the rail being threaded on the grout pad and form. **Note: TRST work processes state the threaded rail should be placed beside the grout pad.** The E/O stated, identifying the form prior to beginning work but assumed it would not cause any safety issues. The E/O further stated, while at the end of threading the stringer rail, the rail was threaded on top of the grout pads, wooden forms, fasteners, clips, and a piece of rail which required an additional pass to move the stringer rail in the appropriate position (center on the roadway). The E/O stated while attempting to nudge the rail over with the boom to clear the grout pad and store the affected rail on a flat surface; personnel approached the unit and stated a person was injured. Reportedly, the E/O did not know the rail had turned over until backing the unit up to remove the Threader attached within the web of the rail.

Office of Track and Structure (TRST)

TRST Written Procedure

TRST has work instructions and Job Hazard Analysis (JHA) developed; however, the authority has identified safety issues within the work procedures that require a revision.

Personal Protective Equipment (PPE)

Based on the TRST injury trend analysis report, data revealed injuries related to this job function did not meet the parameters for additional PPE (metatarsal foot protection). The current JHA provides adequate PPE for the specific job and requires no further action. During the event, the employee was wearing appropriate composite toe footwear.

Training

SAFE is reviewing training material used during instruction processes and evaluating its accuracy related to the written work-instructions. Additionally, SAFE is evaluating training processes and will adjust accordingly.

Human Factors

Years of Service

The RPRC Supervisor #1 - The Washington Metropolitan Area Transit Authority (WMATA) employee is a Six (6) Year RPRC Supervisor with 20-years of service and possessed a valid Roadway Worker Protection (RWP) Level 4 ID at the time of the incident.

The RPRC Supervisor #2 - WMATA employee is a 14-Year RPRC Supervisor with 19-years of service and possessed a valid Road Way Protection (RWP) Level 4 ID at the time of the incident.

The RPRC Employee #1 (Serious Injury) - WMATA employee is a One (1)-Year E/O with 12-years of service and possessed a valid Road Way Protection (RWP) Level 4 ID at the time of the incident.

The RPRC Employee #2 (Minor Injury) - WMATA employee has a 11-Years of service with the authority and possessed a valid Road Way Protection (RWP) Level 4 ID at the time of the incident.

The RPRC SM04 E/O – WMATA employee is a 13-year E/O with 16-years of service with the authority. The E/O was last certified in 2019 and possessed a valid Road Way Protection (RWP) Level 4 ID at the time of the incident.

Note: None of the above personnel had any operational incidents within the last three (3) years, and all personnel were familiar with the job being conducted. All personnel were wearing proper safety equipment at the time of the incident.

Fatigue

Based on SAFE's review of the employees' 30-day work history, it was determined that the E/O hours of service were in accordance with WMATA's *Fatigue Risk Management Policy 10.6* and *Hours of Service Limitations for Prevention of Fatigue Policy 10.7*.

Post-Incident

The employees involved in the incident were not subject to post-incident toxicology testing due to criteria not being in accordance with the Drug and Alcohol Policy and Testing Program 7.7.3/5.

Weather

At the time of the incident, the temperature was 62°F, and SAFE has concluded that weather was not a contributing factor in this incident (Weather source: National Oceanic Atmospheric Administration (NOAA) – Location: District of Columbia.)

Findings

- The SM04 E/O stated the rail fell over during the very end of threading processes
- Based on ARS playback, the RPRC Supervisors did not communicate with the RPRC personnel and the SM04 E/O, to inform them that personnel were in a place of safety before the unit began and ended threading processes
- The RPRC resumed installing clips after the unit was approximately 900 ft. past their location
- The supervisors did not give verbal instructions to the injured RPRC employees to resume work.

Conclusion

Based on salient facts as part of this investigation, SAFE concludes, the root cause of this event was the failure to abide by written work procedures outlining the safe work practices while installing and removing the Continuous Welded Rail (CWR).

SAFE further concludes the following actions resulted in the employee injury:

1. The RPRC did not remain in a place of safety until after the SM04 completed the threading process of the old stringer rail
2. The RPRC resumed work without authorization
3. The RWIC/Flag Person did not ensure personnel remained in a place of safety while the SM04 began final threading processes
4. The RWIC did not effectively communicate with SM04 E/O or RPRC to resume work
5. The E/O did not verify if personnel were in a place of safety prior to beginning threading process

6. The E/O identified a hazard; however, they took no immediate action, which subsequently prevented the E/O from positioning the old stringer rail against the grout pad shoulder.
7. The old stringer rail being removed was not a manageable length.

In closing, based on all the facts gathered, SAFE has no further information to reveal regarding E19557.

Immediate Mitigation to Prevent Recurrence

1. TRST developed a Maintenance Bulletin with an emphasis on the removal processes of stringer rail, refer to attachment 1.
2. Work stopped after the incident and the RPRC/RWIC performed a post-incident safety briefing discussing the incident details

Corrective Actions Plan

1. TRST shall review and assess work instructions to ensure hazards are identified, mitigated, and instructions cover in detail the roles and responsibilities of supervision.

Photos

Photo 1 – Old running rail fall direction (Rail distance from the clips and fasteners varied at both ends of the work area).

Photo 2 – Clips and fasteners installed on the New Rail

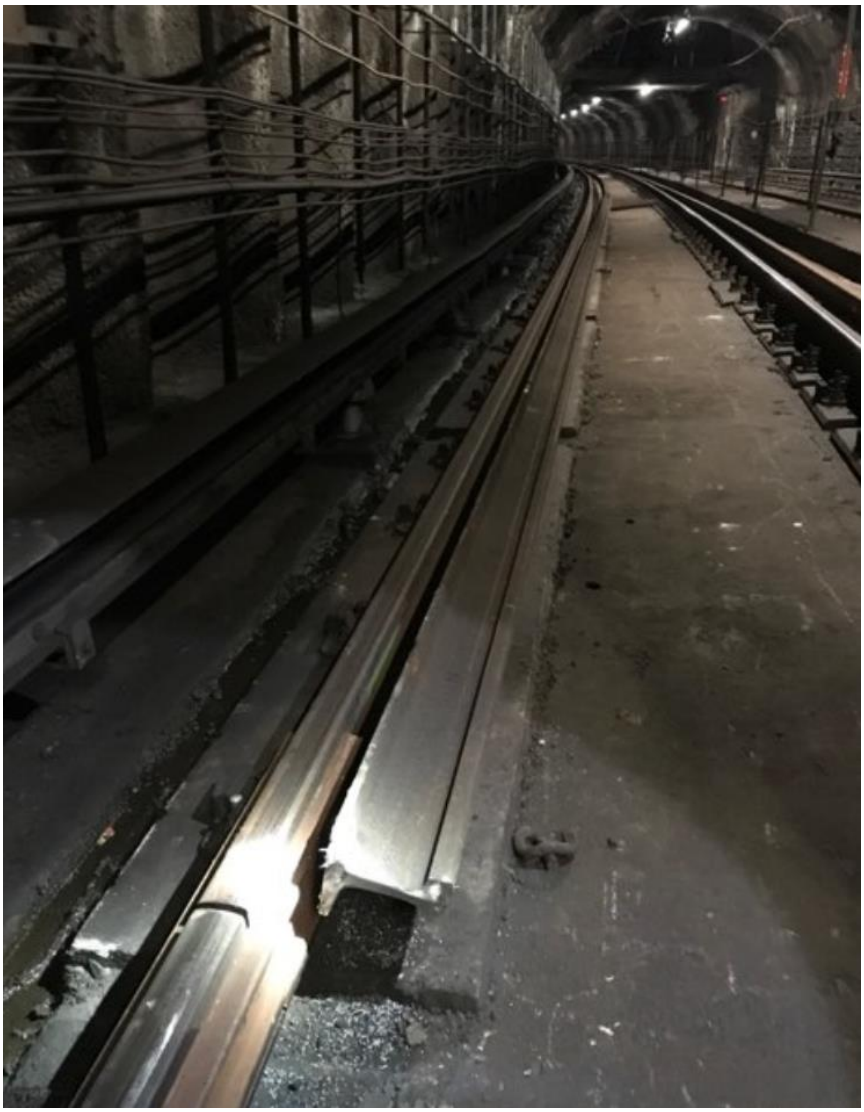
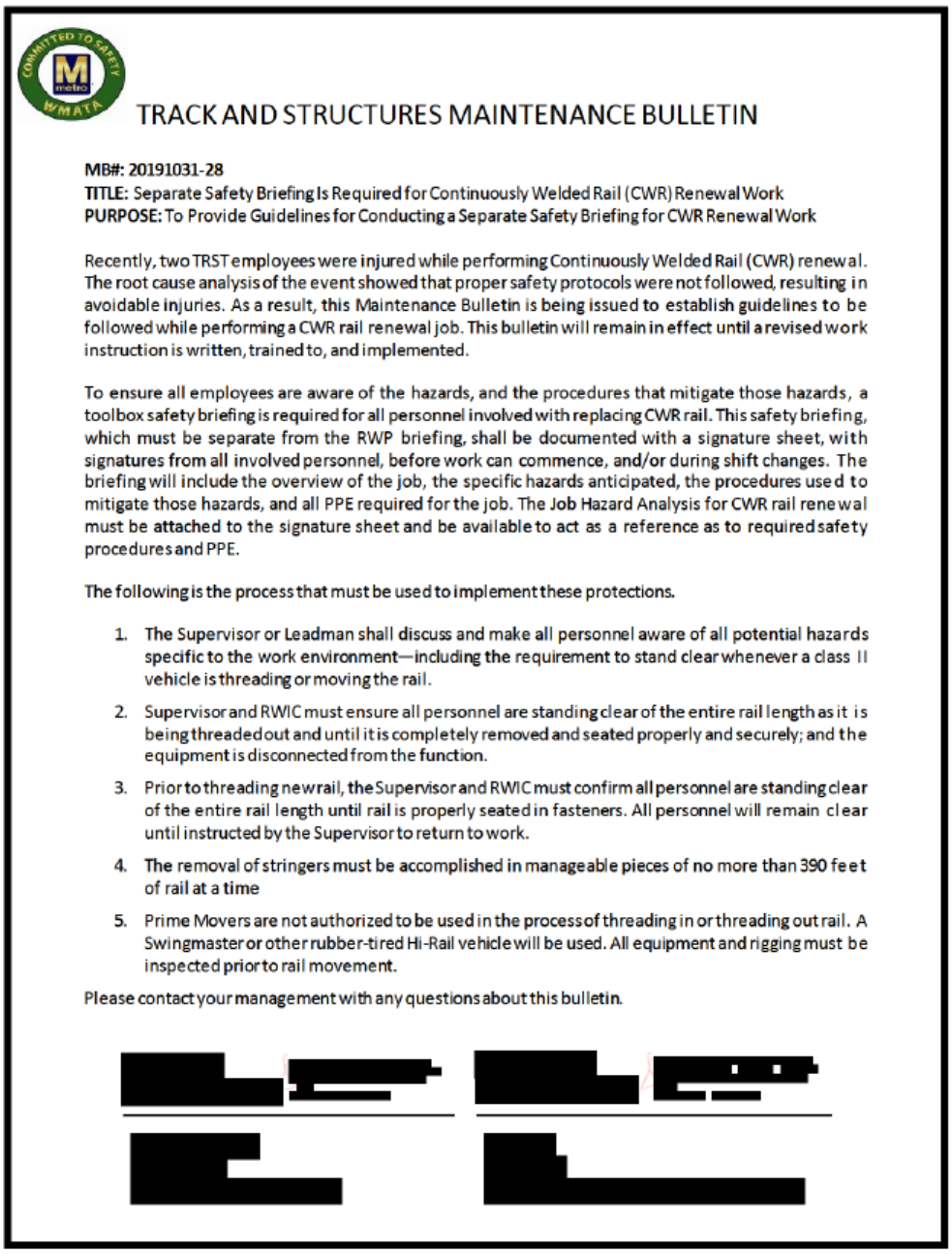


Photo 3 – Old stringer rail positioned on top of the clips and fasteners on arrival in the proximity of CM A2-084+00 (Ten) 10-feet away from SM04.



TRACK AND STRUCTURES MAINTENANCE BULLETIN

MB#: 20191031-28
TITLE: Separate Safety Briefing Is Required for Continuously Welded Rail (CWR) Renewal Work
PURPOSE: To Provide Guidelines for Conducting a Separate Safety Briefing for CWR Renewal Work

Recently, two TRST employees were injured while performing Continuously Welded Rail (CWR) renewal. The root cause analysis of the event showed that proper safety protocols were not followed, resulting in avoidable injuries. As a result, this Maintenance Bulletin is being issued to establish guidelines to be followed while performing a CWR rail renewal job. This bulletin will remain in effect until a revised work instruction is written, trained to, and implemented.

To ensure all employees are aware of the hazards, and the procedures that mitigate those hazards, a toolbox safety briefing is required for all personnel involved with replacing CWR rail. This safety briefing, which must be separate from the RWP briefing, shall be documented with a signature sheet, with signatures from all involved personnel, before work can commence, and/or during shift changes. The briefing will include the overview of the job, the specific hazards anticipated, the procedures used to mitigate those hazards, and all PPE required for the job. The Job Hazard Analysis for CWR rail renewal must be attached to the signature sheet and be available to act as a reference as to required safety procedures and PPE.

The following is the process that must be used to implement these protections.

1. The Supervisor or Leadman shall discuss and make all personnel aware of all potential hazards specific to the work environment—including the requirement to stand clear whenever a class II vehicle is threading or moving the rail.
2. Supervisor and RWIC must ensure all personnel are standing clear of the entire rail length as it is being threaded out and until it is completely removed and seated properly and securely; and the equipment is disconnected from the function.
3. Prior to threading new rail, the Supervisor and RWIC must confirm all personnel are standing clear of the entire rail length until rail is properly seated in fasteners. All personnel will remain clear until instructed by the Supervisor to return to work.
4. The removal of stringers must be accomplished in manageable pieces of no more than 390 feet of rail at a time
5. Prime Movers are not authorized to be used in the process of threading in or threading out rail. A Swingmaster or other rubber-tired Hi-Rail vehicle will be used. All equipment and rigging must be inspected prior to rail movement.

Please contact your management with any questions about this bulletin.

[redacted]

Attachment 1 – Track and Structure Maintenance Bulletin