



WMSC Commissioner Brief: W-0130 – Improper Roadway Worker Protection – Red Line – July 21, 2021

Prepared for Washington Metrorail Safety Commission meeting on December 7, 2021

Safety event summary:

Metrorail track inspectors entered the roadway without permission and without any required roadway worker protection in place to continue a track inspection from Takoma Station to Silver Spring Station, leading to a near-miss of a collision.

The inspectors had previously requested and received permission to conduct segments of the inspection under Advanced Mobile Flagger (AMF) protection between Rhode Island Ave and Brookland stations, between Brookland and Fort Totten stations, and between Fort Totten and Takoma stations. For the walk between Brookland and Fort Totten stations, the AMF did not respond to the Roadway Worker In-Charge (RWIC) confirming that the AMF was properly positioned on the platform.

After the RWIC received permission at 11:46 a.m. to enter the roadway from Fort Totten Station to walk toward Takoma Station, there were no further radio communications between the RWIC and the Rail Operations Control Center (ROCC) or with either of the crew's two AMFs regarding the work crew's movement or location. During multiple portions of the inspection, the RWIC did not follow requirements to contact the AMF after getting permission to access the roadway to inform the AMF to begin their flagging duties. In an interview, the RWIC did not include this required contact when describing the AMF procedure.

Review of CCTV during the investigation showed the work crew arrived at Takoma Station at approximately 12:14 p.m. then took a brief break on the platform due to the heat. At approximately 12:36 p.m., the work crew entered the roadway without contacting the ROCC or their AMF. Train 101 arrived at Takoma Station at approximately 12:43 p.m., but the operator did not report that there were personnel on the roadway without proper protections.

At 12:52 p.m., the Train Operator of Train 205 reported to the ROCC that they had come upon the inspectors between Silver Spring and Takoma stations at full speed because there was no AMF in place at the Silver Spring Station platform, and there was no notice of inspectors on the roadway in that segment of track. Vehicle data shows the train was moving 60.2 mph when the operator applied the brakes. The train stopped only after passing the inspectors, who had moved to the fence line at the edge of Metrorail's right of way. Based on vehicle data, the train was moving approximately 34 mph when it passed the work crew, and stopped with approximately 4 cars past the work crew. One minute later, the Train Operator moved the train another 887 feet at up to 18 mph before stopping again. When the ROCC contacted the inspectors, the RWIC stated that another train had also passed them, and inaccurately stated that they had received permission to walk from Takoma to Silver Spring Station and that their AMF was on the platform at Silver Spring. The ROCC instructed the operator of Train 205 to continue at restricted speed to Takoma Station.

The ROCC directed the inspectors to be picked up by the following train.

Metrorail did not remove any members of the work crew from service for post-event drug and alcohol testing as required by Metrorail policy.

**Probable Cause:**

The probable cause of this event was the rushed nature of Metrorail's track inspections, insufficient supervisory oversight and compliance monitoring to ensure safety rules and procedures are understood and followed, and the failure of each member of the work crew to identify and challenge actions taken outside of safety rules and procedures. Contributing to the potential consequences of this event was the failure of the first train operator to pass this work crew without proper protection in place to report the safety issue.

Corrective Actions:

Track and Structures is developing a departmental procedure to ensure drug and alcohol testing is completed as required by Metrorail policy.

Metrorail is required to address its inconsistent implementation of post-event testing in response to WMSC Fitness for Duty Audit Finding 7 issued on August 31, 2021.

Metrorail's Department of Rail Transportation (RTRA) reissued a Rail Operations Personnel Notice (ROPN) directing Train Operators to stop their trains and report all encounters and observations of unexpected personnel on the roadway and committed to continued targeted conversations by rail supervisors with train operators, station managers and interlocking operators.

Metrorail provided retraining on AMF radio communication to the work crew involved in this event, and provided RWP Level 4 retraining to the RWIC.

Track and Structures discussed this incident and associated RWP rules and procedures in its safety meetings.

WMSC staff observations:

When the AMF waiting for direction to flag on the Silver Spring platform heard the radio transmission about their crew, they attempted to contact the crew using a cell phone. The use of personal electronic devices while on the roadway is not permitted by Metrorail policy except in emergencies. Had the AMF known the work crew was on the roadway with a train approaching, the proper procedure would have been to report the emergency on the radio.

Although not part of this safety event, the investigation demonstrated that the Train Operator of Train 205 departed the Silver Spring Station platform by moving the master controller to P5 power mode, which is the maximum power mode available. Training instructs operators in manual mode to move from P1 through P5 gradually, which creates a smoother and more efficient ride with less wear and tear on WMATA infrastructure.

The data review also demonstrates brief emergency braking automatically applied outside Silver Spring Station when speed commands dropped out for approximately 50 feet.

Staff recommendation: Adopt final report.



Washington Metro Area Transit Authority
Department of Safety and Environmental
Management (SAFE)

FINAL REPORT OF INVESTIGATION A&I E21302

Date of Event:	07/21/2021
Type of Event:	Improper Roadway Worker Protection
Incident Time:	12:53 Hours
Location:	Takoma Station to Silver Spring Station, Track 2 (CM B2 425+00)
Time and How received by SAFE:	12:55 Hours; SAFE/IMO
WMSC Notification Time:	13:32 Hours
Responding Safety Officers:	WMATA: N/A WMSC: N/A Other: N/A
Rail Vehicle:	Train ID 205, L7386-7387.7329-7328.7414-7415.7443-7442T
Injuries:	None
Damage:	None
Emergency Responders:	None
SMS I/A Incident Number:	20210722#94597

Silver Spring Station – Improper Roadway Worker Protection

July 21, 2021

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Abbreviations and Acronyms

AMF	Advanced Mobile Flagger
ARS	Audio Recording System
CAP	Corrective Action Plan
CCTV	Closed-Circuit Television
COMM	Office Systems Maintenance Communications Section
CM	Chain Maker
CMNT	Office of Car Maintenance
CMOR	Office of Chief Mechanical Officer
ER	Event Recorder
IIT	Incident Investigation Team
MSRPH	Metrorail Safety Rules and Procedures Handbook
NOAA	National Oceanic and Atmospheric Administration
NVR	Network Video Recording
PPE	Personal Protective Equipment
ROCC	Rail Operations Control Center
RJSB	Roadway Job Safety Briefing
RSSC	Rail Safety Standards Committee
RTC	Rail Traffic Controller
RTRA	Office of Rail Transportation
RWIC	Roadway Worker in Charge
SAFE	Department of Safety and Environmental Management
SMS	Safety Measurement System
TRST	Office of Track & Structures
VMDS	Vehicle Monitoring and Diagnostic System
WMATA	Washington Metropolitan Area Transit Authority
WMSC	Washington Metrorail Safety Commission

Executive Summary

On Wednesday, July 21, 2021, at approximately 12:53 hours, the Train Operator of Train ID 205 (L7386-7387.7329-7328.7414-7415.7443-7442T) reported observing Office of Track & Structures (TRST) personnel walking on the roadway between Takoma Station (B07) and Silver Spring Station (B08), Track 2 at Chain Marker (CM) B2 404+00, to the Rail Operations Control Center (ROCC) Radio Rail Traffic Controller (RTC). The Train Operator reported not seeing or communicating with an Advanced Mobile Flagger (AMF) before departing Silver Spring Station, Track 2.

The Audio Recording System (ARS) playback revealed that at approximately 10:29 hours, the Roadway Worker In Charge (RWIC) of a Track and Structures (TRST) Mobile Work Crew requested permission to perform a track inspection between Rhode Island Avenue and Silver Spring Stations, track 2. The track inspection began after the RWIC received permission from ROCC to enter the roadway at Rhode Island Avenue Station to inspect the track to Brookland Station after contacting the AMF #1 located at Brookland Station, track 2; 8-car marker.

At approximately 11:00 hours, the RWIC contacted ROCC and reported the Mobile Work Crew was clear of the roadway at Brookland Station and requested permission to continue a track inspection between Brookland and Fort Totten Stations. The RWIC was instructed to contact the AMF #2, and permission was given to continue the track inspection.

At approximately 11:44 hours, the RWIC contacted ROCC and reported the Mobile Work Crew was clear of the roadway at Fort Totten Station and requested permission to continue a track inspection between Fort Totten and Takoma Stations. The RWIC was instructed to contact the AMF #1, who confirmed their location at Takoma Station, track 2; 8-car marker. Permission was given to the RWIC from ROCC after the train approaching Fort Totten Station properly berthed on the platform to continue the track inspection. There were no further transmissions between the RWIC and ROCC nor the RWIC and AMF #2 prior to the incident.

At approximately 12:53 hours, the Train Operator of Train ID 205 reported observing a Mobile Work Crew performing a track inspection between Takoma and Silver Spring Stations, track 2, without an AMF in place at Silver Spring Station. Forward-facing train camera showed that AMF #2 was not in place at Silver Spring Station, track 2 when train ID 205 arrived on the platform at 12:49 hours. The AMF reported that they were inside the Silver Spring Station terminal standing by for the instruction to begin AMF duties from the RWIC. ROCC requested the location of the Mobile Work Crew and questioned if the RWIC requested permission to enter the roadway between Takoma and Silver Spring Stations, track 2. The Mobile Work Crew was instructed to stand clear of the roadway for a train pick up. At approximately 13:11 hours, the Mobile Work Crew exited the roadway via Train ID 201 pick up at CM 425+00.

The Office of Car Maintenance (CMNT) performed a post-incident inspection on the brake system, propulsion system, and master controller operational checks on the consist of train ID 205. CMNT found that these subsystems worked as designed. CMNT did not identify any anomalous conditions that contributed to this event.

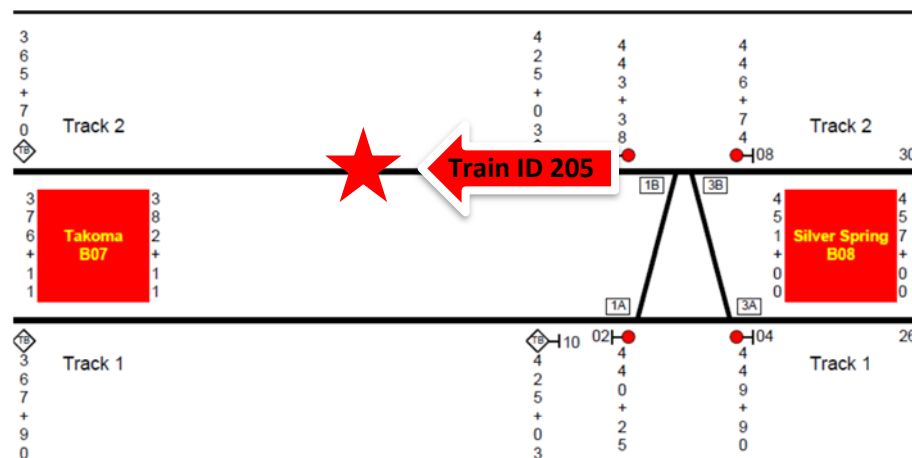
After reviewing the Audio Recording System (ARS) playback, there did not appear to be any communication deficiencies with the radio system.

The causal factors that led to the incident were the human performance difficulties by the RWIC, when they failed to contact ROCC to request permission to enter the roadway, and did not establish positive communication with the AMF #2 to ensure their placement at the 8-car marker, positioned to begin AMF operations at Silver Spring Station. This action was a direct violation of MSRPB Section 5 – 5.13.6 Advanced Mobile Flagging – Mobile Work Crew, *The RWIC will contact ROCC and perform a radio check establishing positive communication. After receiving confirmation that the AMF is in position, the RWIC will request permission from ROCC to enter the Roadway. Once ROCC gives permission, and before the Mobile Work Crew enters the Roadway, the RWIC will notify the AMF to begin AMF operations.* The conversations between the work crew likely contributed to a loss of situational awareness. The Track Inspectors followed the RWIC into the roadway without ensuring that the RWIC requested the proper protection for the track inspection. As stated by the RWIC, they had a desire to get the track inspection “over with,” which also likely contributed to the missed request for permission to enter the roadway.

Incident Site

Takoma Station to Silver Spring Station, Track 2 at CM B2 425+00

Field Sketch/Schematics



Purpose and Scope

The purpose of this accident investigation and candid self-evaluation is to collect and analyze available facts, determine the probable cause(s) of the incident, identify contributing factors, and make recommendations to prevent a recurrence.

Investigative Methods

The investigative methodologies included the following:

- Site Assessment through document review
- Formal Interviews – SAFE interviewed four (4) individuals as part of this investigation, including:
 - TRST RWIC
 - AMF #2
 - Track Inspectors (2)

- Informal Interviews – Collected through conversations with individuals during the investigation to provide background and supporting information.
- Documentation Review – A collection of relevant work history information and process documentation contained in Metro systems of record. These records include:
 - Employee Training Procedures & Records
 - Metro Safety Rules and Procedures handbook (MSRPH)
 - National Oceanic and Atmospheric Administration (NOAA) data
 - Certifications
 - The 30-Day work history
 - Office of Chief Mechanical Officer (CMOR) / Incident Investigation Team (IIT) post-incident analysis data
 - Office of Car Maintenance (CMNT) post-incident inspection data
 - TRST Investigation Report
 - Maximo
- System Data Recording Review – A collection of information contained in Metro Data Recording Systems. This data includes:
 - Audio Recording System (ARS) playback including OPS 1 Radio
 - Closed-Circuit Television (CCTV)

Investigation

On Wednesday, July 21, 2021, at approximately 12:53 hours, the Train Operator of Train ID 205 notified the ROCC Radio RTC that they observed a TRST mobile work crew walking on the roadway between Takoma (B07) and Silver Spring Stations (B08), Track 2, at Chain Marker (CM) B2 404+00. During the mobile work crew's track inspection, the Train Operator of Train ID 205 did not see or have contact with an Advanced Mobile Flagger (AMF) before departing Silver Spring Station, Track 2.

The mobile work crew involved received permission from ROCC to perform a track inspection beginning at Rhode Island Avenue Station, with AMF #1 positioned at Brookland Station and AMF #2 at Fort Totten Station at approximately 10:30 hours. After completing track inspection between Rhode Island Avenue Station and Brookland Station, the RWIC requested and received permission to continue track inspection between Brookland Station and Fort Totten Station. The RWIC confirmed that AMF #2 was in place at Fort Totten Station via radio at approximately 11:02 hours.

At approximately 11:46 hours, the TRST mobile work crew departed Fort Totten Station after receiving permission to enter the roadway from ROCC and verification that the AMF #1 was in place at Takoma Station, track 2. AMF #2 reported that after the mobile work crew arrived at Fort Totten Station, they responded to Silver Spring Station and entered the terminal to await instructions to begin AMF duties once the mobile work crew arrived at Takoma Station. Upon arrival at Takoma Station, the RWIC did not contact ROCC to report that the mobile work crew was clear of the roadway. This action is not in compliance with MSRPH Section 5 – 5.13.6 Advanced Mobile Flagging – Mobile Work Crew, *Once the RWIC, with their Mobile Work Crew, reaches the platform where the AMF is set up, the RWIC repeats this process until the tasks of the Mobile Work Crew are complete.*



Figure 1 - Mobile Work Crew arriving at Takoma Station, approximately 12:14 hours.

The CCTV revealed that the work crew took a break at Takoma Station for approximately 21 minutes after arrival. As the mobile work crew took a break on the platform at Takoma Station, Train ID 110 entered the station on track 2, serviced the station, and departed at approximately 12:25 hours. At approximately 12:34 hours, the mobile work crew prepared to continue their track inspection as Train ID 204 entered the station on track 2, serviced the station, and then departed.



Figure 2 - Train ID 204 entering Takoma Station, approximately 12:34 hours.

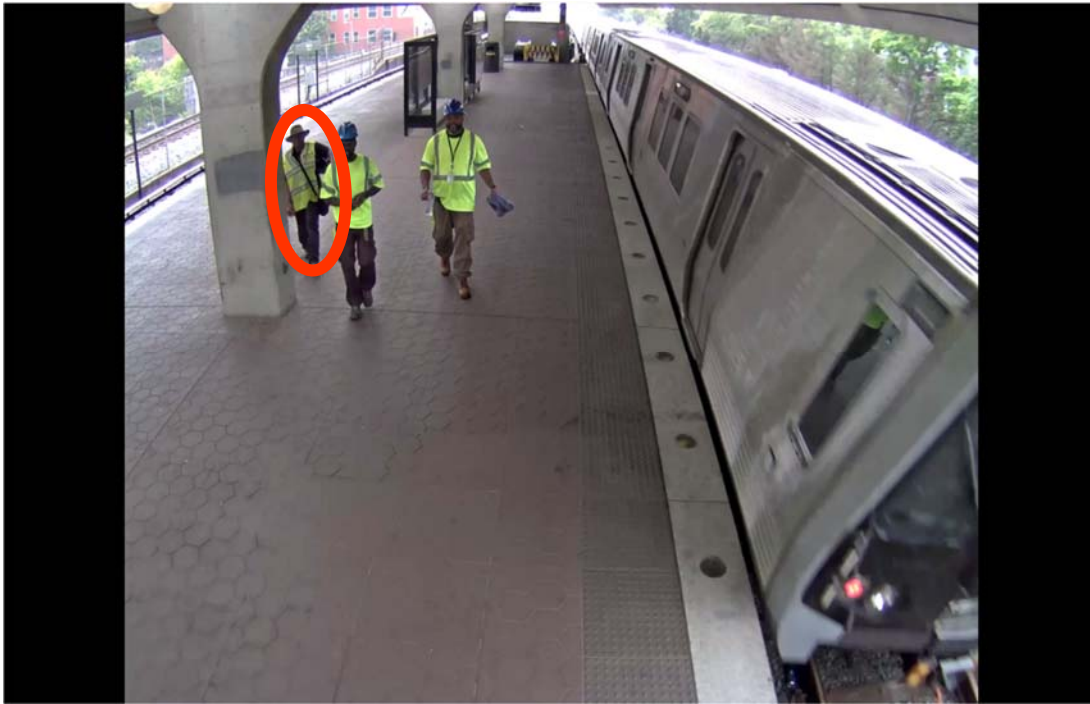


Figure 3 - Train ID 204 departing Takoma Station, approximately 12:35 hours.

At approximately 12:36 hours, the mobile work crew departed Takoma Station, track 2, and entered the roadway without contacting ROCC and the AMF #2 located at Silver Spring Station. This action was not in compliance with MSRPH Section 5 – 5.13.6 Advanced Mobile Flagging – Mobile Work Crew, *The RWIC will contact ROCC and perform a radio check establishing positive communication. After receiving confirmation that the AMF is in position, the RWIC will request permission from ROCC to enter the Roadway. Once ROCC gives permission, and before the Mobile Work Crew enters the Roadway, the RWIC will notify the AMF to begin AMF operations.* **Note:** In Figure 3 above, the Track Inspector is observed wearing an unauthorized bag. This action was a violation of MSRPH Section 4 – Safety Rules, 4.33, *Employees shall wear and/or use the prescribed safety equipment required for the type of work being performed.*



Figure 4 - Mobile Work Crew departing Takoma Station, approximately 12:36 hours.

At approximately 12:40 hours, Train ID 101 departed Silver Spring Station, track 2, and arrived at Takoma Station at approximately 12:43 hours.

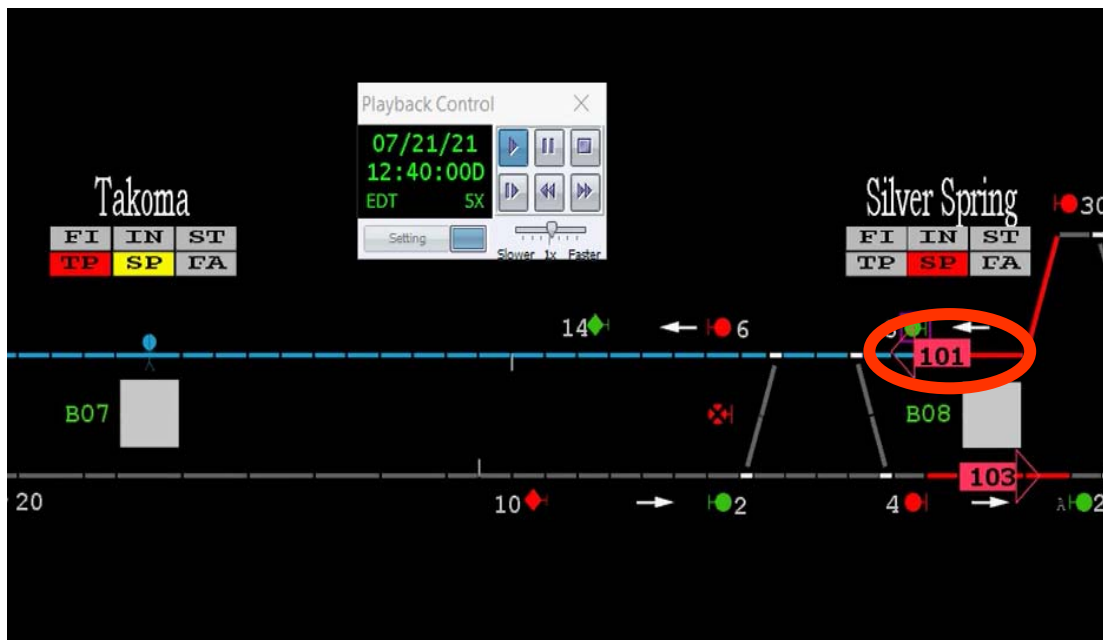


Figure 5 – Train ID 101 departing Silver Spring Station, approximately 12:40 hours.

The time between Train ID 101 departing Silver Spring Station and traveling to Takoma Station suggests that the Mobile Work Crew was on the roadway during this time. (NVR images were not available; the train consist was not fitted with forward-facing imaging.)



Figure 6 – Train ID 101 traveling between Silver Spring and Takoma Stations, approximately 12:41 hours.

The Train Operator of Train ID 101 did not report seeing the Mobile Work Crew on the roadway and an AMF #2 not in place at the 8-car marker at Silver Spring Station, track 2. This action is not in compliance with *Metrorail Safety Rules and Procedures Handbook (MSRPH)*, GR 1.32 - *Employees involved in, witnessing, or informed of an accident or incident, to include near misses, on the Metrorail System shall inform their supervisor, Transit Police, ROCC and/or other appropriate authority as soon as possible, and shall file a written report requirements.*

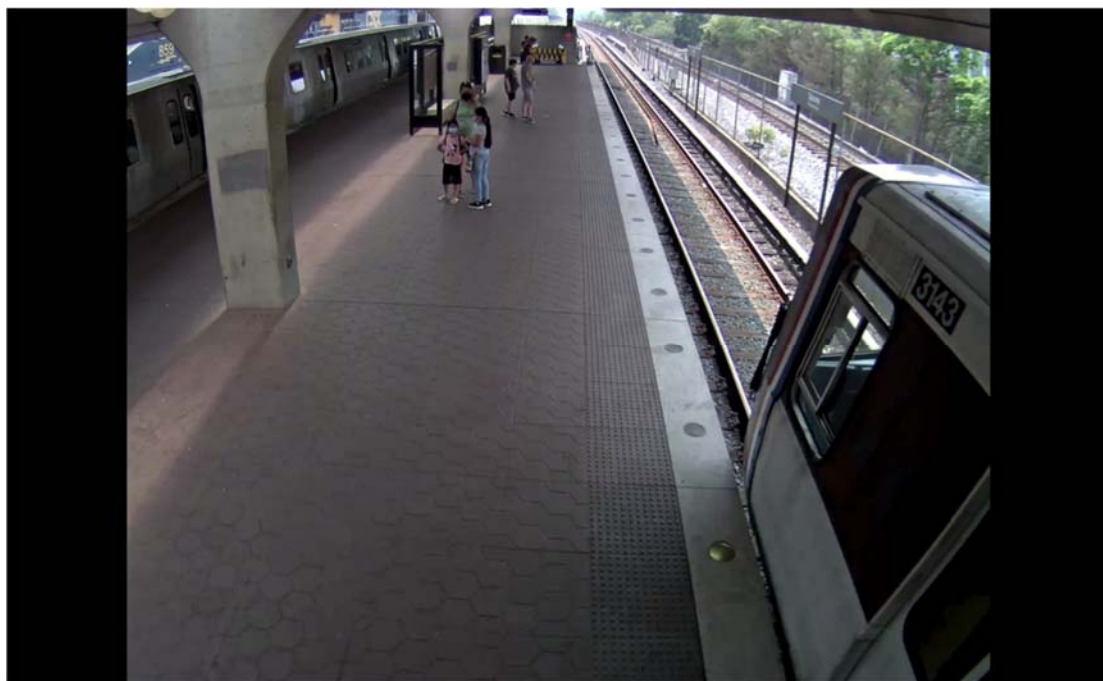


Figure 7 - Train ID 101 arriving at Takoma Station, approximately 12:43 hours.

At approximately 12:49 hours, Train ID 205 entered Silver Spring Station, serviced the platform, and departed the station without seeing or communicating with an AMF #2.



Figure 8 - Train ID 205 arriving at Silver Spring, approximately 12:49 hours.

The Train Operator of Train ID 205 departed Silver Spring Station at approximately 12:50 hours, and after traveling approximately 3,543 feet the Train Operator contacted ROCC and reported seeing the Mobile Work Crew on the roadway without seeing or communicating with an AMF #2 at Silver Spring Station.



Figure 9 - Train ID 205 approaching the Mobile Work Crew at CM B2 404+00, approximately 12:51 hours.

Chronological Event Timeline

A review of ARS playback, i.e., phone and radio communications, revealed the following timeline:

Time	Description
10:29:25 hours	<p><u>TRST RWIC</u>: Contacted ROCC.</p> <p><u>ROCC Radio RTC</u>: Acknowledged TRST RWIC.</p> <p><u>TRST RWIC</u>: Requested permission to do a track inspection between Rhode Island Avenue and Silver Spring track 2. AMF (#1) at Brookland 8-car marker.</p> <p><u>ROCC Radio RTC</u>: Acknowledged. [Radio Ops 1]</p>
10:30:02 hours	<p><u>ROCC Radio RTC</u>: Instructed, go direct to your AMF, stand by stand clear.</p> <p><u>TRST RWIC</u>: Responded, AMF, are you in place? [Radio Ops 1]</p>
10:30:16 hours	<p><u>AMF #1</u>: Responded, in place at Brookland, 8-car marker.</p> <p><u>TRST RWIC</u>: Responded; AMF is in place.</p> <p><u>ROCC Radio RTC</u>: Announcement, Track Walkers between Rhode Island Avenue and Brookland Stations, track 2. Permission to access the roadway. [Radio Ops 1]</p>
11:00:25 hours	<p><u>TRST RWIC</u>: Reported, clear of the roadway, Brookland Station.</p> <p><u>ROCC Radio RTC</u>: Acknowledged. [Radio Ops 1]</p>
11:00:58 hours	<p><u>TRST RWIC</u>: Requested permission to continue Brookland Station to Fort Totten Station.</p> <p><u>ROCC Radio RTC</u>: Instructed: Go direct with your AMF. [Radio Ops 1]</p>
11:01:43 hours	<p><u>TRST RWIC</u>: Responded, AMF (#2), are you in place? Let them know your location.</p> <p><u>AMF #2</u>: Copy, Fort Totten, track 2, eight car marker.</p> <p><u>ROCC Radio RTC</u>: Announcement, Track Walkers between Brookland Station and Fort Totten Station, track 2. [Radio Ops 1]</p>
11:06:21 hours	<p><u>ROCC Radio RTC</u>: Responded, [RWIC], you have permission to continue Brookland to Fort Totten Station.</p> <p><u>TRST RWIC</u>: Acknowledged. [Radio Ops 1]</p>
11:44:25 hours	<p><u>TRST RWIC</u>: Contacted ROCC.</p> <p><u>ROCC Radio RTC</u>: [RWIC], go with your message.</p> <p><u>TRST RWIC</u>: Permission to continue Fort Totten to Takoma Stations, track 2.</p> <p><u>ROCC Radio RTC</u>: Instructed: Go direct with your AMF.</p> <p><u>TRST RWIC</u>: Responded, AMF (#1), are you in place?</p> <p><u>AMF #1</u>: Responded, in place at Takoma, 8-car marker.</p> <p><u>TRST RWIC</u>: Responded. AMF is in place.</p> <p><u>ROCC Radio RTC</u>: Acknowledged and made an announcement. [Radio Ops 1]</p>
11:45:24 hours	<p><u>ROCC Radio RTC</u>: Advised [RWIC], you have one train in approach; when that train berths, you have permission to continue.</p> <p><u>TRST RWIC</u>: Acknowledged. [Radio Ops 1]</p>
11:46:56 hours	<p><u>TRST RWIC</u>: Responded. The train has berthed, permission to continue to Takoma Station.</p> <p><u>ROCC Radio RTC</u>: Announcement, Track Walkers between Fort Totten Station and Takoma Station, track 2. [Radio Ops 1]</p>
12:52:03 hours	<p><u>Train Operator of Train ID 205</u>: Reported, Track Walkers on the roadway, and no AMF (#2) in place at Silver Spring Station. [Radio Ops 1]</p>
12:52:24 hours	<p><u>ROCC Radio RTC</u>: Train ID 205, have you passed the personnel? [Radio Ops 1]</p>

Time	Description
12:53:30 hours	Train Operator of Train ID 205: Reported, I dumped the train. ROCC Radio RTC: Responded, what's your chain marker? [Radio Ops 1]
12:53:30 hours	Train Operator of Train ID 205: Responded, B2 404+00. ROCC Radio RTC: Acknowledged. [Radio Ops 1]
12:53:43 hours	ROCC Radio RTC: Contacted ROCC Asst. Superintendent. [Phone]
12:53:54 hours	ROCC Radio RTC: Requested, [RWIC] contact ROCC. TRST RWIC: Acknowledged ROCC. ROCC Radio RTC: Responded, what's your location? TRST RWIC: Responded, B2 422+00 ROCC Radio RTC: Responded, did you request to walk from Takoma to Silver Spring? TRST RWIC: Responded, affirm I made the request. ROCC Radio RTC: Responded, contact ROCC via landline. [Radio Ops 1]
12:54:26 hours	ROCC Radio RTC: Instructed [RWIC] stand-by stand clear for the next train pick up. [Radio Ops 1]
12:54:52 hours	ROCC Radio RTC: Answers the phone. TRST RWIC: This is [RWIC]. ROCC Radio RTC: What time did you make your request to walk Takoma Station to Silver Spring Station? Where is your AMF? TRST RWIC: How many trains passed me? Only 2 trains passed me. ROCC Radio RTC: Where is your AMF? TRST RWIC: Silver Spring ROCC Radio RTC: Your AMF is not on the platform. The Train Operator reported no AMF at Silver Spring. TRST RWIC: Two trains passed me. ROCC Radio RTC: Calm down. Before you started walking off the platform from Takoma Station were you instructed to go direct to your AMF? Did ROCC request to go direct with your AMF from Takoma Station to Silver Spring Station? TRST RWIC: I'm not sure. ROCC Radio RTC: You're saying no? TRST RWIC: I'm not sure. ROCC Radio RTC: Standby and stand clear for the next train pick up. TRST RWIC: I was told when the train is safely berth on the platform, I can go. ROCC Radio RTC: Standby and stand clear for a train pick up. TRST RWIC: Standing by and standing clear. [Phone]
12:55:19 hours	Train Operator of Train ID 205: Reported, standing by waiting for instructions. ROCC Radio RTC: Responded, do you see the personnel? Train Operator of Train ID 205: Reported, personnel passed the train. ROCC Radio RTC: Instructed Train ID 205, use restricted speed to Takoma Station. [Radio Ops 1]
12:55:52 hours	ROCC Radio RTC: Train 102 come into to ROCC. Train Operator of Train ID 102: B2 425+00
12:56:30 hours	ROCC Radio RTC: Train 102, when you arrive to Silver Spring advise if there is an AMF.
12:58:44 hours	ROCC Radio RTC: Train 102 permissive block to the 8-car marker track 2 Silver Spring.

Time	Description
12:58:53 hours	<u>ROCC Radio RTC</u> : Train 102 come in to ROCC.
12:58:59 hours	<u>ROCC Radio RTC</u> : Train 102 track 2 Silver Spring come in to ROCC.
12:59:48 hours	<u>ROCC Radio RTC</u> : Train 102 track 2 Silver Spring come in to ROCC.
12:59:58 hours	<u>ROCC Radio RTC</u> : Train 102 track 2 leaving Silver Spring come in to ROCC.
01:00:06 hours	<u>Train Operator of Train ID 102</u> : This is 102. <u>ROCC Radio RTC</u> : Was there an AMF track 2 Silver Spring? <u>Train Operator of Train ID 102</u> : Yes, there was an AMF that said the track walkers were standing by. <u>ROCC Radio RTC</u> : Acknowledged.
01:00:21 hours	<u>ROCC Radio RTC</u> : [RWIC], come in with your location and chain marker. <u>TRST RWIC</u> : Standing by B2 425+00. <u>ROCC Radio RTC</u> : Train 102 have you passed B2 425+00?
01:01:20 hours	<u>ROCC Radio RTC</u> : Train 102 have you passed B2 425+00? <u>Train Operator of Train ID 102</u> : I have passed B2 425+00. <u>ROCC Radio RTC</u> : Acknowledged and repeated.
01:01:46 hours	<u>ROCC Radio RTC</u> : Train 201 track 2 Wheaton. [RWIC] continue to stand by and stand clear. You will be picked up by a train. <u>TRST RWIC</u> : Standing by and standing clear to be picked up by a train.
01:02:12 hours	<u>ROCC Radio RTC</u> : Train 201 track 2 Wheaton. <u>Train Operator of Train ID 201</u> : Acknowledged ROCC. <u>ROCC Radio RTC</u> : I need a train pick up, personnel standing by B2 425+00. <u>Train Operator of Train ID 201</u> : Can you repeat the chain marker? <u>ROCC Radio RTC</u> : B2 425+00, key down and give a radio check at that location. <u>Train Operator of Train ID 201</u> : Acknowledged and repeated.
01:11:15 hours	<u>Train Operator of Train ID 201</u> : This is 201, radio check on the handset B2 425+00. <u>ROCC Radio RTC</u> : Radio check loud and clear, you're keyed down at this time. [RWIC] you have permission to enter the train, verify that the train is keyed down. <u>TRST RWIC</u> : The train is keyed down. <u>ROCC Radio RTC</u> : Contact 1652 from the platform. <u>TRST RWIC</u> : Acknowledged and repeated. Safely on the train. <u>ROCC Radio RTC</u> : [RWIC] your clearing time is 13:12 hours. <u>TRST RWIC</u> : Acknowledged and repeated.
01:12:41 hours	<u>Train Operator of Train ID 201</u> : Personnel are aboard the train. Permission to key up and continue. <u>ROCC Radio RTC</u> : You have permission to key up and continue.

****Note:** Times above may vary from other system's timelines based on clock settings.

Office of Chief Mechanical Officer (CMOR) / Vehicle Monitoring and Diagnostic System (VMDS) / Incident Investigation Team (IIT)

Event Recorder (ER) Data Graph/Sequence of Events

Based on IIT CMOR analysis of the downloaded VMDS and ER, details from the data analysis are as follows:

TIME	Description
12:48:47 hours	Train ID 205 entered Silver Spring Station, Track 2
12:49:29 hours	Train ID 205 came to a stop at the 8-Car Marker at Silver Spring station
12:49:40 hours	All doors closed and locked signal goes low (Doors were Opened)
12:49:59 hours	All doors closed and locked signal goes high (Doors were Closed)
12:50:05 hours	Master Controller moved to the P5 Power Mode; Train ID 205 begins to move towards Takoma Station
12:50:22 hours	ATP speed limit dropped from 50 mph to 0 mph; Overspeed Alarm activated; Full-Service Brake applied; after traveling 514 feet past the 8-Car Marker at Silver Spring Station; train speed was 39.1 mph
12:50:23 hours	ATP speed limit increased back to 50 mph, 561 feet past the 8-Car Marker at Silver Spring Station
12:50:24 hours	Overspeed alarm de-activated; Full-Service Brake released at 658 feet past the 8-car Marker at Silver Spring Station; Master Controller moved to P1-P4 Power Mode
12:50:25 hours	Master Controller moved to P5 Power Mode 672 feet past Silver Spring Station
12:50:28 hours	ATP speed limit increased to 75 mph; Train speed 40.3 mph, 889 feet past Silver Spring Station
12:50:47 hours	Master Controller moved to Coast; Train speed 59.7 mph, 2,254 feet past Silver Spring Station
12:50:54 hours	Master Controller moved to B5 brake mode; Train speed 60.2 mph 2,887 feet past Silver Spring Station
12:51:05 hours	Passed Mobile Work Crew on the wayside, 3,643 feet past Silver Spring Station, at a speed of 34 mph
12:51:17 hours	The train stopped, 3,926 feet past Silver Spring Station; 283 feet past the Mobile Work Crew (lead car)
12:52:16 hours	Master Controller moved to P5 power mode
12:52:17 hours	The train began to move in the direction of Takoma Station, traveling at speeds not to exceeding 18 mph
12:52:52 hours	Master Controller moved to B1-B3 Braking Mode; Train speed 18 MPH
12:53:12 hours	The train comes to a stop, 3,393 feet before Takoma Station (train traveled 887 feet from the previous stop)
12:55:54 hours	Road Horn activated
12:55:54 hours	Master Controller moved to P5 power mode
12:55:56 hours	The train moved towards Takoma Station
12:57:06 hours	The train entered Takoma Station at a speed of 18.079 mph
12:57:30 hours	The train stopped 177feet before the 8-car marker at Takoma Station
12:57:43 hours	Master Controller moved in P5 power mode

TIME	Description
12:57:44 hours	The train moved towards Takoma Station 8-Car Marker.
12:58:07 hours	The train stopped at Takoma Station 8-Car Marker

Based on the VMDS and ER data, all the subsystems' safety components such as Automatic Train Control (ATC), brakes, and propulsion acted as designed, and there were no faults with the train that contributed to this event.

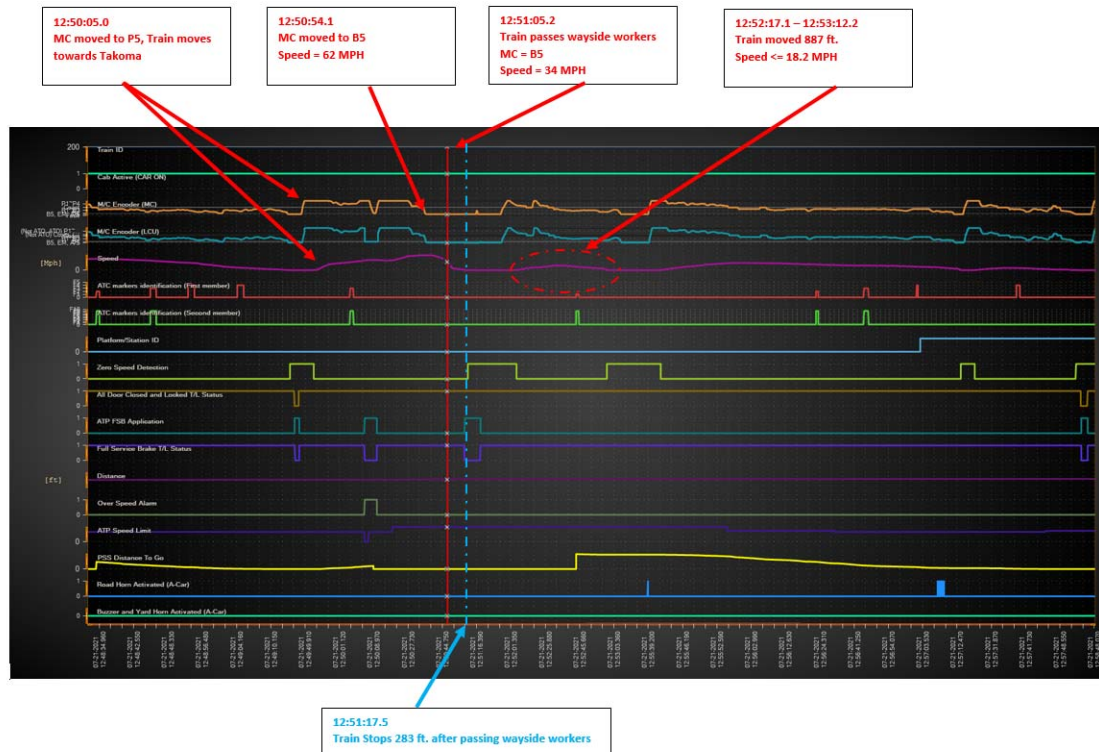


Figure 10 - Event Recorder Graphical Analysis

Office of Car Maintenance (CMNT)

CMNT personnel performed a post-incident inspection on the brake system, propulsion system, and master controller operational checks. CMNT found that these subsystems worked as designed. CMNT did not identify any anomalous conditions that contributed to the event.

Rail Operations Control Center (ROCC) SPOTS Event Log

Based on ROCC SPOTS event log data download, SAFE determined the following rail consists potentially traveled between Takoma Station and Silver Spring Station, track 2 passing the Mobile Work Crew without reporting to ROCC:

ROCS SPOTS REPORT

based on up-to-the-second operational performance data from the Rail Operations Control System

Current date/time: Mon Aug 2 18:08:04 2021

Select Platform: and/or Select ID: Leave blank to remove criteria
Select Date: Jul ▼ 21 ▼ 2021 ▼ Select Times (0-24HRS): From 12:00 ▼ To 14:00 ▼

Generate Report

ID	Platform	length	dcode	Right door open	Right door close	dwelt	Left door open	Left door close	dwelt	Head Arrived	Tail cleared	Headway (door open to door open) door open to door open
109	B08-2	8	12							12:02:52	12:04:29	-
203	B08-2	8	5							12:13:46	12:15:52	-
110	B08-2	8	12							12:21:03	12:22:27	-
204	B08-2	2	5							12:31:54	12:33:13	-
101	B08-2	8	12							12:39:17	12:40:52	-
205	B08-2	8	5							12:49:07	12:50:29	-
102	B08-2	8	12							12:57:27	12:59:58	-
201	B08-2	8	5							13:08:33	13:10:12	-

Interview Findings

Based on the investigation launched into the Silver Spring Station Improper Roadway Worker Protection event, SAFE conducted four virtual interviews via Microsoft Teams, including the investigation team and representatives from the WMSC. The following key findings associated with this event, are as follows:

The RWIC attended a morning meeting and performed a Roadway Job Safety Briefing (RJSB) at Shady Grove Rail Yard before departing to perform a walking track inspection between Rhode Island Avenue to Silver Spring Stations track 2. The RWIC verified that the Personal Protective Equipment (PPE) of the four crew members was verified before the work crew left the rail yard. The RWIC reported radio communication issues, due to the amount of radio traffic, particularly with the RTCs confusing similar unit IDs. On the day of the incident, the RWIC reportedly corrected the RTC earlier in the day, and the RTC acknowledged the mistake. Before beginning the track inspection, the RWIC contacted ROCC and provided the section that the Work Crew would be inspecting. The RTC instructed them to communicate directly with the AMF.

For the segments inspected prior to departing Takoma Station, the RWIC contacted the AMF via handheld radio, and the AMF would confirm that they are in place. The RWIC reported not remembering if they called the AMF #2 prior to leaving Takoma Station. The RWIC reported that it was not the day of the incident. The Work Crew took a break to allow a member of the group to get water. The RWIC admitted that they called for permission to enter the roadway when the

crew member returned, and the Work Crew continued walking. The RWIC reported conducting a RJSB at the yard and the contractors were present for the RJSB. The RWIC reported that they did not know where the AMF #2 was that was supposed to be in place at Silver Spring Station and admitted that they did not transmit or receive communication with the AMF #2 to begin flagging duties at Silver Spring Station. The RWIC reported being behind schedule and that they were rushing. They also believed that the weather (heat) could have contributed to the lapse in situational awareness.

The AMF #2 and Mobile Work Crew reported performing a track inspection between Rhode Island Avenue and Silver Spring Stations, track 2. Upon completing the AMF duties at Fort Totten Station, the AMF #2 traveled to Silver Spring Station and waited for the RWIC to contact them via handheld radio. The AMF #2 heard a Train Operator transmit that there were people on the roadway after leaving Silver Spring Station, track 2, and realized that it was their Mobile Work Crew that the Train Operator was referencing. The AMF #2 called the Mobile Work Crew via cellular telephone and asked the Mobile Work Crew if they had already started walking. The Mobile Work Crew responded, yes. The AMF #2 informed the Mobile Work Crew that no one had directly contacted them before beginning the walk between Takoma Station and Silver Spring Station.

The Train Operator of Train ID 205 reported they felt distraught when they were operating the train and unknowingly came upon the Mobile Work Crew between Takoma and Silver Spring Stations. The Train Operator placed the train brakes in emergency to stop the train as quickly and safely as possible. The Train Operator reported only thinking about what could have happened if they were not alert and in control of their train. The Train Operator stated that the rules and procedures for the AMF duties are in place to keep everyone safe, including the Train Operator.

Weather

On July 21, 2021, at the time of the incident, NOAA recorded the temperature as 88° F, with Partly Sunny skies throughout the afternoon. Based on the inconsistent statements between members of the work crew, SAFE has concluded that the weather (heat) was not a likely contributing factor in this incident (Weather source: NOAA – Location: Silver Spring, MD.)

Human Factors

Fatigue

Signs and Symptoms of Fatigue

Roadway Worker In Charge (RWIC)

Evidence of fatigue:

Conditions at the time of the incident were evaluated to distinguish whether evidence of fatigue was present. No evidence of fatigue was indicated by the available data. Video of the incident was reviewed for behaviors suggesting fatigue. No evidence of fatigue was evident from the video. The RWIC reported feeling Fully Alert at the time of the incident. The Employee reported experiencing no symptoms of fatigue in the time leading up to the incident.

Advanced Mobile Flagger #2 (AMF)

Evidence of fatigue:

Conditions at the time of the incident were evaluated to distinguish whether evidence of fatigue was present. No evidence of fatigue was indicated by the available data. Video of the incident

was reviewed for behaviors suggesting fatigue. No evidence of fatigue was evident from the video. The Advanced Mobile Flagger reported feeling Fully Alert at the time of the incident. The Employee reported experiencing no symptoms of fatigue in the time leading up to the incident.

Track Inspector #1

Evidence of fatigue:

Conditions at the time of the incident were evaluated to distinguish whether evidence of fatigue was present. No evidence of fatigue was indicated by the available data. Video of the incident was reviewed for behaviors suggesting fatigue. No evidence of fatigue was evident from the video. The Track Walker reported feeling Fully Alert at the time of the incident. The Employee reported experiencing no symptoms of fatigue in the time leading up to the incident.

Track Inspector #2

Evidence of fatigue:

Conditions at the time of the incident were evaluated to distinguish whether evidence of fatigue was present. No evidence of fatigue was indicated by the available data. Video of the incident was reviewed for behaviors suggesting fatigue. No evidence of fatigue was evident from the video. The Track Walker reported feeling Fully Alert at the time of the incident. The Employee reported experiencing no symptoms of fatigue in the time leading up to the incident.

Fatigue Risk

Roadway Worker In Charge (RWIC)

Fatigue Risk:

Incident data was evaluated for fatigue risk factors. No risk factors for fatigue were identified. The incident time of day (12:53 hours) did not suggest an increased risk of fatigue-related impairment. The employee worked day shifts in the days leading up to the incident and was awake for 6.8 hours at the time of the incident. Based on the employee's reported sleep and wake times the day before the incident, the employee slept a total of 8 hours in the sleep period preceding the incident, which was comparable to the employee's reported usual workday sleep durations of 6 hours. The off-duty period preceding the incident was 18.5 hours long, which provides the opportunity for 7-9 hours of sleep. The employee reported no issues with sleep.

Advanced Mobile Flagger #2 (AMF)

Fatigue Risk:

Incident data was evaluated for fatigue risk factors. No risk factors for fatigue were identified. The incident time of day (12:53 hours) did not suggest an increased risk of fatigue-related impairment. The employee worked day shifts in the days leading up to the incident and was awake for 7.6 hours at the time of the incident. Based on the employee's reported sleep and wake times the day before the incident, the employee slept a total of 7.5 hours in the sleep period preceding the incident, which was comparable to the employee's reported usual workday sleep durations of 6 hours. The off-duty period preceding the incident was 18.9 hours long, which provides the opportunity for 7-9 hours of sleep. The employee reported no issues with sleep.

Track Inspector #1

Fatigue Risk:

Incident data was evaluated for fatigue risk factors. No risk factors for fatigue were identified. The incident time of day (12:53 hours) did not suggest an increased risk of fatigue-related impairment. The employee worked both day and overnight shifts in the weeks leading up to the incident and worked only day shifts in the five (5) days leading up to the incident. The employee was awake for 8.8 hours at the time of the incident. Based on the employee's reported sleep and wake times the day before the incident, the employee slept a total of 8 hours in the sleep period preceding the incident, which was comparable to the employee's reported usual workday sleep durations of

7.5 hours. The off-duty period preceding the incident was 19 hours long, which provides the opportunity for 7-9 hours of sleep. The employee reported no issues with sleep.

Track Inspector #2

Fatigue Risk:

Incident data was evaluated for fatigue risk factors. No risk factors for fatigue were identified. The incident time of day (12:53 hours) did not suggest an increased risk of fatigue-related impairment. The employee worked day shifts in the days leading up to the incident and was awake for 7.8 hours at the time of the incident. Based on the employee's reported sleep and wake times the day before the incident, the employee slept a total of 7 hours in the sleep period preceding the incident, which was comparable to the employee's reported usual workday sleep durations of 7 hours. The off-duty period preceding the incident was 11.9 hours long, and the employee reported no issues with sleep.

Post-Incident Toxicology Testing

- Per TRST management, the Mobile Work Crew was removed from the roadway and returned to the division but was not removed from service for post-incident testing.
(Reference Corrective Action 94858_SAFECAPS_TRST_003)

Findings

- The RWIC entered the roadway at Takoma Station, Track 2 without permission from ROCC and failed to notify the AMF to take their position at Silver Spring Station.
- Train Operator observed personnel on the roadway while traveling 60.2 mph, approximately 2,887 feet outside of Silver Spring Station on track 2.
- Train ID 205's lead car came to a complete stop approximately 283 feet beyond the work crew, who were standing in a place of safety at the time.
- The railcar performed as designed and according to the Train Operator's rail vehicle operations.
- Train ID 101 passed the mobile work crew after having no contact with the AMF at Silver Spring, track 2 and failed to report the personnel wayside.
- Track Inspector #1 was observed on the roadway with an unauthorized bag strapped across their chest.

Immediate Mitigation to Prevent Recurrence

- The TRST Mobile Work Crew was removed from the roadway, however, the Mobile Work Crew was not taken for post-incident testing.
- RTRA reissued Rail Operations Personnel Notice (ROPN) directing Train Operators to stop their trains and report all encounters and observations of unexpected personnel on the roadway.

Probable Cause Statement

The causal factors that led to the incident were the human performance difficulties by the RWIC, when they failed to request permission from the ROCC to enter the roadway, and did not establish positive communication with the AMF #2 to ensure their placement at the 8-car marker, positioned to begin AMF operations. This action was a direct violation of MSRP Section 5 – 5.13.6 Advanced Mobile Flagging – Mobile Work Crew, *The RWIC will contact ROCC and perform a radio check establishing positive communication. After receiving confirmation that the AMF is in*

position, the RWIC will request permission from ROCC to enter the Roadway. Once ROCC gives permission, and before the Mobile Work Crew enters the Roadway, the RWIC will notify the AMF to begin AMF operations. The conversations between the work crew likely contributed to a loss of situational awareness. The Track Inspectors followed the RWIC into the roadway without ensuring that the RWIC requested the proper protection for the track inspection. As stated by the RWIC, they had a desire to get the track inspection “over with,” which also likely contributed to the missed request for permission to enter the roadway.

SAFE Recommendations/Corrective Actions

Corrective Action Code	Description	Responsible Party	DATE
94597_SA FECAPS_ TRST_001	All personnel shall undergo re-training with an emphasis on Radio Communication. Training should reinforce required procedures regarding MSRP Section 5 – RWP, 5.13.6 Advanced Mobile Flagging – Mobile Work Crew.	TRST	Completed
94858_SA FECAPS_ TRST_003	Develop a Standard Operating Procedure consistent with Policy/Instruction 7.7.3 that details specific incidents and circumstances that require TRST personnel to be removed from service for drug/alcohol screening, including a method to ensure the screening is completed.	TRST	01/30/2022
94597_SA FECAPS_ RTRA_001	Continue to conduct periodic targeted conversations with personnel related to 7/9/2021 ROPN titled “Importance of Proper Notifications” during Rail Supervisor’s daily interactions and safety conversations with Train Operators, Station Managers, and Interlocking Operators.	RTRA	Completed / Ongoing

Office of Track and Structure (TRST) Actions Completed

TRST reviewed this event along with assessing the process and procedures of personnel and has provided the following:

The RWIC involved returned to Remedial RWP Level 4 training, which consists of one week of classroom & hands-on training on RWP level 4 practices and procedures. After completion, the employee had to demonstrate in a field environment, while being monitored by a Supervisor on three separate occasions, that they can confidently apply the RWIC duties on the roadway.

TRST followed up this incident with an informational/stand down session during the Division’s Safety Meeting to discuss and reinforce rules and procedures as Track Inspectors, AMF’s, & RWICs, as it pertains to proper RWP compliance. During this session, management emphasized roadway job safety briefings and the importance of re-briefing crews when stopping for breaks and/or if anything changes while completing inspections.

Additional Action in Progress

WMATA's Rail Safety Standards Committee (RSSC) is currently evaluating Chapter 5 (Roadway Worker Protection) of the MSRPH to include the current procedure for establishing AMF protection. Gaps and failures from previous Improper RWP events are shared with the RSSC in order to assist in developing improved procedures and guidance to roadway personnel.

Appendices

Appendix A – Interview Summary

TRST

Roadway Worker In Charge (RWIC)

The RWIC is a WMATA employee with 16 years of service and six years of experience as a RWIC. The RWIC holds a Roadway Worker Protection (RWP) Level 4 certification that expires in June 2022.

During the virtual interview, the Roadway Worker in Charge (RWIC) stated that they were fully alert and had no sleep issues on the date of this incident. The RWIC reported attending a morning meeting and performing a Roadway Job Safety Briefing at Shady Grove Rail Yard before performing a walking track inspection between Rhode Island Avenue to Silver Spring Stations, track 2. There were four people in total in the work crew: two AMFs (1 contractor (AMF #1) and 1 WMATA (AMF #2)) and two Inspectors. All PPE was verified before the work crew left the rail yard. The RWIC reported that there are always radio communication issues, particularly with the RTCs getting the Unit Numbers mixed up. The RWIC reported that the day before the incident, the RTC gave the RWIC permission and called the wrong unit number, and the RWIC had to correct the RTC. On the day of the incident, the RWIC reportedly corrected the RTC, and the RTC apologized. Before beginning the track inspection at Rhode Island Avenue Station, the RWIC contacted ROCC and provided the section that the Work Crew would be inspecting, and the RTC instructed them to go direct to the AMF.

The RWIC reported that they would contact the AMF via handheld radio, and the AMF would respond that they're in place. The RWIC reported not remembering if they called AMF #2 before leaving Takoma Station. The RWIC reported that it was not the day of the incident. The Work Crew took a break to allow a member of the group to get water. The RWIC reported that they thought that they called for permission to enter the roadway when the crew member returned, and the Work Crew continued walking. The RWIC reported a possible miscommunication. The RWIC reported that they are always concerned with keeping the crew safe. The RWIC reported conducting a RJSB at the yard and the contractor performing AMF duties was present for the RJSB. The RWIC reported instructing the AMF's to be in place at the 8-car marker. The RWIC reported that they did not know the location of AMF #2 that was supposed to be in place at Silver Spring Station and admitted that they did not transmit or receive communication with the AMF #2 to begin flagging duties at Silver Spring Station. The RWIC reported being behind schedule, they were rushing, and the heat could have contributed to the lapse in communication.

TRST

Track Walker/Advanced Mobile Flagger (AMF #2)

The Track Walker/Advanced Mobile Flagger (AMF) is a WMATA employee with 2 years of service and experience as a Track Walker/Advanced Mobile Flagger. The AMF holds a Roadway Worker Protection (RWP) Level 2 certification that expires in October 2021.

During the virtual interview, the AMF stated they were performing the AMF duties for the Mobile Work Crew involved in the Improper Roadway Worker Protection event on July 21, 2021. The AMF stated that the Mobile Work Crew performed a track inspection between Rhode Island Avenue and Silver Spring Stations, track 2. The AMF's first assignment was located at Fort Totten

Station; then, they were supposed to perform the AMF duties at Silver Spring Station. Upon completing the AMF duties at Fort Totten, the AMF traveled to Silver Spring Station and waited for the RWIC to contact them via handheld radio. While they were in the blockhouse, located on the platform, waiting, and listening to the radio communications at Silver Spring Station, they did not hear anyone attempt to contact them.

The AMF stated that they heard a Train Operator transmit that there were people on the roadway, and he soon realized that it was their Mobile Work Crew that the Train Operator was referring to. The AMF stated that they exited the blockhouse near the 8-car marker and called the Mobile Work Crew via cellular telephone. They asked the Mobile Work Crew if they had already started walking, and the Mobile Work Crew replied yes. The AMF stated that they informed the Mobile Work Crew that no one had directly contacted them before beginning the walk between Takoma Station and Silver Spring Station. The AMF stated that they heard the Rail Operations Control Center (ROCC) Radio Rail Traffic Controller (RTC) instruct the Mobile Work Crew to stand by for a train pick up. The AMF stated that they did not hear the Mobile Work Crew notify ROCC that they were clear from the roadway when they arrived at Takoma Station, walking from Fort Totten Station. The AMF stated that they did not hear the Mobile Work Crew request to ROCC to continue to walk from Takoma Station to Silver Spring Station, track 2. The AMF stated that the Roadway Worker In Charge (RWIC) never contacted them to begin AMF duties. The AMF stated that they contacted the Mobile Work Crew via cellular telephone immediately after realizing that they were the Mobile Work Crew that was on the roadway unauthorized.

TRST

Track Walker/Track Inspector #1

The Track Walker/Track Inspector is a WMATA employee with 1.5 years of service and experience as a Track Walker/Track Inspector. The Track Inspector holds a Roadway Worker Protection (RWP) Level 2 certification that expires in January 2022.

During the virtual interview, the Track Inspector stated they were performing the track inspection duties for the Mobile Work Crew involved in the Improper Roadway Worker Protection event on July 21, 2021. The Track Inspector stated that, before the event, the Work Crew was on the Takoma Station platform, waiting for the other inspector to come back from getting something to drink. The Work Crew stopped and rested for a few minutes before starting the next walk to Silver Spring. The Work Crew talked and had a conversation while walking to the 8-car marker and reported seeing the RWIC with the radio in his hand. The two Track Inspectors were going back and forth talking. They got to the 8-car marker and believed they heard ROCC say something about when the next train berths the platform you have permission to go on the roadway. They reportedly heard a transmission from ROCC say that the train has properly berthed the platform, and they began to walk down the track. They saw the RWIC had the radio up to his ear, so they assumed the RWIC was calling ROCC, and they would not have walked down the track until ROCC had given them permission to the roadway but did not have their own radio to listen. They walked down the track, did not have any problems, and felt safe until they got to CM B1 425+00. The track inspector reported that three trains passed them while walking, and the Train Operators blew their horn, which is a normal procedure. Two to three trains passed them, blew the horn, and they got out of the way. There was no rushing. The inspector reported that the last train before they got to that 425+00 was moving fast, coming around the corner, and you could smell the brake dust. Then they heard a call on the radio stating that there are track walkers out on the roadway and they do not have permission, and the Mobile Work Crew was shocked. The Train Operator said there was no AMF on the platform and ROCC told the Mobile Work Crew to get a train pick up. There were two people between the conversations; TRST has two-track walkers with similar call numbers, all of us were walking simultaneously.

TRST

Track Walker/Track Inspector #2

The Track Walker/Track Inspector is a WMATA employee with three years of service and one year of experience as a Track Walker/Track Inspector. The Track Inspector holds a Roadway Worker Protection (RWP) Level 4 certification that expires in October 2021. The Track Inspector reported that they attended a six-week training course to become certified as a Track Inspector.

During the virtual interview, the Track Inspector stated that they were fully alert before the incident. The Track Inspector confirmed that they attended the Roadway Job Safety Briefing, and the assignments were established before the track inspection. The Track Inspector reported no issues between Rhode Island Avenue and Fort Totten Stations during the track inspection. The Track Inspector confirmed good communication between Rhode Island Avenue and Brookland Stations. At Brookland Station, the Track Inspector reported that the RWIC attempted to contact the AMF located at Fort Totten Station. The Track Inspector reported that he contacted the AMF via cellular phone before leaving Brookland Station and then established positive communication over the handheld radio between the RWIC and the AMF before leaving Brookland Station. The Track Inspector reported that the second Track Inspector took a 10-minute break at Takoma. The Track Inspector was unsure if communication between the RWIC and ROCC was established before leaving Takoma Station.

The Track Inspector reported they did not remember if any communication was established between the RWIC and AMF at Silver Spring Station. The Track Inspector reported observing the RWIC holding the handheld radio at Takoma Station. The Track Inspector reported having experience working with the RWIC. The Track Inspector reported the RWIC was approximately 50 feet ahead of the Inspectors, and the second inspector was right behind. The Track Inspector reported that track defects that were identified were properly reported. The Track Inspector assumes RWIC duties approximately three times per week and reported not having a handheld radio on the day of the incident. The Track Inspector reported that the crew was not running behind schedule. The Track Inspector reported that during the inspection from Takoma to Silver Spring, other trains were blowing the horn and did not see any reason to think that the AMF was not in place at Silver Spring Station.

The Track Inspector reported that the reporting train (ID 205) was coming fast towards the crew and not blowing the horn. The crew stepped from the roadway and heard the train lose air (indication of emergency braking). The train stopped, and the crew was approximately mid-way of the train length. The Track Inspector reported hearing the Train Operator contact ROCC and then the ROCC called the RWIC. The Track Inspector reported the crew was picked up from the roadway and went to Takoma.

Appendix B – Advanced Mobile Flagging – Mobile Work Crew, Metrorail Safety Rules and Procedures Handbook (MSRPH), SOP 5.13.6



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For personnel being dropped off or picked up on the Roadway, only the following FT checklist items shall be required:

1. Repeat the FT request and advise the Requestor and crew to standby and stand clear.
2. Grant FT to the Requestor.



Important: The Rail Vehicle will be held until the personnel are in a place of safety and FT is relinquished.

When the Requestor has determined that FT is no longer necessary, they shall relinquish it through the following process:

1. From a place of safety, the requestor contacts ROCC and states the following:
 - Radio ID
 - They are relinquishing FT at the granted FT location
 - Their current chain marker, station, and/or physical location
2. ROCC confirms over the radio to the Requestor that FT has been relinquished at their stated location and advises the Requestor to be on the lookout for rail vehicle movement.
3. ROCC must document the time that FT was relinquished.



Important: Although WMATA personnel may request FT any time they feel it is warranted to ensure their safety, FT is required for all **RED HOT SPOTS**.

5.13.6 Advanced Mobile Flagging (AMF) – Mobile Work Crew

AMF protection is the use of Watchman/Lookouts assigned to a Mobile Work Crew in conjunction with an additional flagger positioned at the station in advance of the Mobile Work Crews. A Watchman/Lookout must be a minimum of 50 feet in advance of the Mobile Work Crew. The Advance Mobile Flagger (AMF) is an assigned Roadway Worker positioned at the end of a platform (8 car marker or end gate) in the direction of normal travel for Class 1 or 2 Rail Vehicle. RWICs are to use the Need vs. Speed Chart to determine sight distance vs Rail Vehicle speeds to provide Ample Time/Warning. If proper sighting distance cannot be achieved for the work crew to reach a place of safety in Ample Time/Warning, then a higher form of protection (e.g. FT, ETO, or IT) must be used.

Advanced Mobile Flagging Procedures:

1. The RWIC will conduct a RJSB prior to entering the Roadway and assign the AMF(s) and Watchman/Lookout(s).
2. The RWIC will contact ROCC and perform a radio check establishing positive communication.
3. The AMF is required to follow PPE guidelines per the Minimum PPE Standard for On-Track Safety in the MSRPH Section 5 - RWP.
4. In addition to the PPE required, the following equipment is also required when performing the duties of an AMF (reference 5.12.2 of the MSRPH for designated safety equipment and devices for AMF):
 - WMATA Approved Flashing Amber Lantern/E-Flare and Orange Flag
 - WMATA Approved and Certified Working Radio
 - WMATA Approved Air Horn and Whistle
5. Under the direction of the RWIC, the AMF will position themselves at the next station ahead (in the direction the Mobile Crew will be walking). The AMF will take their position at the end of the platform (8 car marker or end gate) in the direction the train is traveling, and on the track the Mobile Work Crew is inspecting.

Section 5 – RWP Rules Ver.1.3

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6. Once the AMF has taken their position on the platform ahead of the Mobile Work Crew, they will turn on and place their Flashing Amber Lantern/E-Flare into its base and position it at the end of the platform (8-car marker or end gate area) in the direction of Rail Vehicle movement, on the track their crew is inspecting or working on. The AMF shall always hold the Orange Flag in their hand while they are on duty.
7. The AMF **MUST** establish positive communication, via WMATA certified radio, to notify the RWIC that they are in place and the Flashing Amber Lantern/E-Flare positioned and Orange Flag in their possession.
8. After receiving confirmation that the AMF is in position, the RWIC will request permission from ROCC to enter the Roadway.
9. The RWIC shall request the location of any Rail Vehicles on the Roadway that may currently be operating or stopped between the station where the AMF is positioned and the station where the Mobile Work Crew is preparing to enter the Roadway.
10. Once ROCC gives the RWIC permission to enter the Roadway, the RWIC will note their "On-Track Time" given by ROCC on their RJSB form.
11. Once ROCC gives permission, and before the Mobile Work Crew enters the Roadway, the RWIC will notify the AMF to begin AMF operations.
12. As the Class 1 or 2 Rail Vehicle approaches, the AMF is to present the Orange Flag toward the Rail Vehicle operator and confirm the Amber Lantern/E-Flare is visible to ensure the Class 1 or Class 2 Vehicle comes to a complete stop at their location.
13. If the AMF hears multiple horn blasts from a Class 1 Rail Vehicle, indicating the vehicle is not planning to service the station, the AMF must make every effort, by continuously give this Hand Signal utilizing the Orange Flag, to stop the approaching vehicle.
14. If **ANY** Rail Vehicle fails to stop at the AMF's location and is proceeding towards the Mobile Work Crew, the AMF must **IMMEDIATELY** contact the RWIC and advise them to clear all personnel from the Roadway; alerting them to the approaching rail vehicle. If the RWIC does not acknowledge the AMF's alarm to the approaching rail vehicle, the AMF shall warn the work crew utilizing their air horn and whistle in short rapid blasts. The incident must also be reported to ROCC, at the first available opportunity, and an investigation by SAFE shall be completed.
15. Once the Rail Vehicle is stopped, the AMF will provide face-to-face instructions to the Rail Vehicle Operator. The AMF shall read the script as follows:

AMF Script to Class 1 or Class 2 Rail Vehicle Operators:

"There may be multiple work groups ahead. Proceed at half your regulated speed until you reach the next station. Continuously blow your horn. Reduce speed to 15 mph when observing and passing all work crews. Current AMF procedures govern you."

16. A cell phone can only be used by the AMF or the Mobile Work crew in an emergency. All other cell phone use on the Roadway will comply with WMATA Electronic Device Policy/Instruction 10.3/5.
17. If the AMF is not in position at the 8-car marker, or a distraction requires them to leave their position, the Roadway-Worker-In-Charge (RWIC) of the Mobile Work Crew must be notified by the assigned AMF and clear the crew from the Roadway prior to the AMF leaving their assigned position. The AMF must never leave their position while the Mobile Work Crew is still on the Roadway.
18. When FT procedures are in effect, the RWIC shall inform the AMF to hold the Rail Vehicle until FT is relinquished and the AMF procedures can resume.
19. Upon entering the Roadway, the RWIC will position Watchman/Lookout(s) a minimum of 50 feet in advance of the Mobile Work Crew.

Section 5 – RWP Rules Ver.1.3

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20. Once the RWIC, with their Mobile Work Crew, reaches the platform where the AMF is set up, the RWIC repeats this process until the tasks of the Mobile Work Crew are complete.



Important: The AMF will not give a Proceed Signal to a rail operator while FT is in effect.

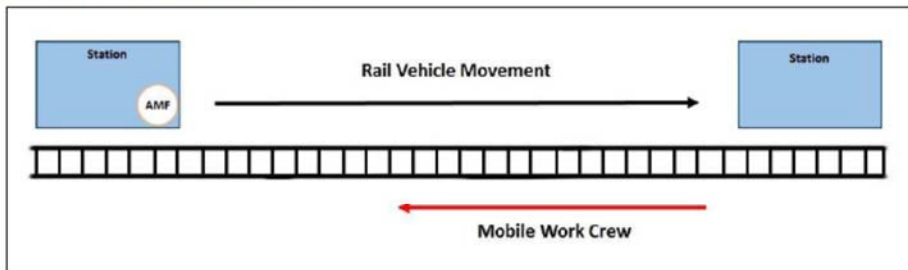


Notice: This procedure will be repeated until the Mobile Work Crew completes their assignment for the day and clears the roadway.

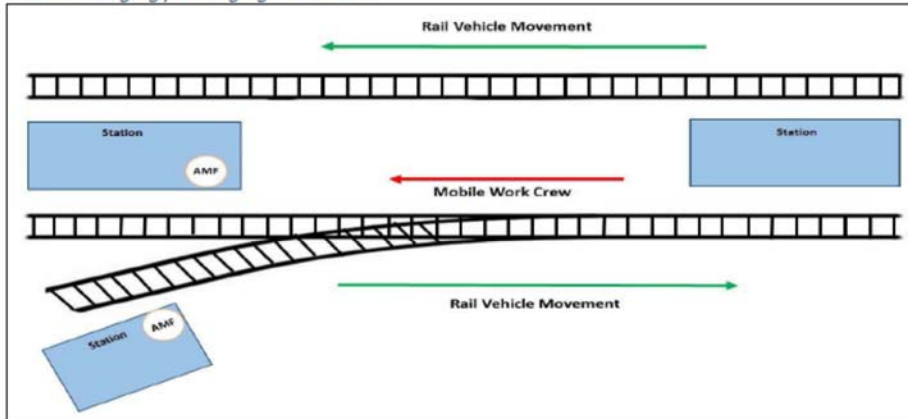


Notice: The Mobile Work Crew has the right to increase their level of protection to FT at any time.

AMF Station to Station movement



AMF Converging / Diverging movement





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AMF Procedures for Locations with Connecting Rail Lines:

- For an inspection commencing at A02 (Farragut North); while walking INBOUND on TRACK #2, **YOU MUST REQUEST FOUL TIME** from the platform at A02 CM A2 38+35, until you call clear on the outbound side of the C&A Connection on TRACK #2 at CM A2 37+10.
- For an inspection commencing at A03 (Dupont Circle); while walking OUTBOUND on TRACK #1, **YOU MUST HAVE TWO AMFs** – ONE at A04 (Woodley Park) and ONE at A03 (Dupont Circle).
- For an inspection commencing at A04 (Woodley Park); while walking INBOUND on TRACK #2, **YOU MUST HAVE TWO AMFs** – ONE at A04 (Woodley Park) and ONE at A03 (Dupont Circle).
- For an inspection commencing at B06 (Fort Totten); while walking INBOUND on TRACK #1, **YOU MUST REQUEST ROCC OPS #1 CONTROLLER TO HOLD ALL MOVEMENTS** from the E-line to the B-line operating through the B&E Connection at CM B1 262+25. This will be until you call clear on the inbound side of the B&E Connection on TRACK #1 at CM B1 262+25.
- For an inspection commencing at C05 (Rosslyn); while walking OUTBOUND on TRACK #1, **YOU MUST REQUEST FOUL TIME** from the platform C05 CM C1 144+75 until you call clear on the outbound side of C05 interlocking CM C1 147+00 on the K-line or C-line TRACK #1.
- For an inspection commencing at C07 (Pentagon); while walking INBOUND on TRACK #2, **YOU MUST REQUEST FOUL TIME** from the platform at C07 CM C2 256+30 until you call clear on the inbound side of C07 Interlocking CM C2 256+10 on the C line or the L-line TRACK #2.
- For an inspection commencing at C13 (King Street); while walking OUTBOUND on TRACK #1, **YOU MUST REQUEST FOUL TIME** from the platform at C13 CM C1 557+75 until you call clear on the outbound side of C97 Interlocking at CM 571+60 on the J line or C-line TRACK #1.
- For an inspection commencing at C14 (Eisenhower Avenue); while walking INBOUND on TRACK #2, **YOU MUST REQUEST FOUL TIME** at C14. CM 592+00.
- For an inspection commencing at D08 (Stadium-Armory); while walking OUTBOUND on TRACK #2, **YOU MUST HAVE TWO AMFs** - ONE at G01 (Benning Road) and ONE at D09 (Minnesota Avenue).
- For an inspection commencing at E07 (West Hyattsville); while walking INBOUND on TRACK #1, **YOU MUST REQUEST ROCC OPS #3 CONTROLLER TO HOLD ALL MOVEMENTS** from the B-line to the E-line operating through the B&E Connection at CM E1 275+50. This will be until you call clear on the inbound side of the B&E connection TRACK #1 CM E1 275+00.
- For an inspection commencing at F03 (L'Enfant Plaza); while walking OUTBOUND on TRACK #1, **YOU MUST REQUEST FOUL TIME** from the platform F03 CM F1 51+25 until you call clear on the outbound side of F03 interlocking on the L-line or F-line TRACK #1.
- For an inspection commencing at K05 (East Falls Church); while walking OUTBOUND on TRACK #1, **YOU MUST HAVE TWO AMFs** - ONE at K06 (West Falls Church) and ONE at N01 (McLean).
- For inspections commencing at terminal stations, **YOU MUST HAVE ONE AMF WITH TWO AMF SETUPS**. An AMF setup is required on both sides of the platform at the terminal station.



Notice: All Chain Markers are approximate. Ensure the Mobile Work Crew is clear of the dynamic envelope of the connecting line before relinquishing Foul Time.

AMF Procedures for Locations where yard lead connects to the roadway:

When AMF Protection is used in areas where yard leads connect to the Roadway between stations, the RWIC will:

Before entering the Roadway, standing by in a Place of Safety, contact the ROCC by radio on the appropriate Ops channel and request AMF protection with canceled signals/prohibited exits at the following locations:

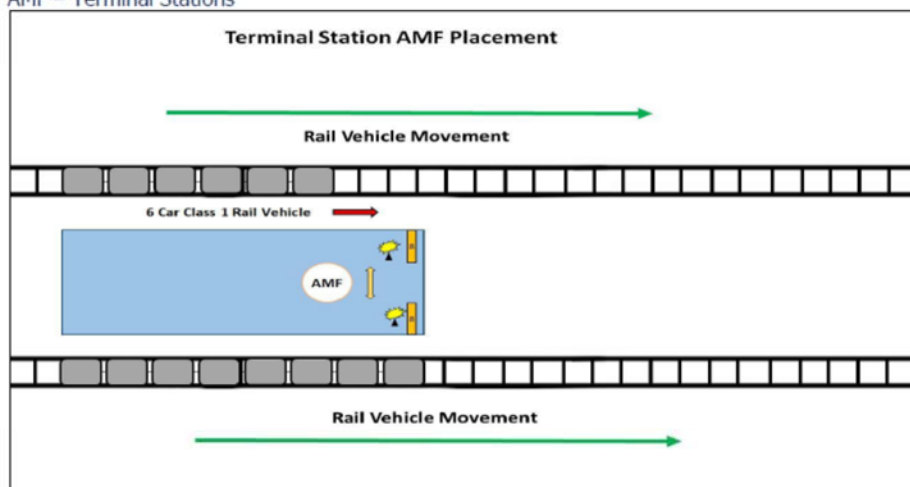
- Brentwood Rail Yard when walking between Rhode Island Ave (B04) and NoMa Gallaudet U (B35) (Red Line)



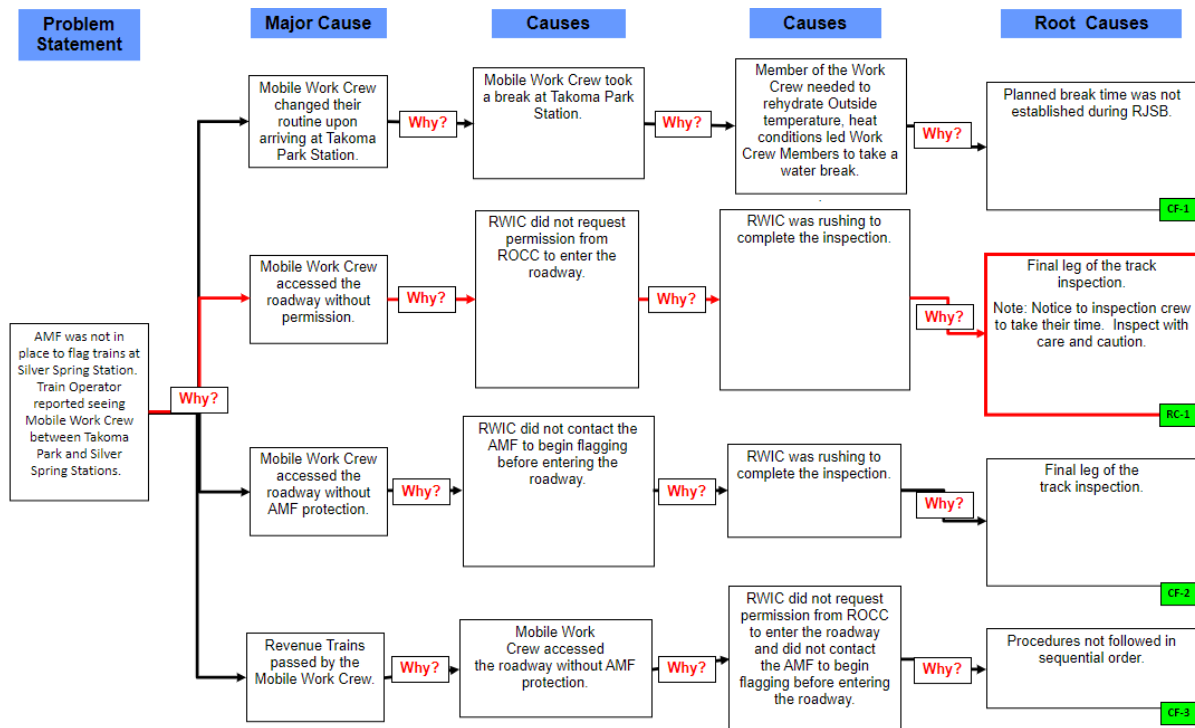
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- Track 1 - cancel signals B99/22, B99/18 and prohibit signals B99/28, B99/16
- Track 2 cancel signals B99/62, B99/38 and prohibit B99/10, B99/36
- Alexandria Rail Yard when walking between Van Dorn Street (J02) and King St. (C13) (Blue Line)
 - Track 1 – cancel signal C98/32 and prohibit signal C98/02
 - Track 2 – cancel signal J01/06 and prohibit signal C98/06
- Alexandria Rail Yard when walking between King St (C13) and Eisenhower (C14) (Yellow Line).
 - Track 1 – cancel signal C14/02
 - Track 2 – cancel signal C14/06
- West Falls Church Rail Yard when walking between McLean (N01) and East Falls Church (K05) (Silver Line)
 - Track 1 - cancel signal N91/34 and prohibit N91/26
 - Track 2 - cancel signal N91/34 and prohibit N91/30
- West Falls Church Rail Yard when walking between West Falls Church (K06) and Dunn Loring (K07)
 - Track 1 – cancel signal K06/34, K06/18 and prohibit K06/26, K06/28
 - Track 2 – cancel signal K06/22 and prohibit signal K06/32

AMF – Terminal Stations



Appendix C – Root Cause Analysis



Root Cause Analysis

