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W-0396 – Derailment – near Ronald Reagan National Airport Station – April 16, 2024

Document Purpose:

This WMSC written report on WMATA Metrorail's safety event investigations and review of Metrorail's findings in accordance with the WMSC Program Standard, in conjunction with the attached Metrorail investigation reports that have undergone WMSC staff review and, if necessary, feedback and revision, describes the investigation activities, identifies factors causing or contributing to the safety events, and sets forth ongoing, additional, or upcoming corrective actions and further oversight work (such as inspections and audits) as necessary or appropriate. The WMSC's ongoing oversight during the investigative process, including safety event reporting and verification, participation in investigative interviews, data review, consistent communication with the Metrorail investigations team, and feedback on Metrorail's reports leads to further improvements prior to consideration of the reports by WMSC Commissioners for adoption. The WMSC's safety event investigation oversight assures the sufficiency and thoroughness of Metrorail's investigations. The WMSC Commissioners are considering these documents (the WMSC review and Metrorail's investigation reports) as a unified item for adoption at the Washington Metrorail Safety Commission meeting on September 16, 2025.

WMSC staff recommend adoption of this investigation.

In 2024, Metrorail reported 3 derailments, a decrease from the 7 reported in 2023. Of the 2023 derailments, one (1) involved a passenger occupied train and six (6) involved roadway maintenance machines (RMM). All 2024 derailment events involved RMMs.

Roadway Maintenance Machines

The WMSC's audit of Metrorail's Maintenance Machine Program, issued on October 18, 2023, demonstrated that while Metrorail has made improvements to its RMM program, Metrorail is not effectively tracking and mitigating hazards related to RMM maintenance and operations. Metrorail has developed, and the WMSC has approved corrective action plans to address the audit's five findings and six recommendations. The WMSC continues to review deliverables for these corrective action plans, which have scheduled completion dates through December 2025, and will conduct oversight activities even after the CAPs are closed to ensure the improvements made continue.

Safety event summary:

On Tuesday, April 16, 2024, while traveling in a convoy with three other roadway maintenance machines (RMMs) to Ronald Reagan National Airport Station to be used for scheduled track maintenance, Tie Remover and Inserter or TRIPP (TR-05) derailed as the Equipment Operator tried to negotiate an incline and curve while switching to an improper mode of operation.

As the Equipment Operator began to negotiate the 4% incline on the 800-foot curve between Crystal City and Ronald Reagan National Airport stations, the unit began to lose traction propulsion. To regain traction, the Equipment Operator switched from Travel mode, the required mode of operation while transporting the vehicle, to Work mode. In Work mode, the unit is lowered closer to the track, allowing for increased stability and traction. At 1:21 a.m., after regaining power traction and continuing through the curve at speeds no greater than 5 miles per hour, the front wheel of the unit came off the track, causing the unit to derail, making contact with the third rail insulator and coverboard before coming to rest. At 1:24 a.m., TR-05's Equipment Operator reported the derailment to the Button Rail Traffic Controller in the

Control Center via phone. The Button Rail Traffic Controller contacted the Roadway Worker in Charge (RWIC) to inquire about the derailment, to which the RWIC responded they were unaware of. At 1:26 a.m., the Equipment Operator confirmed the derailment via radio to the Radio Rail Traffic Controller. At 1:31 a.m., approximately 7 minutes after the derailment was reported, the Radio Rail Traffic Controller inquired with the RWIC if there were any injuries. There were no injuries reported as a result of the derailment. At 1:38 a.m., the RWIC notified the Radio Rail Traffic Controller that TR-05 contacted the third rail, which had already been de-energized due to the area being part of a work location. The RWIC stated they would be using a hot stick to confirm that power was de-energized. After third rail power was confirmed to be down, the RWIC was instructed by the Radio Rail Traffic Controller to stand clear of the roadway.

At 3:25 a.m., Prime Mover (PM 37) was sent to rerail TR-05. At 3:34 a.m., Power personnel were dispatched to the scene of the derailment outside of Ronald Reagan National Airport Station to inspect for damage to the third rail before power was restored. TR-05 was rerailed at 3:46 a.m. and towed at 4:10 a.m. by PM 37 to Alexandria Rail Yard after a track inspection had been performed. A test train was used to ensure the involved section of track was safe for passenger service.

TR-05's Equipment Operator was removed from service for post-incident inspection and TR-05 underwent inspection.

Post-derailment vehicle inspection

Contributing factors to this event were determined to be a design flaw that makes the TRIPP Machines unable to navigate the steep inclines/declines, tight radius and spirals that are present in WMATA's system. This issue was been identified in all four TRIPP Machines on WMATA property.

Investigation W-0396 led to specific corrective actions including:

- Metrorail created, completed and closed Equipment Configuration Change (ECC) 2406022 to increase the displacement and torque on the hydraulic drive motors. Installation was completed on TRIPPs TR04, TR05, TR06 and TR07.
- Metrorail reviewed installing on-board camera/DVR and data logging systems

Related Open corrective actions:

- CAP C-0241 addresses the finding that Metrorail is not effectively tracking and mitigating hazards related to RMM maintenance and operations in accordance with its PTASP (Scheduled completion date February 2026).
- CAP C-0243 addresses the finding that Metrorail does not have a process and assigned resources to inspect and maintain the hi-rail gear or hi-rail vehicles owned by WMATA as required to ensure the vehicles' safe operation (Currently under review for closure)
- CAP C-0244 addresses the finding that Metrorail is not reviewing its RMM-related procedures as required (Scheduled completion date September 2025).

Washington Metropolitan Area Transit Authority
Department of Safety (SAFE)
Office of Safety Investigations (OSI)

FINAL REPORT OF INVESTIGATION A&I E24301

Date of Event:	04/16/2024
Type of Event:	A5: Derailment
Incident Time:	01:24 hours
Location:	Reagan National Airport Station, Track 2, CM C2 354+00
Time and How received by SAFE:	01:28 hours
WMSC Notification Time:	02:44 hours
Responding Safety Officers:	Office of Safety Investigations (OSI)
Rail Vehicle:	TR-05 Nordco Tie Remover and Inserter (TRIPP Machine)
Injuries:	None
Damage:	Minor damage to Third Rail Cover Board, Insulators, and Running Rail
Emergency Responders:	Metro Transit Police Department (MTPD)
SMS I/A Incident Number:	20240416#116191

National Airport – Derailment

April 16, 2024

Table of Contents

Abbreviations and Acronyms

AIMS	Advanced Information Management System
AOM	Assistant Operations Manager
ARS	Audio Recording System
ATCM	Office of Automatic Train Control Maintenance
CAP	Corrective Action Plan
CCTV	Closed-Circuit Television
CENV	Office of Vehicle Program Services
CM	Chain Marker
CMNT	Office of Car Maintenance
CMOR	Office of the Chief Mechanical Officer
CTEM	Car Track Equipment Maintenance
ERT	Emergency Response Team
ESR	Event Scene Release
GOTRS	General Orders and Track Rights System
IIT	Incident Investigation Team
ITSS	Office of Information Technology Systems & Software
MAC	Mission Assurance Coordinator
MICC	Metro Integrated Command and Communications Center
MOC	Maintenance Operations Center
MOR	Metrorail Operating Rulebook
MOWE	Maintenance of Way Engineering
MTPD	Metro Transit Police Department
NOAA	National Oceanic and Atmospheric Administration
OM	Operations Manager
OSI	Office of Safety Investigations
POD	Point of Derailment
PM	Prime Mover
RMM	Rail Maintenance Machines or Class 2 Vehicles
RTC	Rail Traffic Controller
RTRA	Office of Rail Transportation
RWIC	Roadway Worker In Charge
SAFE	Department of Safety
SMS	Safety Measurement System
ST	Spot Tamper
TC	Tie Crane
TR	Tie Remover/Inserter
TGV	Track Geometry Vehicle
TRST	Office of Track and Structures
VMDS	Vehicle Monitoring and Diagnostic System
WMATA	Washington Metropolitan Area Transit Authority
WMSC	Washington Metrorail Safety Commission

Executive Summary

**Note that all times listed are approximate and may contain minor variations due to differences between systems of record. **

On Tuesday, April 16, 2024, at 00:30 hours, Tie Remover and Inserter TR-05 (TRIPP Machine[1]), a Rail Maintenance Machine (RMM), was traveling to the National Airport Station from Alexandria Yard for scheduled roadway maintenance.

As the Office of Track and Structures (TRST) Equipment Operator AA of TR-05 navigated a four percent (4%) incline on an 800-foot curve on track 2 from Crystal City Station to National Airport Station in the forward position, the RMM began to lose traction propulsion. The Equipment Operator switched from "Travel" mode to "Work" mode[2]. The RMM regained traction power and continued navigating the curve at speeds of no more than 5 (Miles Per Hour) MPH. As the RMM was exiting the spiral to tangent track, the front wheels of the RMM derailed near Chain Marker (CM) C2 354+00.

At 01:24 hours, the Equipment Operator AA of TR-05 notified via phone the Metro Integrated Command and Communications Center (MICC) OPS 3 Button Rail Traffic Controller (RTC) to report that the unit derailed near CM C2 354+00.

At 01:25 hours, the Radio RTC contacted the Roadway Worker In Charge (RWIC[3]) to ask if TR-05 had derailed at Reagan National Airport Station. The RWIC informed the MICC that they had no knowledge of a derailment and would investigate.

At 01:26 hours, the Equipment Operator of TR-05 confirmed that their unit derailed outside the platform limits near Chain Marker (CM) C2 354+00. The left front wheel made contact with a third rail insulator and coverboard.

It should be noted that the Advanced Information Management System (AIMS) log displayed that third rail power was de-energized between National Airport Station and Crystal City Station at 01:21 hours for scheduled roadwork before the derailment.

The MICC notified all appropriate personnel. TRST Emergency Response Team (ERT), Car Track Equipment Maintenance (CTEM), Rail Fleet, and Safety Investigations responded. At 03:30 hours, Safety Investigations released the scene, and measures were taken to rerail the RMM.

At 03:52 hours, TR-05 was successfully rerailed. Prime Mover (PM) 37 towed the unit to Alexandria Yard and held it for a post-incident inspection. Tracks 1 and 2 were inspected, a test train was sent through the incident location, and at 04:11 hours, it was determined that both tracks were good for revenue service.

The probable cause of the derailment at National Airport Station on April 16, 2024, was due to a design issue of the TRIPP Machines. Specifically, TR05 was not designed to navigate the steep

[1] A TRIPP Machine is Class 2 work vehicle with a wheelbase of 314 inches and a single axel design.
[2] TRIPP Machines have an air suspension that is inflated in "travel mode" and deflated in "work mode." The speed in travel mode must not exceed 15 MPH, and the speed in work mode must not exceed 5 MPH.
[3] The Roadway Worker In Charge is a qualified employee who is responsible for establishing on-track safety for roadway work crews and lone workers who are qualified to establish on-track safety for themselves.

inclines/declines, tight radius, superelevation, and spirals of the WMATA rail system. To increase the torque to the wheels, CENV reconfigured and added additional traction motors to the TRIPP machines to assist with navigating WMATA's rail system, but there are still challenges navigating in travel mode.

Following the derailment, a post-inspection by Car Track Equipment Maintenance (CTEM) revealed a minor hydraulic seal leak at the rear drive motor. However, this issue was determined not to be a contributing factor to the derailment.

Vehicle Program Services within Rail Fleet are currently exploring options to enhance torque supply to the RMM wheels, aiming to eliminate the need for entering work mode outside designated work areas.

Incident Site

National Airport Station Chain Marker (CM) C2 354+00

Field Sketch/Schematics

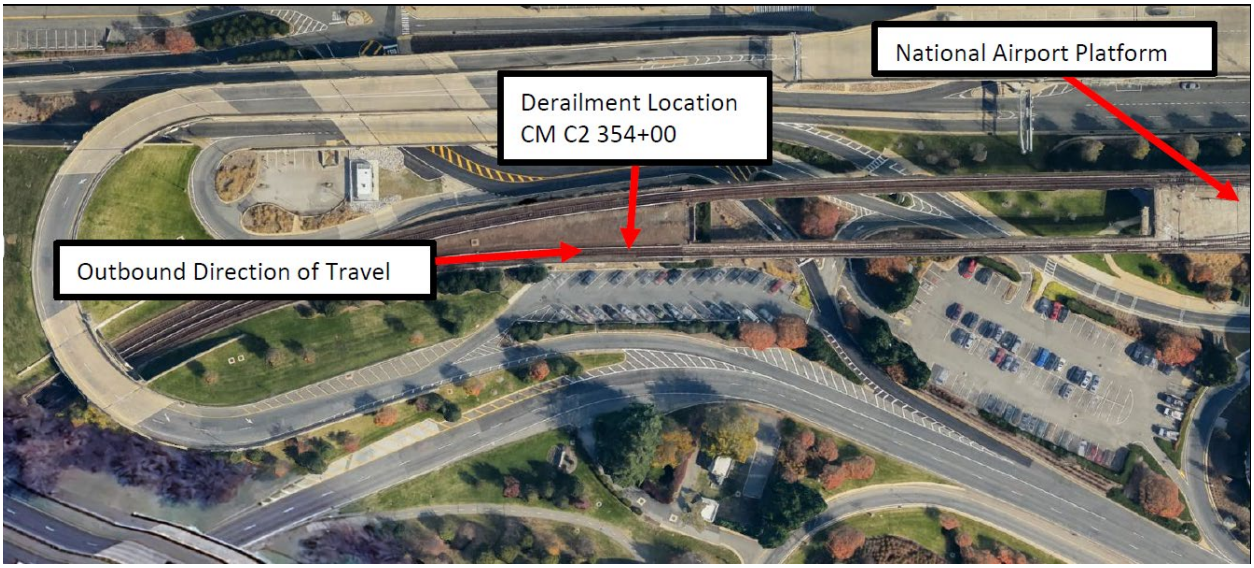


Figure 1 - Aerial view of derailment location

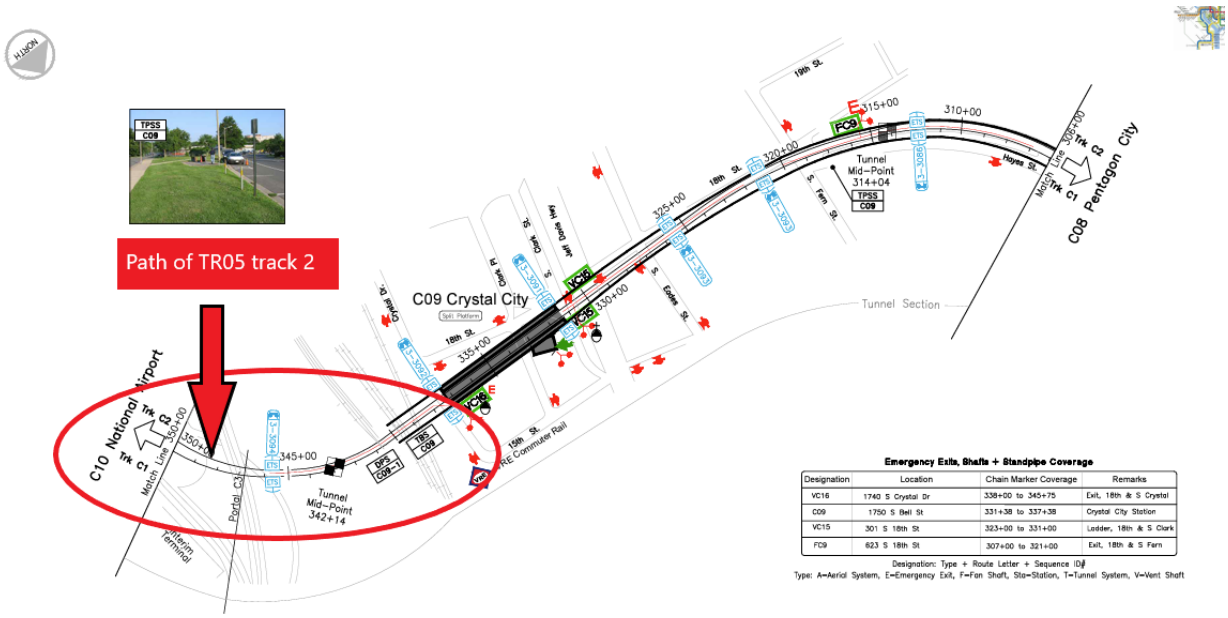


Figure 2 - Path of travel for TR-05 at Crystal City (C09), track 2 towards National Airport (C10)

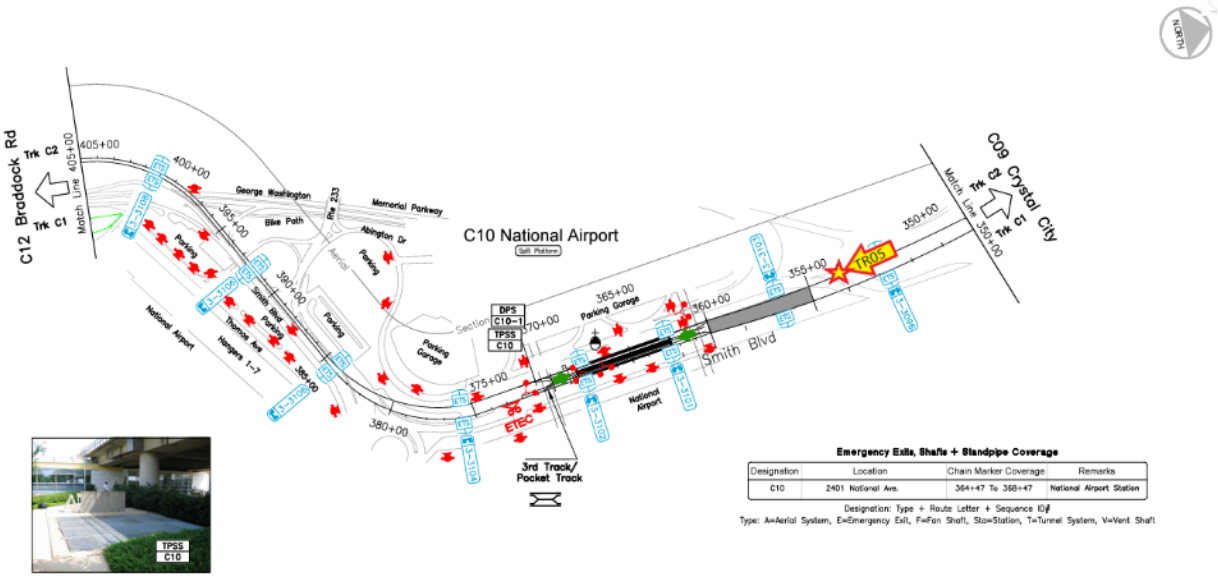


Figure 3 - Field sketch of the location where TR-05 derailed in approach to National Airport Track 2 platform limits.

The above depiction is not to scale.

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:

- Physical Site Assessment

- Formal Interviews – SAFE interviewed one (1) individual as part of this investigation. The interview included persons present at, during, and after the incident, those directly involved in the response process, and representatives from the Washington Metrorail Safety Commission (WMSC). SAFE interviewed the following individual:

    - Equipment Operator AA

- Documentation Review – Collection of relevant work history information and process documentation contained in WMATA systems of record. These records include:
    - Metrorail Operating Rulebook (MOR)
    - National Oceanic and Atmospheric Administration (NOAA)
    - 30 Day Work History
    - Preventive Maintenance Manual Nordco Tie Remover/Inserter Machine Review
    - Car Track Equipment Maintenance (CTEM) Inspection Data Review [Pending]
    - Office of Track and Structures (TRST) Inspection Data Review
    - Maintenance of Way Engineering (MOWE), Track Engineering Analysis Report
    - Office of IT Systems & Software (ITSS) Data Review
    - Rail Operations Center (ROC) Approved Incident Report
    - Maximo Data
    - General Orders & Track Rights System (GOTRS)

- System Data Recording Review – Collection of information contained in Metro Data Recording Systems. This data includes:
    - Audio Recording System (ARS) playback [Radio and Landline Communications]
    - Vehicle Program Services, Rail Fleet Vehicle Monitoring and Diagnostic System (VMDS) log
    - Closed-Circuit Television (CCTV)
    - AIMS playback

Investigation

On Monday, April 15, 2024, at 23:58 hours, the TRST Supervisor (herein known as the RWIC) contacted the MICC OPS 3 RTC to request a Supervisory Outage under ETO protection on track 1, CM C1 338+00 to 361+00 and a Red Tag Outage on track 2, under ETO protection from CM C2 339+24 to 370+20 and informed the RTC that their four (4) unit convoy with PM-37, TC-04, TR-05, and ST-04 was leaving Alexandria Yard enroute to National Airport Station.

Figure 4 - TRIPP Machine

M REAL TIME EVENTS | AIM REAL TIME ALARMS | AIM REAL TIME TABULAR | **AIM EVENTS HISTORY**

Tue Apr 16 01:21:40 EDT 2024	Crystal	City C09-34 DC Feeder Tie Breaker COMMANDED Prohibit Close BY SYSTEM AT vasc-hostapva	Yb	LAZY	1-EVT
Tue Apr 16 01:21:40 EDT 2024	Crystal	City C09-34 DC Feeder Tie Breaker CURRENT STATE = Tripped	Yb	LAZY	3-MAJ
Tue Apr 16 01:21:39 EDT 2024	National	Arpt C10-C32A Third Rail Power CURRENT STATE = Deenergize	Yb	LAZY	1-EVT
Tue Apr 16 01:21:39 EDT 2024	Crystal	City C09-C30 Third Rail Power CURRENT STATE = Deenergize	Yb	LAZY	1-EVT
Tue Apr 16 01:21:39 EDT 2024	National	Arpt C10-36 DC Feeder Tie Breaker COMMANDED Prohibit Close BY SYSTEM AT vasc-hostapva	Yb	LAZY	1-EVT
Tue Apr 16 01:21:39 EDT 2024	National	Arpt C10-36 DC Feeder Tie Breaker CURRENT STATE = Tripped	Yb	LAZY	3-MAJ
Tue Apr 16 01:21:39 EDT 2024	National	Arpt C10-32 DC Feeder Tie Breaker COMMANDED Prohibit Close BY SYSTEM AT vasc-hostapva	Yb	LAZY	1-EVT
Tue Apr 16 01:21:39 EDT 2024	National	Arpt C10-32 DC Feeder Tie Breaker CURRENT STATE = Tripped	Yb	LAZY	3-MAJ
Tue Apr 16 01:21:39 EDT 2024	Crystal	City C09-33 DC Feeder Tie Breaker CURRENT STATE = Tripped	Yb	LAZY	3-MAJ
Tue Apr 16 01:21:39 EDT 2024	Crystal	City C09-33 DC Feeder Tie Breaker COMMANDED Prohibit Close BY SYSTEM AT vasc-hostapva	Yb	LAZY	1-EVT
Tue Apr 16 01:21:39 EDT 2024	Crystal	City C09-42 DC Feeder Tie Breaker CURRENT STATE = Tripped	Yb	LAZY	3-MAJ
Tue Apr 16 01:21:39 EDT 2024	Crystal	City C09-46 DC Feeder Tie Breaker CURRENT STATE = Racked Out	Yb	LAZY	4-MIN
Tue Apr 16 01:21:39 EDT 2024	Crystal	City C09-C30A Third Rail Power CURRENT STATE = Deenergize	Yb	LAZY	1-EVT
Tue Apr 16 01:21:39 EDT 2024	Crystal	City C09-42 DC Feeder Tie Breaker COMMANDED Prohibit Close BY SYSTEM AT vasc-hostapva	Yb	LAZY	1-EVT

Figure 5 – AIMS log depicting Third Rail Power de-energized and Tie Breakers Prohibit Closed between National Airport Station and Crystal City Station at 01:21 hours.

The scheduled work was to address gauge defects between Crystal City and National Airport.

Track	Start Location	End Location	DESCRIPTION	START_DATE	Problem Code	VALUE	LENGTH	Condition Rating	EAM Repeat Defect
TC2	351 + 70	351 + 94	Gage Wide	4/2/2024	D26-OUT OF GAUGE	57.65	26	Red	YES
TC2	349 + 97	350 + 19	Gage Wide	4/2/2024	D26-OUT OF GAUGE	57.567	23	Red	NO
TC2	349 + 46	349 + 81	Gage Wide	4/2/2024	D26-OUT OF GAUGE	57.758	36	Red	NO
TC2	349 + 31	349 + 60	Gage Change	4/2/2024	D26-OUT OF GAUGE	0.895	29	Red	YES
TC2	351 + 56	351 + 77	Gage Change	4/2/2024	D26-OUT OF GAUGE	0.767	22	Red	YES
TC2	350 + 68	350 + 79	Gage Wide	4/2/2024	D26-OUT OF GAUGE	57.518	12	Red	NO
TC2	350 + 35	350 + 44	Gage Wide	4/2/2024	D26-OUT OF GAUGE	57.435	10	Yellow	YES
TC2	346 + 97	347 + 08	Gage Wide	4/2/2024	D26-OUT OF GAUGE	57.346	12	Yellow	YES
TC2	348 + 38	348 + 48	Gage Wide	4/2/2024	D26-OUT OF GAUGE	57.368	11	Yellow	NO
TC2	351 + 20	351 + 33	Gage Wide	4/2/2024	D26-OUT OF GAUGE	57.312	14	Yellow	YES

Figure 6 - Track Geometry Vehicle (TGV) Report from April 2, 2024

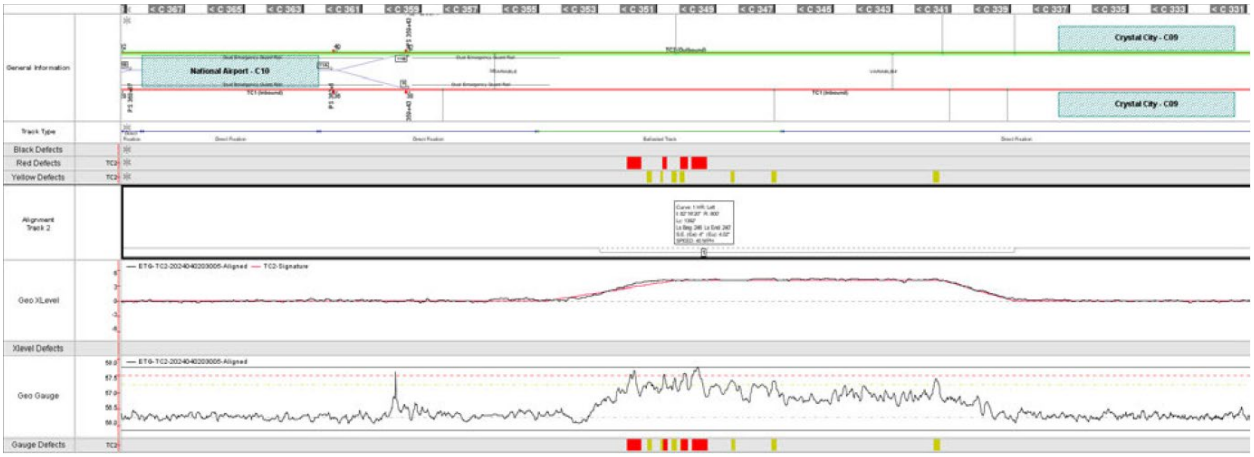


Figure 7 -TGV Report from April 2, 2024

At 01:24 hours, the Equipment Operator AA of TR-05 contacted the Metro Integrated Command and Communications Center (MICC) OPS 3 Button Rail Traffic Controller (RTC) via phone to report the unit derailed near CM C2 354+00.

At 01:25 hours, the MICC RTC contacted the RWIC to ask if TR-05 had derailed at National Airport Station. The RWIC informed the MICC that they had no knowledge of a derailment and would investigate.

At 01:26 hours, the Equipment Operator AA of TR-05 conducted an inspection and confirmed that the unit derailed outside the platform limits near CM C2 354+00. The left front wheel made contact with a de-energized third rail insulator and coverboard. The RWIC verified that no injuries were reported and provided an update to the MICC AOM. The MICC notified all appropriate personnel. TRST ERT, CTEM, Rail Fleet, and Safety Investigations responded.

At 01:38 hours, the RWIC received permission and proceeded to hot stick in order to confirm that the third rail power was de-energized. The scheduled roadwork was placed on delay by the RTC.

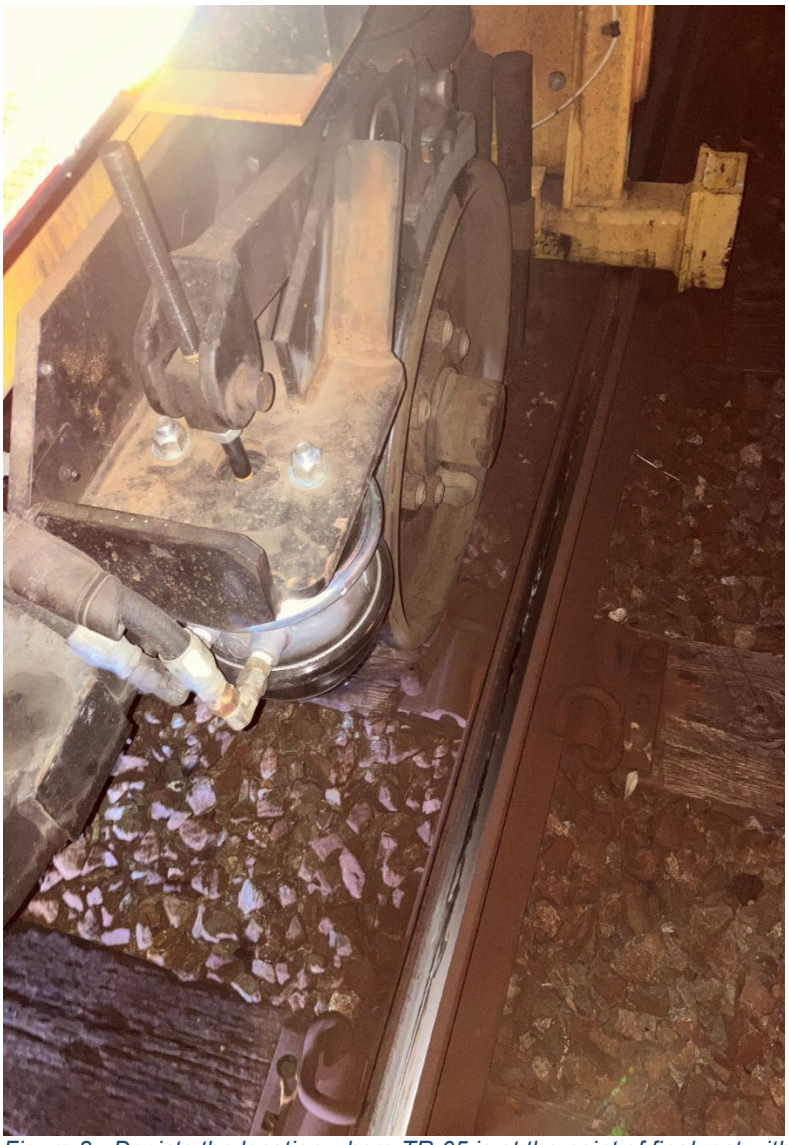


Figure 8 - Depicts the location where TR-05 is at the point of final rest with the front wheel off of the running rail.

At 03:30, Safety Investigations released the scene, and measures were taken to rerail the RMM. At 03:34 hours, the MICC requested that Power personnel respond to the National Airport to inspect damages before the third rail power was restored.

At 03:52 hours, TR-05 was successfully rerailed. PM 37 towed the unit to Alexandria Yard and held it for a post-incident inspection. ERT personnel inspected tracks 1 and 2, and a test train was sent through the incident location. At 04:11 hours, ERT reported both tracks were good for revenue service.

Chronological Event Timeline

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

Time	Description
	Monday, April 15, 2024
23:18:04 hours	**TR-05 Equipment Operator**: Contacted Alexandria Tower Interlocking Operator. **Interlocking Operator**: Instructed TR-05 Equipment Operator to standby [Alex Yard Radio]
23:19:19 hours	**Interlocking Operator**: Radioed to TR-04 Equipment Operator **TR-05 Equipment Operator**: Stated they had TR-05 replacing TR-04[4]. They were ready to enter the mainline once they looped around. They were going to National Airport, track 2, by way of Crystal City Station. [Alex Yard Radio]
23:45:42 hours	**RWIC**: Requested a Supervisory Outage, track 1, C09 to C10 between Chain Markers (CM) 343+00 to 356+00, using ETO Protection. Also requesting a Red Tag Outage on track 2, under ETO Protection from CM C2 344+24 to 365+20 **Radio RTC**: Informed the RWIC that they inherited the General Order and were the junior (piggybacking). The RTC requested the main Chain Markers of their protected area. **RWIC**: Asked the RTC to repeat the message. **Radio RTC**: Informed the RWIC that they inherited the General Order and needed the Chain Markers for the original location's protected area. **RWIC**: Stated they would get back with that information shortly [OPS 3 Radio]

[4] TR-04 was out of service due to an issue with the left rail lift cylinder.

Drafted By: SAFE 708 - 05/05/2024
Reviewed By: SAFE 704 - 06/25/2024
Approved By: SAFE 707 – 06/26/2024

Time	Description
23:48:07 hours	**RWIC**: Radioed for the MICC **Radio RTC**: Asked the RWIC how the four units in the convoy should be lined up and where were the vehicles coming from **RWIC**: Stated PM 37 would be the only unit on track 1. ST-04, TR-04, and TC-04 on track 2. **Radio RTC**: Asked the RWIC what station should PM 37 be located. **RWIC**: Stated National Airport, track 1 **Radio RTC**: Repeated PM 37 would be on track 1 and asked the RWIC where did they want ST-04, TR-04 and TC-04 located. **RWIC**: Stated they would be on track 2 **Radio RTC**: Asked if the RMMs would be placed in that order, with TR-04 on the Huntington end and TC-04 on the Downtown end. **RWIC**: Stated ST-04 should be on the Downtown end and TC-04 on the Huntington end. **Radio RTC**: Repeated ST-04 should be on the Downtown end and TC-04 on the Huntington end and added that TR-04 should be the center vehicle. **RWIC**: Replied affirmative. **Radio RTC**: Asked the RWIC to confirm the chain markers for the work zone that they inherited. [OPS 3 Radio]
23:50:08 hours	**CMNT**: Called off duty at National Airport **Radio RTC**: Acknowledged message. **Radio RTC**: Stated to TU 646 that they see they have PM37, ST-04, and TC-04 coming out of C99 (Alexandria Yard). The RTC asked what location was TR-04 was coming from. **RWIC**: Stated TR-04 was also coming from Alexandria Yard **Radio RTC**: Replied Affirmatively and stated they were waiting for the RWIC's request to put it into GOTRS **RWIC**: Request a Supervisory Outage under ETO protection on track 1, CM 270+2 to 315+56, and a Red Tag Outage on track 2, CM 339+24 to 370+20 **Radio RTC**: Replied that the chain markers given did not correspond to the chain markers that were in GOTRS **RWIC**: Stated that they would check once again [OPS 3 Radio]
23:54:28 hours	**RWIC**: Stated to Central they were requesting a Supervisory Outage under ETO protection on track 1, C1 338+00 to 361+00, and requested a Red Tag Outage on track 2, under ETO Protection from 339+24 to 370+20 **Radio RTC**: Instructed the RWIC to call the MICC via landline [OPS 3 Radio]

Time	Description
23:55:49 hours	**Button RTC**: Informed the RWIC that when they inherit the entire General Order, they must provide the chain markers for the entire work zone, not just their section of the work location. The RTC stated the chain markers 370 to … **RWIC**: Stated 330+20 **Button RTC**: Stated yes, to 285 and informed the RWIC that these were the Chain Markers requested by the Radio RTC, not the chain markers for their work location. **RWIC**: Stated [inaudible] 339+24 to 330+20 on track 2, C2. **Button RTC**: informed the RWIC that the work zone started at CM 285+24. The RTC continued to explain which chain markers were in the original work zone. Track 1 CM 285+24 to 371+14 and Track 2 CM 285+24 to 370+20 [Yellow/Green 2 Phone][GOTRS]
Tuesday, April 16, 2024	
00:06:31 hours	**Button RTC**: Instructed the Alexandria Tower Interlocking Operator to line up ST-04 as the lead, TR-05, TC-04, and PM 37 at the trailing end. [Yellow/Green 2 Phone]
00:14:44 hours	**Radio RTC**: Informed the RWIC that a red tag power outage was granted under ETO protection at C1 285+24 to 371+14 and C2 285+24 to 370+20. The Radio RTC confirmed the RWIC was operating PM 37 and TC-04, TR-05, and ST-04 were the RMMs in the convoy, leaving from Alexandria Yard. [OPS 3 Radio]
00:32:20 hours	**Radio RTC**: Instructed ST-04 Equipment Operator to verify the lunar aspect at C98-36 signal and granted an absolute block to Potomac Yard, track 1. **ST-04 Equipment Operator**: Acknowledge the message with 100% repeat back. [OPS 3 Radio]
00:33:35 hours	**Radio RTC**: Shortened the ST-04's absolute block to signal C97-12, displaying a red aspect. **ST-04 Equipment Operator**: Acknowledged the transmission with 100% repeat back and stated the convoy had cleared signal C98-02. [OPS 3 Radio]
00:36:40 hours	**ST-04 Equipment Operator**: Stated they were stopped at signal C97-12, displaying a red aspect. [OPS 3 Radio]
00:38:08 hours	**Radio RTC**: Instructed TR-05 Equipment Operator to verify the lunar signal at C98-36 and granted an absolute block of no closer than 10 feet of the unit ahead, clearing signal C98-02. They informed the TR-05 Equipment Operator that ST-04 was holding at signal C97-12, displaying a red aspect. **TR-05 Equipment Operator**: Acknowledged the transmission with 100% repeat back. [OPS 3 Radio]

Time	Description
00:39:23 hours	**TR-05 Equipment Operator**: Stated they cleared signal C98-02. **Radio RTC**: Acknowledged the message. They then asked ST-04 Equipment Operator if they were comfortable leading the convoy. **ST-04 Equipment Operator**: Stated they felt comfortable leading the convoy. **Radio RTC**: Acknowledged the message. They then asked TR-05 Equipment Operator if they were comfortable being the middle vehicle in the convoy. **TR-05 Equipment Operator**: Stated they were comfortable the second vehicle in the convoy. **Radio RTC**: Acknowledged the message. They then asked TC-04 Equipment Operator if they were at signal C98-36. **TC-04 Equipment Operator**: Acknowledged the message. **Radio RTC**: Asked TC-04 Equipment Operator if they were comfortable being the trailing vehicle in the convoy. **TC-04 Equipment Operator**: Acknowledged the message and stated they were comfortable being the trailing vehicle in the convoy. **Radio RTC**: Acknowledged the message and instructed the convoy to keep a safe following distance, do not pass any red signals, and granted a permissive block to King Street, track 1. **ST-04 Equipment Operator**: Acknowledged the message with 100% repeat back. [OPS 3 Radio]
00:40:07 hours	**Radio RTC**: Instructed ST-04, TR-05, and TC-04 to maintain a safe following distance and not pass any red signals. The Radio RTC granted a convoy block to King Street Station, track 1. [OPS 3 Radio]
00:43:03 hours	**Radio RTC**: Granted ST-04, TR-05, and TC-04 a convoy block to Braddock Road Station, track 1, and informed them that signal C12-02 was displaying a red aspect. **ST-04 Equipment Operator**: Acknowledged the message with 100% repeat back. **TC-04 Equipment Operator**: Stated the convoy cleared signal C97-02. **Radio RTC**: Acknowledged the message with 100% repeat back. [OPS 3 Radio]
00:46:13 hours	**TC-04 Equipment Operator**: Stated the convoy had cleared King Street Station, track 1. **Radio RTC**: Acknowledged the message and granted PM 37 holding at signal C98-37 and absolute block to King Street Station, track 1. **ST-04 Equipment Operator**: Acknowledged the message with 100% repeat back. [OPS 3 Radio]
00:47:27 hours	**RWIC**: Stated they were holding at signal C98-02. **Radio RTC**: Acknowledged the message and informed ST-04, TR-05 and TC-04 that they would be receiving a lunar signal shortly. [OPS 3 Radio]

Drafted By: SAFE 708 - 05/05/2024
Reviewed By: SAFE 704 - 06/25/2024
Approved By: SAFE 707 – 06/26/2024

Time	Description
00:48:33 hours	**Radio RTC**: Granted ST-04, TR-05, and TC-04 a convoy block to Pentagon City Station, track 1. **ST-04 Equipment Operator**: Acknowledged the message with 100% repeat back. [OPS 3 Radio]
00:49:30 hours	**Radio RTC**: Granted ST-04, TR-05, and TC-04 a convoy block to Pentagon City Station, clearing signal C08-04. **ST-04 Equipment Operator**: Acknowledged the message with 100% repeat back. [OPS 3 Radio]
00:50:00 hours	**RWIC**: Stated they were held at King Street Station, track 1. [OPS 3 Radio]
00:51:01 hours	**Radio RTC**: Asked the convoy if they were comfortable with PM 37 joining the convoy. **ST-04 Equipment Operator**: Stated they were comfortable with PM 37 joining the convoy. **Radio RTC**: Asked PM 37 if they were comfortable being the trailing unit in the convoy. **Radio RTC**: Stated the convoy would be ST-04, TR-05, TC-04, and PM 37 in a convoy block to Reagan National Airport Station, track 1. PM 37 would drop off from the convoy and ST-04, TR-05, and TC-04 would continue in a convoy to Pentagon City Station signal C08-04. [OPS 3 Radio]
00:56:05 hours	**RWIC**: Acknowledged they were the trailing unit in the convoy to Reagan National Airport Station, track 1. [OPS 3 Radio]
00:57:29 hours	**TC-04 Equipment Operator**: Stated the convoy had cleared Potomac Yard Station, track 1. **Radio RTC**: Acknowledge the message. [OPS 3 Radio]
01:05:36 hours	**TC-04 Equipment Operator**: Stated the convoy had cleared signal C10-38 track 1. **Radio RTC**: Acknowledge the message. [OPS 3 Radio]
01:06:31 hours	**RWIC**: Stated PM 37 was held at Reagan National Airport Station on track 1. **Radio RTC**: Acknowledge the message. [OPS 3 Radio]
1:08:06 hours	**TC-04 Equipment Operator**: Stated the convoy had cleared Crystal City Station, track 1. [OPS 3 Radio]

Time	Description
01:09:16 hours	**Radio RTC**: Informed the convoy once they had cleared signal C08-04 at Pentagon City Station, TC-04 would be the lead RMM in the convoy. **Radio RTC**: Asked TC-04 Equipment Operator if they were comfortable being the lead unit in the convoy. **TC-04 Equipment Operator**: Stated that were comfortable being the lead unit in the convoy. **Radio RTC**: Asked TR-05 Equipment Operator if they were comfortable being the second unit in the convoy. **TR-05 Equipment Operator**: Stated that were comfortable being the second unit in the convoy. **Radio RTC**: Asked ST-04 Equipment Operator if they were comfortable being the trailing unit in the convoy. **ST-04 Equipment Operator**: Stated that were comfortable being the trailing unit in the convoy. **Radio RTC**: Acknowledged the message. [OPS 3 Radio]
01:12:18 hours	**TC-04 Equipment Operator**: Stated the convoy had cleared signal C08-04. **Radio RTC**: Acknowledged the message with 100% repeat back. [OPS 3 Radio]
01:13:23 hours	**Radio RTC**: The convoy was instructed to keep a safe following distance and not pass any red signals. A convoy block was granted to Reagan National Airport, track 2. Signal C10-32 would display a red aspect. **TC-04 Equipment Operator**: Acknowledged the message with 100% repeat back. **Radio RTC**: Acknowledged the message. [OPS 3 Radio]
01:17:08 hours	**ST-04 Equipment Operator**: Stated the convoy had cleared signal C08-06, track 2. **Radio RTC**: Acknowledged the message with 100% repeat back. [OPS 3 Radio]
01:20:36 hours	**ST-04 Equipment Operator**: Stated the convoy had cleared Crystal City Station, track 2. **Radio RTC**: Acknowledged the message with 100% repeat back and instructed the convoy to notify Central once they had arrived at Reagan National Airport Station. [OPS 3 Radio]
01:22:26 hours	**ST-04 Equipment Operator**: Stated ST-04 had arrived at Reagan National Airport Station to secure the work location. **Radio RTC**: Acknowledged the message. [OPS 3 Radio]

Time	Description
01:22:41 hours	**RWIC**: Instructed the Radio RTC to proceed with their message. **Radio RTC**: Stated ETO protection was granted on Track 1 CM 285+24 to 371+14 and Track 2 CM 285+24 to 370+20 for the purpose of loading shunts. Power was still hot and energized, and Units were stationed on tracks 1 and 2 at Reagan National Airport. **RWIC:** Stated they received the message and repeated that they now had permission to place their shunts and their unit at their work location and that the third rail was hot and energized. [OPS 3 Radio]
01:23:18 hours	**Radio RTC**: Asked the RWIC if they would be clamping any switches. **RWIC**: Replied yes, they are clamping 11B on track 2 **Radio RTC**: Asked the RWIC if they would be clamping any switches on track 1 **RWIC**: Stated yes, they are clamping 11A on track 1 **Radio RTC**: Informed the RWIC that switch 11A was on the center track and they did not have permission for the center track. They informed the RWIC that switch 9A was on track 1 and instructed them to verify the switch being clamped. [OPS 3 Radio]
01:24:06 hours	**TR-05 Equipment Operator**: Notified the Buttons RTC via phone to report TR-05 derailed. **Buttons RTC**: Asked the Equipment Operator for their location. **TR-05 Equipment Operator**: Stated they were near CM C2 354+00. **Buttons RTC**: Informed the Equipment Operator that they were requesting assistance. [VAHQ ROCC Yel/Grn 2 Phone]
01:25:37 hours	**Radio RTC**: Asked the RWIC for confirmation that a unit derailed at their location. **RWIC**: Stated that this was the first time they were made aware of any vehicle derailing and asked which unit was involved. **Radio RTC** Stated that TR-05, the second unit in the convoy, was the unit that possibly derailed and asked the RWIC to investigate and confirm. **RWIC**: Asked the RTC to repeat the message. **Radio RTC:** Stated they received a report that TR-05 had derailed. That was the second unit on the platform on the Downtown end at Reagan National Airport. They asked the RWIC to confirm if any vehicles had derailed at their work location. **RWIC**: Stated that they would speak with the Equipment Operator [OPS 3 Radio]

Time	Description
01:26:52 hours	**TR-05 Equipment Operator**: Requested to speak to Central. **Radio RTC**: Instructed TR-05 to proceed with their message. **TR-05 Equipment Operator**: Confirmed that their unit had derailed at CM C2 354+00. **Radio RTC**: Asked for confirmation of the derailment at CM C2 354+00 and the vehicle that derailed was TR-05. **TR-05 Equipment Operator**: Confirmed the information. **RWIC**: stated that they received the message [OPS 3 Radio]
01:27:44 hours	**Radio RTC**: Asked the RWIC if all three rail vehicles were berthed at the platform at Reagan National Airport **Radio RTC**: Stated PM37 was berthed on track 1. Track Crane, TC-04, was the only units on track 2. **Radio RTC**: Repeated that TC-04 was the only unit on track 2 at Reagan National Airport, then stated that TR-05 and FD04 are holding outside of the work area. **Radio RTC**: Advised the RWIC that their work was going on "Delayed" status as of 01:28 hours due to the derailment. **RWIC**: Acknowledged message and provide 100% repeat back. **Radio RTC**: Asked the RWIC to inquire if any medical assistance was needed. **RWIC**: acknowledged and stated that they were contacting the Equipment Operator via cellphone. [OPS 3 Radio]
01:31:37 hours	**RWIC**: Contacted the AOM to provide the Equipment Operator's information. **AOM**: Asked if there were any injuries reported. **RWIC**: Stated there were no injuries and no medical assistance needed. **AOM**: Asked if there was any damages. **RWIC**: Stated they were walking to the derailed vehicle to investigate. **AOM**: Instructed the RWIC to call back once they had assessed the situation. [Rail 2 Phone]

Drafted By: SAFE 708 - 05/05/2024
Reviewed By: SAFE 704 - 06/25/2024
Approved By: SAFE 707 – 06/26/2024

Time	Description
01:38:06 hours	**RWIC**: Informed the RTC that TR-05 came into contact with the Third Rail at CM C2 354+00. Stated they would be hot-sticking to confirm power was de-energized. **Radio RTC**: Acknowledged message with 100% repeat back. Authorized hot-sticking, and added the RWIC must notify the MICC before any work is done to the unit. **RWIC**: Acknowledged the message. **RWIC**: Informed the RTC that hot-sticking was performed and confirmed power was de-energized at CM C2 353+00. Radio RTC: Acknowledged message and instructed the RWIC to standby and stand clear. **RWIC**: Acknowledged the message. [OPS 3 Radio]
01:55:28 hours	**ERT Supervisor**: Asked the Radio RTC to have PM37 drop their flatcar at signal C10-38, put the unit in the pocket track, then reverse onto track 2 in order for the boom to rerail TR-05 **Button RTC**: Stated that someone would have to clamp the switches in reverse. **ERT Supervisor**: Stated that's fine. **Button RTC**: Informed the Radio RTC to have PM37 drop their flat car at signal C10-38, go into the pocket track, and come out on track 2. The RTC was unable to set the lead. The switch would have to be clamped in reverse. **ERT Supervisor**: Stated that was the fastest way to rerail the vehicle. [Yellow/Green Phone]
03:25:07 hours	**Radio RTC**: Authorized PM 37 to pass signal C10-44 red with switches 11 B and 11 A clamped in the reverse position, speed not to exceed 5 MPH over the switches. Absolute block to clear signal C10-42, and advised to notify Central once they've cleared signal C10-42 **PM37 Equipment Operator**: Acknowledged message with 100% repeat back **RWIC**: Acknowledged message with 100% repeat back [OPS 3 Radio]
03:27:29 hours	**PM37 Equipment Operator**: Cleared signal C10-42 **Radio RTC**: Acknowledged message with 100% repeat back **Radio RTC**: Instructed the RWIC to unclamp switches 11A and 11B and notify Central when completed [OPS 3 Radio]
03:34:57 hours	**Metro-1**: Requested the Power Desk to send personnel to National Airport to inspect the third rail damage before power is restored [Metro-1 Phone]
03:36:00 hours	**OSI**: Released the scene to TRST to begin rerailing [MAC Desk Phone]
03:47:00 hours	**TRST Supervisor #2**: Informed the AOM that TR-05 was rerailed at 03:46 hours and was being connected to PM 37 to be towed to the Alexandria Yard (C99) yard [Rail 2 Phone]

Time	Description
03:49:08 hours	**TRST Supervisor #2**: Informed the RTC that TR-05 was rerailed at 03:46 hours, was being connected to PM 37, and would request a lead to C99 Yard once the CTEM Mechanic inspected the vehicle and approved transport. **Radio RTC**: Acknowledged message and instructed TRST Supervisor #2 to notify them once TR-05 is added to PM 37. [Rail 2 Phone]
04:02:08 hours	**TRST Supervisor #2**: Informed the RTC that track inspection was performed on track 2 at National Airport Station. The track was good for service. [OPS 3 Radio]
04:10:57 hours	**Radio RTC**: Asked the RWIC if they were ready to return their supervisory outage tags. **RWIC**: Informed the RTC that they were unable to perform any scheduled work and never received their tags. They informed the RTC that all personnel and equipment were clear of the roadway on tracks 1 and 2, and third rail power could be restored at their discretion. **Radio RTC**: Acknowledged message with 100% repeat back **RWIC**: Informed the RTC that they were ready for transport to C99 Yard **Radio RTC**: Acknowledged clear time at 04:11 hours and asked the RWIC if both tracks were revenue ready. **RWIC**: Confirmed that both tracks were revenue ready. **PM 37 Equipment Operator**: Stated to the RTC that they were ready for the lead to C99 Yard **Radio RTC**: Acknowledged the message and instructed the Operator to verify the lunar signal at C10-42 with an absolute block of no closer than 10 feet of C11-08 signal red [OPS 3 Radio] TR-05 was towed to Alexandria Yard (C99) for post-incident inspection [OPS 3 Radio]

Note: Times above may vary from other systems' timelines based on clock settings.

Closed-Circuit Television (CCTV)
Although TR-05 is equipped with CCTV security video, the CCTV did not record the incident.

Automated Information Management System (AIMS)

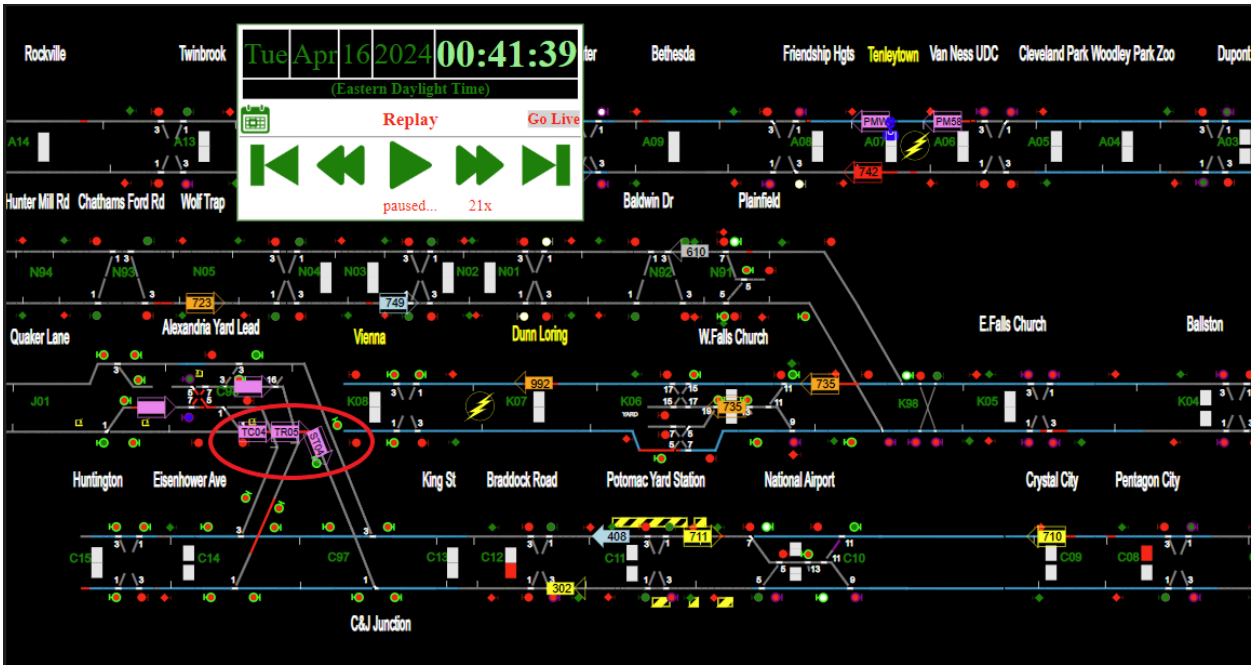


Figure 9 - Depicts the convoy with TR-05 leaving Alexandria Yard.

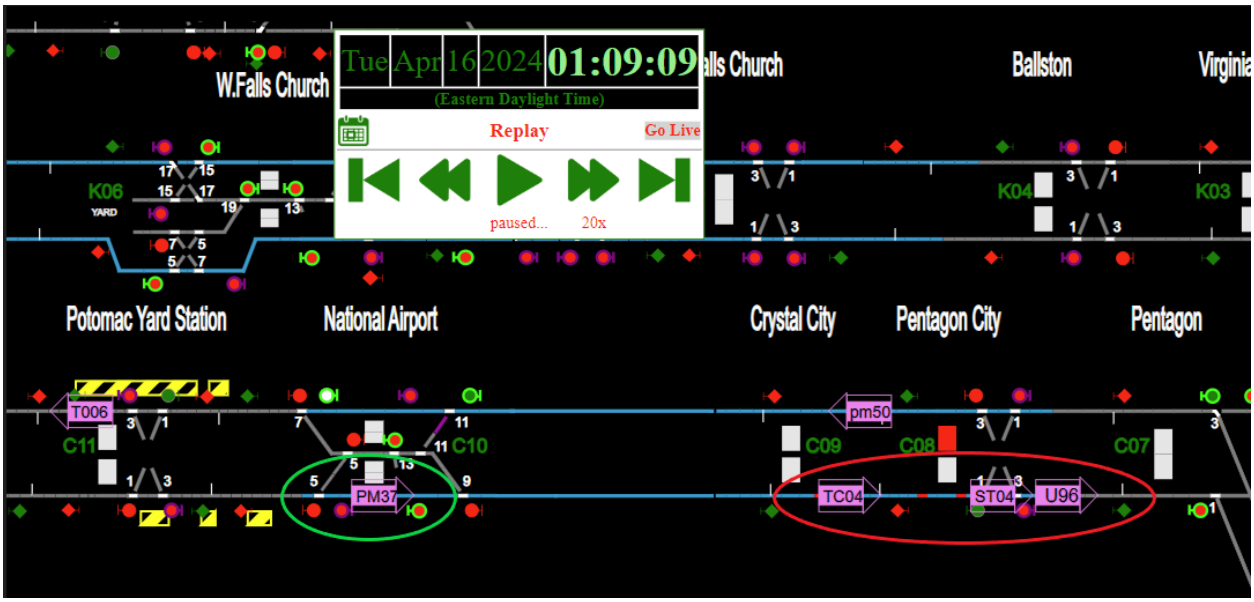


Figure 10 - depicts the convoy passing National Airport Station and Crystal City Station on track 1 to switch to track 2 towards National Airport Station.

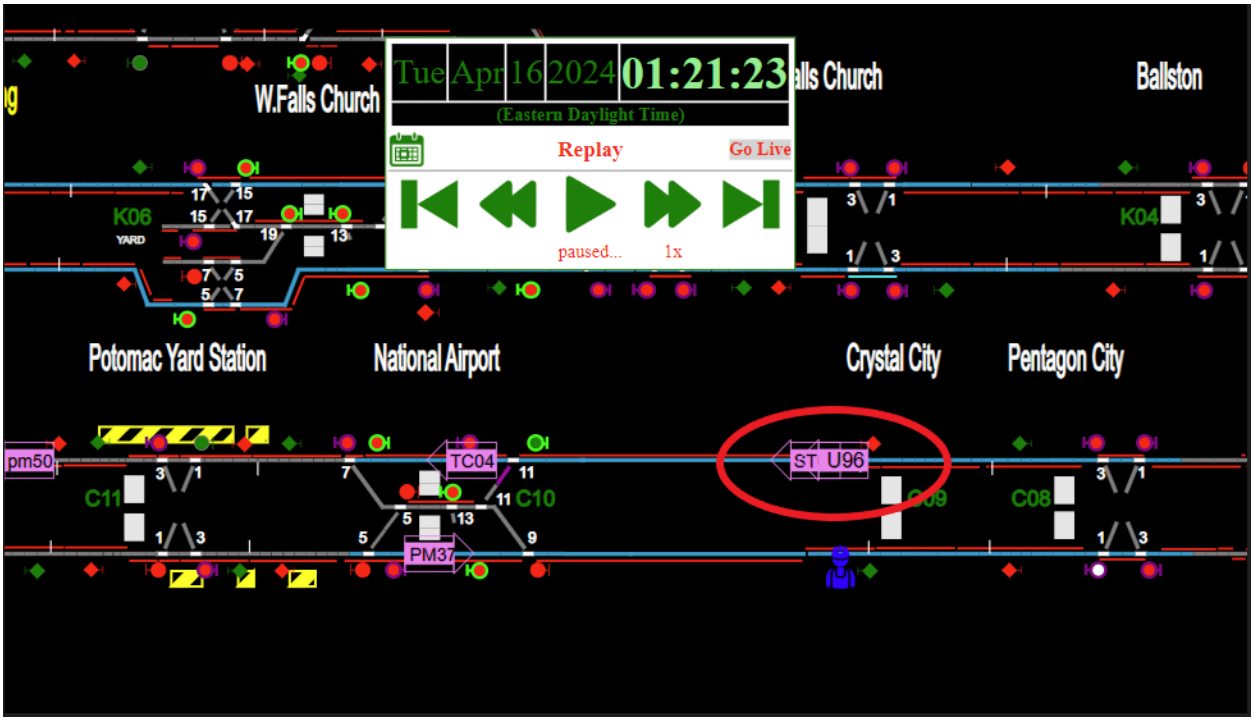


Figure 11 - Depicts convoy on track 2 towards National Airport

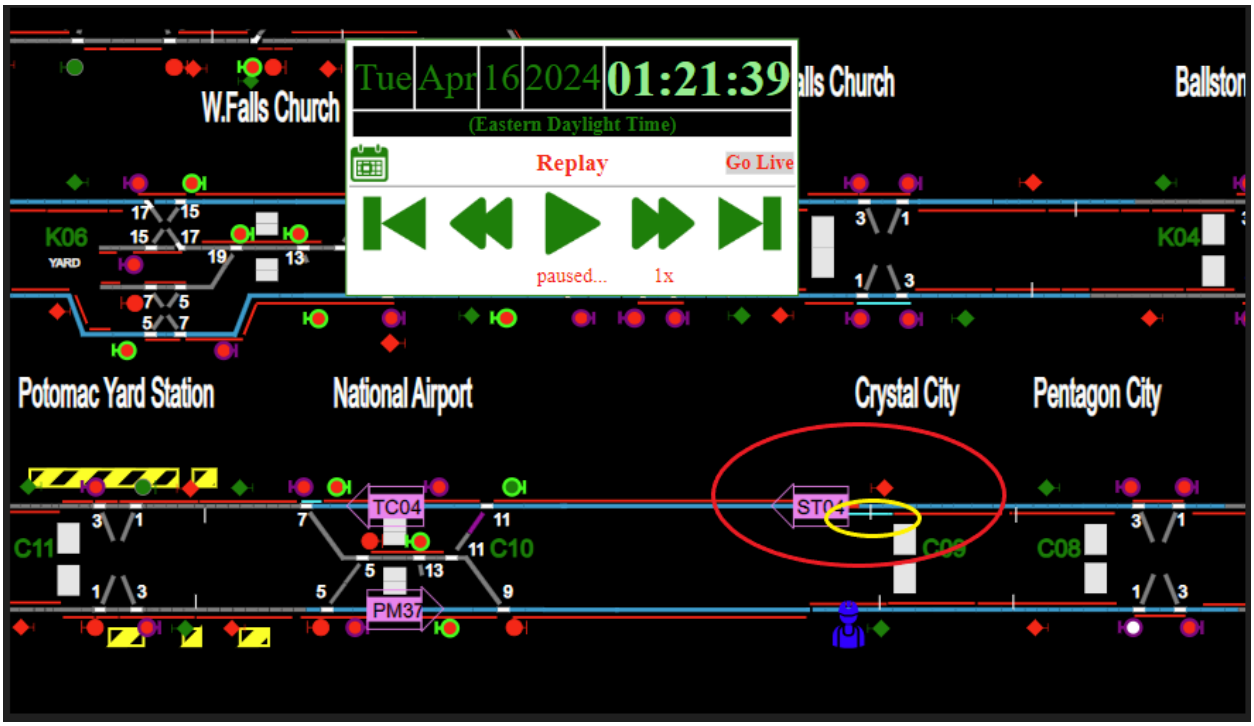


Figure 12 - Depicts Third Rail Power de-energized shortly before the derailment occurred.

Vehicle Program Services, Rail Fleet (CENV)
Adopted from the CENV Incident Report

Leading up to this incident, TR-05 was unable to negotiate the incline coming out of the Crystal City station in Travel mode. The 4% incline combined with an 800-foot radius required more tractive effort than was available. Although the operator was requesting full power to the wheels, TR-05 decelerated. Switching to Work mode allowed TR-05 to continue up the incline. The difference between Travel mode and Work mode is limited to the suspension, with propulsion remaining unaffected. Vehicle Program Services, Rail Fleet, has not, at this point, been able to define track conditions, either singularly or sum-total, that will result in a derailment or the reason why additional tractive effort is available in Work mode.

Vehicle Program Services, Rail Fleet will undertake a study to supply more torque to the wheels to remove the need to enter Work mode outside of the work area.

An Engineering workflow was created to test and reconfigure the TRIPP fleet. CENV is in the process of increasing the displacement (more torque) of the drive motors. All of the parts have been ordered, but not all have arrived by the submittal of this report.

Office of Car Maintenance (CMNT)

TR-05 Event Recorder depicts TR-05 decelerated to a stop in Travel Mode while forward propulsion was authorized (see Figure 08). The Equipment Operator switched to Work Mode and adhered to the less than 5 MPH speed restriction. The likely time of derailment is denoted by the red line at approximately 00:00:05 hours and final rest at 00:00:08 hours[5].**

[5] CMNT Engineering confirms that the Event Recorder clock was one hour and twenty-one minutes behind Eastern Daylight Savings Time during the incident.

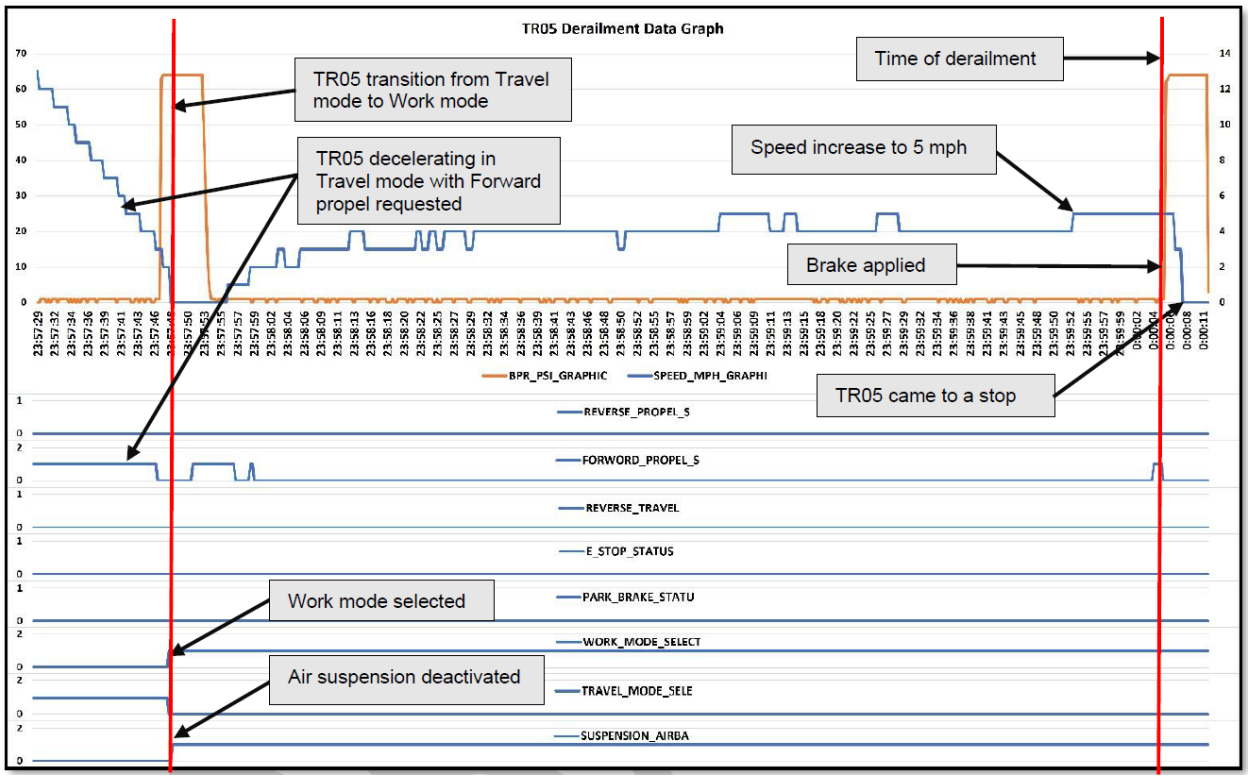


Figure 13 - TR-05 Event Recorder log of the derailment at National Airport

***Note: Times above may vary from other systems' timelines based on clock settings and reporting sources.*

It should be noted that both the Event Recorder and CCTV surveillance system are new projects that are currently being tested for use in RMMs.

Office of Information Technology, Systems and Software (ITSS)

Based on the AIMS playback and Track circuit occupancy data, ITSS identified three (3) vehicles on track 2 at National Airport. This information, in addition to the ARS playback, we were able to deduce TR-05 (identified as TR-04 in AIMS) was the middle vehicle of the convoy. The estimated speed of the vehicle before the Point of Derailment (POD) was 3.6 MPH.

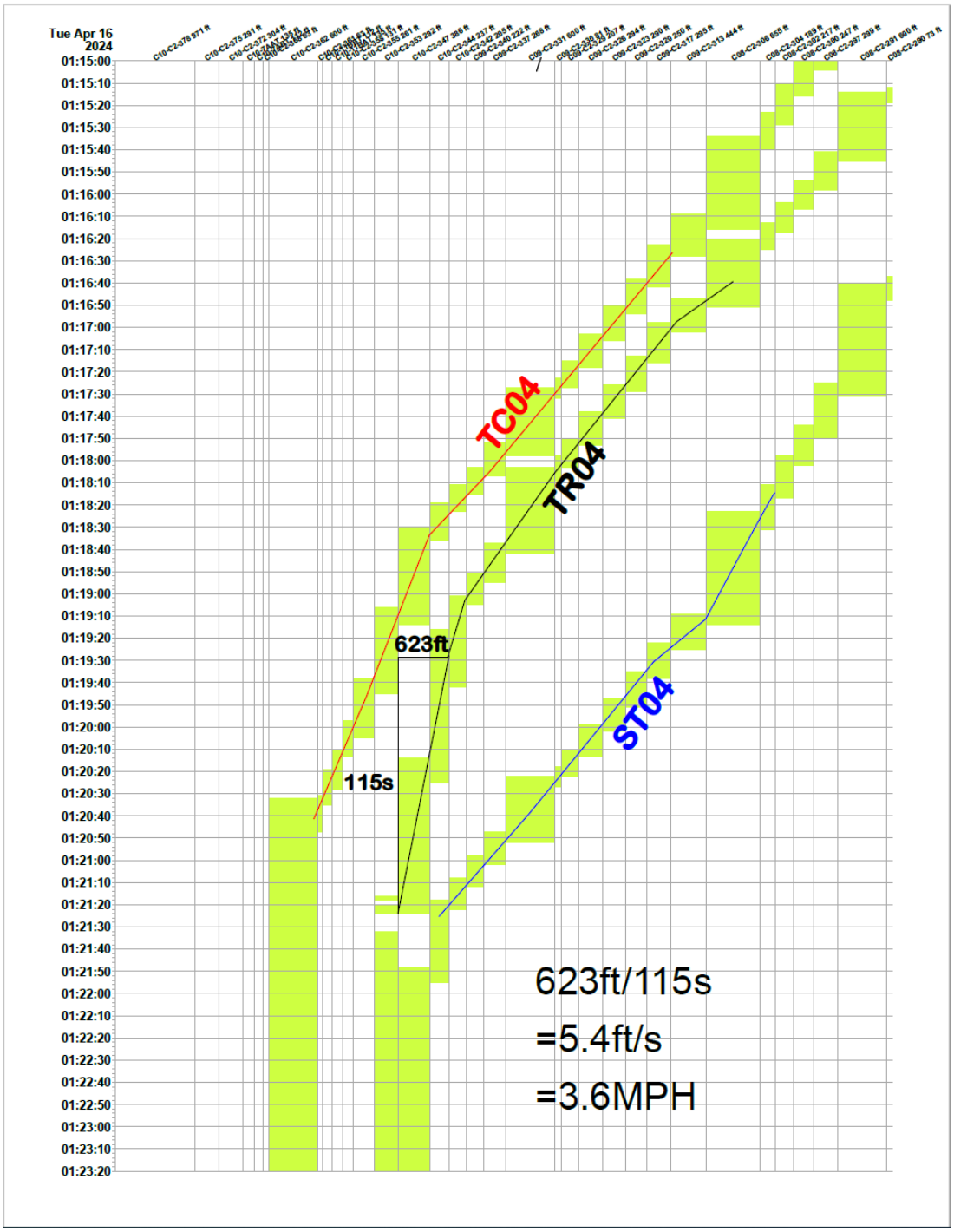


Figure 14 The graph above represents the track circuit occupancy on track 2 near National Airport. The green cells represent rail vehicle occupancy. The top of the graph shows the distance between CMs, and the left side shows the time in 10-second intervals. This data is used to calculate the estimated speed of the RMM at the time of the event.

Car and Track Maintenance Equipment (CTEM)

On April 19, 2024, a post-incident inspection of TR-05 was conducted and documented in Maximo under Work Order (WO) number 18543243. No damage to the unit was found. Back-to-back measurements were within specifications. During the inspection, a minor hydraulic leak was observed from a seal in the rear drive motor. This was not determined to be the cause of or the result of the incident. The unit was cleared to be returned to service once the drive train had been serviced.

Maintenance of Way Engineering (MOWE)

MOWE provided information after the derailment to determine whether track conditions contributed to the derailment. The curve on track 2 leaving Crystal City Station is from CM 338+85 to 352+86, with a right-side super elevation of 4 inches. The body of the curve is from 341+31 to 350+37. The curve ends at 352+97. The POD occurred at 354+00.

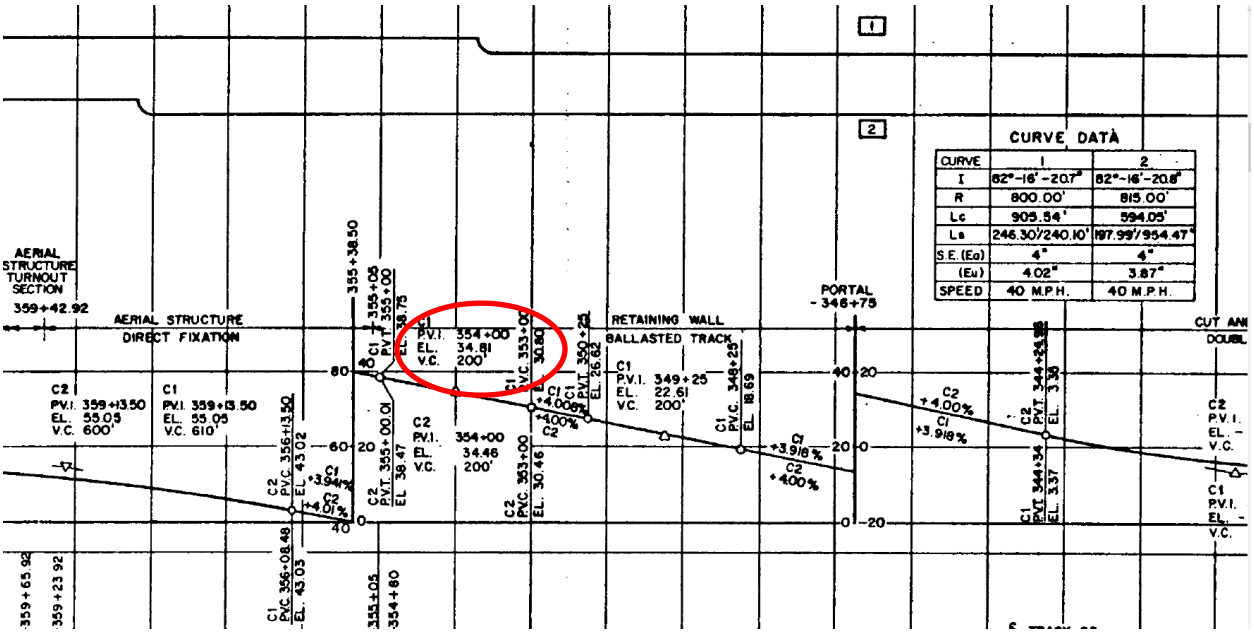


Figure 15 – depicts the Track Map between Crystal City Station and National Airport Station, showing POD circled in red..

Interview Findings

As part of the investigation launched into the event, SAFE interviewed one (1) employee. The interview identified the following key findings associated with this event. Findings detailed below include reported information from involved personnel and may conflict with other data sources contained in the report.

Equipment Operator AA

SAFE conducted one (1) interview via Microsoft Teams. This virtual interview identified the following key findings associated with this event:

The Equipment Operator AA stated:

- TR-05 had difficulty navigating uphill curves. The Equipment Operator AA had to switch the mode of operations from travel mode to work mode.
- They were moving at a slow pace while in work mode.
- TR-05 began losing or losing propulsion on three (3) occasions while operating in Travel Mode at the curved section of the rail.
    - Leaving Alexandria yard near the restraining rail, the unit began to lose propulsion but made it through the curve without the Equipment Operator AA having to switch modes.
    - On a curved incline approaching King Street Station (C13), track 1, the unit stopped completely. The Equipment Operator AA switched the unit to Work Mode and returned to Travel mode once they reached the tangent track.

    - Leaving Crystal City Station (C09), track 2 on a curved incline towards National Airport (C09), the unit stopped completely. The Equipment Operator AA switched the unit to Work Mode once again to traverse the curve. After navigating the curve and approaching the tangent track, the front wheels of the unit derailed.

Weather

On April 16, 2024, at the time of the incident, NOAA recorded the temperature as 69.8°F, with clear skies, winds ten mph, and 43.19% humidity. Weather was not a contributing factor in this incident (Weather source: NOAA) – Location: [Arlington, VA].

Human Factors

Evidence of Fatigue

SAFE evaluated incident data for fatigue risk factors. No video of the Equipment Operator AA was available to ascertain whether signs of fatigue were present. The employee reported feeling fully alert at the time of the incident. Employee reported experiencing no symptoms of fatigue in the time leading up to the incident.

Fatigue Risk

SAFE evaluated incident data for fatigue risk factors. Risk factors for fatigue were present. The incident time of day did not suggest an increased risk of fatigue-related impairment. The Equipment Operator AA reported some variation in the sleep schedule in the days leading up to the incident. The employee performed day and night work in the days leading up to the incident. The employee was awake for 6.4 hours at the time of the incident. The employee reported 7.5 hours of sleep in the 24 hours preceding the incident. The off-duty period preceding the incident was less than 10 hours long [9.75 hours], which may impact the opportunity for sufficient sleep.

This was less than the employee's usual workday sleep duration. The employee reported no issues with sleep. The employee worked AM and PM shifts in the days leading up to the incident.

Post-Incident Toxicology Testing

WMATA's Drug and Alcohol Program determined that the Equipment Operator AA complied with the Drug and Alcohol Policy and Testing Program P/I 7.7.3/6.

Findings

- The Equipment Operator stated that on April 16, 2024, TR-05 had difficulty transversing curved areas of track.
- TR-05 lost traction propulsion traversing an inclined curved section of the track.
- The Equipment Operator switched the RMM from Travel mode to Work mode on the curved areas of the track.
- The TR-05 Datalogger graph showed that the TR-05 Equipment Operator did not exceed 5 MPH while operating in Work Mode.
- ITSS track circuit speed calculation of TR-05 prior to the POD places TR-05 average speed at 3.6 MPH
- TR-05 derailed on the spiral to tangent track near CM C2 354+00

Immediate Mitigation to Prevent Recurrence

- TR-05 Equipment Operator AA was removed from service for post-incident testing.
- TR-05 was removed from service for post-incident investigation inspections.
- The immediate derailment area was inspected by ATCM and TRST
- A test train was used to make sure the derailment area was safe for revenue service.

Probable Cause Statement

The probable cause of the derailment at National Airport Station on April 16, 2024, was due to a design issue of the TRIPP Machines. Specifically, TR05 was not designed to navigate the steep inclines/declines, tight radius, superelevation, and spirals of the WMATA rail system. To increase the torque to the wheels, CENV reconfigured and added additional traction motors to the TRIPP machines to assist with navigating WMATA's rail system, but there are still challenges navigating in travel mode.

Recommended Corrective Actions

Corrective Action Code	Description	Responsible Party	Estimated Completion Date
116191_SAFECAPS_CENV_001	(RC-1) Office of Vehicle Program Service, Rail Fleet - to develop measures to supply additional torque to the RMM wheels, removing the need to enter into work mode outside of the work area.	CENV	Ongoing

Appendices

Appendix A – Interview Summaries

The below narratives summarize the incident and represent the statements made by the involved individual. As such, times and details may present a conflict with the data contained in systems of record.

Office of Track and Structures (TRST)

Equipment Operator AA

Equipment Operator AA is a WMATA employee with 26.2 years of service and has worked as an Equipment Operator AA for 26.2 years. Equipment Operator AA holds a Roadway Worker Protection (RWP) Level 4 certification that expires in July 2024

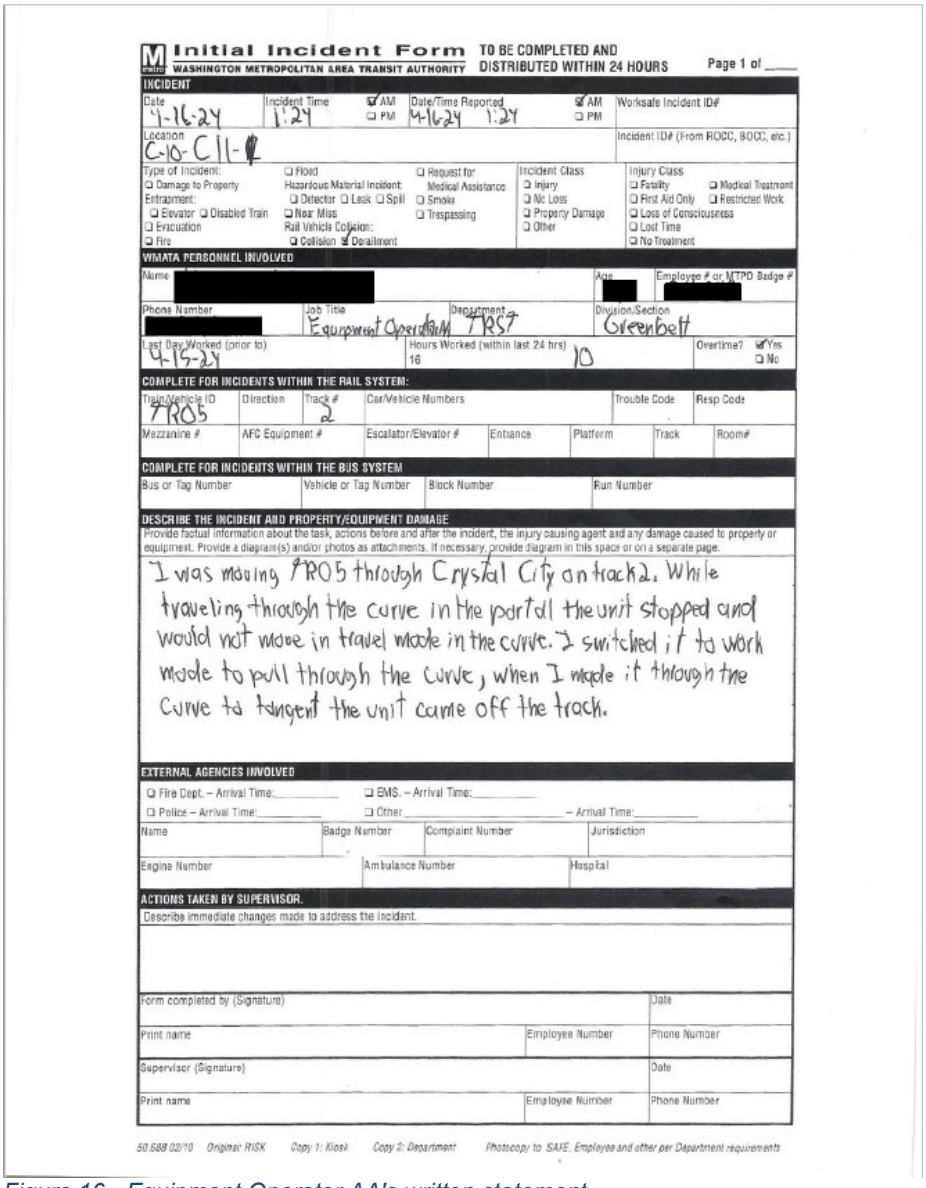
During the interview conducted on April 19, 2024, the Equipment Operator AA discussed the incident at the National Airport Station. The primary aim of the discussion was to identify the root cause of the event.

During the interview, the Equipment Operator validated their work history within the organization and years in their current position. They had an in-depth conversation about their work schedule and any possible fatigue-related issues. The Equipment Operator then discussed the incident, stating that their assignment was to replace railroad ties between Crystal City and the National Airport Stations on Track 2. A pre-trip inspection of TR-05 had been completed prior to leaving Alexandria Yard, and no defects were identified. The Equipment Operator stated as they were leaving Alexandria Yard, TR-05 began to slow down near the restraining rail. The Equipment Operator stated that TRIPP machines normally have a difficult time navigating around curves.

After leaving Alexandria Yard and entering the mainline near King Street, TR-05 was traveling on an uphill grade curve, and the unit stopped. The unit was in travel mode. The Equipment Operator AA switched the vehicle to work mode to get through the curve. The Equipment Operator traveled to tangent track, stopped and returned the unit to travel mode and continued towards National Airport. When the Equipment Operator AA reached a slight curve at the aerial structure the unit was able to pass the curve in travel mode.

The Equipment Operator AA stated that after leaving Crystal City, track 1, and switching to track 2, they reached another uphill curved area. While transversing the curve in travel mode, the vehicle lost propulsion and came to a stop. The Equipment Operator AA switched the vehicle to work mode and began moving slowly, clearing the curve, but as they reached the tangent track, the vehicle derailed.

Appendix B – Written Statements



Initial Incident Form TO BE COMPLETED AND DISTRIBUTED WITHIN 24 HOURS Page 1 of ____

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

INCIDENT

Date	Incident Time	Date/Time Reported	Worksafe Incident ID#
4-16-24	1:24 ☑ AM ☐ PM	4-16-24 1:24 ☑ AM ☐ PM	

Location: C-10 - C11 - [redacted]

Incident ID# (From ROCC, BOCC, etc.)

Type of Incident: ☐ Damage to Property; Entrapment: ☐ Elevator ☐ Disabled Train ☐ Evacuation ☐ Fire; ☐ Flood; Hazardous Material Incident: ☐ Detector ☐ Leak ☐ Spill; ☐ Near Miss; Rail Vehicle Collision: ☐ Collision ☑ Derailment; ☐ Request for Medical Assistance; ☐ Smoke; ☐ Trespassing

Incident Class: ☐ Injury ☐ No Loss ☐ Property Damage ☐ Other

Injury Class: ☐ Fatality ☐ Medical Treatment ☐ First Aid Only ☐ Restricted Work ☐ Loss of Consciousness ☐ Lost Time ☐ No Treatment

WMATA PERSONNEL INVOLVED

Name	Age	Employee # or MTPD Badge #
[redacted]	[redacted]	[redacted]

Phone Number	Job Title	Department	Division/Section
[redacted]	Equipment Operator AA	7RS7	Greenbelt

Last Day Worked (prior to)	Hours Worked (within last 24 hrs)	Overtime?
4-15-24	16 10	☑ Yes ☐ No

COMPLETE FOR INCIDENTS WITHIN THE RAIL SYSTEM:

Train/Vehicle ID	Direction	Track #	Car/Vehicle Numbers	Trouble Code	Resp Code
7R05		2			

Mezzanine #	AFC Equipment #	Escalator/Elevator #	Entrance	Platform	Track	Room#

COMPLETE FOR INCIDENTS WITHIN THE BUS SYSTEM

Bus or Tag Number	Vehicle or Tag Number	Block Number	Run Number

DESCRIBE THE INCIDENT AND PROPERTY/EQUIPMENT DAMAGE

Provide factual information about the task, actions before and after the incident, the injury causing agent and any damage caused to property or equipment. Provide a diagram(s) and/or photos as attachments. If necessary, provide diagram in this space or on a separate page.

I was moving 7R05 through Crystal City on track 2. While traveling through the curve in the portal the unit stopped and would not move in travel mode in the curve. I switched it to work mode to pull through the curve, when I made it through the curve to tangent the unit came off the track.

EXTERNAL AGENCIES INVOLVED

☐ Fire Dept. – Arrival Time:_____ ☐ EMS. – Arrival Time:_____

☐ Police – Arrival Time:_____ ☐ Other _____ – Arrival Time:_____

Name	Badge Number	Complaint Number	Jurisdiction

Engine Number	Ambulance Number	Hospital

ACTIONS TAKEN BY SUPERVISOR.

Describe immediate changes made to address the incident.

Form completed by (Signature)		Date
Print name	Employee Number	Phone Number
Supervisor (Signature)		Date
Print name	Employee Number	Phone Number

50.589 02/10 Original: RISK Copy 1: Kiosk Copy 2: Department Photocopy to SAFE, Employee and other per Department requirements

Figure 16 - Equipment Operator AA's written statement

Appendix C – Rail Operations Center (ROC) Approved Incident Report

Washington Metropolitan Area Transit Authority
Maintenance and Material Management System
MOC Approved Incident Report

Incident Number : 8749225 **SMS Number :**

C10, CM C2-354+00 TR-05 DERAILMENT TRACK #2

Date/Time 04/16/2024 01:33	**Station Location** C10: (NATIONAL AIRPORT STATION)	**Reported By**
Trouble Code TRAK TRACK EQUIPMENT TROUBLE	**Location Details**	**Notifications**
Responsibility Code TRK TRACK DEPT	**Direction**	**Resolved By** [redacted]
Train ID	**Track Number** N/A	**Approved/Closed by**
Line	**Chain Markers**	**Org. OCC** MOCC

Delays in Minutes

Line Delay	Train Delay	Passenger Delay
0	0	0

Trips Modified

Partial	Late Dispatch	Rerouted	Not Dispatched	Offloads
0	0	0	0	0

Incident Chronology (Timeline)

Time	Add'l Pass. Delays	Add'l Trouble	Incident Level Code	Description
01:33		TRAK	B3	C10, CM C2-354+00 TR-05 DERAILMENT TRACK #2
01:42				TRST [redacted]ON SCENE
01:48				CTEM [redacted] notified ETA 45 minutes
01:56				SAFE notified [redacted]ETA 35 minutes
02:46				TRST [redacted] AISST SUPT ETA 20 minutes
02:57				CTEM [redacted]on site
03:10				SAFE [redacted]on site
03:21				TRST ASSIT SUPT [redacted]on site
03:33				TRST [redacted]reports switch 11A/B unclamped and safe for unit movement
03:41				TRST [redacted] reports switch 5A/B clamped in normal for unit movement
03:48				CTEM [redacted] report unit TR05 rerailed and connecting to PM 37
04:02				TRST [redacted]reports tracks are revenue ready
04:03				TRST [redacted] reports switches 5A/B unclamped and revenue ready
04:12				TRST [redacted]reports PM-37 has removed TR-05 from site work zone has been cleared and tracks are revenue ready issue has been resolved

WT_MOC_Approved_Incident.rptdesign 04/17/2024 03:23

Appendix D – Scene Photographs

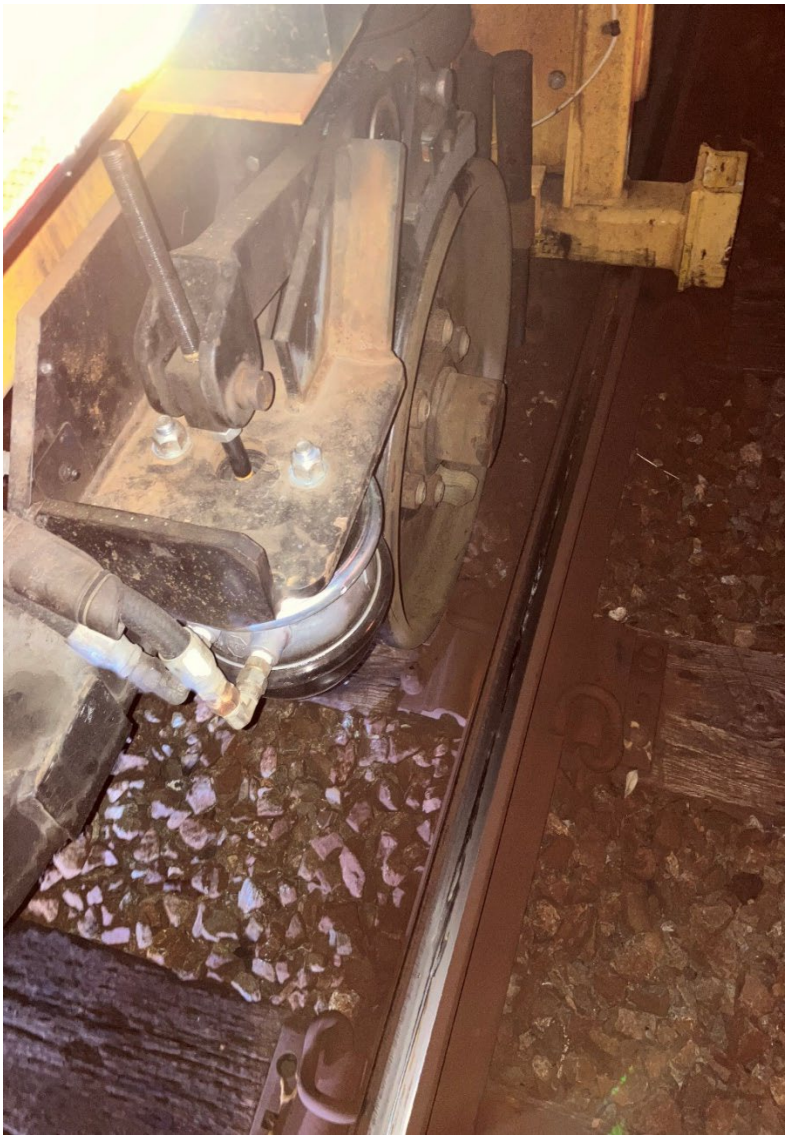


Figure 17 - Depicts the location where TR-05 derailed and scrapes on the running rail

Figure 18 - Photo of TR-05 left front wheel derailed

Figure 19 - depicts the rear wheel of TR-05 that remained on the running rail

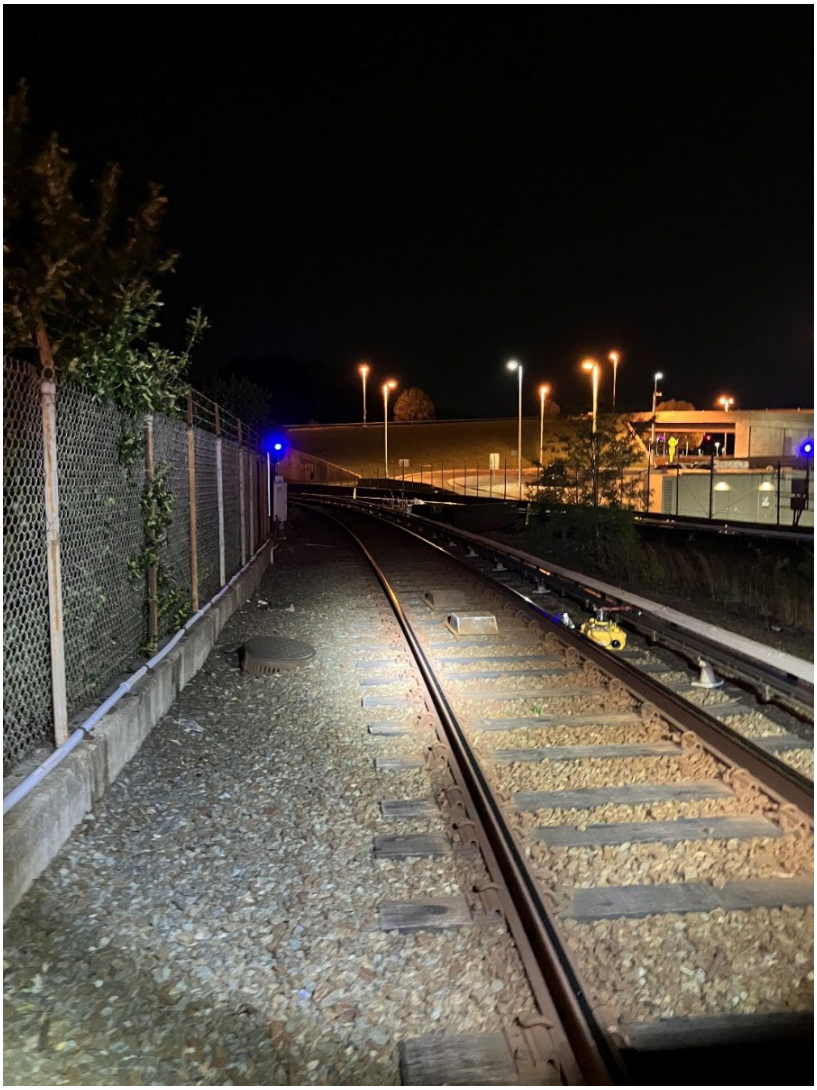
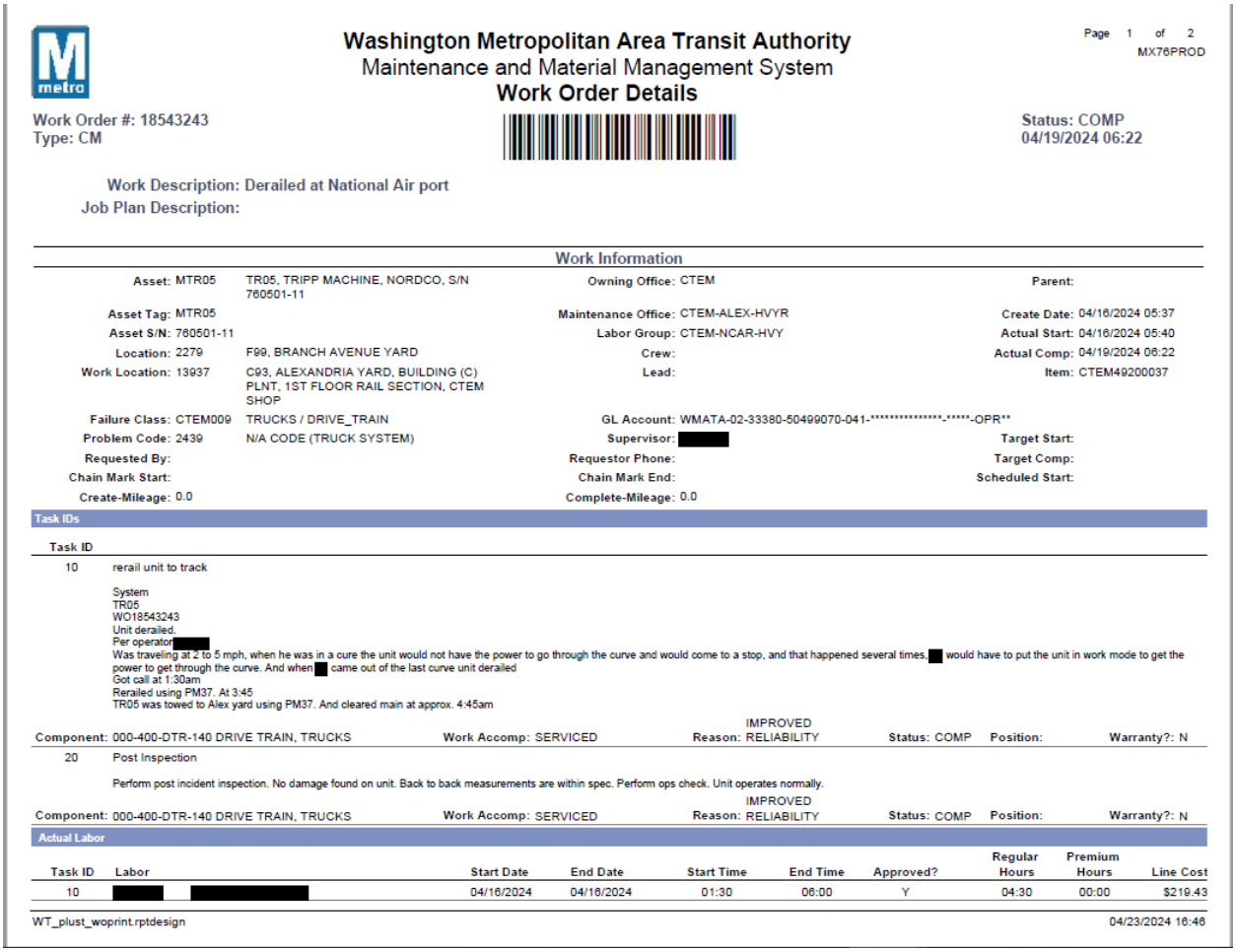


Figure 20 - Depicts the approach path TR-05 traveled to the Point of Derailment (POD).

Figure 21 - Depicts damages to the Third Rail insulator.

Figure 22 - TR-05 contact with the third rail and broken Insulator

Appendix E –Work Orders



Washington Metropolitan Area Transit Authority
Maintenance and Material Management System
Work Order Details

Page 1 of 2
MX76PROD

Work Order #: 18543243
Type: CM

Status: COMP
04/19/2024 06:22

Work Description: Derailed at National Air port
Job Plan Description:

Work Information

Asset:	MTR05	TR05, TRIPP MACHINE, NORDCO, S/N 760501-11	Owning Office:	CTEM	Parent:
Asset Tag:	MTR05		Maintenance Office:	CTEM-ALEX-HVYR	Create Date: 04/16/2024 05:37
Asset S/N:	760501-11		Labor Group:	CTEM-NCAR-HVY	Actual Start: 04/16/2024 05:40
Location:	2279	F99, BRANCH AVENUE YARD	Crew:		Actual Comp: 04/19/2024 06:22
Work Location:	13937	C93, ALEXANDRIA YARD, BUILDING (C) PLNT, 1ST FLOOR RAIL SECTION, CTEM SHOP	Lead:		Item: CTEM49200037
Failure Class:	CTEM009	TRUCKS / DRIVE_TRAIN	GL Account:	WMATA-02-33380-50499070-041-**********-*****-OPR**	
Problem Code:	2439	N/A CODE (TRUCK SYSTEM)	Supervisor:	[redacted]	Target Start:
Requested By:			Requestor Phone:		Target Comp:
Chain Mark Start:			Chain Mark End:		Scheduled Start:
Create-Mileage:	0.0		Complete-Mileage:	0.0	

Task IDs

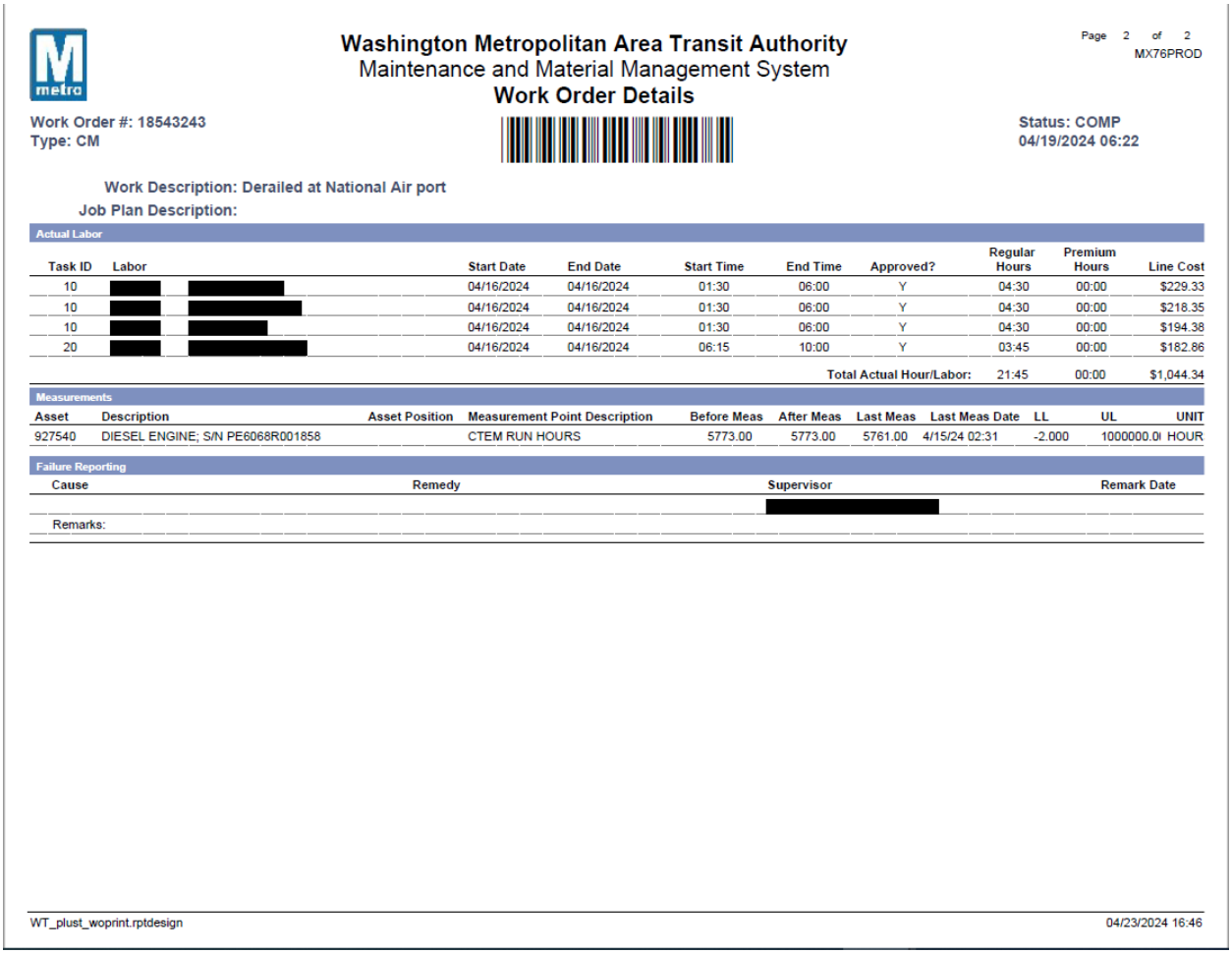
Task ID								
10	rerail unit to track System TR05 WO18543243 Unit derailed. Per operator [redacted] Was traveling at 2 to 5 mph, when he was in a cure the unit would not have the power to go through the curve and would come to a stop, and that happened several times. [redacted] would have to put the unit in work mode to get the power to get through the curve. And when [redacted] came out of the last curve unit derailed Got call at 1:30am Rerailed using PM37. At 3:45 TR05 was towed to Alex yard using PM37. And cleared main at approx. 4:45am							
	Component: 000-400-DTR-140 DRIVE TRAIN, TRUCKS	Work Accomp: SERVICED		IMPROVED Reason: RELIABILITY		Status: COMP	Position:	Warranty?: N
20	Post Inspection Perform post incident inspection. No damage found on unit. Back to back measurements are within spec. Perform ops check. Unit operates normally.							
	Component: 000-400-DTR-140 DRIVE TRAIN, TRUCKS	Work Accomp: SERVICED		IMPROVED Reason: RELIABILITY		Status: COMP	Position:	Warranty?: N

Actual Labor

Task ID	Labor	Start Date	End Date	Start Time	End Time	Approved?	Regular Hours	Premium Hours	Line Cost
10	[redacted]	04/16/2024	04/16/2024	01:30	06:00	Y	04:30	00:00	$219.43

WT_plust_woprint.rptdesign 04/23/2024 16:46

Figure 23 - Maximo WO, page 1 of 2



Washington Metropolitan Area Transit Authority
Maintenance and Material Management System
Work Order Details

Page 2 of 2
MX76PROD

Work Order #: 18543243
Type: CM

Status: COMP
04/19/2024 06:22

Work Description: Derailed at National Air port
Job Plan Description:

Actual Labor

Task ID	Labor	Start Date	End Date	Start Time	End Time	Approved?	Regular Hours	Premium Hours	Line Cost
10	[redacted]	04/16/2024	04/16/2024	01:30	06:00	Y	04:30	00:00	$229.33
10	[redacted]	04/16/2024	04/16/2024	01:30	06:00	Y	04:30	00:00	$218.35
10	[redacted]	04/16/2024	04/16/2024	01:30	06:00	Y	04:30	00:00	$194.38
20	[redacted]	04/16/2024	04/16/2024	06:15	10:00	Y	03:45	00:00	$182.86
						Total Actual Hour/Labor:	21:45	00:00	$1,044.34

Measurements

Asset	Description	Asset Position	Measurement Point Description	Before Meas	After Meas	Last Meas	Last Meas Date	LL	UL	UNIT
927540	DIESEL ENGINE; S/N PE6068R001858		CTEM RUN HOURS	5773.00	5773.00	5761.00	4/15/24 02:31	-2.000	1000000.0(	HOUR

Failure Reporting

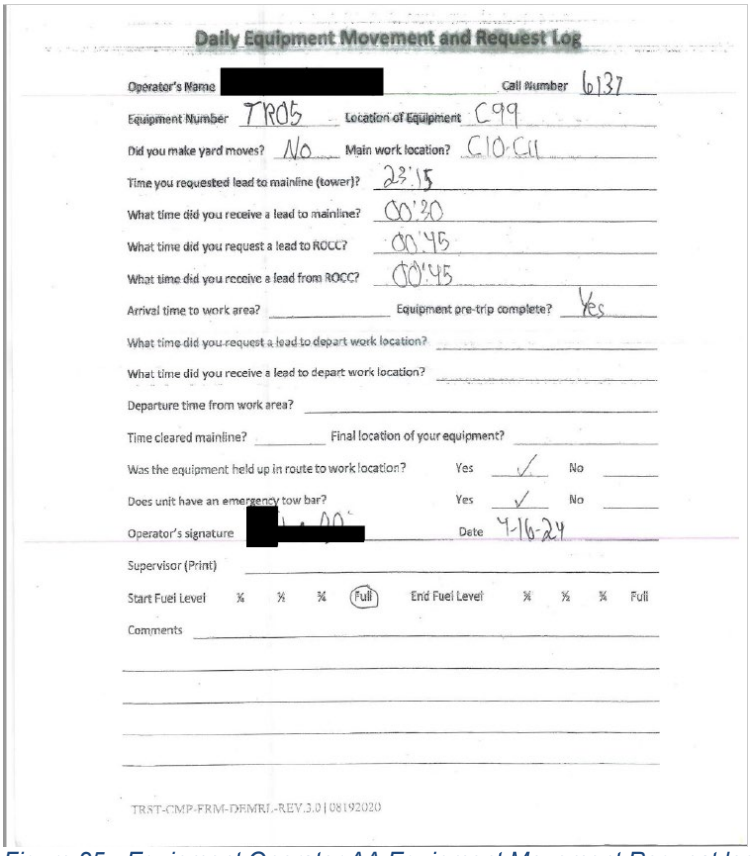
Cause	Remedy	Supervisor	Remark Date
		[redacted]	

Remarks:

WT_plust_woprint.rptdesign 04/23/2024 16:46

Figure 24 - Maximo WO, page 2 of 2

Appendix F –TRST Daily Equipment Movement and Request Log



Daily Equipment Movement and Request Log

Operator's Name [redacted] Call Number 6137

Equipment Number TR05 Location of Equipment C99

Did you make yard moves? No Main work location? C10-C11

Time you requested lead to mainline (tower)? 23:15

What time did you receive a lead to mainline? 00:20

What time did you request a lead to ROCC? 00:45

What time did you receive a lead from ROCC? 00:45

Arrival time to work area? _____ Equipment pre-trip complete? Yes

What time did you request a lead to depart work location? _____

What time did you receive a lead to depart work location? _____

Departure time from work area? _____

Time cleared mainline? _____ Final location of your equipment? _____

Was the equipment held up in route to work location? Yes ✓ No _____

Does unit have an emergency tow bar? Yes ✓ No _____

Operator's signature [redacted] Date 4-16-24

Supervisor (Print) _____

Start Fuel Level ¼ ½ ¾ (Full) End Fuel Level ¼ ½ ¾ Full

Comments _____

TRST-CMP-FRM-DFMRL-REV.3.0 | 08192020

Figure 25 - Equipment Operator AA Equipment Movement Request log for TR-05 on April 16, 2024

Appendix G – TR-05's Class 2 Rail Vehicle Pre-trip Inspection Form

WMATA CLASS 2 RAIL VEHICLE PRIOR TO USE INSPECTION

Initials (Operator /Flag Person)	
	1. Check for wheel chocks and that the required quantity for unit(s) in consist are present.
	2. Check angle cocks, train line seals, air tool and drain valves. (Open or close as required).
	3. Check main engine for proper oil level.
	4. Check for any loose, broken, torn, cracked, or leaking components as you make your walk around inspection.
	5. If using auxiliary components such as cranes, generators and compressors, check all controls, movements, fluid levels, and safety devices.
	6. Start machine and check all switches, gauges, and warning indicators.
	7. Check for sufficient air pressure and if equipped with A-9, make sure it is at 90 psi in the release position.
	8. Check transmission for correct oil level and any abnormal sounds or functions.
	9. Ensure all equipment, tools, supplies or loose debris are secured on decks and not posing any safety hazards.
	10. If equipped and scheduled for use, inspect work head assemblies for wear, out of adjustment and damage. Check oil fill reservoirs and grease all fittings.
	11. If equipped, inspect E-couplers, tow bars, and revenue train couplers. Make sure all tools are properly stored and secured while maintaining proper housekeeping of materials and equipment.
	12. Gas cylinders should be secured and in their proper location.
	13. Ensure all work heads and components such as crane booms, outriggers, measuring buggies, clamp frames, plows, turn tables and extension arms are pinned and locked with safety devices prior to travel.
	14. Check fuel and hydraulic tanks for proper level.
	15. Check all wheels, brakes, visible linkage, and suspension on all rolling stock vehicles.
	16. Check for cracked, broken, missing windows and side boards. Make sure there are no bent or loose railings, steps, or cabinet enclosures that are missing safety chains, locks or latches.
	17. Turn on and inspect all lighting on unit(s) in consist for any defects or problems.
	18. Check that back up alarms and horns sound.
	19. Fire extinguishers should be charged and secured. Sign the monthly inspection log (if not already signed).
	20. Verify the radio(s) is/are able to transmit and receive clearly.
	21. Inspect all items in flagman's booth for proper operation and functionality.
	22. Ensure loads are secure, evenly distributed and are not hanging over the side or ends of flat car.
	23. Check all Flat Car emergency dump valves and hand brakes.
	24. Inspect hi-rail components for thin flanges, leaking cylinders, safety pins, tires, shunts, and proper lock when on hi-rail.
	25. Perform a stretch test. ☐ Successful Test ☐ N/A
	26. Perform a rolling brake test (all class 2 vehicles).
	27. Perform standing brake test (all flatcars, PM26-PM53 only).
	28. Verify the intercom headsets are able to transmit and receive clearly (if applicable).
	29. Operators and Pilots have reviewed, and have in their possession, mainline and yard maps showing their intended routing, curves and interlockings and restrictions and other vital information.

Note: When transporting units for PMI, make ensure cabs, decks, platforms and operating stations are clear and free from trash, debris, tools, materials and supplies.

Notes/Comments:

Print Name(s): [redacted] **ID# (s):** [redacted]

Signature(s): [redacted] **Equipment#:** TR05

Yard or location where inspection is performed: 99

Date: April 15th 2024 **Time of inspection:** 11pm

TRST-OMP-FRM-C2RV-PUR-REV.5.2 | 04122021

Figure 26 - Equipment Operator AA Pre-trip Inspection Form for TR-05 on April 16, 2024

Appendix H –CTEM Post-Derailment & Accident Damage Inspection Form

CTEM Post-derailment & Accident Damage Inspection Form

(1 Form per Unit)

DATE:	Apr 16, 2024	**INSPECTOR:**	[redacted]	**UNIT #:**	TR05
INCIDENT #:		**INCIDENT LOCATION:**	C10 platform		

GUIDELINES:

- This form is to be used for all rail vehicles involved in derailments, accidents.
- This form is to function as a guide to assist in ensuring that all vehicles are inspected to ensure that they still meet standards for operation.
- Some reference to codes and standards may be required to complete this inspection form.
- All inspection items on this form are to be marked as:

✓ = Passed **X** = Failed **NA** = Not Applicable **UC** = Unable to Check

NOTE: Any items that have failed are to be documented in the "Inspection Fault Report" field included on this form.

Incident Information: *(NOTE: Use blank field under each question for additional information if answered Yes.)*		
Did the unit contact the 3rd rail? (If Yes, where was the contact on the unit?)	☐ Yes	☒ No
Did the unit contact infrastructure such as a wall or platform? (If Yes, what was contacted?)	☐ Yes	☒ No
Did the unit contact another unit? (If Yes, what unit and where was the contact on the unit?)	☐ Yes	☒ No

Truck Inspection:	
Roller bearings - no visual damage and in accordance with Rule 36	NA
Roller bearings - no unusual noises; hand spun or run-by test	NA
Bearing Adapters - within wear limits and in accordance with Rule 37	NA
Drive systems - no visual damage or leaks	√
Side frames and bolsters - no visual damage and in accordance with Rule 47 & 48	√
Ride control - friction shoes & bearing adapters within limits and in accordance with Rule 46	√
Springs - no damage, correctly seated and in accordance with Rule 50	√
General - no visual damage, all components secured and in accordance with Rule 74	√
NOTES:	
Drive motor is leaking found during inspection this is not due to the derailment.	

Chassis Inspection:	
Chassis and sub-frames - no cracks, twists, other visual damage	√
Center plates and side bearing - no visual damage and in accordance with Rule 60, 61, and 62	NA
Body & decking - no structural, cladding, or decking damage	√
Loading - load is balanced and secure	√
Coupler and draft arrangement - no visual damage and in accordance with Rule 16	NA
General - no visual damage, all components secured and in accordance with Rule 74	NA
NOTES:	

CMNT Form 50.993, Rev. 0.0 **Page 1 of 2** **February 01, 2018**

Figure 27 - CTEM Post Derailment & Accident Damage Inspection Form, page 1 of 2

CTEM Post-derailment & Accident Damage Inspection Form

Wheel Inspection:	
Wheels - Discoloration, cracks, spalling, and signs of movement	√
Gauging - Back to back measurement and in accordance with Rule 43	√
Gauging - Flanges & tread, and in accordance with Rule 41	√
General - no visual damage	√
NOTES:	

Brake Inspection:	
Brake rigging & cylinders - no visual damage or apparent leaks	√
Brake hoses & trunk lines - no visual damage or apparent leaks	√
Brake piping, valving and cocks - - no visual damage or apparent leaks	√
Brake operation - passes functional test	√
Friction shoes - greater than 3/8" and accordance with Rule 12	√
Rolling brake test - unit stop as designed without locking up wheels	√
Hand brake - - no visual damage and applies as designed	NA
General - no visual damage, all components secured and in accordance with Rule 74	√
NOTES:	

Miscellaneous Equipment Inspection:	
Horn - operational	√
Lighting - operates as designed	√
Radio - perform radio check, operates as designed	√
Propulsion and braking controls - all controls operate as designed	√
Cameras - clear picture, operates as designed	√
Emergency equipment - Interlocks emergency valves, E-stops, etc., operate as designed	√
Locks & restraints - mechanical locks and restraints are in place and operate as designed	√
NOTES:	

Inspection Fault Report:

unit can be returned to service after the repair to the drive motor has been completed.

Can unit be returned to service? ☒ Yes ☐ No

Inspector's Signature: [redacted] WMATA Digitally signed by [redacted] WMATA Date: 2024.04.16 09:39:15 -04'00'

CMNT Form 50.993, Rev. 0.0 **Page 2 of 2** **February 01, 2018**

Figure 28 - CTEM Post Derailment & Accident Damage Inspection Form, page 2 of 2

Appendix I –GOTRS

GOTRS - GENERAL ORDERS & TRACK RIGHTS SYSTEM
Track Rights Request

Request Summary

Request Number:	202410301601	**Track Access:**	True
Dates Requested:	04/16/2024 00:30 to: 04/16/2024 04:00	**Clear In Ten:**	False
Request Status:	Closed	**Equipment on Track:**	1
Requestor:	[redacted]	**Allow Piggybacks:**	True
Requestor Organization:	TRST/TRG	**In Piggyback:**	Yes, Junior
Tag #:	Closed (2024107529-A)	**Power Outage:**	Supervisory Supervisory
Lock Out / Tag Out:	No	**Additional AC:**	
Request Title:	C09 Expedited TGV Wide Gauge Remediation (Crosstie Renewal)		

Location, Work Type and Description

Location:	Mainline
Non-Wayside Location Type:	
Request Type:	Expedited
Charge Job Number:	
Contract Number:	
Maximo Work Order:	
Request Group:	No
Location Description:	C09 Expedited TGV Wide Gauge Remediation (Crosstie Renewal)
Request Description:	Replace Defective Crossties to remediate wide gauge condition
Work Type:	Tie Replacement
Meeting Location:	C99
PB Meeting Location:	
Tools and Equipment:	Various Hand Tools Safety Equipment and PPE
Equipment on Track:	Trip machine Tie Crane other RMM

	Track 1	
Actual Work Area:	C343+00	C356+00
Protected Work Area:	C338+00	C361+00

Hot Stick Info. Third Rail Gaps:

From	To	Track ID
C290+10	C316+56	1
C317+12	C337+88	1
C338+44	C371+14	1
C290+24	C316+56	2
C317+12	C337+88	2
C338+16	C338+96	2
C339+24	C370+20	2

As of 04/17/2024 16:28
1 of 3

Figure 29 - GOTRS, page 1 of 3

GOTRS - GENERAL ORDERS & TRACK RIGHTS SYSTEM
Track Rights Request

Request Summary

Request Number:	202410301601	**Track Access:**	True
Dates Requested:	04/16/2024 00:30 to: 04/16/2024 04:00	**Clear In Ten:**	False
Request Status:	Closed	**Equipment on Track:**	1
Requestor:	[redacted]	**Allow Piggybacks:**	True
Requestor Organization:	TRST/TRG	**In Piggyback:**	Yes, Junior
Tag #:	Closed (2024107529-A)	**Power Outage:**	Supervisory Supervisory
Lock Out / Tag Out:	No	**Additional AC:**	
Request Title:	C09 Expedited TGV Wide Gauge Remediation (Crosstie Renewal)		

Date & Time

Start: 04/16/2024 00:30 **End:** 04/16/2024 04:00

Contacts

Entered by

[redacted]

Work: [redacted]

Cell: [redacted] **Home:**

Requestor

[redacted]

Work: [redacted]

Cell: **Home:**

WMATA Manager

[redacted]

Work: [redacted]

Cell: [redacted] **Home:**

Emergency Contact

[redacted]

Work: [redacted]

Cell: [redacted] **Home:**

Support

SUPPORT GROUP	Crew Size
TRST/TRACK	8

Request Change History

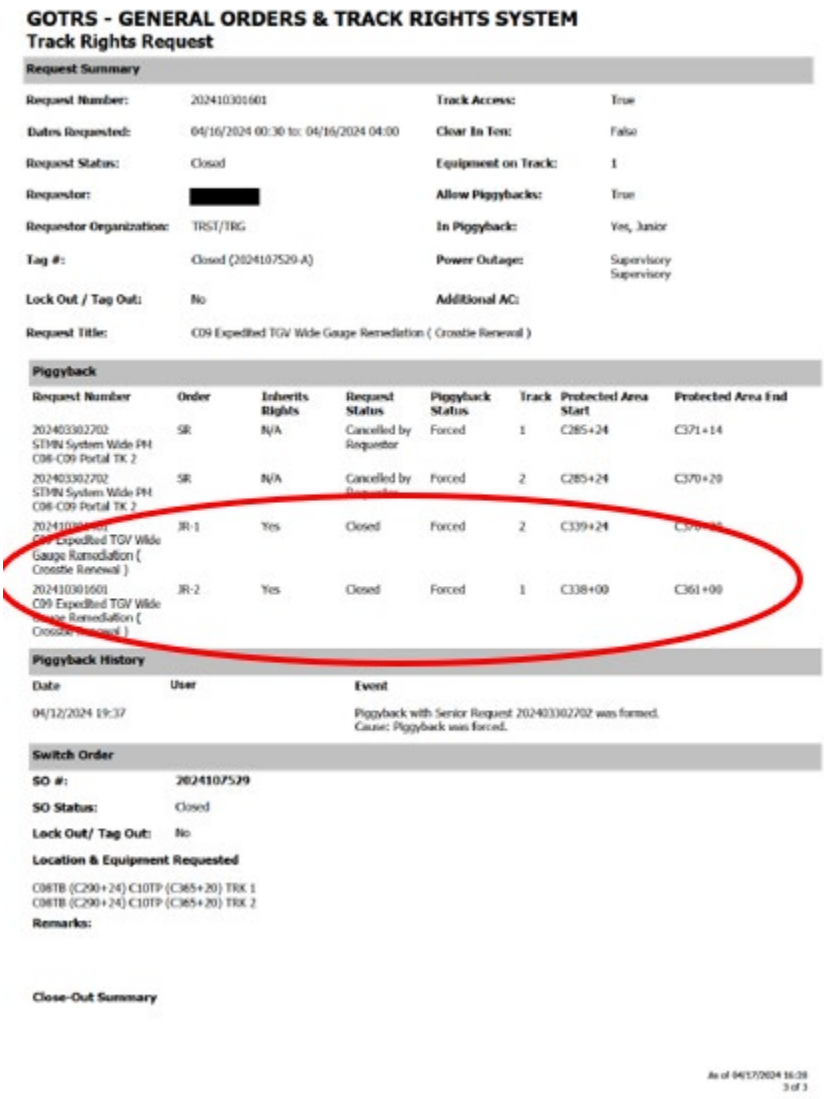
Date	Event
04/12/2024 15:39	Request was replicated from Request 202410301600.
04/12/2024 19:37	Request status was changed to Approved
04/16/2024 02:53	Work Prep was completed.
04/16/2024 04:15	Request status was changed to Opened
04/16/2024 08:12	Request status was changed to Closed

Request Group

Request Number	Description

As of 04/17/2024 16:28
2 of 3

Figure 30 - GOTRS, page 2 of 3



GOTRS - GENERAL ORDERS & TRACK RIGHTS SYSTEM
Track Rights Request

Request Summary

Request Number:	202410301601	**Track Access:**	True
Dates Requested:	04/16/2024 00:30 to: 04/16/2024 04:00	**Clear In Ten:**	False
Request Status:	Closed	**Equipment on Track:**	1
Requestor:	[redacted]	**Allow Piggybacks:**	True
Requestor Organization:	TRST/TRG	**In Piggyback:**	Yes, Junior
Tag #:	Closed (2024107529-A)	**Power Outage:**	Supervisory Supervisory
Lock Out / Tag Out:	No	**Additional AC:**	
Request Title:	C09 Expedited TGV Wide Gauge Remediation (Crosstie Renewal)		

Piggyback

Request Number	Order	Inherits Rights	Request Status	Piggyback Status	Track	Protected Area Start	Protected Area End
202403302702 STMN System Wide PH C08-C09 Portal TK 2	SR	N/A	Cancelled by Requestor	Forced	1	C285+24	C371+14
202403302702 STMN System Wide PH C08-C09 Portal TK 2	SR	N/A	Cancelled by	Forced	2	C285+24	C370+20
[illegible] C09 Expedited TGV Wide Gauge Remediation (Crosstie Renewal)	JR-1	Yes	Closed	Forced	2	C339+24	[illegible]
202410301601 C09 Expedited TGV Wide Gauge Remediation (Crosstie Renewal)	JR-2	Yes	Closed	Forced	1	C338+00	C361+00

Piggyback History

Date	User	Event
04/12/2024 19:37		Piggyback with Senior Request 202403302702 was formed. Cause: Piggyback was forced.

Switch Order

SO #:	**2024107529**
SO Status:	Closed
Lock Out/ Tag Out:	No

Location & Equipment Requested

C08TB (C290+24) C10TP (C365+20) TRK 1
C08TB (C290+24) C10TP (C365+20) TRK 2

Remarks:

Close-Out Summary

As of 04/17/2024 16:28
3 of 3

Figure 31 - GOTRS, page 3 of 3 shows the piggybacking crew inherited the work zone

Washington Metropolitan Area Transit Authority

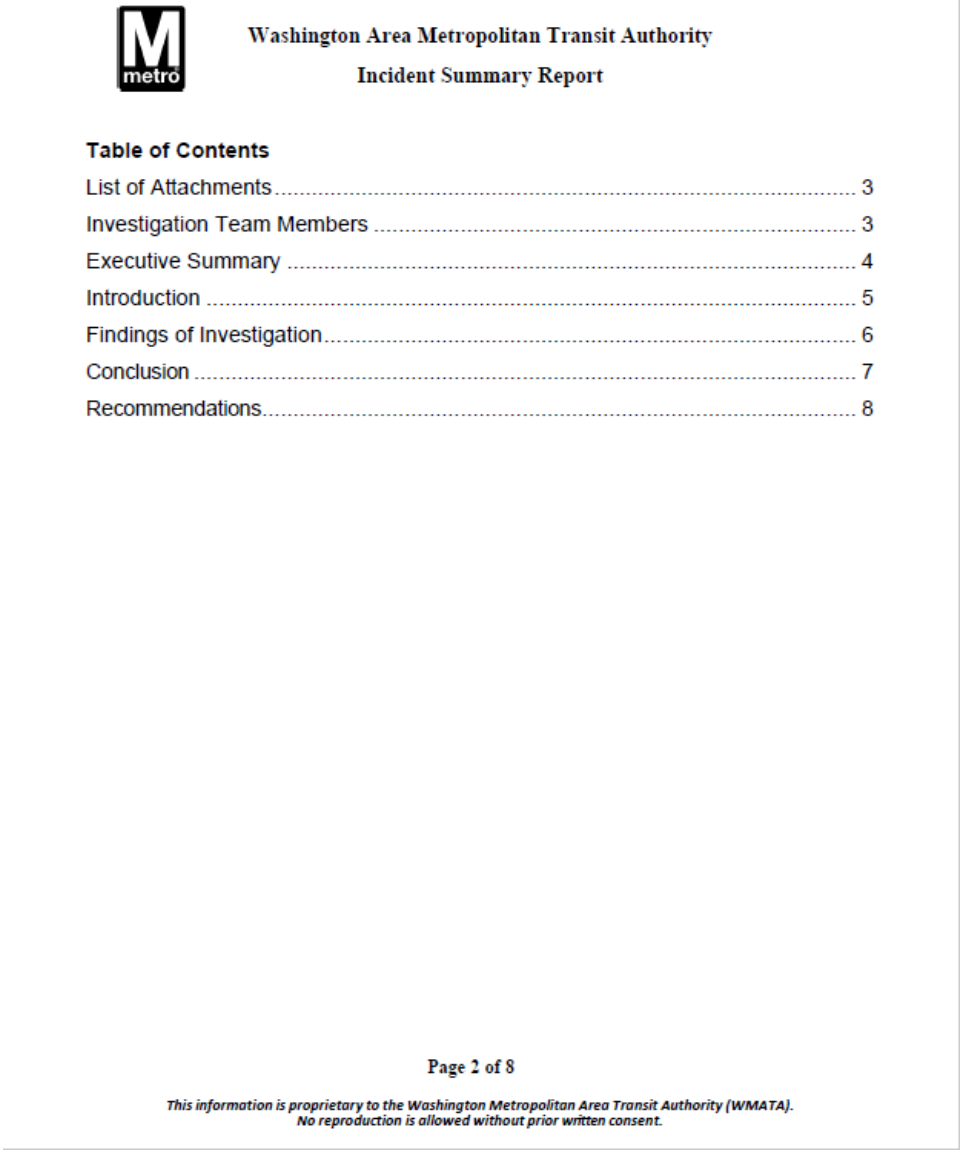
Vehicle Program Services, Rail fleet
Incident Report

TR05 Derailment at National Airport

April 16, 2024

Page 1 of 8

Figure 32 - CENV Final Report, page 1 of 8



Washington Area Metropolitan Transit Authority

Incident Summary Report

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Figure 33 - CENV Final Report, page 2 of 8

List of Attachments

Attachment A – 50.993 TR05 Post-derailment & Accident Damage Inspection Form

LOCATION: CM C2 354+00
INCIDENT #: WO 18543243
DATE: 04/16/2024
TIME: 01:21 AM

Investigation Team Members

[redacted] Vehicle Engineer – Vehicle Program Services, Rail Fleet
[redacted] Superintendent – Car Track Equipment Maintenance, Rail Fleet

Report Prepared By: [redacted]

Report Approved By: [redacted]

[redacted] Digitally signed by [redacted]
[redacted] Date: 2024.06.17 19:04:35 -04'00'

Page 3 of 8

Figure 34 - CENV Final Report, page 3 of 8

Executive Summary

On the morning of 04/16/2024, at approximately 0121 hours, TRIPP Machine TR05 traveling outbound, derailed near National Airport (C10) at chain marker C2 354+00 (Figure 1). Car Track Equipment Maintenance, Rail Fleet was notified and mechanics were dispatched for rerailment. TR05 was successfully rerailed by approximately 0352 hours, and towed by PM37 to Alexandria Maintenance Yard. TR05 cleared mainline at approximately 0412 hours. No damage to TR05 or injuries to personnel were reported. Damage to the third rail and an insulator was reported.

Analysis from the data recorder reveals that TR05 encountered difficulty ascending an incline in Travel mode approximately two minutes prior to the derailment. After failing to maintain speed, TR05 was placed in Work mode. Forward travel resumed in Work mode for approximately 725 feet before derailing.

In work mode, the vehicle's rigid condition is not optimized for navigating cross-level and other track anomalies. The exact conditions between TR05 and the rail that contributed to this incident has not been determined, however the cause of the derailment is believed to be a combination of traveling in work mode and track conditions.

Figure 1. Location of TR05 Derailment

Figure 35 - CENV Final Report, page 4 of 8

Introduction

WMATA utilizes the TRIPP machine to carry out system maintenance on the WMATA rail system. TR05 is one of the four WMATA-owned TRIPP machines. The TRIPP machines are long-wheelbased (314 inches), single-axle (non-trucked) platforms (Figure 2).

Figure 2. TRIPP Machine

TRIPP machines have two suspension modes. When working, a solid platform is required to resist the forceful action of removing and inserting track ties. But the rigid configuration is not suitable for the cross levels found in spirals and the long wheelbase and the single axle design causes high wheel flange attack angles to occur in curves. Therefore, in Work mode the speed is restricted to 5 mph. To allow for travel through the WMATA system at a reasonable speed, TRIPP machines have an air suspension system that inflates in Travel mode. The flexible suspension accommodates varying track conditions at higher speeds. Service Bulletin SBX005, issued in January 2019, restricts single-axle vehicles to 15 mph. Before the release of SBX005, TRIPP machines were operated at the operator's discretion.

There are multiple occurrences of TRIPP Machines derailing. Historically, derailments have either occurred while traveling with a malfunctioning air suspension or overspeed in Work mode. The weight distribution favors the rear axle leaving the front axle underloaded. Efforts were made during acceptance to increase the weight of the front end, including the installation of a second fuel tank and welding steel plates on the frame directly above the front axle. In 2017, the TRIPP machines were modified with a warning system that notifies the operator when speeds exceed 5 mph in Work mode and when the air suspension is under-inflated in Travel mode.

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Findings of Investigation

At approximately 0121 hours on the morning of April 16, 2024, TR05 was traveling, in the forward direction, outbound on Track 2, toward National Airport (C10). Near chain marker C2 354+00, the front axle derailed to the left side (Figure 3). Third rail power was down at the time of the incident. Damage to the third rail was reported without arcing. Coincidental damage to TR05 was not noted.

Figure 3. TR05 Derailment Front View

Car Track Equipment Maintenance, Rail Fleet arrived at the scene at approximately 0330, Department of Safety cleared the site for rerailing at approximately 0335 and began the rerailing process using the PM37 crane. At approximately 0352, TR05 was successfully rerailed, inspected, and released for transport to the Alexandria yard. At approximately 0412 hours TR05 cleared the mainline. By 0451, TR05 was parked pending post-incident inspection. Car Track Equipment Maintenance, Rail Fleet conducted post-incident inspection (Attachment A). The only noted deficiency was a minor hydraulic leak at the rear drive motor determined not to be the cause of or result of the incident. The hydraulic leak was repaired.

Vehicle Program Services, Rail Fleet retrieved data from TR05's data logger to analyze vehicle operations around the incident. Refer to Figure 4 for graphed data.

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NOTICE: The Data Recorder's time lags local time by 1 hour, 21 minutes and 36 seconds.

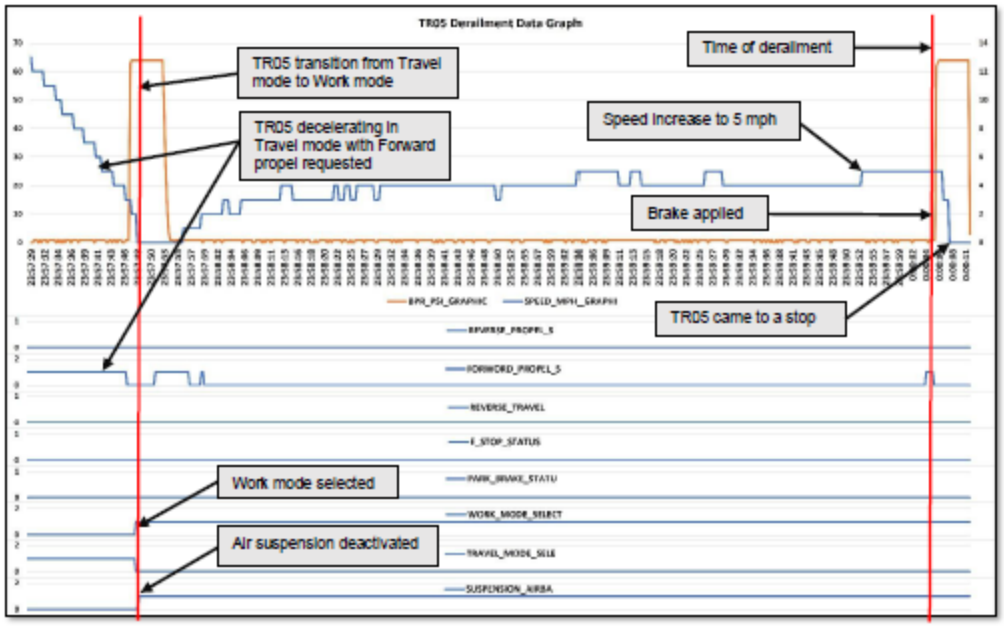

Figure 4. TR05 Derailmet Incident Data Graph

The following is a chronological chain of events leading up to the incident:

1. 01:19:01 - 01:19:22 TR05 decelerated with Forward propel requested
2. 01:19:23 Service brake applied
3. 01:19:25 TR05 came to a stop, work mode selected deactivating the air suspension.
4. 01:19:32 TR05 resumed forward travel in Work mode.
5. 01:21:30 Speed increase to 5 mph.
6. 01:21:41 TR05 derailed
7. 01:21:42 Service brake applied.
8. 01:21:44 TR05 came to a stop.

Leading up to the incident, the vehicle was in Travel mode entering a 4% incline with an 800 foot radius outbound from Crystal City station at normal speed. Within 20 seconds, speed had

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decreased to zero even though Forward propel was being requested. After brakes had been applied, TR05 was switched from Travel mode to Work mode. TR05 was able to continue up the grade staying below the 5 mph speed restriction. According to the data, at no time did the overspeed alarm activate.

Conclusion

TRIPP machines, as with most Roadway Maintenance Machines (RMM), are designed for the typical railroad exchange. The WMATA rail system contains steep inclines/declines, tight radius, superelevation, and spirals that challenge the standard design of RMM. When purchasing equipment, efforts are made to emphasize and account for the non-industry standard trackwork. Due to low-volume purchases, there are consolations that have to be made to keep costs reasonable when acquiring RMM.

As stated in the introduction, the TRIPP machines are long wheel based and have relatively low compliance with front to rear cross level differential. In Travel mode, the air bag suspension helps with changing cross level. In Work mode, the rigid frame can result in uneven wheel loading. Mitigating efforts were made to maintain safety by limiting the maximum allowable speed in Travel mode to 15 mph and 5 mph in Work mode. With more derailments occurring in Work mode, a visual and audible alarm was installed to assist in keeping the operator alert and the TRIPP Machines at a safe speed.

Leading up to this incident, TR05 was unable to negotiate the incline coming out of the Crystal City station in Travel mode. The 4% incline combined with an 800 foot radius required more tractive effort than was available. Although the operator was requesting full power to the wheels, TR05 decelerated. Switching to Work mode allowed TR05 to continue travelling up the incline. The difference between Travel mode and Work mode is limited to the suspension, with propulsion remaining unaffected. Vehicle Program Services, Rail Fleet has not, at this point, been able to define track conditions, either singularly or sum-total, that will result in a derailment nor the reason why additional tractive effort is available in Work mode.

Recommendations

Vehicle Program Services, Rail Fleet will undertake a study to supply more torque to the wheels to remove the need to enter Work mode outside of the work area.

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Appendix K – Why-Tree Analysis