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

W-0353 – Derailment – near Stadium-Armory Station – December 16, 2023

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 December 10, 2024.

WMSC staff recommend adoption of this investigation.

In 2023, Metrorail reported 7 derailments. As of November 15, there have been 3 reported derailments in 2024. This includes events involving passenger trains and events involving maintenance vehicles.

Safety event summary:

Hi-Rail Unit 9042 derailed on track 1 outside Stadium-Armory Station in an area shutdown for scheduled fiberoptics cable installation between Eastern Market and Benning Road stations on the Blue and Silver lines, and between Eastern Market and Minnesota Avenue stations on the Orange Line. The vehicle had been moved to the Stadium-Armory Station platform from New Carrollton Rall Yard several hours prior to the event by another crew.

At 8:08 a.m., the Pilot, a WMATA employee whose job is to assist the Equipment Operator by acting as a guide, instructed the operator, a contractor, to proceed to the work zone. Four minutes later, at 8:12 a.m., after the vehicle had moved approximately 200-300 feet at about 2 miles per hour, the Pilot instructed the operator to stop the vehicle, stating, "stop, it's on the ground." Both the Operator and Pilot disembarked the unit to perform an inspection and notified the Roadway Worker In Charger (RWIC). The Pilot and Operator reported hearing a noise and feeling unusual movement as the rear wheels of the vehicle derailed.

The RWIC did not report the derailment to the Control Center until 8:52 a.m., approximately 40 minutes after the event occurred.

WMATA personnel from various departments including the Office of Track and Structure, and Car Track Equipment Maintenance, were dispatched to the scene. Following an inspection, the vehicle was rerailed, moved and temporarily stored before being towed and removed from the roadway for further inspection at New Carrollton Rail Yard. There was minor infrastructure damage to the running rails, third rail coverboard and insulators.

There were no injuries reported as a result of this safety event. The Equipment Operator and Pilot were removed from service for post-event toxicology testing.

During an investigative interview the Equipment Operator stated that they did not perform a complete pre-trip inspection of the Hi-Rail Vehicle because the unit was located at the Stadium-Armory Station platform with a prime mover parked behind it, limiting access. Metrorail policy requires that equipment operators preparing roadway maintenance machines for movement perform an interior and exterior inspection (walk-around) and a standing and rolling brake test prior to initiating general operation of the consist. In this case, the Equipment Operator should have relocated the Hi-Rail Vehicle past the platform in order to complete a full inspection. The investigation found the derailment was caused by an unlocked rail gear, which allowed the unit to drift. A rail gear is a mechanical lock used to keep the rail gear fully deployed so that the vehicle does not solely rely on hydraulic cylinders to ensure wheels of the Hi-Rail Vehicle maintain contact with the running rails.

The causes of and contributing factors to the event include:

- Non-compliance with operational rules, procedures and instructions

As a result of these investigations Metrorail developed and Lessons Learned – After Action Report, that included the following lessons learned:

- Prior to operating a Hi-Rail Vehicle a complete pre-trip inspection must be performed
- Prior to embarking a Hi-Rail Vehicle onto the roadway ensure all switches and locking mechanisms are locked and in place
- While operating Hi-Rail Vehicle be vigilant in recognizing any roadway hazards
- Adhere to all regulated speed

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

FINAL REPORT OF INVESTIGATION A&I E23892

Date of Event:	December 16, 2023
Type of Event:	A-5: Derailment
Incident Time:	08:12 hours
Location:	Stadium-Armory Station, track 1
Time and How received by SAFE:	09:06 hours – Mission Assurance Coordinator (MAC)
WMSC Notification Time:	09:13 hours
Responding Safety Officers:	WMATA: Office of Emergency Preparedness (OEP) Office of Operations Safety Oversight (OSO) Office of Safety Investigations (OSI) WMSC: None Other: None
Rail Vehicle:	Hi-Rail Vehicle Unit ID 9042
Injuries:	None
Damage:	Infrastructure damage - scratches to running rails, third rail cover boards, and insulators knocked over
Emergency Responders:	None
SMS I/A Incident Number:	20231216#113417MX

Stadium-Armory Station - Derailment

December 16, 2023

Table of Contents

Abbreviations and Acronyms

AOM	Assistant Operations Manager
CAPD	The Office of Capital Delivery
CAP	Corrective Action Plan
CM	Chain Marker
CCTV	Closed-Circuit Television
CENV	The Office Vehicle Services
CTEM	Car Track Equipment Maintenance
MAC	Mission Assurance Coordinator
MICC	Metro Integrated Command and Communications
NOAA	National Oceanic and Atmospheric Administration
OEP	Office of Emergency Preparedness
OSI	Office of Safety Investigations
OSO	Office of Safety Oversight
PM	Prime Mover
RMM	Roadway Maintenance Machine
RTC	Rail Traffic Controller
RWIC	Roadway Worker In Charge
SAFE	Department of Safety
SDOC	Safety Director on Call
SMS	Safety Measurement System
TRST	Office of Track and Structures
WMATA	Washington Metropolitan Area Transit Authority

Executive Summary

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

On Saturday, December 16, 2023, Hi-Rail Vehicle 9042 was staged at the Stadium-Armory Station platform on track 1 to conduct fiberoptics cable installation within a shutdown area between Eastern Market and Benning Road/Minnesota Avenue Stations. At 08:05 hours, Hi-Rail Vehicle Unit 9042 departed the Stadium-Armory platform on track 1, traveling outbound.

At 08:12 hours, Hi-Rail Vehicle Unit 9042 derailed near chain marker CM D1 215+00 outside of Stadium-Armory Station, within the shutdown area. Work was halted in the area, and the Metro Integrated Command and Communication Center (MICC) was notified. Personnel from the Office of Emergency Preparedness (OEP), Office of Operations Safety Oversight (OSO), and Office of Safety Investigations (OSI) responded to investigate and assess the event.

The Equipment Operator, a contractor employed by C3M Power Systems, and the Pilot, a WMATA employee, reported hearing a noise and feeling an unusual movement as the vehicle derailed. The Pilot dismounted the vehicle and discovered that the rear wheels of Hi-Rail Vehicle 9042 were derailed and on the ground.

At 08:53 hours, the Office of Track and Structures (TRST) Roadway Worker in Charge (RWIC) contacted the MICC and reported to the Button Rail Traffic Controller (RTC) that the rear wheels of Hi-Rail Unit 9042 had derailed at CM D1 215+00 near Stadium-Armory Station.

Additional personnel from the Office of Vehicle Program Services (CENV), Car Track Equipment Maintenance (CTEM), and the Office of Capital Delivery (CAPD) were dispatched, conducted an inspection, and reported minor infrastructure damage was observed. At 17:30 hours, Hi-Rail Vehicle Unit 9042 was rerailed and, under its own power, moved and was stored at CM D1 251+00. On December 18, 2024, Prime Mover (PM-49) towed Hi-Rail Vehicle Unit 9042 to Addison Road Station roadway crossing, where it was removed from the roadway.

The Equipment Operator and Pilot were removed from service for post-incident testing. Hi-Rail Vehicle Unit 9042 was transported to New Carrollton Yard for post-incident inspection. Infrastructure damage included scratches to the running rails, third rail cover boards, and insulators (which were knocked over). There were no injuries as a result of this event.

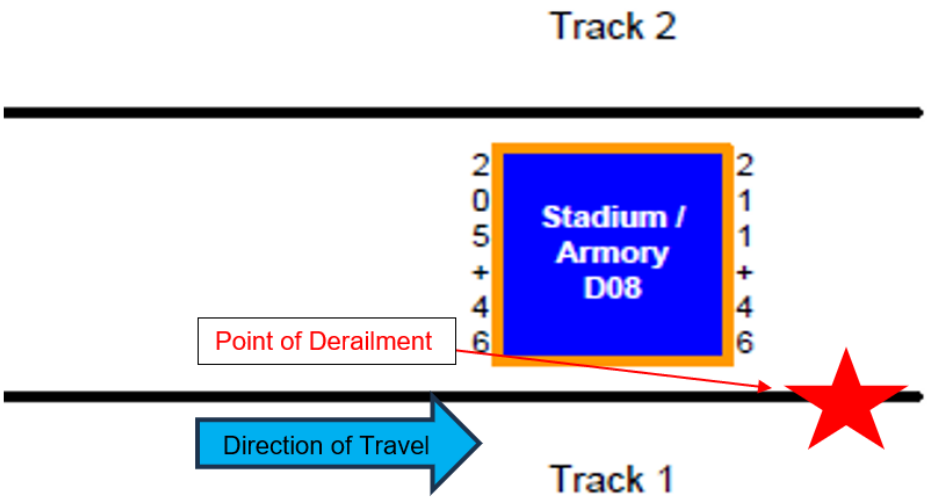
The probable cause of the Derailment near Stadium-Armory Station on December 16, 2023, was due to unlocked rail gear[1]. At the time of the derailment, the hydraulic cylinder[2] was the primary means of maintaining correct wheel-to-rail contact.

[1] *A mechanical lock is used to keep the rail gear fully deployed and not rely solely on the hydraulic cylinder.*
[2] *Hydraulic cylinders on high rail vehicles maintain consistent wheel contact with the tracks, adjusting weight distribution for stability.*

Incident Site

Stadium-Armory Station (D08) CM D1 215+00, in the area of the entrance to Stadium-Armory Station within an area that was shut down for Scheduled Track Maintenance.

Field Sketch/Schematics



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

Upon receiving notification of the Derailment at the Stadium-Armory Station on December 16, 2023, SAFE dispatched a cross-functional team to assess the scene and conduct the subsequent investigation. SAFE team members worked with relevant WMATA subject matter experts to review the incident's facts and data.

The investigative methodologies included the following:

- Physical site assessment

- Formal Interviews – SAFE interviewed one 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 individuals:
  - Equipment Operator
  - Pilot

- Informal Interviews – Collected through conversations with individuals during the investigation to provide background and supporting information. Written statements were reviewed from personnel present during the event.

- 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)
    - Equipment Operator Training Records
    - Equipment Operator Certifications
    - Equipment Operator 30-Day work history review
    - Pilot Training Records
    - Pilot Certifications
    - Pilot 30-Day work history review
    - Hi-Rail Vehicle Inspection Records
    - TRST Track Inspection Report
    - CENV Incident Report

- System Data Recording Review – A collection of information contained in Metro Data Recording Systems. This data includes:
    - Audio Recording System (ARS) playback
    - Closed-Circuit Television (CCTV)

Investigation

On July 13, 2023, Hi-Rail Vehicle Unit 9042 was inspected and approved for a six-month use on the roadway.

Image 1 – Hi-Rail Vehicle 9042 post-derailment position CM D1 215+00. (Front view)

The weekend shutdown began on Saturday, December 16, 2023. During this shutdown, maintenance (fiberoptics cable installation) was performed from Eastern Market Station to Benning Road Station and Minnesota Avenue Station, and there was no rail service at Stadium-Armory Station.

The Audio Recording System (ARS) revealed that at 08:08 hours, the Equipment Operator and Pilot conducted a radio check, and then the Pilot instructed the Equipment Operator to proceed. At 08:12 hours, the Pilot stated, “Stop, it's on the ground.”

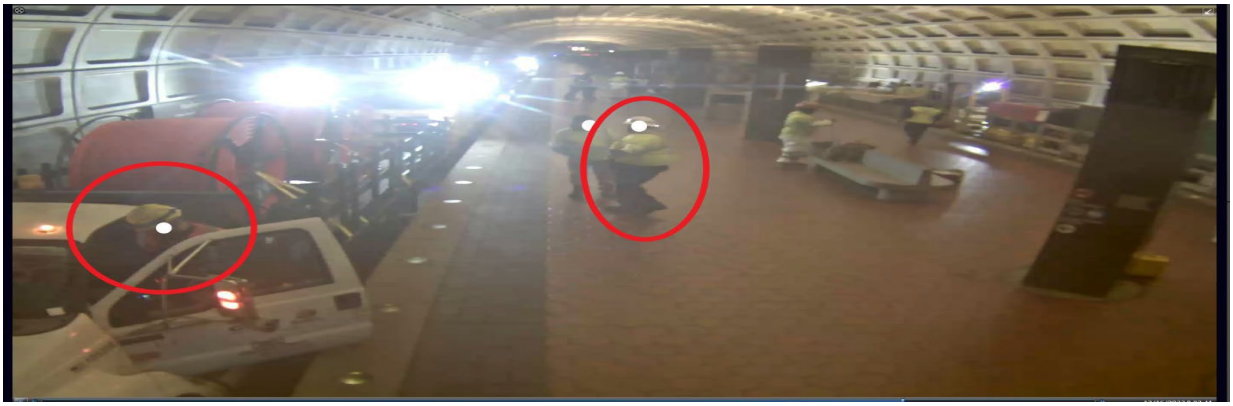


Image 2 - The Equipment Operator entering the cab and the Pilot located on the platform at Stadium-Armory Station, track 1, at 08:03:44 hours.

During the formal interview, the Pilot stated that they disembarked Hi-Rail Vehicle 9042 to perform an inspection and observed that the vehicle had derailed at CM D1 215+00. The Equipment Operator stated that they contacted their supervisor via cellular phone, reported the event, and awaited a response.

At 08:52 hours, the RWIC contacted the Button Rail Traffic Controller (RTC), reported the derailment, and was transferred to the Assistant Operations Manager (AOM). At 08:53 hours, the RWIC notified the MICC AOM and reported the derailment at CM D1 215+00. Advised that they had reported the event to the Supervisor on Duty, and they contacted CTEM, then advised that no medical assistance was needed. At 08:55 hours, the AOM notified the Operations Manager (OM) of the event.

At 09:05 hours, the on-call SAFE representative was notified to respond. At 09:12 hours, the MAC notified the Washington Metrorail Safety Commission (WMSC) of the incident. Personnel from the OEP, OSO, and OSI were dispatched and responded to investigate and assess the scene. The WMSC granted an Event Scene Release at 09:13 hours.

Personnel from CENV, CTEM, and CAPD were dispatched to conduct an inspection. At 10:59 hours, OSI released the scene to allow for the rerailing process to begin.

TRST personnel performed loaded gauge measurements[3] in front and at the rear of the derailed unit. Both were reported within tolerance (D1 215+00 – 216+00). The inspection of the area identified scratches on the running rails, damage to an insulator, and a third rail cover was knocked over.

[3] *Loaded gauge refers to the maximum dimensions of a railway vehicle, including cargo, that can safely operate on a rail network. It includes width, height, and overall size, ensuring safe clearance through tunnels and bridges.*

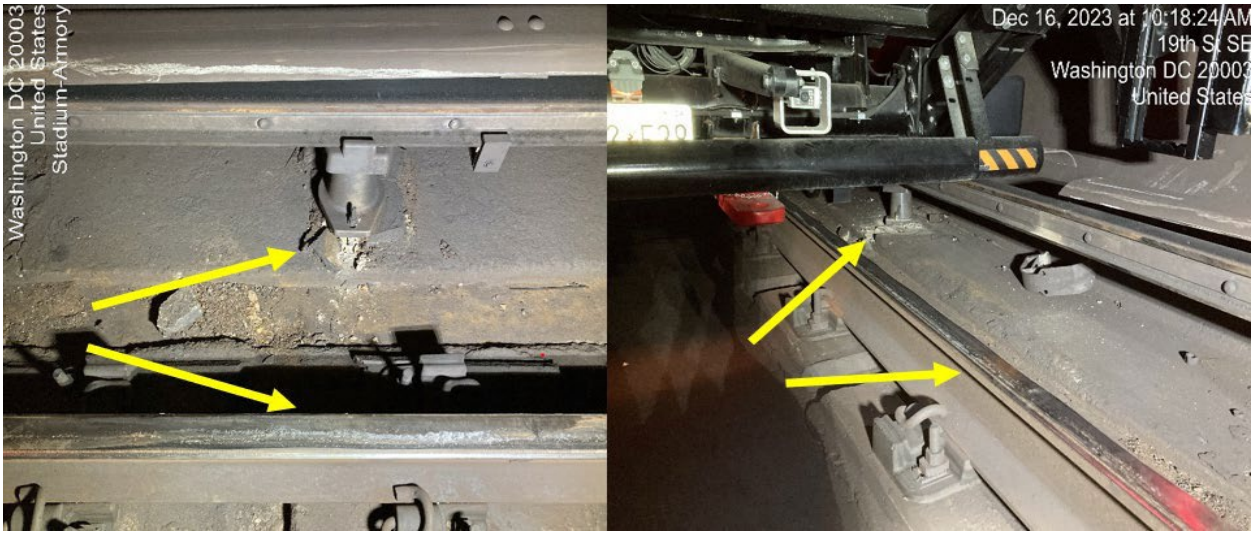


Image 3 & 4 – Images depict damage to running rails and insulators.

At 17:30 hours, Hi-Rail Vehicle Unit 9042 was rerailed and, under its own power, moved and was stored at CM D1 251+00. On December 18, 2024, Prime Mover (PM-49) towed Hi-Rail Vehicle Unit 9042 to Addison Road Station roadway crossing, where it was removed from the roadway.

The cause of the derailment was determined to be the mechanical locks[4] for the rear hi-rail gear set to an unlocked position. The hi-rail gear was unsecured at the time of the derailment. Without the rear hi-rail gear set to a locked position, the hydraulic cylinders' holding valves could not provide enough resistance, leading to the rear hi-rail gear drifting over time. This allowed the rail wheels to unload, resulting in a flange climb.

[4] *Mechanical locks on high rail vehicles secure the rail gear, ensuring proper alignment and preventing derailments. Regular inspection and maintenance are essential for reliability, as failure can compromise vehicle stability during rail and road transitions.*

Images 5 and 6 - Depicts the derailed left rear wheel of Hi- Rail Vehicle 9042. (Rear view)

Image 7 - Right axle of Hi-Rail Vehicle 9042. (Rear view)

Image 8 - Right axle of Hi-Rail Vehicle 9042. (Rear Center View)

The investigation revealed that the Equipment Operator acknowledged that they were not able to perform a pre-trip inspection due to the limited clearance area and positioning of the vehicle on the platform.

The vehicle had a light to medium load on the back bed when the back wheels derailed. The point of the derailment was 25 feet away from the Point of Rest at CM D1 215+00.

The C3M Power Systems returned Hi-Rail Vehicle 9042 to the New Carrollton CTEM shop on December 27, 2023, for a post-incident inspection, during which no deficiencies were noted.

Chronological Event Timeline

A review of ARS playback, i.e., phone and radio communications, revealed the following timeline:
Note: Times above may vary from other systems' timelines based on clock settings.

Time	Description
01:23:29 hours	Hi-Rail Vehicle 9042 was located at New Carrollton Station when the Equipment Operator requested to travel to the work area at Stadium-Armory Station on track 1. [Radio Ops 2]
02:22:51 hours	Equipment Operator: Reported Hi-Rail Vehicle 9042 was located at the work area at Stadium-Armory Station on track 1. [Radio Ops 2]
08:08:06 hours	The Equipment Operator and Pilot conducted a radio check. The Pilot instructed to proceed. [Radio Ops 10]
08:12:37 hours	The Pilot stated, "Stop, it's on the ground." [Radio Ops 10]
08:52:36 hours	RWIC: Reported the derailment at CM D1 215+00. Button RTC: Acknowledged. Transferred to the AOM. [Phone, BL/OR]
08:53:23 hours	RWIC: Reported the vehicle derailed at CM D1 215+00. Advised that they reported the event to the Supervisor on Duty, and they contacted CTEM. Advised that no medical assistance was needed. AOM: Acknowledged. [Phone, Rail 3]

08:54:12 hours	Button RTC: Reported the derailment at CM D1 215+00. ROIC: Acknowledged. Transferred to the AOM. [Phone, BL/OR]
08:55:34 hours	AOM: Notified the OM. OM: Acknowledged. [Phone, Rail 1]
09:00:14 hours	MAC: Advised the SDOC of the event, and OEP personnel were en route. [Phone, MAC]
09:02:41 hours	MICC Button RTC: Updated the AOM on the event. AOM: Acknowledged. [Phone, Metro 1]
09:05:15 hours	MAC: Dispatched the On-Call Safety personnel to Stadium-Armory Station. [Phone, MAC]
09:13:00 hours	MAC: Received Event Scene Release. [Phone, MAC 1]
10:00:05 hours	OSI arrived on the scene. [CCTV]
10:59:00 hours	OSI released the scene, for the rerailing process began. [Radio Ops 2]
12:34:17 hours	RWIC: Reported the vehicle was being rerailed and inspected. [Phone, Rail 1]
17:30:00 hours	Hi-Rail Unit 9042 was rerailed. [CTEM Report]

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

Interview Findings and Written Statements

As part of the investigation into the Derailment near Stadium-Armory Station, SAFE conducted two (2) interviews. The interviews identified the following key findings associated with this event. The findings detailed below include reported information from involved personnel and may conflict with other data sources contained in the report.

The Pilot (Unit 9042)

- The Pilot stated that at 08:00 hours, they located Hi-Rail Vehicle Unit 9042 at Stadium-Armory Station platform where it had been left by another crew hours before.
- The Pilot stated they were traveling within the vicinity of CM D1 215+00 " less than 2 MPH" and heard a very loud, sudden noise. They felt a shift in the vehicle's rear.
- The unit stopped and the Pilot disembarked to inspect the unit and rail.
- The Pilot stated they then observed that the rear wheels had derailed.
- The Pilot stated they then notified their hierarchy of the incident.
- The Pilot and Equipment Operator remained at the scene until they were removed from service.

Equipment Operator

- The Equipment Operator stated that their duties were to take the Hi-Rail Vehicle on track 2 and operate down to the work zone.
- The Equipment Operator stated that they completed as much visual inspection as possible because the vehicle was at the platform with a Prime Mover parked right behind it.
- The Equipment Operator stated that they operated the Hi-Rail Vehicle at 2 MPH or less for about 200-300 feet and heard and felt a jump and bump.
- The Equipment Operator stated that they stopped as the Pilot directed.
- The Equipment Operator stated that the rear of the Hi-Rail Vehicle had slid off the

rails to the right.
- The Equipment Operator stated that they reported the event to their supervisor via cell phone and awaited a response.

Weather

On December 16, 2023, at the time of the incident, NOAA recorded the temperature as 33° F, with moderate cloud cover, winds 5.4 mph, and 28% humidity. The event occurred within a tunneled section of the rail system. Weather was not a contributing factor in this incident (Weather source: NOAA) – Location: Washington, DC.

Related Rules and Procedures

- MOR – RMMs & Hi-Rail Vehicles – 11.1 – Responsibilities.
- MOR – RMMs & Hi-Rail Vehicles – 11.5.2 – Protection on Controlled Track.
- MOR – RMMs & Hi-Rail Vehicles – 11.9 – Operating with Caution.
- MOR – RMMs & Hi-Rail Vehicles – 11.18.4.1 – Crew Member Required Communications.
- SOP 9 – Procedures for Derailment Mainline

Human Factors

Fatigue

Signs and Symptoms of Fatigue

Pilot

The incident data were evaluated for evidence of fatigue that may have been present at the time of the incident. No signs or symptoms of fatigue were detected from the available data. Video of the incident was reviewed for signs of the Pilot's fatigue. No signs or symptoms of fatigue were evident from the video. The employee reported feeling fully alert at the time of the incident. The Pilot reported experiencing no symptoms of fatigue in the time leading up to the incident.

Equipment Operator

The incident data were evaluated for evidence of fatigue that may have been present at the time of the incident. No signs or symptoms of fatigue were detected from the available data. Video of the incident was reviewed for signs of the Equipment Operator's fatigue. No signs or symptoms of fatigue were evident from the video. The employee reported feeling fully alert at the time of the incident. The Equipment Operator reported no fatigue symptoms leading up to the incident.

Fatigue Risk

Pilot

The incident data were evaluated for fatigue risk factors. No significant risk was identified. The incident time of day did not suggest an increased risk of fatigue-related impairment. The Pilot reported keeping a regular sleep schedule in the days leading up to the incident. The Pilot performed night shift work in the days leading up to the incident. The employee was awake for 3.5 hours at the time of the incident. The Pilot reported 8 hours of sleep in the 24 hours

preceding the incident. The off-duty period was 26 hours, which provided an opportunity for 7-9 hours of sleep. This was more than a comparable amount of sleep to the employee's regular workday sleep durations. The employee reported no issues with sleep.

Equipment Operator

The incident data were evaluated for fatigue risk factors. No significant risk was identified. The incident time of day did not suggest an increased risk of fatigue-related impairment. The Equipment Operator reported keeping a regular sleep schedule in the days leading up to the incident. The Equipment Operator performed night shift work in the days leading up to the incident. The employee was awake for 3 hours at the time of the incident. The Equipment Operator reported 8.5 hours of sleep in the 24 hours preceding the incident. The off-duty period was 26 hours, which provides an opportunity for 7-9 hours of sleep. This was more than a comparable amount of sleep to the employee's regular workday sleep durations. The employee reported no issues with sleep.

Post-Incident Toxicology Testing

WMATA's Drug and Alcohol Program determined that the Equipment Operator and Pilot were not in violation of the Drug and Alcohol Policy and Testing Program 7.7.3/7.

Work History

The Pilot is a WMATA employee with over 10 years of total service as an Equipment Operator. The employee is certified to the Roadway Worker Protection (RWP) - 4 Level and expires in December 2024.

The Equipment Operator is a contractor with six months of total service as an Equipment Operator. The Equipment Operator was last certified on June 30, 2023. This employee is certified to the CRWP-1 Level and expires in June 2024.

Findings

- The Pilot stated that the pre-trip inspection was limited due to the partial blocking on the platform side of the vehicle.
- Hi-Rail Vehicle Unit 9042 speed was at 2 MPH at the time of the derailment.
- The derailment occurred within a +35% downgrade, entering the spiral curve.

Immediate Mitigation to Prevent Recurrence

- The Equipment Operator and Pilot were removed from service, post-incident.
- Hi-Rail Vehicle 9042 was removed from service, inspected on scene, and rerailed.
- The vehicle was removed from the work area.
- TRST performed a track inspection with gauge measurements to ensure the track complied with standards.

Probable Cause Statement

The probable cause of the Derailment near Stadium-Armory Station on December 16, 2023, was due to unlocked rail gear. At the time of the derailment, the hydraulic cylinder was the primary means of maintaining correct wheel-to-rail contact.

Recommended Corrective Actions

Corrective Action Code	Description	Responsible Party	Estimated Completion Date
113417_SAFECAPS_CAPD_001	(RC-1) CAPD developed a Lessons Learned - After Action Report	CAPD	Completed

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.

The Pilot

The Pilot is a WMATA Employee with 10 years of service. The Pilot holds an RWP Level 4 that expires on 12/31/2024.

The Pilot stated they were assigned to pilot the Hi-Rail Vehicle as part of a two-person team crewing for Unit 9042.

The Pilot stated that at approximately 08:00 hours, they arrived at Stadium-Armory Station and observed the Hi-Rail Vehicle 9042 which had been operated through eight stations to the site by the evening shift. The Pilot stated that the Equipment Operator was responsible for completing a pre-trip inspection, and the access to perform a pre-trip inspection was limited due to the position of the vehicle at the platform. The Pilot stated that they believed the request to relocate the vehicle for a complete pre-trip inspection was declined by the RWIC. The Pilot stated that they did observe the vehicle was chalked but could not observe if the hi-rail gear was locked or unlocked. The Pilot stated that they were unfamiliar with this particular unit.

The Pilot stated that tThe Equipment Operator received permission to proceed, and both the Equipment Operator and Pilot departed the Stadium-Armory Station. The Pilot stated that their role was to observe and guide the Equipment Operator while also monitoring signals and communicating on the WMATA radio. The Pilot stated that they were traveling about 300 feet, within the vicinity of D1 215+00 “less than 5 MPH” and heard a very loud, sudden noise and the rear of the vehicle shifted. The vehicle stopped. The vehicle had a light to medium load in the back bed but nothing that would have caused the vehicle to shift.

The Pilot stated that they exited the vehicle for inspection. They observed the vehicle was derailed in the rear. They did not observe anything on the rails or vehicle that identified a reason for the derailment. The Pilot stated that they notified the RWIC of the derailment. The Pilot stated that they remained at the scene until other WMATA personnel arrived to assist.

The Pilot stated that they it would be beneficial if WMATA Equipment Operators could become more familiar with the various contractor equipment they assist with as pilots.

Equipment Operator

The Equipment Operator is a WMATA Contractor who works for C3M Power Systems, with six months of total service as an Equipment Operator. The Equipment Operator was last certified on June 20, 2023. The Pilot holds an RWP Level 1 that expires in June, 2024.

The Equipment Operator stated they were assigned to operate a Hi-Rail Vehicle on the track and operate in the work zone. The Equipment Operator stated that they arrived at 0800 hours, to enter the Hi-Rail Vehicle and prepared to move. The Equipment Operator stated that the Hi-Rail Vehicle was positioned at the station platform. It was a large truck alongside the platform with no room to perform a thorough pre-trip. The station was inside a portal with little room on either side.

The Equipment Operator stated that they did as much visual inspection as they could. The Equipment Operator stated they heard the Pilot tell the RWIC they were prepared to move and not to forget the chalks. The Equipment Operator stated they saw the chalks in front of the vehicle. The Equipment Operator stated they climbed down the driver's side to retrieve the chalks. They could see the rear chalks when removed the front chalks but could not reach the back as a Prime Mover was parked close behind.

The Equipment Operator stated they did not perform an additional pre-trip once they cleared the platform as all looked good. The Equipment Operator stated they did not know if the Pilot had asked about relocating for a better opportunity for pre-trip. The Equipment Operator also did not know of any conversation except that they were ready to move. The Equipment Operator stated that they were sure that they vehicle was staged by someone who worked with C3M, who was a qualified person. The Equipment Operator stated once they were rolling down the track, at about 2 MPH, the speedometer read zero, and was basically coasting.

The Equipment Operated stated the truck was newer, bigger, and had some weight in the back. Cable reels were in the bed, properly spaced and balanced. The Equipment Operator reported the travel prior to derailment with nothing unusual. The Equipment Operator reported that the Hi-Rail Vehicle, owned by C3M, moved 200-300 feet before the rear end came off the rail. The Equipment Operator stated they felt a jump, or a bump, louder than normal. The Equipment Operator stated the Pilot said to stop. The Equipment Operator stopped the Hi-Rail Vehicle.

The Equipment Operator stated that they used a light and observed the back-end of they truck was off track. The Equipment Operator stated the Pilot was in the cab when they hopped out. The Equipment Operator went back and advised the Pilot the rear was off track. The Equipment Operator stated the Pilot asked how that did that happen, the Equipment Operator responded they had no idea. The Pilot advised that they would make a phone call. The Equipment Operator stated that they called their foreman.

The Equipment Operator stated that the Pilot said to stand by stand clear and wait. The Equipment Operator stated that they did not notice anything unusual about the truck.

The Equipment Operator stated that when WMATA Safety arrived they noticed the tunnel was really dark with about four lights out. The Equipment Operator stated the WMATA Safety members found an extended bolt on the right-hand side of the rail. The Equipment Operator stated they noticed the rail slope was not completely flat. The Equipment Operator also noted a mark on the left-hand side of the rail where it appeared to have come off.

The Equipment Operator stated they had never experienced a derailment. The Equipment Operator stated they just stood by and let safety handle it.

Washington Metropolitan Area Transit Authority

CENV

Incident Report

CR9042 D98 Derailment

December 18, 2023

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Document 1 – CENV Incident Report, Page 1 of 5

Drafted By: SAFE 709 - 08/21/2023
Reviewed By: SAFE 702 –09/03/2024
Approved By: SAFE 707 – 10/03/2024

Washington Area Metropolitan Transit Authority

Incident Summary Report

Table of Contents

LOCATION: CM D1 215+00 Track 1
INCIDENT #: -----
DATE: 12/16/2023
TIME: 0815

Investigation Team Members

[redacted] Senior Vehicle Engineer – CENV
Assistant Manager – CENV

Report Prepared By: [redacted]

Report Approved By: [redacted]

Document 2 - CENV Incident Report, Page 2 of 5

Executive Summary

On the morning of December 16, 2023, at approximately 0815 hours, contractor hi-rail unit CR9042 derailed within the work zone on D-line Track 1 at chain marker 215+00 (Figure 1). ROCC was notified and CTEM mechanics were dispatched. At 1730 hours, the unit was rerailed and moved to the East end of the work limits. No injuries were reported. Revenue service was not disrupted.

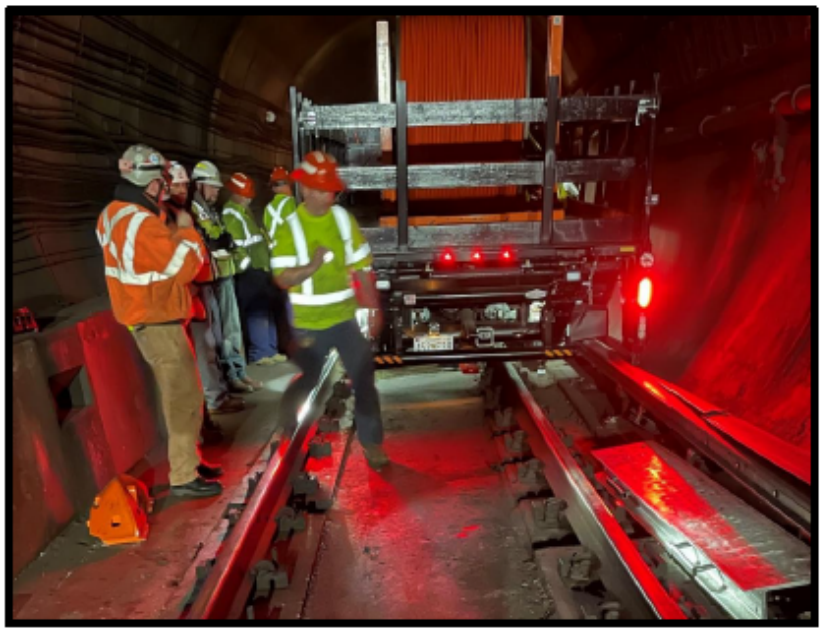

Figure 1. CR9042 derailment

Post incident inspection of CR9042 on December 27, 2023, revealed no deficiencies with the vehicle or hi-rail gear. Review of the photographs taken at the scene by SAFE show the rear hi-rail gear in an unlocked condition. A mechanical lock is provided to keep the rail gear fully deployed and not rely solely on the hydraulic cylinder as the primary means of maintaining correct wheel to rail contact. Unlocked rail gear that allowed cylinder drift and consequently incorrect wheel to rail contact would be a contributing factor to a derailment.

Introduction

WMATA utilizes hi-rail vehicles to perform system maintenance. Hi-rail vehicles have the ability to traverse both over-the-road and on-rail. The most common application is standard DOT trucks outfitted with deployable rail gear. They are commonly used for short-term contracts that have unique requirements that do not warrant long-term investment through a WMATA vehicle purchase.

The contractor, Aldridge Electric, was using a Ford F750 stake bed truck with a 33,000 GVW. The hi-rail gear is DMF RW-1420 series. CR9042 was inspected and approved for six-month use on July 13, 2023 (see Attachment A). WMATA requires contractor rail vehicles to be inspected a minimum of every six months per CMOR OAP 101.01.

Document 3 - CENV Incident Report, Page 3 of 5

Findings of Investigation

On the morning of December 16, 2023, at approximately 0815 hours, contractor hi-rail unit CR9042 derailed on D-line Track 1 at chain marker 215+00. The vehicle was released by SAFE at 1130 hours. CTEM mechanics, using rerail equipment, rerailed CR9042 by 1730 hours. CR9042 transported under its own power to the East end of the work limits at chain marker 251+00 for eventual removal from the work site. No injuries were reported. Revenue service was not disrupted.

On the morning of December 18, 2023, CR9042 was towed to the Addison Road crossing by PM49 for dismount and removal from the roadway. The contractor returned CR9042 to New Carrollton CTEM shop on December 27, 2023, for a post incident inspection, during which no deficiencies in the were noted.

Reviewing photographs from the incident scene show the mechanical locks for the rear hi-rail gear in an unlocked position (Figure 2 and Figure 3). If the hi-rail gear was unsecured at the time of derailment, this would be a contributing factor to the derailment. The hydraulic cylinders have holding valves to provide some resistance to drift, but over time, will allow the rail wheels to unload, resulting in flange climb.

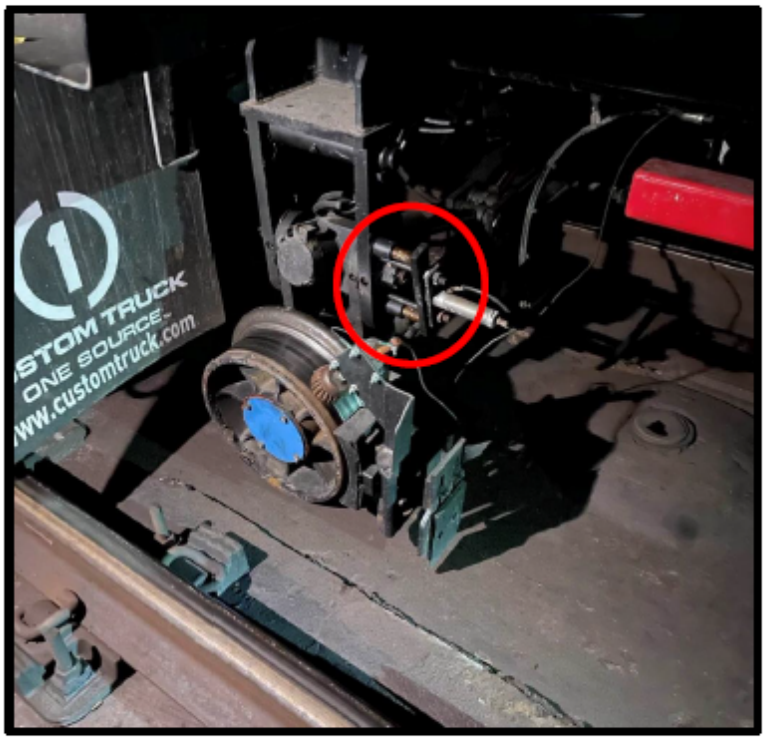

Figure 2. Left locks not engaged

Document 4 - CENV Incident Report, Page 4 of 5

Figure 3. Right locks not engaged

Conclusion

This incident is likely a result of incorrectly deployed rear hi-rail gear. The right and left wheels of the rear rail gear extend independently, and both locks must be verified separately.

Recommendations

- Ensure rail gear is deployed correctly and fully locked when hi-rail trucks mount the rail.
- Ensure a complete track test is performed if the vehicle returns for use on WMATA roadway.

Appendix C – C3M Contractor High Rail Vehicle 9042 Pre-Trip Inspection Form

DRIVER'S VEHICLE INSPECTION REPORT

AS REQUIRED BY THE D.O.T. FEDERAL MOTOR CARRIER SAFETY REGULATIONS

CARRIER: C3M POWER SYSTEMS LLC

LOCATION: 1030 Hampton Park Blvd., Ste. 200 - Capitol Heights, MD 20743

DATE: 12/15/2023 TIME: ~~8:10~~ A.M. 8:10 P.M.

TRACTOR/ TRUCK NO.: 208 ODOMETER READING BEGIN: _____ END: _____

CHECK ANY DEFECTIVE ITEM AND GIVE DETAILS UNDER "REMARKS"

Prt = Pre-Trip Pot = Post-Trip RR = Requires Repair

Prt	Pot	RR		Prt	Pot	RR		Prt	Pot	RR	
☑	☐	☐	Air Compressor	☑	☐	☐	Front Axle	☑	☐	☐	Safety Equipment
☑	☐	☐	Air Lines	☑	☐	☐	Fuel Tanks				Fire Extinguisher
☑	☐	☐	Battery	☐	☐	☐	Generator				Flags - Flares - Fusees
☑	☐	☐	Belts and Hoses	☑	☐	☐	Horn				Reflective Triangles
☑	☐	☐	Body	☑	☐	☐	Lights				Spare Bulbs and Fuses
☑	☐	☐	Brake Accessories				Head - Stop				Spare Seal Beam
☑	☐	☐	Brakes, Parking				Tail - Dash	☑	☐	☐	Starter
☑	☐	☐	Brakes, Service				Turn Indicators	☑	☐	☐	Steering
☐	☐	☐	Clutch	☑	☐	☐	Mirrors	☑	☐	☐	Suspension System
☐	☐	☐	Coupling Devices	☑	☐	☐	Muffler	☐	☐	☐	Tire Chains
☑	☐	☐	Defroster/Heater	☑	☐	☐	Oil Level	☑	☐	☐	Tires
☑	☐	☐	Drive Line	☑	☐	☐	Radiator Level	☑	☐	☐	Transmission
☑	☐	☐	Engine	☑	☐	☐	Rear End	☑	☐	☐	Trip Recorder
☑	☐	☐	Exhaust	☑	☐	☐	Reflectors	☑	☐	☐	Wheels and Rims
☐	☐	☐	Fifth Wheel					☑	☐	☐	Windows
☑	☐	☐	Fluid Levels					☑	☐	☐	Windshield Wipers
☑	☐	☐	Frame and Assembly					☐	☐	☐	Other

TRAILER(S) NO.(S): 1 N/A 2 _____

Prt	Pot	RR		Prt	Pot	RR		Prt	Pot	RR	
☐	☐	☐	Brake Connections	☐	☐	☐	Landing Gear	☐	☐	☐	Straps
☐	☐	☐	Brakes	☐	☐	☐	Lights - All	☐	☐	☐	Tarpaulin
☐	☐	☐	Coupling Devices	☐	☐	☐	Reflectors/Reflective Tape	☐	☐	☐	Tires
☐	☐	☐	Coupling (King) Pin					☐	☐	☐	Wheels and Rims
☐	☐	☐	Doors	☐	☐	☐	Roof	☐	☐	☐	Other
☐	☐	☐	Hitch	☐	☐	☐	Suspension System				

Remarks: TIRE PRESSURE 97 PSI ALL AROUND

☑ CONDITION OF THE ABOVE VEHICLE IS SATISFACTORY

DRIVER'S SIGNATURE: [redacted]

☐ ABOVE DEFECTS CORRECTED

☐ ABOVE DEFECTS NEED NOT BE CORRECTED FOR SAFE OPERATION OF VEHICLE

MECHANIC'S SIGNATURE: _____ DATE: _____

DRIVER'S SIGNATURE: _____ DATE: _____

19444

Document 6 - Hi-Rail Vehicle Pre-Trip Inspection Report, Page 1 of 1

CONTRACTOR'S HI-RAIL UNIT DERAILMENT

After Action Report

March 5, 2024

Statement of Facts

On December 16, 2023, at approximately 0815, contractor HR CR9042 derailed between Stadium Armory and Benning Road at chain marker D1 215+00. Hi Rail pilot notified MICC who dispatched CTEM mechanics. At approximately 1730 HR CR9042 was rerailed onto the roadway.

Possible Contributing Factors

1. HR CR9042 rear hi-rail gear appear to be in an unlock position. (Figure 1 & 2)
2. Track stud bolts possibly extending above track level. (Figure 3)
3. Existing joint on the running rail. (Figure 4)
4. Incomplete pre-trip inspection prior to embarking on the roadway. (No clearance to passenger side of vehicle due to where unit was staged at in the yard).

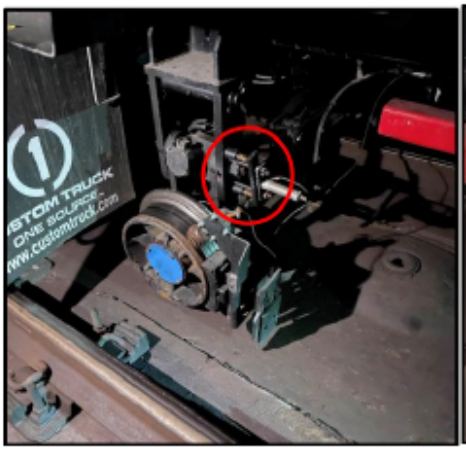

Figure 1. Left rear locking mechanism not engaged

Figure 2. Right rear Locking mechanism not engaged

Preventive Actions

1. **SOP 7.1.3** Rail Vehicle Operators shall ensure that safety devices (e.g., fire extinguishers, switch seals, etc.) are in the proper place and known to be in good working order prior to placing cars into revenue service. The Office of Car Maintenance shall also check these items prior to releasing a car for revenue service.

2. **SOP 7.1.5** Equipment operators removing Roadway Maintenance Machines from storage or preparing Roadway Maintenance Machines for movement shall perform an interior and exterior inspection (walk-around) and perform a standing and rolling brake test prior to initiating general operation of the consist.

3. **SOP 8.9.1** A functional test of the friction braking system shall be made prior to initiating general operation of any rail vehicle.

4. **SOP 11.3.1** Operators of Roadway Maintenance Machines shall be responsible for ensuring that all required daily inspections have been accomplished by qualified personnel before operating vehicle.

Lessoned Learned

1. Prior to operating a Hi-Rail a complete pre-trip inspection must be performed
2. Prior to embarking a Hi-Rail onto the roadway ensure all switches and locking mechanisms are locked and in place.
3. While operating Hi-Rail be vigilant in recognizing any roadway hazards.
4. Adhere to all regulated speed.

Figure 3. Track Stud Bolt

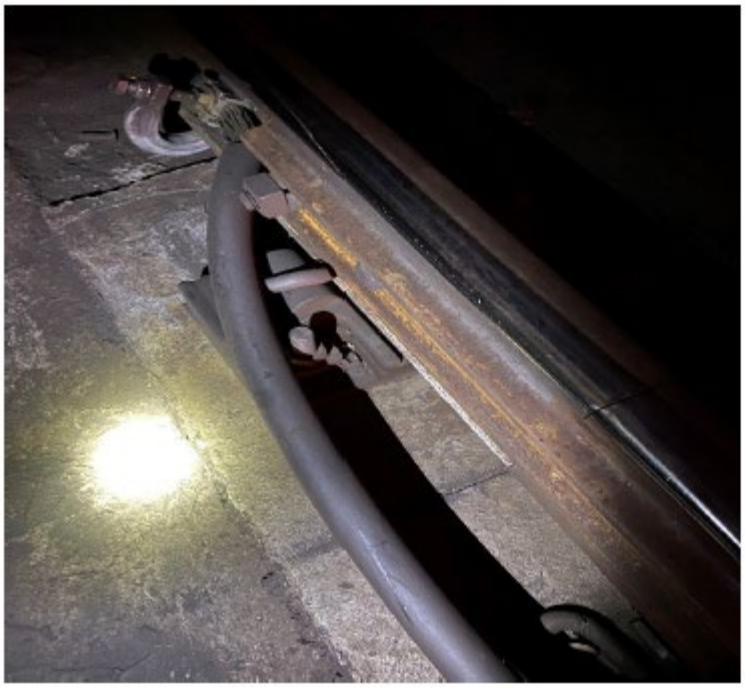

Figure 4. Cut Rail

Appendix D – Why-Tree Analysis