



WMSC Commissioner Brief: W-0260 Derailment – Near Potomac Yard Station – April 11, 2023

Prepared for Washington Metrorail Safety Commission meeting on March 5, 2024

Safety event summary:

A roadway maintenance machine (RMM) being operated from a long-term shutdown area that included the Yellow Line bridge and tunnel between Pentagon and L'Enfant Plaza stations derailed on April 11, 2023 as the Equipment Operator moved the vehicle through a curve approaching Potomac Yard Station. The intended destination was the Alexandria Rail Yard.

The investigation identified that required bolts were not in place on the rear right wheel chassis (used for both road and rail travel), and that the hi-rail gear was incorrectly deployed with the left rear gear not fully deployed (the left and right hi-rail wheels extend and are designed to be locked in place separately). Hi-rail gear includes the flanged metal wheels that make contact with the running rails to allow rubber-tired vehicles to operate on rails as well as over the road. The left side wheel not being fully deployed resulted in a weight imbalance that likely contributed to the derailment.

At the time of this derailment, Metrorail had closed the Yellow Line bridge and tunnel connecting L'Enfant Plaza Station to Pentagon Station for extended repairs. As part of this closure, Metrorail had designated the area an "Authorized Construction Site." Metrorail states that it transfers responsibility for safety to contractors in such a location. As this relates to Roadway Worker Protection, this is under review as part of the Roadway Worker Protection Audit (draft report being finalized).

The rail vehicle, an Aspen Aerial hi-rail truck with a boom crane primarily used to lift people around and under bridges to conduct inspections and repairs, was on the rails in the shutdown area when the Metrorail Equipment Operator arrived. The investigation determined that the vehicle had not been operated for an extended period of time, and had remained in the position on the rails. This was not communicated to the Equipment Operator. The Equipment Operator did not observe any deficiencies prior to operating the vehicle, and received the required permissions from a Rail Operations Control Center Rail Traffic Controller to move the vehicle from the shutdown area toward Braddock Road Station. In the area of Potomac Yard Station, the vehicle derailed. The Equipment Operator was operating in reverse (cab at the trailing end). The hi rail gear at the leading end in the direction of travel (rear of the vehicle) climbed and derailed to the field side.

At the time of the derailment, the vehicle was travelling approximately 14 mph, within the 15 mph limit. The Equipment Operator stated in an investigative interview that these units tend to jerk and shake while travelling through curves. The Equipment Operator regularly operates this type of vehicle for use during bridge inspections.

The Equipment Operator did not immediately realize that the unit had derailed. After identifying the derailment, the Equipment Operator reported the derailment by phone.

Investigation on scene showed that the hi rail gear was not fully deployed. This means that the down forces normally shared with the rail wheel and rubber tires were borne solely by the tires, and the wheel flange would not resist lateral forces in a curve. The risk increases with changing track cross-level (height difference between the two running rails) in a spiral.



The investigation identified significant damage to the left side hi-rail gear and mounting, the side that was not properly deployed at the time of the derailment. On the right side, two of four bolts were missing from the hi-rail mounting, and that side appeared to have been the only side supporting vehicle weight. Metrorail vehicle experts concluded the bolts likely sheared at the time of derailment. All bolts were present on the left side mounting.

During the re-railing process, the rear tow eye on the vehicle was damaged. Subsequent repairs included a speed sensor for the reverse transmission hanging by wires, the broken bracket for the sensor, and light repairs.

Probable Cause:

The probable cause of this event was insufficient safety promotion and safety assurance activities to ensure that hi-rail vehicles are properly placed on the rails, and to ensure that pre-trip inspections are effective and complete.

Corrective Actions:

Metrorail modified its Class 2 (RMM) Rail Vehicle pre-trip inspection form to include hi-rail items such as safety pins being inserted, rail gear being locked in and secured, and proper tire pressure. Metrorail notified equipment operators of the change to the form (Completed).

Metrorail completed an operational hazard analysis on the Aspen Aerial vehicle (Completed).

Metrorail retrained personnel on safety standards for mobile elevating work platforms such as those on boom lifts (Completed).

Metrorail is working on operational hazard analyses for all WMATA-owned RMMs (Expected completion date 2027).

Examples of other related open CAPs

- C-0084: Metrorail is not following and does not have effective safety certification and acceptance procedures for new RMMs. There is no Metrorail-wide safety certification procedure to implement the SSCP. (Scheduled completion July 2024)
- C-0118: Metrorail does not consistently follow its safety certification process, which leads to project activation and use without proper hazard identification and mitigation, putting Metrorail customers, personnel and first responders at risk. (Scheduled completion April 2024)
- C-0241: Metrorail is not effectively tracking and mitigating hazards related to RMM maintenance and operations in accordance with its PTASP. (Scheduled completion December 2025)

WMSC staff observations:

The WMSC is reviewing elements of Metrorail's "Authorized Construction Site" and "Mobile Command" practices as part of the Roadway/Wayside Worker Protection Audit (draft report being finalized).

The event recorder on the vehicle contributed valuable data to this investigation that improves the assessment and development of safety improvements. Metrorail is adding and utilizing these systems as part of corrective actions to address safety issues identified in previous investigations and audits.



Washington Metropolitan Area Transit Authority
Department of Safety (SAFE)
Office of Safety Investigations (OSI)
FINAL REPORT OF INVESTIGATION A&I E23242

Date of Event:	April 11, 2023
Type of Event:	A-5: Derailment
Incident Time:	01:38 hours
Location:	Outside of Potomac Yard Station – CM C2 408+00
Time and How received by SAFE:	01:38 hours MAC Desk
WMSC Notification Time:	03:18 hours
Responding Safety Officers:	Senior Director, Office of Safety Assurance
Rail Vehicle:	Hi-Rail Vehicle #14800
Injuries:	None
Damage:	Hi-Rail rear gear
Emergency Responders:	TRST, OEP, ATCM, CTEM, ERT, SAFE
SMS I/A Number	20230411#107581

Outside Potomac Yard Station – CM C2 408+00 – Derailment

April 11, 2023

Table of Contents

Abbreviations and Acronyms-----	3
Executive Summary -----	4
Incident Site -----	5
Field Sketch/Schematics -----	5
Purpose and Scope -----	5
Investigative Methods-----	5
Investigation -----	6
Chronological Event Timeline-----	7
Digital Images and Photographs -----	9
Office of Vehicle Program Service (CENV)-----	11
Office of IT Systems & Software (ITSS)-----	12
Office of Systems Maintenance, Office of Radio Communications (COMR) -----	12
Office of Track and Structures -----	13
Interview Findings-----	15
Weather -----	16
Human Factors -----	16
Fatigue-----	16
Post-Incident Toxicology Testing -----	16
Findings -----	16
Immediate Mitigation to Prevent Recurrence -----	17
Probable Cause Statement-----	17
Recommended Corrective Actions -----	17
Appendices -----	18
Appendix A – Interview Summary -----	18
Appendix B – CENV Incident Report-----	19
Appendix C – Hi Rail Vehicle Annual Inspection-----	24
Appendix D – Pre – Trip Inspection Form -----	25
Appendix E – Scene Photographs-----	26
Appendix F – Work Orders -----	29
Appendix G – Why Tree-----	33

Abbreviations and Acronyms

AIMS	Advanced Information Management System
ARS	Audio Recording System
CAP	Corrective Action Plan
CCTV	Closed-Circuit Television
CENV	Office of Vehicle Program Services
CM	Chain Marker
CMOR	Office of Radio Communications
MSRPH	Metrorail Safety Rules and Procedures Handbook
NOAA	National Oceanic and Atmospheric Administration
RTC	Rail Traffic Controller
RTRA	Office of Rail Transportation
ROCC	Rail Operations Control Center
SAFE	Department of Safety
SMS	Safety Measurement System
TRST	Office of Track and Structures
WMATA	Washington Metropolitan Area Transit Authority
WMSC	Washington Metrorail Safety Commission

Washington Metropolitan Area Transit Authority
Department of Safety – Office of Safety Investigations

Executive Summary

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

On April 10, 2023, an Office of Track and Structures (TRST) Equipment Operator AA was assigned to transport hi-rail vehicle 14800 from the L-line construction site to Alexandria Yard. When the Hi-Rail Operator arrived at the site, the unit was already on the rails from the prior night's work, so they conducted their pre-trip inspection. At 01:12 hours, the Hi-Rail Operator contacted the Rail Operations Control Center (ROCC) to request a lead from the L-line to Alexandria Yard. The Radio Rail Traffic Controller (RTC) initially gave them an absolute block to Pentagon Station, track 1. At 01:16 hours, the Radio RTC informed the Hi-Rail Operator that their absolute block changed to Regan National Airport, track 2 and they were crossing over from track 1 to track 2 at Pentagon City Station. The unit was traveling in the reverse direction, with the trailing end of the vehicle at the lead. At 01:22 hours, the Radio RTC informed the Hi-Rail Operator that their absolute block changed to Braddock Road Station.

As the hi-rail vehicle traveled from National Airport Station to Braddock Road Station, the rear gear (leading end in the direction of travel) climbed and derailed to the field side, coming to rest at chain marker (CM) C2 408+00. The vehicle traveled approximately 26 feet from the point of derailment to the point of rest. The area traversed is on a 1.8% decline leading to a spiral out of an 855-foot curve.

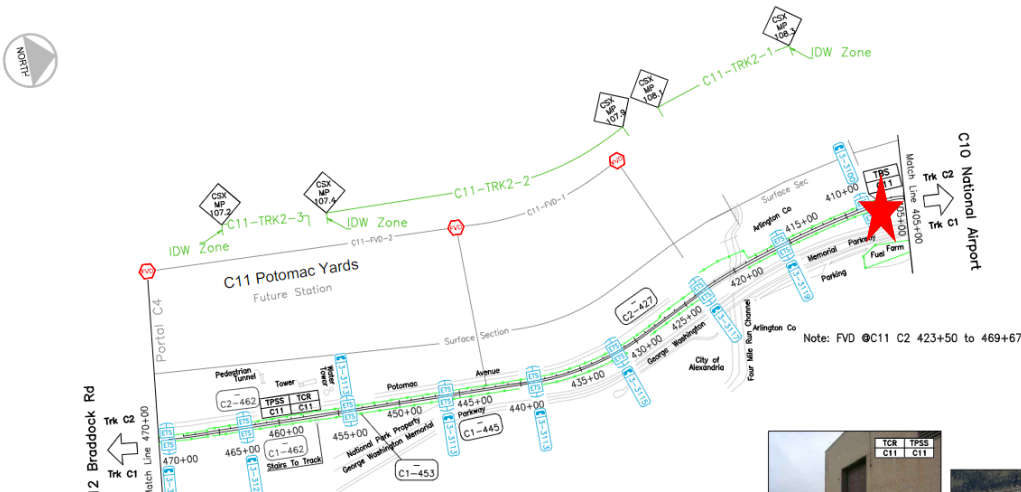
Field investigation by responding Operations and SAFE personnel identified two bolts missing from the rear right wheel chassis, which were not recovered. Field inspection of the area identified a change in wheel-rail interface approximately twenty feet preceding the point of derailment. This was evidenced by noticeable swirl marks on the top of the running rail leading to the point of derailment. There was no damage to the tracks, wayside equipment, or third rail. A post-incident inspection revealed that the Hi-Rail gear was incorrectly deployed, with the left-side rear gear not fully deployed. This resulted in imbalance that likely contributed to the derailment as the vehicle traversed the curve area.

The probable cause for this derailment on April 11, 2023, was the Hi-Rail rear gear being incorrectly deployed. The right and left wheels extend independently and both must be verified and locked separately.

Incident Site

Outdoor section of track that transitioned from an aerial structure to a curved section of ballasted track.

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

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 individual:
 - Hi-Rail Operator
- Documentation Review – Collection of relevant work history information and process documentation contained in WMATA systems of record. These records include:
 - Metrorail Safety Rules and Procedures Handbook (MSRPH)
 - National Oceanic and Atmospheric Administration (NOAA)
 - Hi-Rail Operator 30-Day Work History
 - Hi-Rail Operator Training Records
 - Hi-Rail Operator Safety Records
 - Hi-Rail Vehicle Inspection Records
 - Track Inspections
 - CENV Report
 - Radio Communication Report
- System Data Recording Review – Collection of information contained in Metro Data Recording Systems. This data includes:

- Audio Recording System (ARS) playback, including OPS 3 Radio, Telephone Rail 1, 2, and 3,
- Track Circuit Data
- Samsara Event Recorder

Investigation

On April 10, 2023, a TRST Equipment Operator AA was assigned to transport an Aspen Aerial Hi-Rail vehicle, 14800, from the L-line construction site to Alexandria Yard. The Aspen Aerial Hi-Rail vehicle is used to conduct bridge inspections. When the Hi-Rail Operator arrived at the site, the unit was already on the rails from prior work activities, so they conducted their pre-trip inspection. There were no defects identified during the pre-trip inspection. At 01:12 hours, the Hi-Rail Operator contacted the ROCC to request a lead from the L-line to Alexandria Yard. The Radio RTC initially gave them an absolute block to Pentagon Station, track 1. At 01:22 hours, the Radio RTC informed the Hi-Rail Operator that their absolute block changed to Braddock Road Station. As the hi-rail vehicle traveled from National Airport Station to Braddock Road Station, the rear gear derailed at CM C2 408+00.

The Office of IT System and Software (ITSS) was able to use the track circuit data to provide an estimated speed the hi-rail vehicle was traveling at the time it derailed. Based on the track circuit data, it was estimated that the hi-rail vehicle was traveling at approximately 15 mph. This is the maximum speed this unit should travel. The hi-rail vehicle was also equipped with a data recorder that captured the speed at 14 mph when the unit derailed. During the interview, the Hi-Rail Operator mentioned that these units must traverse curves slowly because the units tend to jerk and shake while traversing curves.

Field investigation by responding Operations and SAFE personnel identified two bolts missing from the rear right wheel chassis. These bolts can be adjusted, but they were designed to stay in place once tightened. The chassis is essential for both rail and over the road operations. Field inspection of the area also identified a change in the wheel-rail interface approximately twenty feet from the point of derailment. This was evidenced by noticeable swirl marks on the top of the running rail leading to the point of derailment. There was no damage to the tracks, ATC equipment, or third rail.

Photographs from the scene revealed that the left side rear gear was not fully deployed whereas the right side gear was deployed correctly. As noted in the CENV report, this resulted in a weight imbalance that likely contributed to the derailment. [\(See Appendix B. pg.4\) The attaching hardware is secured with locking nuts which could loosen but not fall off. The mounting locations show no signs of rattling of loose hardware. This would support the conclusion that hardware sheared at the time of derailment.](#)

Chronological Event Timeline

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

Time	Description
01:12:37 hours	<u>Hi-Rail Operator</u> : Contacted the Radio RTC to inform them that they were standing by at chain marker L1 163+00 and needed a lead back to C99. [Ops. 3]
01:13:05 hours	<u>Radio RTC</u> : Gave the Hi-Rail Operator permission to pass C07-12 signal red, verify switch 1A was clamped in the reverse for the reverse move, and gave them an absolute block to Pentagon 1. <u>Hi-Rail Operator</u> : Gave a 100% repeat back. [Ops. 3]
01:16:16 hours	<u>Hi-Rail Operator</u> : Informed the Radio RTC that they were at Pentagon 1. [Ops. 3]
01:16:20 hours	<u>Radio RTC</u> : Informed the Hi-Rail Operator that their absolute block changed to Regan National Airport Track 2 crossing over from track 1 to track 2 at Pentagon City. [Ops. 3]
01:22:15 hours	<u>Hi-Rail Operator</u> : Contacted the Radio RTC to inform them they were at Crystal City Station. <u>Radio RTC</u> : Informed them that their block changed to Braddock Road, track 2. [Ops. 3]
01:33:48 hours	<u>Hi-Rail Operator</u> : Contacted the Buttons RTC to inform them that the hi-rail vehicle derailed at chain marker C1 408+00. [Phone-Ops.3]
01:36:49 hours	<u>Buttons RTC</u> : Contacted the Power desk to have third rail power de-energized where the derailment occurred. [Phone-Ops.3]
01:46:26 hours	<u>Hi-Rail Operator</u> : Contacted the Buttons RTC to inform them that two COMM personnel were outside the gate where they were and could assist them. They mentioned they had a hot stick to confirm third rail power was down. [Phone-Ops. 3]
01:54:39 hours	<u>Radio RTC</u> : Gave the two Power Units foul time to hot stick the area. [Ops. 3]
01:55:16 hours	<u>Power Desk</u> : Informed the Buttons RTC that power was down, and they could hot stick at their discretion. [Phone-Ops. 3]
01:59:40 hours	<u>Radio RTC</u> : Asked the Hi-Rail Operator if there was a way to access their location by an access gate. [Ops. 3]
02:03:48 hours	<u>Power Units 1146 & 1153</u> : Confirmed third rail power was de-energized. [Ops. 3]
02:10:07 hours	<u>Radio RTC</u> : Instructed the Hi-Rail Operator to stand by and stand clear and not attempt to re-rail the unit. <u>Hi-Rail Operator</u> : Gave 100% repeat back. [Ops. 3]
02:10:42 hours	<u>Hi-Rail Operator</u> : Informed the Buttons RTC that they were alone on the hi-rail unit and there was an access gate close to where the unit derailed. [Phone-Ops. 3]
02:19:00 hours	<u>ROCC Assistant Operations Manager</u> : Contacted MTPD to inform them of the derailment between National Airport and Potomac Yard Stations at chain marker C2 408+00. [Phone-Rail 2]
02:29:35 hours	<u>TRST Unit #1</u> : Contacted the Radio RTC to request permission the enter the access gate into the roadway and crossover from track 1 to track 2 to perform a track inspection. <u>Radio RTC</u> : Gave a 100% repeat back. [Ops. 3]
02:38:42 hours	<u>Radio RTC</u> : Granted the TRST unit foul time to enter the roadway to access the derailment area. [Ops. 3]
02:56:50 hours	<u>Radio RTC</u> : Assigned TRST Unit 75 as the On-Scene Commander. [Ops. 3]
03:18:56 hours	<u>ATC Unit</u> : Contacted the Radio RTC to request permission to enter the roadway to conduct an inspection of ATC equipment in the derailment area. [Ops. 3]

Time	Description
03:28:01 hours	<u>CTEM Mechanic</u> : Informed a ROCC AOM that there were 2 missing bolts in the hi-rail and they were waiting on the re-railing unit. [Phone-Rail 3]
03:31:34 hours	<u>ATC Unit</u> : Contacted the Radio RTC to inform them that all ATC personnel and equipment were clear from the roadway and no damage to any ATC equipment was found. <u>Radio RTC</u> : Gave a 100% repeat back. [Ops. 3]
04:08:26 hours	<u>Hi-Rail Operator</u> : Contacted the Buttons RTC and gave them an update. The Buttons RTC asked if track 1 side could be used to move units through the area. [Phone-Ops. 3]
04:10:52 hours	<u>Safety On-Call Director</u> : Contacted the ROCC to provide an update from the derailment site. Informed them that their portion was completed, and they could start the re-railing process. [Phone-Rail 1]
04:35:15 hours	<u>TRST Unit #1</u> : Advised personnel was bringing out the re-railing equipment and they would give back track 1 once the equipment was cleared. [Ops. 3]
04:40:15 hours	<u>TRST Unit #2</u> : Contacted Rail 2 to request a speed restriction on track 1 at the derailment site. [Phone – Rail 2]
04:51:39 hours	<u>TRST Unit #1</u> : Advised the Radio RTC that third rail power could be restored. [Ops. 3]
04:52:02 hours	<u>Radio RTC</u> : Made blanket announcement that third rail power was being restored between Potomac Yard and Crystal City Stations, tracks 1,2, and 3. [Ops. 3]
05:22:28 hours	<u>Radio RTC</u> : Contacted TRST #1 to inform them that they needed to hot stick and confirm power was de-energized on track 2 and needed them to provide chain markers. [Ops. 3]
05:36:24 hours	<u>TRST Unit #2</u> : Contacted the Radio RTC to request that third rail power be de-energized from CM C2 406+00 – 409+00. <u>Radio RTC</u> : Gave 100% repeat back. [Ops. 3]
05:37:58 hours	<u>Radio RTC</u> : Granted TRST Unit #2 permission to hot stick their gaps and work location to verify power was de-energized. <u>TRST Unit #2</u> : Gave a 100% repeat back. [Ops. 3]
05:39:32 hours	<u>TRST Unit #2</u> : Informed the Radio RTC that third rail power was confirmed de-energized. [Ops. 3]
05:42:26 hours	<u>Radio RTC</u> : Gave TRST Unit #2 permission to resume their work at the derailment site. [Ops. 3]
06:54:20 hours	<u>ROCC Assistant Operations Manager</u> : Contacted TRST Unit #2 to inquire about the status of the re-railing and asked them to go across the air once the unit has been re-railed. [Phone- Rail 3]
07:06:24 hours	<u>TRST Unit #2</u> : Contacted the Assistant Operations Manager to inform them that the unit was re-railed and the unit will travel no greater than 5 mph and they will walk the unit through the interlockings to make sure it clears. [Phone – Rail 3]
07:37:20 hours	<u>TRST Unit #2</u> : Contacted the Radio RTC to inform them that the hi-rail vehicle was re-railed, all personnel and equipment were cleared from the roadway and third rail power could be restored third rail power. <u>Radio RTC</u> : Gave a 100% repeat back. [Ops. 3]
08:25:20 hours	<u>TRST Unit #2</u> : Informed the Radio RTC that the hi-rail vehicle was properly secured at Alexandria Yard, and all personnel was cleared from the roadway. [Ops. 3]

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

Digital Images and Photographs



Figure 1: Hi-rail unit 14800 derailed on 04/11/23 at 01:38, travelling in reverse to Alexandria Yard along the Blue Line, between National Airport and Potomac Yard Stations.



Figure 2: Point of derailment (in red), approximately two feet before Chain Marker C2 408+00.



Figure 3: The shows the point of rest. Note the tie damage due to the wheel flange travel. Point of rest is approximately 26 feet from POD.

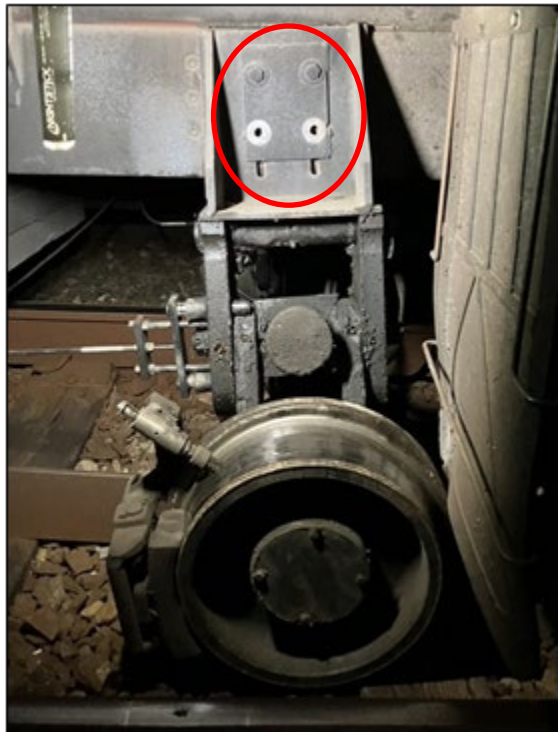


Figure 4: The hi-rail derailed chassis, within the track gauge. Note on the right side two bolts (in red) are always in placed but sheared off.



Figure 5: The rail markings switched to a swirling mark at approximately 20 feet prior to the point of derailment.

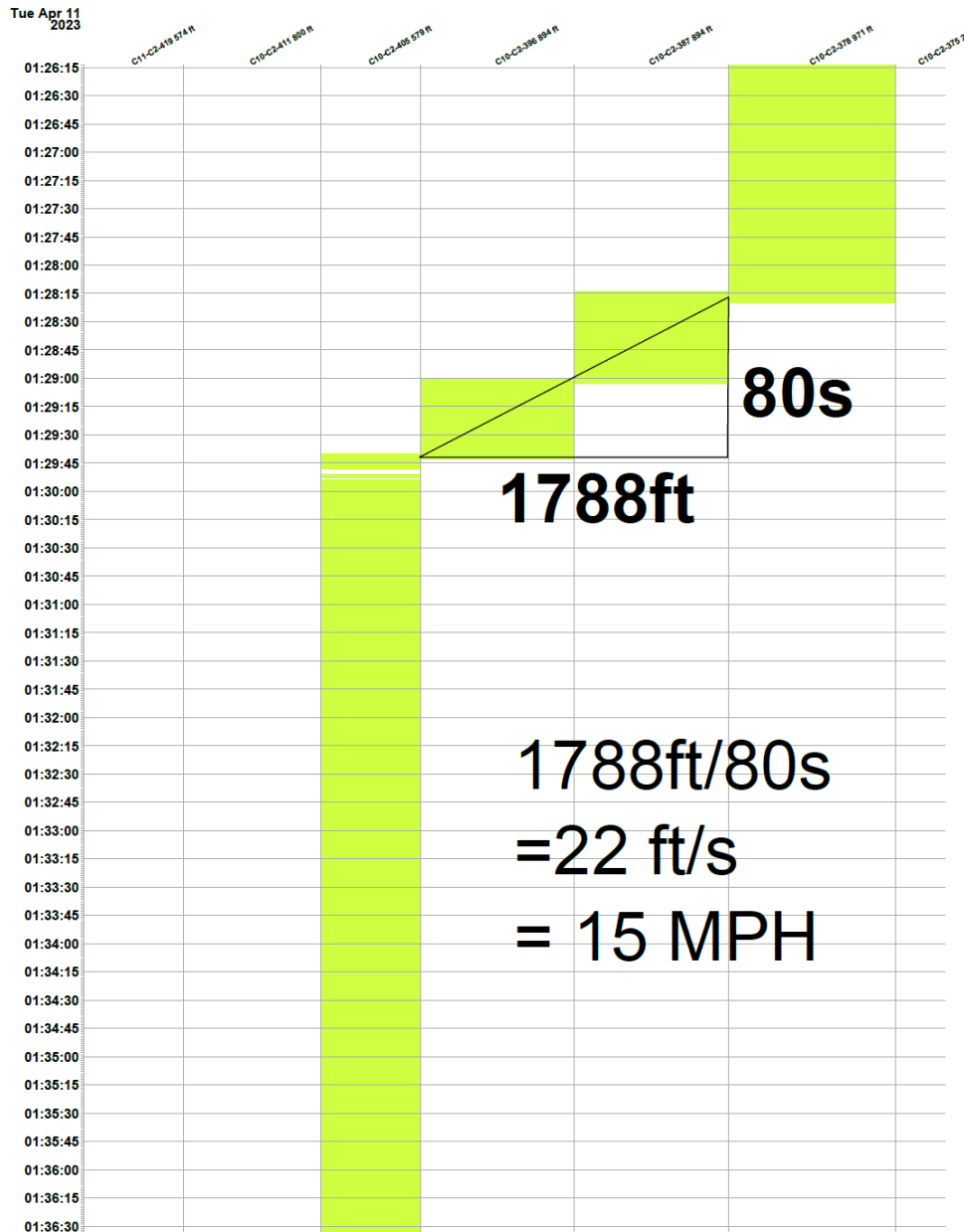
Office of Vehicle Program Service (CENV)

Adopted from CENV Report:

“On the morning of April 11th, 2023, at 0138 hours, WMATA owned hi-rail unit 14800 derailed on the C-line between Reagan National Airport and Potomac Yard stations at chain marker C2 408+00. The ROCC was notified and the rerail team was dispatched. At 0830 hours, the unit cleared mainline to the Reagan National Airport pocket track. No injuries were reported. Revenue trains were required to single track around the derailment. At the time of initial response, the left-side of the rear hi-rail gear was found to be not fully deployed and locked. In this condition, the rail wheel would have been severely unloaded and offer no lateral resistance in the direction of derailment and is the likely cause of the incident.” [\(CENV Incident Report\)](#)

Office of IT Systems & Software (ITSS)

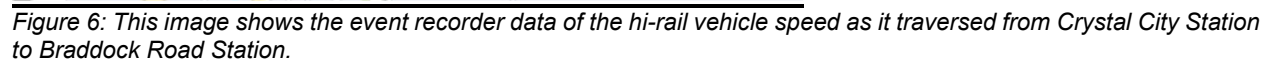
Prior to reaching block C2-405, the vehicle shown shunting in this chart traveled 1,788 feet in 80 seconds, which works out to 15MPH.



Office of Systems Maintenance, Office of Radio Communications (COMR)

The Office of Radio Communications (CMOR) conducted a radio operational test between CM 400+00 – 450+00 on n 1 and 2. CMOR personnel rode the train from Ronald Regan National Airport to Braddock Road, back to Ronald Regan National Airport while making radio checks. All radio checks were loud and clear.

Hi-Rail vehicle 14800 is an Aspen Aerials Underbridge Machine. This hi-rail vehicle is used for bridge maintenance and inspections. This hi-rail vehicle is maintained by the Office of Track and Structures Maintenance. This unit was equipped with an event recorder in June 2022. See Appendix C attachment 2.



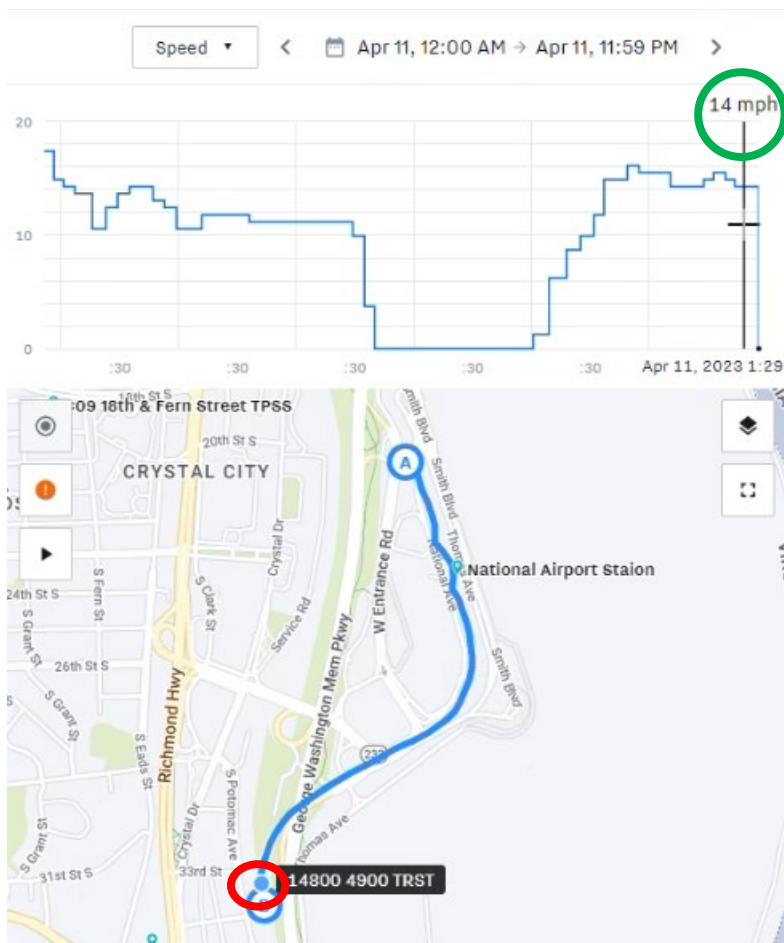


Figure 7: This image shows the event recorder data of the hi-rail vehicle speed right before it derailed.

Track Inspection

TRACK 1	Gauge	Elevation
405-00	56 3/4"	6 1/16"
405+10	56 5/8"	6 1/16"
405+20	56 7/8"	6 3/16"
405+30	56 13/16"	6 1/16"
405+40	56 11/16"	6 1/8"
405+50	56 3/4"	6 1/8"
405+60	56 13/16"	6 5/16"
405+70	56 3/4"	6 3/8"
405+80	56 3/4"	6 3/8"
405+90	56 11/16"	6 3/16"
406+00	56 9/16"	5 15/16"
406+10	56 9/16"	6 1/16"
406+20	56 7/16"	6 1/16"
406+30	56 3/4"	5 7/8"
406+40	56 11/16"	5 13/16"
406+50	56 3/4"	5 3/8"
406+60	56 13/16"	5 1/16"
406+70	56 7/8"	4 15/16"
406+80	56 3/4"	4 11/16"
406+90	56 3/4"	4 9/16"
407+00	56 9/16"	4 3/16"
407+10	56 11/16"	4"
407+20	56 5/8"	3 13/16"
407+30	56 9/16"	3 5/8"
407+40	56 9/16"	3 1/2"
407+50	56 5/8"	3 1/8"
407+60	56 11/16"	3 1/8"
407+70	56 5/8"	3 1/16"
407+80	56 5/8"	2 15/16"
407+90	56 1/2"	2 5/8"
408+00	56 1/4"	2 3/8"
408+10	56 11/16"	2 3/16"
408+20	56 9/16"	2 1/16"
408+30	56 7/16"	1 7/8"
408+40	56 1/2"	1 13/16"
408+50	56 7/16"	1 1/2"
408+60	56 5/16"	1 1/4"
408+70	56 5/16"	1 3/16"
408+80	56 1/4"	1"

Interview Findings

As part of the investigation launched into the event, SAFE interviewed one person. 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.

- The Hi-Rail Operator stated they have operated this unit previously and are very familiar with the operations.
- The Hi-Rail Operator mentioned the hi-rail unit was already on the rails when they arrived at the L-line construction site.
- Their assignment was to transport the hi-rail vehicle back to Alexandria Yard.

- The Hi-Rail Operator stated there were no mechanical issues while they were operating the unit.
- The Hi-Rail Operator was operating the unit in reverse when it derailed.
- The Hi-Rail Operator stated when the unit traverse curves, it tends to shake or jerk so you must slow your speed.
- They did not immediately know the unit had derailed.

Weather

On April 11, 2023, at the time of the incident, NOAA recorded the temperature as 46°F, with clear skies, winds 6.9 mph, and 57% humidity. The weather was not a contributing factor in this incident (Weather source: NOAA) – Location: Arlington, VA

Fatigue

Signs and Symptoms of Fatigue

We evaluated conditions at the time of the incident to distinguish whether evidence of fatigue was present. No video of the involved person was available to ascertain whether evidence of fatigue was present. Hi-Rail Operator reported feeling fully alert at the time of the incident. Hi-Rail Operator reported experiencing no symptoms of fatigue in the time leading up to the incident.

Fatigue Risk

We evaluated incident data for fatigue risk factors. No significant risk was identified. The incident time of day did not suggest an increased risk of fatigue-related impairment. Hi-Rail Operator reported keeping a regular sleep schedule in the days leading up to the incident. The Hi-Rail Operator worked daytime and nighttime shifts in the days leading up to the incident. The Hi-Rail Operator was awake for 5 hours at the time of the incident. The Hi-Rail Operator reported 8 hours of sleep in the 24 hours preceding the incident. The off-duty period was 15 hours which provides an opportunity for 7-9 hours of sleep. This was a comparable amount of sleep as the employee's usual workday sleep durations. The Hi-Rail Operator reported no issues with sleep.

Post-Incident Toxicology Testing

WMATA's Drug and Alcohol Program determined that the Hi-Rail Operator complied with the Drug and Alcohol Policy and Testing Program 7.7.3/6.

Findings

- The hi-rail vehicle was traveling 14-15 mph when it derailed, which is within authorized speed for the equipment.
- There were two bolts missing from the right-side rear gear wheel support.
- This was the hi-rail vehicle's first operation after being inoperable for an extended period of time.
- The derailment occurred within a curved section of track.
- The vehicle's hi-rail gear is certified and inspected by an outside contractor on an annual basis. The last inspection was in June 2022.
- Post-incident inspection found the left side rear gear not fully deployed and locked in as required.
- The mounting location at the work zone showed no signs of rattling of loose hardware.
- All wheel flanges were found within the manufacturer's limits.

Immediate Mitigation to Prevent Recurrence

- The Hi-Rail vehicle was re-railed and removed from service.
- The Hi-Rail Operator was removed from service and taken for post-incident testing.
- The Office of Safety Certification will complete an OHA on hi-rail vehicle 14800.

Probable Cause Statement

The probable cause for this derailment on April 11, 2023, was the Hi-Rail rear gear was incorrectly deployed. The right and left wheels extend independently, and both must be verified and locked separately.

Recommended Corrective Actions

Corrective Action Code	Description	Responsible Party	Estimated Completion Date
107581_SAFE CAPS_TRST_ 001	Modify the WMATA Class 2 Rail Vehicle pre-trip inspection form to include hi-rail vehicle specific items such as safety pins inserted, rail gear fully locked in and secured, proper tire pressure and notify all Equipment Operators of the change.	TRST	Completed
107581_SAFE CAPS_TRST_ 002	Responsible Personnel will be retrained on ANSI A92.22 and A92.24 standards for Type 2, Group B Mobile Elevating Work Platforms (MEWPs)	TRST	Completed
107581_SAFE CAPS_SAFE_ 001	The Office of Safety Certification will complete Operational Hazard Analyses (OHA) all WMATA-owned RMMs.	SAFE	06/30/2027
107581_SAFE CAPS_SAFE_ 002	The Office of Safety Certification will complete an OHA on hi-rail vehicle 14800 before it returns to service.	SAFE	Completed

Appendices

Appendix A – Interview Summary

The below narrative summarizes 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 Hi-Rail Operator is a WMATA employee with 20 years of experience, all as an Equipment Operator. The Hi-Rail Operator previously worked as a Training Assistant. The Hi-Rail Operator is RWP Level 4 certified and must recertify in May 2023. The Hi-Rail Operator was last certified as an Equipment Operator in August 2022. The Hi-Rail Operator mentioned feeling fully alert right before the incident. The Hi-Rail Operator noted that the start of their shift was a typical workday, and they did not experience any mechanical issues with Hi-rail vehicle 14800.

The Hi-Rail Operator stated their work assignment for the day was to transport a hi-rail vehicle, 14800, from the L-line construction site to Alexandria Yard. The Hi-Rail Operator stated when they arrived at the L-line construction site, the hi-rail unit was already on the rail so all they had to do was complete a pre-trip inspection and request a lead from the ROCC to Alexandria Yard. The Hi-Rail Operator mentioned they did not experience any issues while they were traveling back to Alexandria Yard. The Hi-Rail Operator stated they were very familiar with operating this unit because they typically operate it during bridge inspections. The Hi-Rail Operator stated you must reduce your speed when you traverse curved track because the Hi-Rail vehicles tend to jerk or shake if you are traveling too fast. The Hi-Rail Operator could not recall the actual speed they were traveling at the time of the derailment. The Hi-Rail Operator mentioned there have been numerous mechanical issues with this hi-rail vehicle.

The Hi-Rail Operator stated they operate this unit without a pilot and the training was sufficient. They were traveling from an aerial structure into an area of curved track when the unit derailed and traveled about 20 feet. The Hi-Rail Operator did not experience radio communication issues.



Washington Metropolitan Area Transit Authority

CENV

Incident Report

WMATA Hi-Rail C-Line Derailment

June 29, 2023



Washington Area Metropolitan Transit Authority
Incident Summary Report

Table of Contents

Investigation Team Members.....	2
Executive Summary.....	3
Introduction.....	3
Findings of Investigation	4
Conclusion	5
Recommendations.....	5

Attachment A – A1_ Derailment 04112023

Attachment B – HR1480-speed

Attachment C – 14800 High Rail Inspection 6-16-22

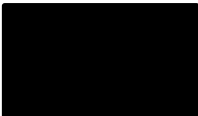
LOCATION: C2 CM 408+00

INCIDENT #: 107581


DATE: 04/11/2023

TIME: 1:38 AM

Investigation Team Members

 Deputy Chief Engineer – CENV
Assistant Manager – CENV
Vehicle Engineer – CENV

Report Prepared By: 

Report Approved By: 

*This information is proprietary to the Washington Metropolitan Area Transit Authority (WMATA).
No reproduction is allowed without prior consent.*

Executive Summary

On the morning of April 11th, 2023, at 0138 hours, WMATA-owned hi-rail unit 14800 derailed on the C-line between Reagan National Airport and Potomac Yard stations at chain marker C2 408+00. ROCC was notified and the reraill team was dispatched (see Attachment A). At 0830 hours, the unit cleared mainline to the Reagan National Airport pocket track. No injuries were reported. Revenue trains were required to single track around the derailment.

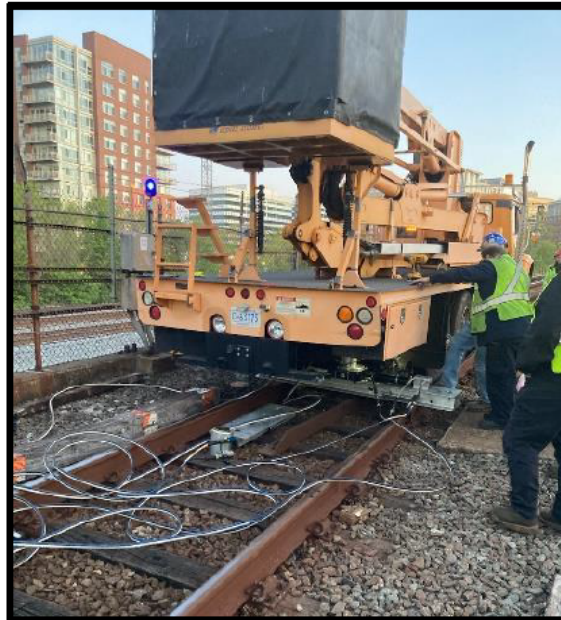


Figure 1. 14800 derailment

At the time of initial response, the left-side of the rear hi-rail gear was found to be not fully deployed and locked. In this condition, the rail wheel would have been severely unloaded and offer no lateral resistance in the direction of derailment and is the likely cause of the incident.

Introduction

Vehicle 14800 is a TRST asset hi-rail truck with a boom crane used for inspecting aerial structures. Vehicle 14800's purpose is to place personnel underneath aerial structures for condition assessment and repairs. It is a 1999 International 4900, tandem rear axle truck with an Aspen A-30 inspection crane mounted on the deck. The truck has DMF hi-rail gear for operating both over-the-road and on-rail. In Maximo, as of 7/22/2016, TAMO rates 14800 as Condition 2 due to "Increasing number of defects; deterioration"

Findings of Investigation

On the morning of April 11th, 2023, at 0138 hours, hi-rail unit 14800 derailed to the left-side, in relation to the vehicle, on the C-line between Reagan National Airport and Potomac Yard stations at chain marker C2 408+00. The unit was travelling outbound in the reverse direction. The vehicle was reported to have an average speed of 15 mph up to the incident (see Attachment B). The track geometry leading to the incident is a 1.8% decline spiraling out an 855-foot radius curve. The track is guarded to chain marker 407+82 with a single emergency guard rail.

ROCC was notified and the rerail team was dispatched. At 0830 hours, the unit cleared mainline to the Reagan National Airport pocket track. The following night, April 12th, the vehicle transported to Alexandria yard arriving at 0230 hours without incident.

During CENV/CTEM review of photographs taken at the incident location, the left-side of the rear hi-rail gear can be seen not fully deployed (see Figure 2). The two rectangular pads circled should be rotated an additional 90° to be coincident with the mounting plate as shown on the right-side.

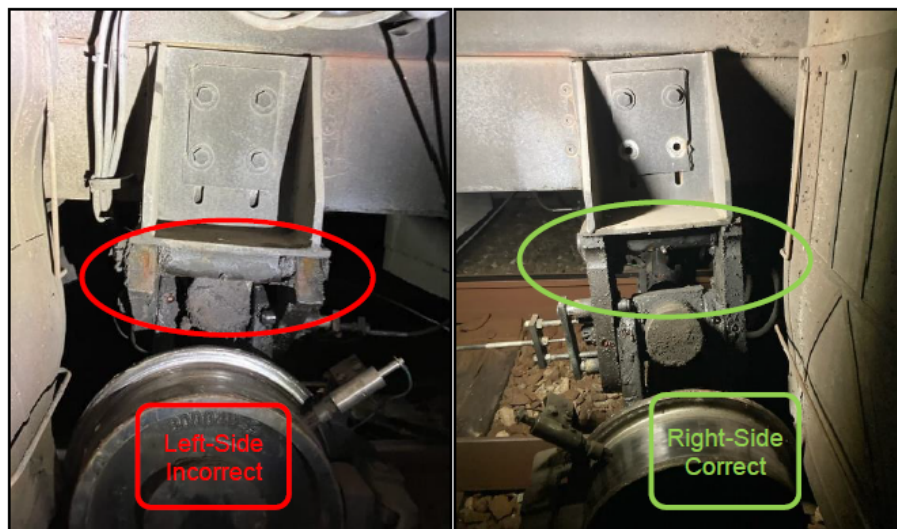


Figure 2. Left-side and right-side hi-rail comparison

In this configuration, the down force normally shared with the rail wheel and tires is borne solely by the tires. Without any downforce, the wheel flange will not offer resistance to lateral forces and the vehicle would not be able to counteract centrifugal forces in a radius. Additionally, the vehicle has less ability to conform to changing cross-level in a spiral.

Significant damage was found to the left side of hi-rail gear and its associated mounting. Although not located at the incident, two of four bolts were missing from the right side hi-rail mounting location (see Figure 2). The right hi-rail was pushed forward consistent with derailling in the reverse travel direction and being the only side supporting vehicle weight. The left side mounting had all four mounting bolts and had only mild misalignment.

Page 4 of 5

*This information is proprietary to the Washington Metropolitan Area Transit Authority (WMATA).
No reproduction is allowed without prior written consent.*

The attaching hardware is secured with locking nuts which could loosen but not fall off. The mounting locations show no signs of rattling of loose hardware. This would support the conclusion the hardware sheared at the time of derailment. The wheel flanges were gauged in Alexandria and all wheel flanges were found within the manufacturer limits. The annual hi-rail gear inspection was up to date, last performed 6/16/22 (see Attachment C).

During the rerailment procedure, the rear toweye experienced damage from jacking (see Figure 3). The bracket is bent and needs to be repaired. When reinstalling, the mounting bolts should be replaced.

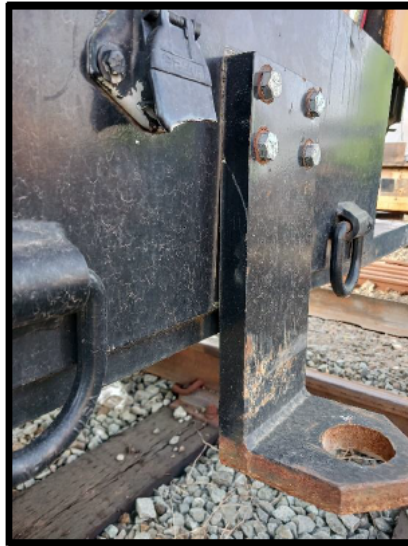


Figure 3. Toweye damage

Conclusion

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

Recommendations

- Review WMATA hi-rail operation and usage training.
- Evaluate the need to return 14800 to service. If the unit is not decommissioned, the following recommendations should be performed:
 - Have the rear hi-rail gear inspected and repaired/replaced by qualified personnel.
 - Repair rear tow eye and install with new mounting hardware.

Appendix C – Hi Rail Vehicle Annual Inspection



Annual Hi-Rail Safety Inspection Checklist
FRA 214.523
Special Fleet Service, Inc.
Harrisonburg, VA 22802
(540)434-4488

Owner: METRO Date: June 16, 2022
Vehicle Make: International Model: 4900 6x4 Year: 1998
VIN: 1HTSHAAAD2H659768 License Tag - State & Number: C63775 Mileage: 22671
Hi-Rail gear installed (Make & Model) Front DMF1630 SN-16964
Rear DMF1630 SN-16965

☒ Manufacturers Installation and/or Maintenance Manual (as applicable) Available

☒ Inspect Hi-Rail Assemblies for loose or missing parts.

☒ Inspect guide wheels wear per manufacturer's limits

☒ Inspect Tram or Alignment in accordance with manufacturer's limits & procedures

☒ Guide wheel gage within manufacturer's limits

Sat Unsat

Sat	Unsat
<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>

Gage Front Axle: 53" Gage Rear Axle: 53"

REQUIRED ON NEW HI-RAIL VEHICLES

FRA § 214.7 Definitions

Hi-Rail vehicle, new means a hi-rail vehicle that is ordered after December 26, 2003 or that is completed after September 26, 2004.

☒ Back up alarm meeting FRA § 214.523 (c)(1) Installed.

☒ Warning light or Beacon meeting FRA § 214.523 (c)(1) Installed

Comments:

Signature:

1. A copy of this inspection report shall be kept on the hi-rail vehicle.

2. The hi-rail gear of this vehicle shall be inspected for safety at least annually and with no more than 14 months between inspections.

Appendix D – Pre – Trip Inspection Form

WMATA CLASS 2 RAIL VEHICLE PRIOR TO USE INSPECTION	
Initials (Operator /Flag Person)	
✓	1. Check for wheel checks 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 backup 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 tuck when on hi-rail.
✓	25. Perform a stretch test. <input type="checkbox"/> Successful Test <input type="checkbox"/> 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):	ID# (s):
Signature(s):	Equipment#: HR14800
Yard or location where inspection is performed:	
Date: 4-10-23	Time of Inspection: 2342
TRST-CMP-FRM-C2RVPUIC-REV.5.2 04122021	

Appendix E – Scene Photographs



Figure 8: This is a picture of Hi-Rail vehicle, 14800.



Figure 9: Hi-rail unit 14800 derailed on 04/11/23 at 01:38, traveling in reverse to Alexandria Yard along the Blue Line, between National Airport and Potomac Yard Stations.



Figure 10: Point of derailment (in red), approximately two feet before Chain Marker C2 408+00. The front of the unit was the trailing end in the direction of travel.



Figure 11: Shows the point of rest. Note the rail tie damage due to the wheel flange travel. Point of rest is approximately 26 feet from POD.

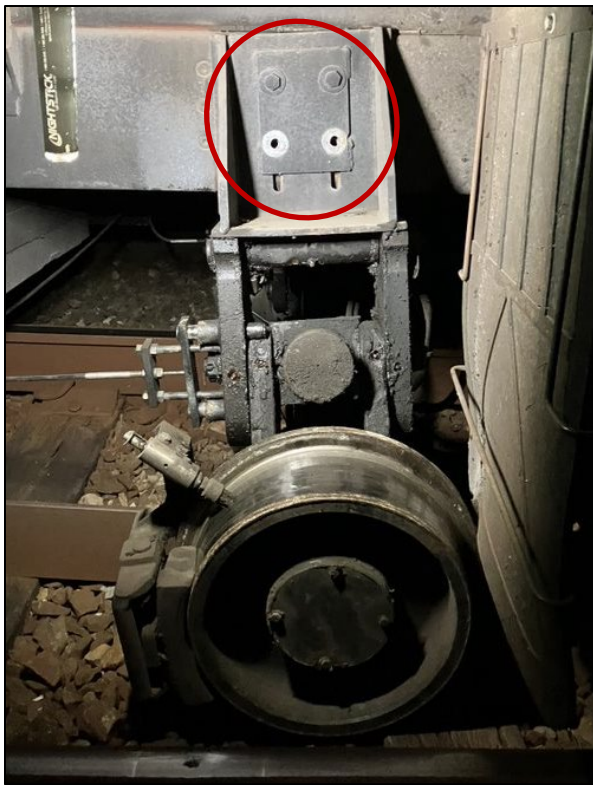


Figure 12: The hi-rail derailed chassis, within the track gauge. Note the two bolts sheared.



Figure 13: The rail markings switched to a swirling mark at approximately 20 feet to the point of derailment.

Appendix F – Work Orders



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

Page 1 of 3
MX76PROD

Work Order #: 17075164
Type: CM



Status: CLOSE
06/15/2022 06:39

Work Description: DEFECTS FOUND ON PMI W/O 17006324
Job Plan Description:

Work Information							
Asset: SV014800		SV014800, CRANE TRUCK OVER/UNDER Aspen Aerial UB30, [REDACTED] 202-480-3857, COO		Owning Office: BMNT-COO-RAIL		Parent:	
Asset Tag: SV014800		Maintenance Office: BMNT-SVMT-CMTR		Create Date: 05/24/2022 06:39			
Asset S/N: 1HTSHAAR8XH059768		Labor Group:		Actual Start: 05/24/2022 06:51			
Location: 1416		Crew: SVMTHVTK		Actual Comp: 06/03/2022 09:19			
Work Location: 3612		Lead: E015221		Item: SVMTV0134			
Failure Class: SVMT023		GL Account: WMATA-02-32380-50499070-041-*****-OPR**					
Problem Code: 4352		Supervisor: [REDACTED]		Target Start:			
Requested By:		Requestor Phone: [REDACTED]		Target Comp:			
Chain Mark Start:		Chain Mark End:		Scheduled Start:			
Create-Mileage: 23637.4		Complete-Mileage: 23637.4					
Task IDs							
Task ID							
10	MARKER LIGHT OUT "MECH"						
	REPALCED RIGHT SIDE MARKER LIGHT						
Component: 000-100 SERVICE VEHICLE	Work Accomp: REPLACED NEW	Reason: INOPERATIVE	Status: CLOSE	Position:	Warranty?: N		
20	BUMPER LIGHTED / POLE BROKEN "MECH"						
	REPLACED RIGHT SIDE FRONT ORANGE BUMPER INDICATOR POLE						
Component: 000-100 SERVICE VEHICLE	Work Accomp: REPLACED NEW	Reason: BROKEN	Status: CLOSE	Position:	Warranty?: N		
30	REPROGRAM FLEETWATCH "MECH"						
	PROGRAMED FLEETWATCH						
	IMPROVED						
Component: 000-100 SERVICE VEHICLE	Work Accomp: PROGRAMED	Reason: RELIABILITY	Status: CLOSE	Position:	Warranty?: N		
40	REVERSE TRANS SPEED SENSOR BRACKET BROKEN "MECH"						
	FOUND SPEED SENSOR FOR REVERSE TRANS JUST HANGING BY WIRES						
	FOUND BRACKET FOR SENOR HAD BROKEN OFF						
	REMOVED BRACKET AND PREPED FOR WELDING BACK TOGETHER						
	WELDED BRACKET BACK TOGETHER						
	CLEANED RUST OFF OF BRACKET AND PAINTED SO IT WOULD NOT RUST AGAIN						
	REINSTALLED BRACKET AND SENSOR TO PROPER LOCATION						
Component: 000-100 SERVICE VEHICLE	Work Accomp: REPAIRED	Reason: BROKEN	Status: CLOSE	Position:	Warranty?: N		

Attachment 1: This is page 1 of 3 of the last preventative maintenance inspection for Hi-Rail vehicle 14800.



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

Page 2 of 3
MX78PROD

Work Order #: 17075164
Type: CM



Status: CLOSE
06/15/2022 06:39

Work Description: DEFECTS FOUND ON PMI W/O 17006324

Job Plan Description:

Task IDs									
Task ID									
50	SERVICE BATTERIES "MECH"								
	TESTED BATTERIES AT AND FOUND 1 BATTERY FIALED TEST REPLACED 3RD BATTERY IN THE REAR								
Component:	000-100 SERVICE VEHICLE	Work Accomp:	REPLACED NEW	Reason:	WEAK	Status:	CLOSE	Position:	Warranty?: N
60	REPLACE LIGHT FOR CONTROL PANEL "OPER"								
	TOOK APART CONTROL PANNEL INSIDIE TRUCK FOR BOOM OPERATION FOUND LIGHT FOR INTERLOCK DISENGAGED NOT WORKING REMOVED OLD LIGHT FROM PANNEL DRILLED HOLE TO FIT NEW LIGHT SOLDERED WIRES ON TO CHIP BOARD VERIFIED OPERATION AFTER REPAIR								
Component:	000-100 SERVICE VEHICLE	Work Accomp:	REPLACED NEW	Reason:	INOPERATIVE	Status:	CLOSE	Position:	Warranty?: N
70	TIP OVER HORN INOP. "OPER"								
	REPLACED TIP OVER HORN PER OPERATOR. PART WAS OBTAINED FROM STANLEY KRUSZEWSKI AND INSTALLED BY SVMT.								
Component:	000-100 SERVICE VEHICLE	Work Accomp:	REPLACED NEW	Reason:	INOPERATIVE	Status:	CLOSE	Position:	Warranty?: N
Planned Materials									
Task ID	Item	Description	Storeroom	Issue Unit	Quantity	Unit Cost	Line Cost		
10	SV0130032	LAMP (SEE IMAGE), AMBER LED, 2-1/2" ROUND, M11300Y, MAXXIMA	145	EA	3	\$9.42	\$28.26		
50	SV0120352	BATTERY: 12 VOLT, GROUP 31, CCA 950-1150, RC 175-195, STUD TYPE, HEAVY TRUCK, DEEP CYCLE DUTY	641	EA	1	\$123.22	\$123.22		
							Total Planned Materials:	\$151.48	
Actual Labor									
Task ID	Labor	Start Date	End Date	Start Time	End Time	Approved?	Regular Hours	Premium Hours	Line Cost
10		05/25/2022	05/25/2022	06:00	06:30	Y	00:30	00:00	\$19.14
20		05/25/2022	05/25/2022	06:30	07:00	Y	00:30	00:00	\$19.14
30		05/25/2022	05/25/2022	07:00	08:00	Y	01:00	00:00	\$38.28
40		05/24/2022	05/24/2022	11:00	13:30	Y	02:30	00:00	\$95.71
50		05/25/2022	05/25/2022	12:30	13:30	Y	01:00	00:00	\$38.28
60		06/01/2022	06/01/2022	08:30	10:30	Y	02:00	00:00	\$76.57
70		06/01/2022	06/01/2022	10:30	11:30	Y	01:00	00:00	\$38.28
Total Actual Hour/Labor:							08:30	00:00	\$325.41

Attachment 1: This is page 2 of 3 of the last preventative maintenance inspection for Hi-Rail vehicle 14800.



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

Page 3 of 3
MX78PROD

Work Order #: 17075164
Type: CM



Status: CLOSE
06/15/2022 06:39

Work Description: DEFECTS FOUND ON PMI W/O 17006324

Job Plan Description:

Actual Materials									
Task ID	Item	Assetnum	Description	Storeroom	Trans Date	Issue Unit	Quantity	Unit Cost	Line Cost
10	SV0130032		LAMP (SEE IMAGE), AMBER LED, 2-1/2" ROUND, M11300Y, MAXXIMA	145	05/25/2022	EA	3	\$9.42	\$28.26
10	SV0130032		LAMP (SEE IMAGE), AMBER LED, 2-1/2" ROUND, M11300Y, MAXXIMA	641	05/25/2022	EA	2	\$7.85	-\$15.71
50	SV0120352		BATTERY: 12 VOLT, STUD TYPE, HEAVY TRUCK, GROUP 31, 31MHD, CCA950	641	05/25/2022	EA	1	\$123.22	\$123.22
								Total Actual Materials:	\$135.77
Related Work Orders									
WO	Description			Class	Status		Relationship		
17006324	BMNT.SVMT.HEAVY_TRUCK.PMI			WORKORDER	CLOSE		ORIGINATOR		
Failure Reporting									
Cause	Remedy			Supervisor			Remark Date		
Remarks:									

Attachment 1: This is page 3 of 3 of the last preventative maintenance inspection for Hi-Rail vehicle 14800.



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

Page 1 of 2
MX76PROD

Work Order #: 17010462
Type: SP



Status: CLOSE
06/02/2022 06:02

Work Description: BMNT/SVMT, GPS (Samsara) Installation, All Non-Revenue Vehicles
Job Plan Description: BMNT/SVMT, GPS (Samsara) Installation, All Non-Revenue Vehicles

A new GPS Tracking system (Samsara) will be replacing the current 'FleetOutlook' system.

This new comprehensive tracking system will allow the Authority to collect various types of information on the condition, operation, and use of approximately 1,550 vehicles owned and/or operated by the Authority in accordance with the technical details.

Services vehicles within WMATA's fleet include approximately 1,550 motor vehicles with up to 7,000 drivers, that are operated from 30 different locations throughout WMATA's three jurisdictions, i.e. Washington DC, Maryland, and Virginia.

See Attached Samsara Data Install Sheet

Point of Contact - [REDACTED]

Work Information			
Asset: SV014800	SV014800, CRANE TRUCK OVER/UNDER	Owning Office: BMNT-COO-RAIL	Parent: 16961541
Asset Tag: SV014800	Aspen Aerial UB30, [REDACTED], COO	Maintenance Office: BMNT-SVMT-CMTR	Create Date: 04/22/2022 12:42
Asset S/N: 1HTSHAAR8XH659768		Labor Group:	Actual Start: 05/24/2022 12:18
Location: 1416	T38, CARMEN TURNER FACILITY	Crew: BMNTCONT	Actual Comp: 06/02/2022 06:02
Work Location: 3612	T38, CARMEN TURNER FACILITY, BUILDING (F) BUS2, 1ST FLOOR SERVICE VEHICLE SHOP	Lead: [REDACTED]	Item: SVMTV0134
Failure Class:		GL Account: WMATA-02-32380-50499070-041-*****OPR**	Target Start: 12/01/2021 00:00
Problem Code:		Supervisor:	Target Comp: 09/01/2022 13:20
Requested By:		Requestor Phone: [REDACTED]	Scheduled Start:
Create-Mileage: 23587.1		Complete-Mileage: 23637.4	

Task IDs						
Task ID						
10	Acquire vehicle asset data/Complete Wmata install data sheet					
	INSTALLED SAMSARA					
Component: 000-100 SERVICE VEHICLE	Work Accom: UPDATED	Reason: SOFTWARE	Status: CLOSE	Position:	Warranty?: N	
20	Identify any existing telematics systems					
Component: 000-100 SERVICE VEHICLE	Work Accom: UPDATED	Reason: SOFTWARE	Status: CLOSE	Position:	Warranty?: N	

Attachment 2: This is page 1 of 2 for the event recorder installation.



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

Page 2 of 2
MX76PROD

Work Order #: 17010462
Type: SP



Status: CLOSE
06/02/2022 06:02

Work Description: BMNT/SVMT, GPS (Samsara) Installation, All Non-Revenue Vehicles
Job Plan Description: BMNT/SVMT, GPS (Samsara) Installation, All Non-Revenue Vehicles

Task IDs											
Task ID											
30	Install Samsara Device & One Badge Reader										
Component: 000-100 SERVICE VEHICLE		Work Accom: UPDATED		Reason: SOFTWARE		Status: CLOSE		Position:		Warranty?: N	
40	Associate Device to Wmata Vehicle										
Component: 000-100 SERVICE VEHICLE		Work Accom: UPDATED		Reason: SOFTWARE		Status: CLOSE		Position:		Warranty?: N	
50	Confirm System Operation and Check Sheet Entries										
Component: 000-200 BUS		Work Accom: UPDATED		Reason: SOFTWARE		Status: CLOSE		Position:		Warranty?: N	
Planned Labor											
Task ID	Labor						Quantity	Hours	Rate	Line Cost	
10							1	00:05	31.90	\$2.66	
20							1	00:05	31.90	\$2.66	
30							1	00:05	31.90	\$2.66	
40							1	00:05	31.90	\$2.66	
50							1	10:00	31.90	\$318.99	
									Total Planned Labor:	\$329.62	
Actual Labor											
Task ID	Labor		Start Date	End Date	Start Time	End Time	Approved?	Regular Hours	Premium Hours	Line Cost	
10			06/01/2022	06/01/2022	06:30	08:30	Y	02:00	00:00	\$76.57	
								Total Actual Hour/Labor:	02:00	00:00	\$76.57
Failure Reporting											
Cause			Remedy			Supervisor			Remark Date		
Remarks:											

Attachment 2: This is page 2 of 2 for the event recorder installation.



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

Page 1 of 1
MX76PROD

Work Order #: 17870619
Type: TST



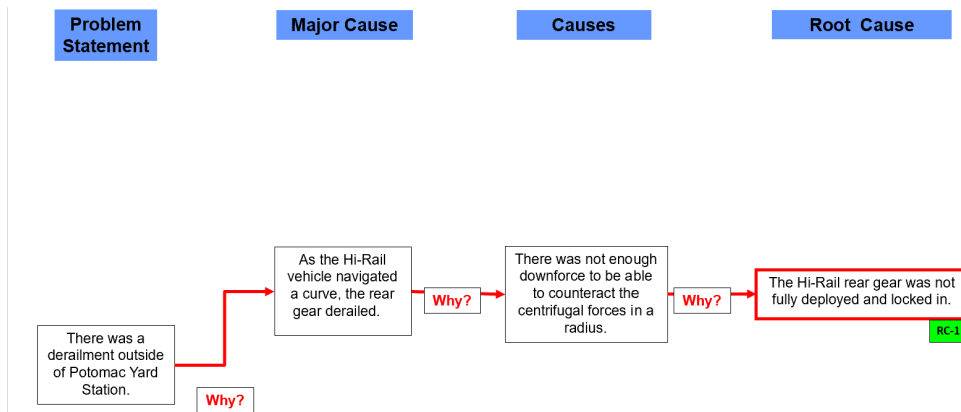
Status: CLOSE
05/14/2023 23:16

Work Description: C11, Safety request Radio Operational test to cover Station and to cover CM 400+00 and 450+00 Tracks 1&2
Job Plan Description:

Work Information									
Asset: 60335	RADIO, CRCS, REMOTE SITE, T38	Owning Office: COMM-TSSM-RADO	Parent:						
Asset Tag:		Maintenance Office: COMM-TSSM-RADO	Create Date: 05/11/2023 16:22						
Asset S/N: CRCSRST38		Labor Group: COMM3RADO	Actual Start: 05/12/2023 20:15						
Location: 3952	T38, CARMEN TURNER FACILITY, BUILDING (G) SVMT BODY, 2ND FLOOR	Crew:	Actual Comp: 05/12/2023 20:15						
Work Location:		Lead: [REDACTED]	Item: N60040086						
Failure Class: COMR003	RADIO COMMUNICATIONS SYSTEMS	GL Account: WMATA-02-33540-50499280-042-*****-OPR**							
Problem Code: 3669	COMMS FAILURE	Supervisor: [REDACTED]	Target Start:						
Requested By: 55385		Requestor Phone: [REDACTED]	Target Comp:						
			Scheduled Start:						
Create-Mileage: 0.0		Complete-Mileage: 0.0							
Task IDs									
Task ID									
10 RODE TRAIN FROM C10 TO C12 AND BACK TO C10 MAKING RADIO CHECKS WITH UNIT 317 AND ALL RADIO CHECKS WERE LOUD AND CLEAR.									
Component: Work Accompl: Reason: Status: CLOSE 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]	05/12/2023	05/12/2023	19:00	22:00	Y	03:00	00:00	\$139.80
10	[REDACTED]	05/12/2023	05/12/2023	19:00	22:00	Y	03:00	00:00	\$143.93
Total Actual Hour/Labor:							06:00	00:00	\$283.73
Failure Reporting									
Cause	Remedy	Supervisor	Remark	Date					
1397 COMM OPS RADIO SYSTEM PROBLEM	1061 ALIGNED	[REDACTED]		05/14/2023					
Remarks: RODE TRAIN FROM C10 TO C12 AND BACK TO C10 MAKING RADIO CHECKS WITH UNIT 317 AND ALL RADIO CHECKS WE									

Attachment 3: This is page 1 of 1 for the radio check that was performed between stations.

Appendix G – Why Tree



Root Cause Analysis

