



WMSC Commissioner Brief: W-0261 Collision – Greenbelt Rail Yard – June 29, 2023

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

Safety event summary:

Roadway maintenance machines (RMMs) collided on a storage track in the Greenbelt Rail Yard at approximately 12:30 p.m. on June 29, 2023. The Equipment Operator and Flagman were not following Metrorail communication procedures, the Flagman did not have the radio required for such a move, and they did not conduct the required pre-job briefing for the move. The Equipment Operator and Flagman did not report the collision to the Interlocking Operator or Rail Operations Control Center as required by Metrorail procedure.

The Equipment Operator and Flagman are part of the Car Track Equipment Maintenance (CTEM) group that maintains roadway maintenance machines. The Flagman stated during the investigation that they had been working in the shop to clean and repair equipment when the Equipment Operator requested assistance for this move. A supervisor had directed the Equipment Operator to use a Prime Mover to move two flat cars out of the shop to a storage track to create room for other vehicles in the shop. The Equipment Operator selected the Flagman, and reported being aware that the Flagman did not have a handheld radio with them as required for safe vehicle movement. The crew did not conduct a pre-job briefing required by Metrorail procedure, and had not specified the location where the consist needed to stop. They began the move despite the Flagman not having a handheld radio with them that Metrorail procedures require for any vehicle Flagman. This limited communication to an air horn and hand signals. In an investigative interview, the Flagman stated that they believed, despite Metrorail safety requirements, most yard moves do not require a radio, because hand signals and air horns are sufficient.

The Equipment Operator communicated with the Interlocking Operator as required for permission to move from the shop toward the storage track, but then did not communicate as required regarding the second part of the move.

As the consist entered the storage track, the Flagman was stationed at the end of flatcar F-544, at the front of the consist in the direction of travel. The Equipment Operator was in the Prime Mover, which was pushing the flatcars. CCTV shows that the crew did not conduct any of the safety stops required by Metrorail procedures. The Flagman reported sounding the air horn to indicate the operator should stop, but the operator reported that the noise of the engine made the air horn difficult to hear. The track layout made hand signals difficult to see. The consist continued until it struck Aerial Vehicle AV-01, which was secured on the storage track. The collision damaged a camera housing structure on AV-01 and scratched the bumper of F-544. The Equipment Operator stated in the investigative interview they had intended to move past the clearance point where the vehicles would not foul the adjacent track. The Flagman stated in a separate interview that they were unsure why the Equipment Operator moved so far beyond that clearance point before beginning to stop.

The Equipment Operator and Flagman did not report the collision to the Interlocking Operator or Rail Operations Control Center as required by Metrorail procedure. The Equipment Operator reported that they secured the Prime Mover, then verbally informed their supervisor. Neither the Interlocking Operator nor ROCC were notified. At 2:10 p.m., more than 1.5 hours after the collision, a Superintendent emailed the General Superintendent about the collision. At 2:27 p.m., the General Superintendent emailed the Safety Department's Office of Safety Oversight. That group then contacted



the Mission Assurance Coordinator in the Rail Operations Control Center at 2:56 p.m., nearly 2.5 hours after the collision.

The event was therefore subsequently reported to the WMSC beyond the 2-hour time period required by the WMSC Program Standard.

Probable Cause:

The probable cause of this event was inadequate control of rail vehicle movement on storage tracks. Contributing to this event is insufficient supervisory oversight of yard movement and noncompliance with written rules and procedures, which permitted such a move to occur without required safety equipment and practices.

Corrective Actions:

Metrorail reinstructed the Flagman on operating speed restrictions, required equipment, and job safety briefing requirements.

The Equipment Operator was disqualified from operating any Class 2 vehicle for one year. The Equipment Operator is expected to retire within that one year.

Example of other related open CAP

- CAP C-0181 addresses the finding that elements of Metrorail have a culture that accepts noncompliance with written operational rules, instructions, and manuals. (Scheduled completion October 2024)



Washington Metropolitan Area Transit Authority
Department of Safety (SAFE)
Office of Safety Investigations (OSI)
FINAL REPORT OF INVESTIGATION A&I E23443

Date of Event:	June 29, 2023
Type of Event:	Collision
Incident Time:	12:30 Hours
Location:	Greenbelt Yard Storage Track, behind E99-182
Time and How received by SAFE:	15:29 Hours
WMSC Notification Time:	15:29 Hours
Responding Safety Officers:	WMATA: Office of Safety Investigations (OSI) WMSC: None Other: None
Rail Vehicle:	Prime Mover (PM-55), Flat Cars (F-539/F-544), Aerial Vehicle (AV-01)
Injuries:	None
Damage:	AV01- Rear-Mounted Camera Housing F-544 – Scratched Rear-End Bumper
Emergency Responders:	None
SMS I/A Incident Number:	20230629#109567MX

Greenbelt Yard – Collision

June 29, 2023

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Abbreviations and Acronyms

CAP	Corrective Action Plan
CCTV	Closed-Circuit Television
CMNT	Office of Car Maintenance
CTEM	Office of Car Track Equipment Maintenance
MAC	Mission Assurance Coordinator
MSRPH	Metrorail Safety Rules and Procedures Handbook
NOAA	National Oceanic and Atmospheric Administration
OSI	Office of Safety Investigations
RTRA	Office of Rail Transportation
ROCC	Rail Operations Control Center
SAFE	Department of Safety
SMS	Safety Measurement System
WMATA	Washington Metropolitan Area Transit Authority
WMSC	Washington Metrorail Safety Commission

Executive Summary

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

On June 29, 2023, at approximately 12:30 hours, an Office of Car Track Equipment Maintenance (CTEM) Equipment Operator was utilizing Prime Mover (PM-55) to relocate two Flatcars (F-539 and F-544) within Greenbelt Yard on a storage track behind signal E99-182. As the Equipment Operator was operating from PM-55, pushing the two Flat Cars, the Flagman was located on F-544, standing outside of the Flagman's booth. The crew were communicating using hand signals and an air horn. An employee assigned flagging duties for a Class 2 rail vehicle shall use a radio with a current verification date when performing flag duties. per SOP #17 and SOP 23.4.3. The Flagman did not have possession of a radio during the movement as required. Hand signals were inadequate given the loss of line of sight in curved areas of the track. The air horn was inadequate as the engine rpm caused increased noise.

During the move, the consist was approaching Aerial Vehicle (AV-01), which was secured on the same storage track. F-544 collided with the rear of AV-01 at a speed of 1-2 MPH as estimated by Equipment Operator. This caused damage to the housing structure of the rear-mounted camera on AV-01. There were no injuries reported that resulted from this event.

The Equipment Operator secured PM-55, disembarked the unit, then verbally notified their supervisor of the collision. The Mission Assurance Coordinator (MAC) was notified of the event. The Office of Safety Investigations (OSI) was notified and dispatched to Greenbelt Yard.

CTEM removed the Equipment Operator and Flagman from service for post-incident testing. The equipment (PM-55, F539, F544 and AV-01) was removed from service for post-incident inspection.

The probable cause of the Collision event on June 29, 2023, at Greenbelt Yard was the Equipment Operator's failure to stop before colliding with a secured vehicle. Contributing factors to the event included the Flagman failing to activate the emergency brake or notify the Equipment Operator to stop. The Flagman did not have a required handheld radio, which prevented them from directly communicating with the Equipment Operator.

Incident Site

Greenbelt Yard – Behind E99-182

PM 55-F-539/F-544

NOTE:
Solid line in switch areas shows direction of travel with switch in Normal.

Legend:
Locations
Vital Legic
Non-Vital Legic
Switch
Six TGRs
GRS
GRS/Alotom VPI
GRS/Alotom Model 6

CROSSING GATE

Purpose and Scope

Investigative Methods

- Physical Site Assessment
- Formal Interviews – SAFE interviewed two individuals as part of this investigation. The interviews 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
 - Flagman
- Documentation Review – Collection of relevant work history information and process documentation contained in WMATA systems of record. These records include:
 - Employee Training Records
 - Employee Certifications
 - Employee 30-Day work history review
 - Metrorail Safety Rules and Procedures Handbook (MSRPH)
 - National Oceanic and Atmospheric Administration (NOAA)
 - Employee Investigation (CMNT) Report
 - Maximo Data

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

Investigation

On June 29, 2023, at approximately 12:30 hours, a CTEM Equipment Operator with a Flagman was utilizing PM-55 to relocate F-539 and F-544 within Greenbelt Yard on a storage track behind signal E99-182 when F-544 collided with AV-01.

The Flagman reported that prior to the move they were cleaning and repairing equipment when the Equipment Operator requested their assistance with a yard move. The move involved relocating two flat cars by a PM to a storage track to allow room for incoming vehicles in the shop. The Flagman reported that they decided to forego retrieving a handheld radio and to rely on an air horn and hand signals to flag the unit during the move.

The Flagman reported that after assessing the equipment, the track, and the route, it appeared that relying on hand signals and an air horn for signaling was sufficient. The Flagman was stationed on the end of F-544, which was at the far end of the consist, away from PM-55, where the Equipment Operator was stationed. The movement from the shop to the storage track followed established procedures for communication with the Interlocking Operator.

None of the required safety stops were completed. At the time of the collision, AV-01 was secured on the storage track when F-544 collided with the rear of AV-01, causing damage to the housing structure of the rear-mounted camera. The collision did not move AV-01.



Image 2 - Pre-collision PM-55 and AV01



Image 3 – Post-collision PM55 and AV01

The Equipment Operator reported that they secured PM-55, disembarked the unit, and verbally notified their supervisor of the collision. Work was halted at the time of the collision. Work did not resume until the next day after CTEM inspected the vehicles.

Neither the Interlocking Operator nor ROCC was immediately notified of the event. At 14:10 hours, the Superintendent notified the General Superintendent via email. At 14:27 hours, the General Superintendent notified the Office of Safety Oversight (OSO) via email. At 14:56 hours, OSO notified the MAC, and OSI was notified of the event and dispatched to Greenbelt Yard.

At 17:10 hours, an OSI Investigator arrived on the scene, performed an inspection, and released the scene at 18:00 hours.

CTEM inspected PM-55, F-539, F544, and AV-01. The inspection revealed damage observed to the housing structure of AV-01's rear-mounted camera; the camera was not damaged. Additionally, F-544 sustained scratches to the back-end bumper.



Image 1 – Damage to the housing structure of the rear-mounted camera of AV-01.

The Equipment Operator was disqualified from operating any Class 2 for the remainder of their anticipated one year tenure at WMATA.

Chronological Event Timeline

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

Time	Description
12:30:00 hours	PM-55 x F539 x F544 moving, then slowing to a stop upon colliding with AV-01 at Greenbelt Yard on a storage track. [CCTV]
Unknown	The Equipment Operator verbally notified CTEM Supervisor in person.
Unknown	The CTEM Supervisor notified the CTEM Superintendent.
14:10:00 hours	CTEM Superintendent notified the CTEM General Superintendent [Email]
14:27:00 hours	CTEM General Superintendent notified OSO. [Email]
14:56:00 hours	OSO notified MAC and OSI Director. [Email]
17:10:00 hours	OSI Investigator arrived on scene. [Email]
18:00:00 hours	OSI Investigator cleared and released the scene. [Email]

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

Office of Track Car Maintenance (CTEM)

The Office of Car Track Equipment Maintenance (CTEM) performed an inspection on PM-55, F-539, F544, and AV-01. The inspection revealed that damage was observed to the housing structure of AV-01's rear-mounted camera; the camera was not damaged. Scratches to the back-end bumper of F-544 were also observed.

Interview Findings

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

Equipment Operator (PM55)

- At the time of the event the Equipment Operator had 1.5 hours remaining in their workday.
- The Equipment Operator had been working in the yard cleaning, repairing and moving equipment prior to the event.
- The Equipment Operator's supervisor directed the flat car move.
- The Equipment Operator selected the Flagman to assist shortly before the move.
- The Equipment Operator stated they were aware that the Flagman did not have a handheld radio to communicate.
- The Equipment Operator stated that at the time of the incident PM-55's Engine made significant noise while pushing the two flatcars and likely obscured the Flagman's airhorn warnings.
- The Equipment Operator stated the speed of the Unit was less than 2 mph.

Flagman

- The Flagman stated that after making an assessment of the equipment, the track and the route it appeared that relying on hand and airhorn signaling was sufficient and they did not secure a handheld radio to use during the move.
- The Flagman stated that they did not confirm with Equipment Operator where to stop the unit before the unit was moved.

Weather

At the time of the incident, NOAA recorded the temperature at 80° F. Weather was not a contributing factor in this incident. (Weather source: NOAA – Location: Greenbelt, MD)

Related Rules and Procedures

MSRPH Section 3 - 3.87 Class I and II Rail Vehicle Operators shall maintain a constant lookout in the direction in which their vehicles are moving.

MSRPH Section 3 - 3.9.1 Rail Vehicles shall not be operated so as to collide with another vehicle, bumping post, or obstruction.

MSRPH Section 3 - 3.9.6 Whenever a Class I or Class II rail vehicle is operated from other than the lead car/end a qualified employee shall be assigned as a flag person. Positive communications shall be established between the operator and the vehicle flag person. The Operator shall confirm that the flag person clearly understands each authorized move before proceeding. If communication is lost, the operator shall bring the vehicle to a stop.

SOP # 23 - 23.4.3 Employees assigned the flagging responsibilities shall use a radio and/or one of the following means of communication: Radio headset, Flashlight, Hand signals (in the open during daylight hours).

SOP # 11 - 11.5.1.1 Any employee witnessing, discovering or being involved in a train collision shall notify the ROCC and provide the following information: caller's name and identification, reason for the call, location of the collision, track number, line identification and nearest station, and equipment involved in the collision.

Human Factors

Fatigue

CTEM

Equipment Operator

Evidence of Fatigue

Conditions were evaluated at the time of the incident to distinguish whether evidence of fatigue was present. The Equipment Operator reported feeling fully alert at the time of the incident. The Equipment Operator reported experiencing no symptoms of fatigue in the time leading up to the incident.

Fatigue Risk

The incident data was evaluated for fatigue risk factors for the Equipment Operator. Risk factors for fatigue were not present for the Equipment Operator. Since fatigue evidence and risk factors were absent, the biomathematical fatigue modeling application (SAFTE-FAST Web SFC) was not applied.

Flagman

Evidence of Fatigue

Conditions were evaluated at the time of the incident to distinguish whether evidence of fatigue was present. The Flagman reported feeling fully alert at the time of the incident. The Flagman reported experiencing no symptoms of fatigue in the time leading up to the incident.

Fatigue Risk

The incident data was evaluated for fatigue risk factors for the Flagman. Risk factors for fatigue were not present for the Flagman. Since fatigue evidence and risk factors were absent, the biomathematical fatigue modeling application (SAFTE-FAST Web SFC) was not applied.

Post-Incident Toxicology Testing

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

WMATA's Drug and Alcohol Program determined that the Flagman complied with the Drug and Alcohol Policy and Testing Program 7.7.3/6.

Findings

- The Flagman did not have a required handheld radio to communicate with the Equipment Operator.
- The Equipment Operator was aware that the Flagman did not have a handheld radio to communicate.
- The planned movement of the unit was not fully briefed between parties before the movement began.

Immediate Mitigation to Prevent Recurrence

- The Equipment Operator was removed from service.
- The Flagman was removed from service.
- PM-55, F539, F544 and AV01 were removed from service for inspection.

Probable Cause Statement

The probable cause of the Collision event on June 29, 2023, at Greenbelt Yard was the Equipment Operator's failure to stop before colliding with a secured vehicle. Contributing factors to the event included the Flagman failing to activate the emergency brake or notify the Equipment Operator to stop. The Flagman did not have a required handheld radio, which prevented them from directly communicating with the Equipment Operator.

Recommended Corrective Actions

Corrective Action Code	Description	Responsible Party	Estimated Completion Date
109567_SAFE CAPS_CTEM _001	Conduct refresher or reinstruction of CTEM Flagman for RWP to include required safe operating speed reductions in areas of limited visibility, required equipment, PPE, and RSJB to include knowledge of work site conditions.	CTEM SRC	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.

Equipment Operator

The Equipment Operator is a Mechanic AA, a WMATA employee, a Mechanic AA for four years and a total of 16 years of service and experience as a Mechanic at WMATA. The Equipment Operator holds an RWP Level 2 that expires in September 2023.

The Equipment Operator stated the incident occurred as a result of moving a PM and two Flatcars out of the area by the shop to make room for another piece of equipment being brought into the shop. The Equipment Operator was directed by their supervisor to move the flat cars. The Equipment Operator spoke with another mechanic to serve as a flagman for the move. The Equipment Operator stated they used PM-55 which was pushing two flatcars, 539 and 544 to an area of track that would not impede any other equipment movements.

That track was already occupied by AV-01, an aerial lift vehicle which was chocked and not being used. The position of AV-01 on the track left sufficient room for the PM-55 consist to park. The Flagman was positioned on the front of flatcar 544, observing the direction the consist was headed. The Equipment Operator was in the cab of PM-55 at the rear of the consist. The Equipment Operator stated the plan was to pass the clearance marker to ensure the consist would cause no obstruction once parked. The Equipment Operator intended to stop before reaching AV-01.

The Equipment Operator stated they had difficulty hearing the Flagman's airhorn signal due to the loud engine noise of the PM-55. The Equipment Operator had no issue hearing the horn earlier when the consist was being pulled but the pushing required higher RPMs and generated more noise.

The Equipment Operator stated the Flagman did not have a radio with them to communicate. The Equipment Operator acknowledged both they and the Flagman were aware the Flagman was required to have a radio. The Equipment Operator did have a radio in PM-55's cab. The Equipment Operator estimated the consist was moving at 1.5 to 2 mph as it approached AV-01.

The Equipment Operator did not report making required safety stops. The Equipment Operator began stopping the consist independent of the sounding of the Flagman's reported airhorn warning. The consist was unable to stop in time to avoid making contact with AV-01. The collision resulted in damage to the metal housing protecting the rear-facing camera on AV-01. The camera was not damaged. Flatcar 544 had some minor scrapes on the B-End coupler. The Equipment Operator shut PM-55 down, dumped the brakes and confirmed there were no injuries. The Equipment Operator and Flagman then reported the event to their supervisor.

The Equipment Operator acknowledged joint responsibility with the Flagman for the collision identifying the lack of communication as the primary issue. The Equipment Operator stated they had not had any radio contact with the tower as they had not travelled beyond signal 182 in the yard. The movement required coordination under both the existing MSRPH and current MOR.

The Equipment Operator repeated a concern of hearing the radio traffic inside the PM when it is operating at higher RPMs. They also described believing another ground person assisting in the movement would have improved the safety of the movement.

The Equipment Operator was removed from service as a result of the incident.

Flagman

The Flagman is a WMATA Employee with 9.5 years of service and experience as a Mechanic with WMATA. The Flagman holds an RWP Level 2 that expires in December 2023.

The Flagman advised the Equipment Operator had asked for assistance to do a yard move to clear an area for equipment expected within the next day. The Flagman described the initial movements of the consist with PM-55 pulling in a straight line of track and quietly enough that both hand and airhorn signals appeared effective.

The consist then switched to pushing the two Flatcars and entered a curved portion of the track that limited the Flagman's line of sight to the Equipment Operator. The engine noise seemed to increase, making the airhorn less effective. As the Flagman noticed the closing distance with the parked AV-01 they sounded the airhorn to stop. The consist continued moving at a very low speed of maybe 1-2 mph. The consist continued to slow but not sufficiently to stop and avoid contacting the housing of AV-01's rear-facing camera.

The Flagman acknowledged responsibility for not having a radio, which was a significant factor in the collision. The Flagman had assessed the anticipated track movements and believed the hand and airhorn signals would suffice. The Flagman stated most yard moves involve one or two vehicles that hand signals, supplemented by airhorns would cover. They were just complacent.

The Flagman was not sure why the Equipment Operator had the consist travel so far past the clearance marker before stopping on their own prior to the Flagman's attempts to halt the consist. The Flagman was aware of the hand brake on the flatcar. The Flagman had pulled the hand brake when they realized the consist was slowing but not stopping quickly enough. The Equipment Operator and Flagman had not discussed the move entirely before starting to identify who would determine the actual stopping point.

The Flagman was removed from service as a result of the incident.

Appendix B – Maximo Work Orders



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

Page 1 of 1
MX78PROD

Work Order #: 17996066
Type: IN



Status: CLOSE
07/21/2023 06:58

Work Description: Post incident inspection
Job Plan Description:

Work Information			
Asset: MPM55	PM55, PRIME MOVER, PLASSER, PMC-50, S/N 3484	Owning Office: CTEM	Parent:
Asset Tag: MPM55		Maintenance Office: CTEM-ALEX-HVYR	Create Date: 07/10/2023 10:12
Asset S/N: 3484		Labor Group: CTEM-GBLT-HVY	Actual Start: 07/10/2023 10:15
Location: 1213	C89, ALEXANDRIA YARD	Crew:	Actual Comp: 07/10/2023 11:20
Work Location: 2976	E91, GREENBELT YARD, BUILDING (D) FIELD BASE PLNT, 1ST FLOOR, CTEM SHOP	Lead:	Item: CTEM49200006
Failure Class: CTEM001	GENERAL	GL Account: WMATA-02-33380-50496070-041-*****-OPR**	
Problem Code: 1025	ACCIDENT/COLLISION/DERAIL	Supervisor: [REDACTED]	Target Start:
Requested By:		Requestor Phone: [REDACTED]	Target Comp:
			Scheduled Start:
Create-Mileage: 0.0		Complete-Mileage: 0.0	

Task IDs	
Task ID	
10	Post incident inspection
	Post Incident Inspection was performed and attached to this Work Order.
	No labor associated with this work order.
	000-400 CTEM-CAR TRACK EQUIPMENT (NON-REVENUE VEHICLES)
Component:	Work Accompl: INSPECTED Reason: INCIDENT//ACCIDENT Status: CLOSE Position: Warranty?: N

Related Incidents				
Ticket	Description	Class	Status	Relationship
8679328	Collision In Greenbelt Yard (E99), O/D, E99, TRK, COLL, PM54	SR	INPROG	RELATED

Failure Reporting				
Cause	Remedy	Supervisor	Remark	Date
1023	ACCIDENT OTHER VEHICLE INVOLVEMENT	3192 TESTED / INSPECTED	[REDACTED]	07/10/2023
Remarks: Performed Post Incident Inspection				

Document 1 – Maximo Work Order #17996066 – PM-55 Inspection, Page 1 of 1

Incident Date: 06/29/2023 Time: 12:30 hours
Final Report – Collision
E23443

Drafted By: SAFE 709 – 08/27/2023
Reviewed By: SAFE 707 – 08/26/2023
Approved By: SAFE 71 – 08/28/2023

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

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MX76PROD

Work Order #: 17996055
Type: IN



Status: CLOSE
07/21/2023 06:59

Work Description: Post incident inspection
Job Plan Description:

Work Information			
Asset: MF544	CTEM, FLAT CAR, S/N F544	Owning Office: TRST-TRAK-GBLT	Parent:
Asset Tag: MF544		Maintenance Office: CTEM-NCAR-HVYR	Create Date: 07/10/2023 10:04
Asset S/N: F544		Labor Group: CTEM-GBLT-HVY	Actual Start: 07/10/2023 10:16
Location: 1230	D99, NEW CARROLLTON YARD	Crew:	Actual Comp: 07/10/2023 11:15
Work Location: 2976	E91, GREENBELT YARD, BUILDING (D) FIELD BASE PLNT, 1ST FLOOR, CTEM SHOP	Lead:	Item: CTEM49200003
Failure Class: CTEM001	GENERAL	GL Account: WMATA-02-33380-50499070-041-*****-OPR**	
Problem Code: 1025	ACCIDENT/COLLISION/DERAIL	Supervisor: [REDACTED]	Target Start:
Requested By:		Requestor Phone: [REDACTED]	Target Comp:
			Scheduled Start:
Create-Mileage: 0.0		Complete-Mileage: 0.0	

Task IDs	
Task ID	
10	Post incident inspection
	Post Incident Inspection was performed and attached to this Work Order. No labor associated with this work order.
	000-400 CTEM-CAR TRACK EQUIPMENT (NON-
Component: REVENUE VEHICLES)	Work Accompl: INSPECTED Reason: INCIDENT//ACCIDENT Status: CLOSE Position: Warranty?: N

Related Incidents	
Ticket	Description
8679328	Collision In Greenbelt Yard (E99), 0/0, E99, TRK, COLL, PM54
	Class: SR Status: INPROG Relationship: RELATED

Failure Reporting	
Cause	Remedy
1023	ACCIDENT OTHER VEHICLE INVOLVEMENT
	3192 TESTED / INSPECTED
	Supervisor: [REDACTED]
	Remark Date: 07/10/2023
Remarks: Post Incident Inspection conducted	

Document 2 - Maximo Work Order #17996055 – F-544 Inspection, Page 1 of 1

Incident Date: 06/29/2023 Time: 12:30 hours
Final Report – Collision
E23443

Drafted By: SAFE 709 – 08/27/2023
Reviewed By: SAFE 707 – 08/26/2023
Approved By: SAFE 71 – 08/28/2023

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

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MX76PROD

Work Order #: 17996060
Type: IN



Status: CLOSE
07/21/2023 06:58

Work Description: Post incident inspection
Job Plan Description:

Work Information			
Asset: MF539	CTEM, FLAT CAR, S/N F539	Owning Office: TRST-TRAK-GBLT	Parent:
Asset Tag: MF539		Maintenance Office: CTEM-NCAR-HVYR	Create Date: 07/10/2023 10:08
Asset S/N: F539		Labor Group: CTEM-GBLT-HVY	Actual Start: 07/10/2023 10:17
Location: 1230	D99, NEW CARROLLTON YARD	Crew:	Actual Comp: 07/10/2023 11:18
Work Location: 2976	E91, GREENBELT YARD, BUILDING (D) FIELD BASE PLNT, 1ST FLOOR, CTEM SHOP	Lead:	Item: CTEM49200003
Failure Class: CTEM001	GENERAL	GL Account: WMATA-02-33380-50499070-041-*****-OPR**	
Problem Code: 1025	ACCIDENT/COLLISION/DERAIL	Supervisor: [REDACTED]	Target Start:
Requested By:		Requestor Phone: [REDACTED]	Target Comp:
			Scheduled Start:
Create-Mileage: 0.0		Complete-Mileage: 0.0	

Task IDs	
Task ID	
10	Post incident inspection
	Post Incident Inspection was performed and attached to this Work Order. No labor associated with this work order.

Component: REVENUE VEHICLES)	Work Accom: INSPECTED	Reason: INCIDENT//ACCIDENT	Status: CLOSE	Position:	Warranty?: N
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Related Incidents				
Ticket	Description	Class	Status	Relationship
8679328	Collision In Greenbelt Yard (E99), 0/0, E99, TRK, COLL, PM54	SR	INPROG	RELATED

Failure Reporting			
Cause	Remedy	Supervisor	Remark Date
1023	ACCIDENT OTHER VEHICLE INVOLVEMENT	3192	TESTED / INSPECTED
		[REDACTED]	07/10/2023
Remarks: Post Incident Inspection conducted			

Document 3 - Maximo Work Order #17996060 – F-539 Inspection, Page 1 of 1

Incident Date: 06/29/2023 Time: 12:30 hours
Final Report – Collision
E23443

Drafted By: SAFE 709 – 08/27/2023
Reviewed By: SAFE 707 – 08/26/2023
Approved By: SAFE 71 – 08/28/2023

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

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MX76PROD

Work Order #: 17996040
Type: IN



Status: CLOSE
07/21/2023 07:24

Work Description: Post incident inspection
Job Plan Description:

Work Information			
Asset: MAV01	AV01, BRIDGE INSPECTION VEHICLE, HARSCO, UTV, S/N 6122341	Owning Office: CTEM	Parent:
Asset Tag: MAV01		Maintenance Office: CTEM-DULL-HVYR	Create Date: 07/10/2023 09:55
Asset S/N: 6122341		Labor Group: CTEM-GBLT-HVY	Actual Start: 07/10/2023 10:16
Location: 1213	C99, ALEXANDRIA YARD	Crew:	Actual Comp: 07/10/2023 11:11
Work Location: 2976	E91, GREENBELT YARD, BUILDING (D) FIELD BASE PLNT, 1ST FLOOR, CTEM SHOP	Lead:	Item:
Failure Class: CTEM001	GENERAL	GL Account: WMATA-02-33380-50499070-041-*****-OPR**	
Problem Code: 1025	ACCIDENT/COLLISION/DERAIL	Supervisor: [REDACTED]	Target Start:
Requested By:		Requestor Phone: [REDACTED]	Target Comp:
			Scheduled Start:
Create-Mileage: 0.0		Complete-Mileage: 0.0	

Task IDs	
Task ID	
10	Post incident inspection
Post Incident Inspection performed and attached to this work order. No labor is associated with this work order.	
000-400 CTEM-CAR TRACK EQUIPMENT (NON-REVENUE VEHICLES)	
Component:	REVENUE VEHICLES
Work Accomp:	INSPECTED
Reason:	INCIDENT//ACCIDENT
Status:	CLOSE
Position:	
Warranty?:	N

Related Incidents	
Ticket	Description
8679328	Collision In Greenbelt Yard (E99), 0/0, E99, TRK, COLL, PM54
Class	SR
Status	INPROG
Relationship	RELATED

Failure Reporting	
Cause	Remedy
1023	ACCIDENT OTHER VEHICLE INVOLVEMENT
1571	DERAIL INSPECTION REQD
Supervisor	[REDACTED]
Remark Date	07/10/2023
Remarks: Post Incident Inspection conducted	

Document 4 - Maximo Work Order #17996040 – AV-01 Inspection, Page 1 of 1

Incident Date: 06/29/2023 Time: 12:30 hours
Final Report – Collision
E23443

Drafted By: SAFE 709 – 08/27/2023
Reviewed By: SAFE 707 – 08/26/2023
Approved By: SAFE 71 – 08/28/2023

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Appendix C – CTEM Post-Accident Inspection Form



CTEM Post-derailment & Accident Damage Inspection Form

(1 Form per Unit)

DATE:	JUN 30 2023	INSPECTOR:		UNIT #:	AV01
INCIDENT #:	20230630#109576	INCIDENT LOCATION:	Greenbelt Yard		

GUIDELINES:

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

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

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

Incident Information: (NOTE: Use blank field under each question for additional information if answered Yes.)	
Did the unit contact the 3rd rail? (If Yes, where was the contact on the unit?)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Did the unit contact infrastructure such as a wall or platform? (If Yes, what was contacted?)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Did the unit contact another unit? (If Yes, what unit and where was the contact on the unit?)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
F544	

Truck Inspection:	
Roller bearings - no visual damage and in accordance with Rule 36	✓
Roller bearings - no unusual noises; hand spun or run-by test	✓
Bearing Adapters - within wear limits and in accordance with Rule 37	✓
Drive systems - no visual damage or leaks	✓
Side frames and bolsters - no visual damage and in accordance with Rule 47 & 48	✓
Ride control - friction shoes & bearing adapters within limits and in accordance with Rule 46	✓
Springs - no damage, correctly seated and in accordance with Rule 50	✓
General - no visual damage, all components secured and in accordance with Rule 74	✓
NOTES:	

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

CMNT Form 50.993, Rev. 0.0

Page 1 of 2

February 01, 2018

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Document 5 - AV01 Vehicle Inspection Form, page 1 of 2.

Incident Date: 06/29/2023 Time: 12:30 hours
Final Report – Collision
E23443

Drafted By: SAFE 709 – 08/27/2023
Reviewed By: SAFE 707 – 08/26/2023
Approved By: SAFE 71 – 08/28/2023

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CTEM Post-derailment & Accident Damage Inspection Form

Wheel Inspection:

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

NOTES:

Brake Inspection:

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

NOTES:

Miscellaneous Equipment Inspection:

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

NOTES:

Camera Box was bent from the B-end knuckle of F544, No other damage

Inspection Fault Report:

Can unit be returned to service?

☒ Yes ☐ No

Inspector's Signature:

WMATA

Digitally signed by [redacted] WMATA
Date: 2023.07.10 06:38:47 -04'00'

CMNT Form 50.993, Rev. 0.0

Page 2 of 2

February 01, 2018

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Document 6 - AV01 Vehicle Inspection Form, page 2 of 2.

Incident Date: 06/29/2023 Time: 12:30 hours
Final Report – Collision
E23443

Drafted By: SAFE 709 – 08/27/2023
Reviewed By: SAFE 707 – 08/26/2023
Approved By: SAFE 71 – 08/28/2023

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Appendix D – Scene Photographs

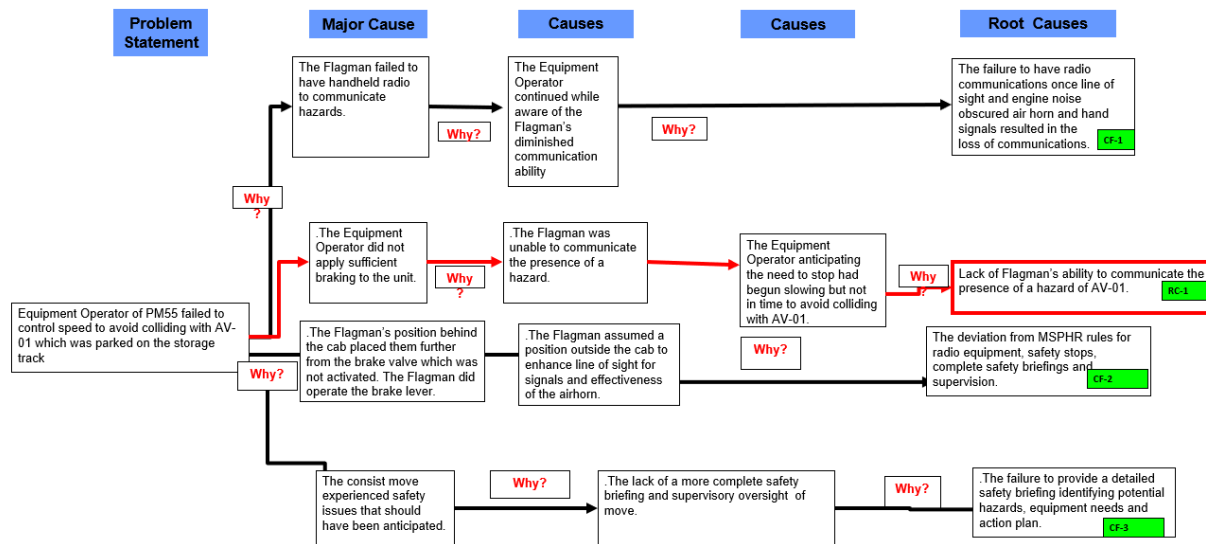


Image 1 - Post-Incident AV-01 - F544 - F539 - PM55 (left to right).



Image 2 - Post-Incident AV01 - F544 - F539 - F544 - AV01 - PM55 (left to right).

Appendix E – Why-Tree Analysis



Root Cause Analysis