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WMSC Commissioner Brief: W-0163 – Improper Movement – Suitland Station – December 7, 2021

Prepared for Washington Metrorail Safety Commission meeting on May 24, 2022

Safety event summary:

A Train Operator of an outbound train carrying passengers toward Branch Avenue Station overran Suitland Station at approximately 5:46 a.m. on December 7, 2021. All cars were beyond the station platform. After reporting this station overrun to the Rail Operations Control Center (ROCC) and being directed by the ROCC Controller to move from the cab at the front of the train to the cab at what had been the trailing end of the train, the Train Operator moved the train back toward Suitland Station without permission from the ROCC and without an absolute block. These are required safety protections against a collision when moving a train against the normal flow of traffic.

This improper movement that put the safety of employees and passengers at risk was not identified and reported by ROCC management, other operations personnel, or Metrorail's Safety Department (SAFE) designee in the ROCC, the Incident Management Official (IMO) -- now called the Mission Assurance Coordinator (MAC). A ROCC Rail Controller had informed the ROCC Assistant Operations Manager (AOM) of the improper movement, but that AOM did not pass this report along to the Operations Manager and IMO. The AOM had already informed the IMO of the station overrun. The ROCC was dealing with several issues at this time, including a downed track circuit and clamped switch. A Metrorail Safety Department investigator discovered and reported the improper vehicle movement while evaluating the station overrun as required by Metrorail's investigation program. Specifically, the investigator identified this while reviewing audio recordings from the event. The station overrun was reported to the WMSC within the required two hours. The improper movement was reported to the WMSC two days after the event.

Vehicle system data shows the train entered the station at 49 mph, with the master controller in the lowest propulsion mode (P1). This is faster than the 40 mph that Metrorail has established as the maximum station entry speed. The train was moving 49 mph when it reached the center of the platform, with the master controller in coast mode. Approximately two-thirds of the way through the platform, the Train Operator moved the master controller to B1 braking mode when the train was still moving 49 mph. The Train Operator then moved the master controller into B4 braking mode 73 feet before the end of the station platform, when the train was moving 45 mph. The Train Operator moved the master controller between B2 and B5 (the maximum braking level below emergency), and the train slowed. The train was moving 37 mph with the master controller in B4 braking mode when it passed the end of the station platform. After the front of the train passed the end of the station platform, the train experienced a slide condition. Vehicle data shows emergency braking was not applied. The slide conditions experienced when the train was moving approximately 13 mph contributed to a brief speed increase to 18 mph before braking stopped the train approximately 8 seconds later. The front of the train stopped approximately 599 feet beyond the platform. A six-car train is approximately 450 feet long. Therefore, the train stopped with the rear of the train approximately two car lengths beyond the platform. The front of the train was approximately eight car lengths beyond the platform.

Post-event inspection of the train by Metrorail's Office of Car Maintenance found that the train's braking systems appeared to be functioning properly at the time of this event, however, the vehicle data recording system was not collecting data on the speed commands to the train. The inspection also identified wheel flats on the train. The response of the train, which did not include any emergency or automatic braking, indicates the speed commands were higher

than the speed the train was travelling when entering and passing through the station. The maximum authorized speed in this area for a Class 1 vehicle (passenger train), when not in or entering a station, is 55 mph.

The ROCC Buttons Controller communicated to the ROCC Assistant Operations Manager that the train had fully overrun the station. The Assistant Operations Manager instructed the Radio Controller and Button Controller to have the Train Operator reverse ends and move the train back to Suitland Station. The Radio Controller instructed the Train Operator to key down from the lead car, reverse ends (walk through the train to the opposite end) and key up in the cab at the opposite end of the train.

At approximately 5:52 a.m., approximately four minutes after instructing the operator to move to what had been the trailing end of the train, the controllers identified that their screens showed that the train had moved. When contacted, the Train Operator stated that they had moved the train back to the platform and opened the doors to service the station. The Train Operator had moved without the required absolute block and without speed commands. Vehicle data and closed-circuit television (CCTV) reviewed during the investigation demonstrated that the Train Operator also stopped the train approximately 50 feet short of the eight-car marker at the Greenbelt-bound end of the station platform. Under Metrorail rules and procedures, the Train Operator should have berthed at the eight-car marker to ensure that the train was properly berthed before opening the doors.

The Train Operator said they were returning to the original lead car.

The controllers identified that the Train Operator had moved against the established direction of traffic without the required permission from the ROCC to ensure safety, which would have included an absolute block. The ROCC Button Controller called the Assistant Operations Manager and reported the improper movement.

The controllers gave the Train Operator permission to continue to Branch Avenue Station. The operator was then removed from service at Branch Avenue Station and taken for post-event toxicology testing. The testing did not detect any violation of Metrorail's Drug and Alcohol Policy.

Probable Cause:

The probable cause of the station overrun was a lack of effective supervisory oversight regarding the safe operation of trains.

The probable cause of this improper movement event was that elements of Metrorail have a culture that accepts noncompliance with written operational rules, instructions and manuals.

Corrective Actions:

Metrorail is developing computer-based training for train operators on station overrun prevention strategies.

Metrorail conducted an Assistant Operations Manager Staff Meeting to discuss the IMO (now MAC) notification process, including signed documentation acknowledging comprehension of notification procedures.

Metrorail required the Train Operator to complete line familiarization and mainline train observation and provided the Train Operator refresher training.

Following WMSC staff review and comment on a draft of this investigation report and associated corrective actions, Metrorail added a corrective action to address the movement of trains carrying passengers against the normal flow of

traffic following a station overrun. Metrorail plans to prohibit such moves, and instead have the Train Operator continue to the next station. These changes also include Metrorail determining that it will not service a station that an operator has overrun.

WMSC staff observations:

The Train Operator properly reported the event as required, and the Train Operator properly acknowledged in the interview that they moved the train back to the platform without the absolute block required for safety. The WMSC's Rail Operations Audit (final report April 7, 2022) found that elements of Metrorail have a culture that accepts noncompliance with written operational rules, instructions and manuals. Metrorail is required to address this through a corrective action plan (CAP) that includes consistent supervisory oversight and effective training and safety promotion to ensure that personnel follow all rules and procedures, document compliance with rules and procedures, and ensuring that the "just culture" and other principles embodied in the safety management system Metrorail has committed to in its Public Transportation Agency Safety Plan (PTASP) are implemented. In all, the Rail Operations Audit included 14 findings and 3 recommendations. Other findings Metrorail is required to address include deficiencies in identifying and addressing hazards, gaps related to training and certification requirements that create safety risks (including not requiring territory familiarization and physical characteristics training, not meeting its refresher training and recertification requirements, and a lack of documented procedures and criteria), and gaps in Metrorail's Rail Transportation QA/QC program and associated corrective action.

Regarding communication with the MAC, Metrorail is required to specify roles and responsibilities of the position and provide training for anyone functioning in or whose role requires interaction with the MAC as part of a CAP required to address a finding in the WMSC's Emergency Management and Fire and Life Safety Audit (final report February 2022).

Metrorail should consider adjusting performance levels in the Automatic Train Control (ATC) system so that the speed commands in each station reflect no more than the actual maximum allowed speed of 40 mph. Metrorail has determined that, for a passenger train servicing a station, the maximum allowed safe entry speed is 40 mph. Metrorail restricts trains that are not servicing a station from passing through the station at any speed greater than 25 mph.

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

FINAL REPORT OF INVESTIGATION A&I E21638

Date of Event:	12/07/2021
Type of Event:	Improper Vehicle Movement
Incident Time:	05:45 Hours – Station Overrun 05:52 Hours – Improper Movement & Improper Door Operation
Location:	Suitland Station, Track 2
Time and How received by SAFE:	12/09/2021 – ARS Review
WMSC Notification Time:	12/07/2021 – 06:33 hours (Station Overrun) 12/09/2021 – 15:20 hours (Improper Rail Vehicle Movement)
Responding Safety Officers:	WMATA: N/A WMSC: N/A Other: N/A
Rail Vehicle:	L3055/54x3182/83x2032/33T
Injuries:	None
Damage:	Wheel Flats
SMS I/A Incident Number:	20211207#97233MX

Suitland Station – Improper Vehicle Movement

December 7, 2021

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Abbreviations and Acronyms

AIMS	Advanced Information Management System
AOM	Assistant Operations Manager
ARS	Audio Recording System
ATC	Automatic Train Control
CAP	Corrective Action Plan
CCTV	Closed-Circuit Television
CMOR	Office of Chief Mechanical Officer
IMO	Incident Management Official
IIT	Incident Investigation Team
MSRPH	Metrorail Safety Rules and Procedures Handbook
NOAA	National Oceanic and Atmospheric Administration
OM	Operations Manager
RTC	Rail Traffic Controller
RTRA	Office of Rail Transportation
ROCC	Rail Operations Control Center
SAFE	Department of Safety and Environmental Management
SMS	Safety Measurement System
VMS	Vehicle Monitoring System
WMATA	Washington Metropolitan Area Transit Authority
WMSC	Washington Metrorail Safety Commission

FINAL REPORT OF INVESTIGATION E21638

Executive Summary

On Tuesday, December 7, 2021, at approximately 05:46 hours, a Greenbelt Division Train Operator of Train ID 504 (L3055/54x3182/83x2032/33T), operating an outbound Green Line train in the direction of Branch Avenue Station, reported to the Rail Operations Control Center (ROCC) Radio Traffic Controller (RTC) that the train overran Suitland Station on track 2. At approximately 05:47 hours Radio RTC #1 instructed the Train Operator to key down from the lead car and reverse ends. At approximately 05:51 hours the Train Operator reversed ends and moved the train in the opposite direction of normal traffic, stopping the train at the 8-car marker on the Greenbelt end of Suitland Station's platform, track 2 and serviced the station. There were no injuries, however wheel flats were reported on rail cars 3055/54x3182/83x2032/33 as a result of the Station Overrun. A SAFE Investigator discovered the Improper Rail Vehicle Movement (moving against the normal flow of traffic without an absolute block and permission from ROCC) while reviewing audio playback of the Station Overrun event and initiated a full review of the event.

The Audio Radio System (ARS) playback revealed that at approximately 05:46 hours, the Train Operator of train ID 504 reported a station overrun at Suitland Station, track 2 and was unable to verify how many cars were off the platform. At approximately 05:47 hours the Button RTC determined that all cars were off the platform by looking at the AIMS indication and notified the Assistant Operations Manager (AOM) that train ID 504 overran Suitland Station and all cars were off the platform. The AOM advised the Radio RTC #1 to instruct the Train Operator to reverse ends and move the train back to Suitland Station under an absolute block. At approximately 05:48 hours, the Radio RTC #1 instructed the Train Operator to reverse ends and key-up on the Suitland end of the consist. At approximately 05:52 hours, the Radio RTC #1 inquired the location of the Train Operator of train ID 504. The Train Operator informed the Radio RTC #1 that the train was on the platform with the doors open and the Train Operator was walking down the platform to return to the lead car. The Radio RTC #1 informed the Train Operator that their incident time was 05:52 hours. The Button RTC notified the AOM that the Train Operator of train ID 504 reversed ends and moved the train against the established direction of traffic without receiving an absolute block, stopping the train at the 8-car marker on the Greenbelt end of the platform and serviced the station.

At approximately 05:57 hours, the Radio RTC #1 confirmed with the Train Operator that they were keyed up on the Branch Avenue end of the train and gave permission for the train to continue to Branch Avenue Station.

The Office of Rail Transportation (RTRA) later removed the Train Operator from service for post-incident toxicology testing.

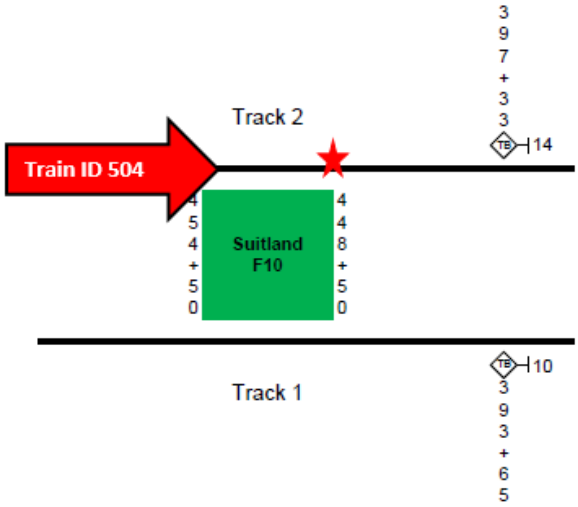
The probable cause of the Improper Vehicle Movement event was stress factors related to the station overrun incident that occurred minutes prior; the Train Operator was involved in a station overrun and the entire consist stopped outside of the platform limits. The Train Operator appears to have experienced performance pressure, taking action beyond what was authorized by the RTC. In addition, the probable cause of the AOM failing to report the Improper Vehicle Movement

event to the Operations Manager (OM) and/or the Incident Management Official (IMO) is also likely attributed to performance pressure to maintain service and monitor several concurrent events, including a down track circuit and clamped switch.

Incident Site

Suitland Station, Track 2

Field Sketch/Schematics*



**Locations are approximate. Not to scale*

Purpose and Scope

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

Investigative Methods

Upon discovery of the Improper Vehicle Movement at Suitland Station on December 7, 2021, SAFE engaged with a cross-functional team to assess the scene and conduct the subsequent investigation. SAFE team members worked with relevant Washington Metropolitan Area Transit Authority (WMATA) subject matter experts to review the incident's facts and data.
The investigative methodologies included the following:

- Site Assessment through document review
- Formal Interviews – SAFE interviewed one (1) person as part of this investigation. The interview included representatives from the Washington Metrorail Safety Commission (WMSC). SAFE interviewed the following individual:
    - Train Operator

Informal Interviews – Collected through conversations and written statements with individuals during the investigation to provide background and supporting information. Note: Written

statements were reviewed from personnel present during the event and present due to a shift change.

- ROCC Radio RTC #1
- ROCC Radio RTC #2
- ROCC Button Controller
- Assistant Operations Manager
- Incident Management Official

Documentation Review – Collection of relevant work history information and process documentation contained in WMATA systems of record. These records include:

- Train Operator & Interlocking Operator Training Records
- Train Operator & Interlocking Operator 30-Day work history
- Metrorail Safety Rules and Procedures Handbook (MSRPH)
- National Oceanic and Atmospheric Administration (NOAA)
- Rail Operations Control Center (ROCC) Incident Report
- Maintenance Operations Center (MOC) Daily Summary
- Maximo Data

System Data Recording Review – Collection of information contained in Metro Data Recording Systems. This data includes:

- Audio Recording System (ARS) playback [Radio and Landline Communications]
- The Office of Chief Mechanical Officer (CMOR) Incident Investigation Team (IIT) Vehicle Monitoring System (VMS) analysis
- Closed-Circuit Television (CCTV)

Investigation

On Tuesday, December 7, 2021, at approximately 05:46 hours, a Greenbelt Division Train Operator of Train ID 504 (L3055/54x3182/83x2032/33T), operating an outbound Green Line train in the direction of Branch Avenue Station, reported to the ROCC Radio RTC that the train overran Suitland Station, track 2[1]. The Button RTC immediately notified the AOM of the station overrun event. The AOM instructed the Radio RTC #1 to give permission to the Train Operator allowing them to reverse ends and move the train back onto the platform to service the station using the proper procedures according to the MSRPH. The AOM notified the OM of the station overrun event. At approximately 05:47 hours the Radio RTC #1 instructed the Train Operator to key down the train, reverse ends and key up the train in the trailing car. At approximately 05:48 hours, the OM notified the IMO of the station overrun event.

At approximately 05:51 hours, the Train Operator keyed up the train in the trailing car 2033 and began to move the train in the opposite direction of normal traffic without permission from the ROCC RTC, stopping the train approximately 495 feet into the platform limits stopping

[1] Train ID 504 entered Suitland Station, track 2 at a speed of 49 MPH, with the master controller in a P1 mode. The train reached the center of the platform at a speed of 49 MPH with the master controller in a coast mode. The train passed the 8-car marker at a speed of 37 MPH with the master controller in a B4 braking mode. At approximately 05:46 hours the train (approximately 450 feet in length) came to a stop with the lead car approximately 599 feet beyond the 8-car marker (approximately one platform length).

approximately 50 feet short of the 8-car marker on the Greenbelt end of the platform and approximately 1⅓ cars short of the 8-car marker on the Branch Avenue end of Suitland Station, track 2, then opened the doors on the platform side without verifying that the train was properly berthed at the 8-car marker on the Branch Avenue end of the platform and serviced the station. This action is not in accordance with MSRPH – SOP #15, *Absolute Block/Permissive Block* and MSRPH – SOP #40, 40.5.1.5.1 "Make eight-car stops with all trains unless otherwise directed by ROCC (Ensure the train is properly berthed on the platform for the number of cars in the consist)." The Radio RTC #1 observed the train moving on the Advanced Information Management System (AIMS) and requested the Train Operator's location. The Train Operator confirmed that they moved the train back onto the platform[2] and were heading to the [original] lead car, 3055.

Image 1 – AIMS Display depicting Train ID 504 on the platform and The Train Operator of Train ID 504 moving the train in back on the platform at Suitland Station, Track 2 after the station overrun.

At approximately 05:52 hours, the Button RTC notified the AOM of the improper vehicle movement event via telephone. The AOM acknowledged the report but did not communicate the information to the OM or to the IMO located within the Control Center. This action is inconsistent with ROCC Procedure 100-ROCC-ALL-03-02 Sec. 5 *Responsibilities* 5.1 *RACI Table* and resulted in a delay in reporting to the WMSC. The Improper Vehicle Movement Safety Notification was submitted to the WMSC on December 9, 2021 at approximately 03:21 hours, 2 days after the date of the incident after being discovered by a SAFE Investigator reviewing the Station Overrun event.

At approximately 06:09 hours, train ID 504 returned to Branch Avenue Station and the Train Operator was removed from service. The Terminal Supervisor at Branch Avenue reported flats on the consist to ROCC.

[2] During the formal interview, the Train Operator admitted that after reversing ends they did not permission to move the train to the platform. Additionally, the Train Operator stated that they are aware that an absolute block is needed when moving the train in the opposite direction of normal traffic.

Chronological Event Timeline

The ARS playback revealed the following timeline:

Time	Description
05:46:39 hours	Train ID 504: Central 504, station overrun. Train wouldn't stop at the end of the platform limits at all. [Radio]
05:47:01 hours	ROCC Radio RTC #1: Acknowledged and repeated. How many doors off the platform? Train ID 504: I don't know how many I have off. ROCC Radio RTC #1: What's your lead car? Train ID 504: 3055 ROCC Radio RTC #1: Acknowledged and repeated. [Radio]
05:47:20 hours	ROCC Button RTC: 504 all cars off the platform Assistant Operations Manager: Was 504 in service? ROCC Button RTC: Yes. Assistant Operations Manager: Give permission to go back to the platform with an absolute block to go back to Suitland. [Phone]
05:48:02 hours	ROCC Radio RTC #1: 504, key-down your train reverse ends and key-up on your Suitland end. Train ID 504: Acknowledged and repeated. [Radio]
05:51:55 hours	ROCC Radio RTC #1: 504, track 2 Suitland come in to Central. Train ID 504: Acknowledged ROCC. [Radio]
05:52:08 hours	ROCC Radio RTC #1: 504, what's your current location? Train ID 504: Train is on the platform; doors are open; servicing the station. I'm walking down the platform. ROCC Radio RTC #1: Acknowledged and repeated. 504, stand by. Your incident time is 05:52 hours. Train ID 504: Acknowledged and repeated incident time 05:52 hours. [Radio]
05:52:13 hours	ROCC Button RTC: We told him to key down, reverse ends, never gave an absolute block. The Train Operator moved without getting an absolute block. Assistant Operations Manager: Oh my gosh. ROCC Button RTC: Now he moved back to the platform without getting an absolute block. Assistant Operations Manager: Find out their name and information. ROCC Button RTC: I'll bring it to you. [Phone]
05:53:36 hours	ROCC Radio RTC #1: Unit 20 contact ROCC via landline. [Radio]

Time	Description
05:54:25 hours	ROCC Button RTC: 504 is out of service. Unit 20: Okay, I'm at PG. ROCC Button RTC: They overran, keyed-down and moved back. Unit 20: They moved before asking permission? ROCC Button RTC: Uh-huh. Unit 20: Okay. ROCC Button RTC: The incident time for moving without an absolute block is 05:52 hours. Unit 20: Acknowledged and repeated. ROCC Button RTC: Call Branch Avenue Terminal to coordinate. Unit 20: I already did. ROCC Button RTC: 05:47 hours for the station overrun and 05:52 hours moving without an absolute block. Unit 20: Okay. [Phone]
05:57:58 hours	Train ID 504: 504 standing by with customers. ROCC Radio RTC #1: Are you keyed-up on the Branch Avenue end? Train ID 504: Affirmative. ROCC Radio RTC #1: With speed commands you may continue. Train ID 504: Acknowledged and repeated. [Radio]

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

Office of Radio Communications (COMR)

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

Office of Chief Mechanical Officer (CMOR) / Vehicle Monitoring System (VMS) Timeline

As provided by the CMOR/Incident Investigation Team (IIT) from the downloaded VMS and ER, the following analysis is adopted as part of this report:

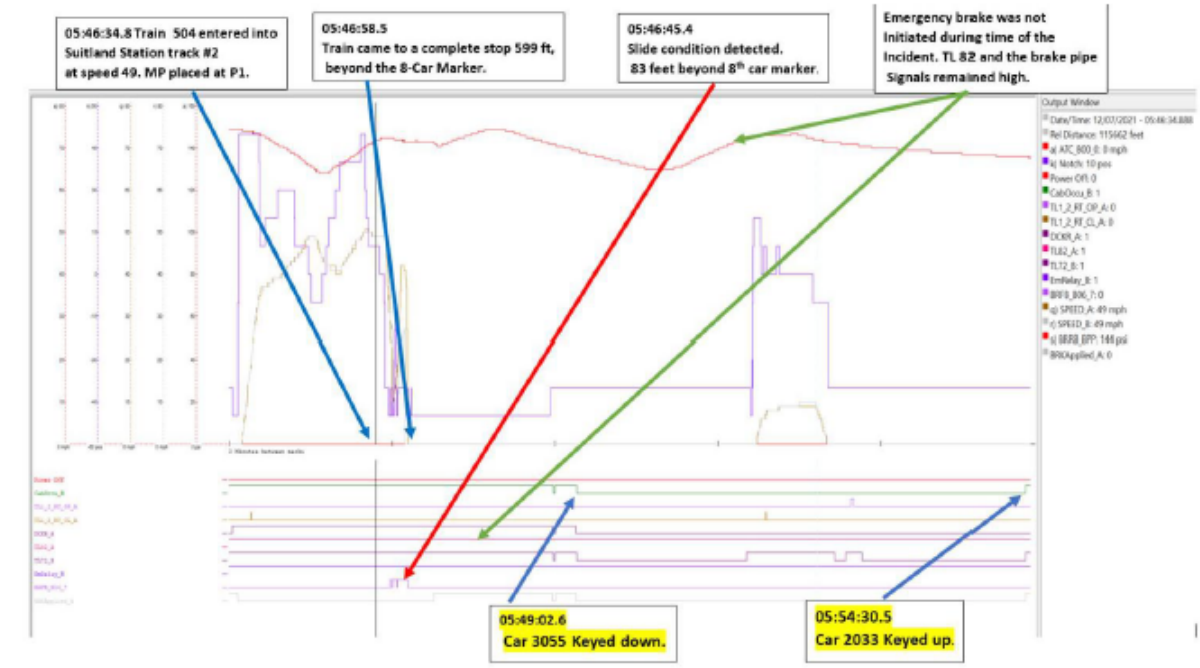
"IIT has completed the analysis of data retrieved from the reported consist for a station overrun. Train ID 504, lead car 3055 entered Suitland Station, track 2 at a speed of 49 MPH with the master controller in the P1 mode. The regulated speed in approach to Suitland Station is 40 MPH and maximum authorized speed is 55 MPH. The Automatic Train Control (ATC) Subsystem was not communicating with the VMS at time of the incident, the trains speed commands were not available. The lead car experienced a slide condition[3] after the train overran the station at approximately 83 feet after the 8-car marker. The slide was observed on all cars. While experiencing sliding conditions, the master controller was moving between B2 and B5 braking mode and the train eventually came to a complete stop 599 feet beyond the 8-car marker. Lead car 3055 keyed down then keyed up on the trailing car 2033. The consist moved back onto the platform at Suitland Station, track 2 and came to complete stop 495 feet into the platform. The

[3] Slide conditions may occur for various reasons including wet running rails, snow, or tree leaves on the tracks, etc. Additionally, slide conditions may occur when emergency braking is initiated by the Train Operator.

doors opened and station was serviced. There were no faults observed with the train that may have contributed to the cause of this incident."

Time	Description
05:46:34 hours	Train ID 504 entered Suitland Station, track 2 at speed of 49 MPH, with the Master Controller placed in P1 power mode.
05:46:38.6 hours	Train ID 504 reached the center of the platform at a speed of 49 MPH, with the Master Controller placed in Coast.
05:46:40.6 hours	The Master Controller moved to B1 braking mode 206 feet before the 8-car marker. The train speed was 49 MPH.
05:46:42.4 hours	The master controller moved to B4 braking mode 73 feet before the 8-car marker. The train speed was 45MPH.
05:46:43.7 hours	Train ID 504 passed the 8-car marker at a speed of 37MPH with the master controller placed in a B4 braking mode.
05:46:44.3 hours	The master controller moved to B5 braking mode 34 feet after the 8-car marker. The train speed was 34MPH.
05:46:45.4 hours	Slide conditions were detected 83 feet beyond 8-car marker. The train speed was 26MPH, with the master controller in a B5 braking mode.
05:46:45.7 hours	The master controller moved to a B4 braking mode 97 feet beyond the 8-car marker. The train speed was 24MPH.
05:46:47.3 hours	The master controller moved to a B3 braking mode 138 feet beyond the 8-car marker. The train speed was 10MPH.
05:46:49.0 hours	The master controller moved to a B2 braking mode 167 feet beyond the 8-car marker. The train speed was 13MPH (with slide conditions).
05:46:50.0 hours	The master controller moved to a B5 braking mode 192 feet beyond the 8-car marker. The train speed was 18MPH (with slide conditions).
05:49:50.6 hours	The master controller moved to a B4 braking mode 207 feet beyond the 8-car marker. The train speed was 16MPH. (with slide condition)
05:46:57.5 hours	The master controller moved to a B5 braking mode 573 feet beyond 8-car marker. The train speed was 18MPH (with slide conditions).
05:46:58.5 hours	The train came to a complete stop 599 feet beyond the 8-car marker.
05:49:02.6 hours	The lead car 3055 keyed down.
05:51:07.0 hours	The trailing car 2033 was keyed up (opposite end).
05:51:11.9 hours	The train started to move back toward Suitland Station. The master controller was placed in a P2 power mode. The train speed was 10 MPH. *The ATC subsystem was not communicating with the VMS at time of the incident, the trains speed commands were not available.
05:51:29.0 hours	The train was at Suitland platform limits. The master controller was placed in a P1 power mode and the train speed was 8 MPH.
05:52:09.2 hours	The train came to a complete stop after traveling 495 feet from the beginning of Suitland Station platform limits.
05:52:23.5 hours	The right-side doors opened from car 2033 (Station Serviced).
05:52:32.0 hours	Car 2033 was keyed down.
05:54:30.5 hours	Car 3055 was keyed up.
05:59:07.7 hours	The left side doors closed (from car 3055).
05:59:22.9 hours	The train continued to Branch Avenue Station.

3055 VMS DATA :



2033 VMS DATA:

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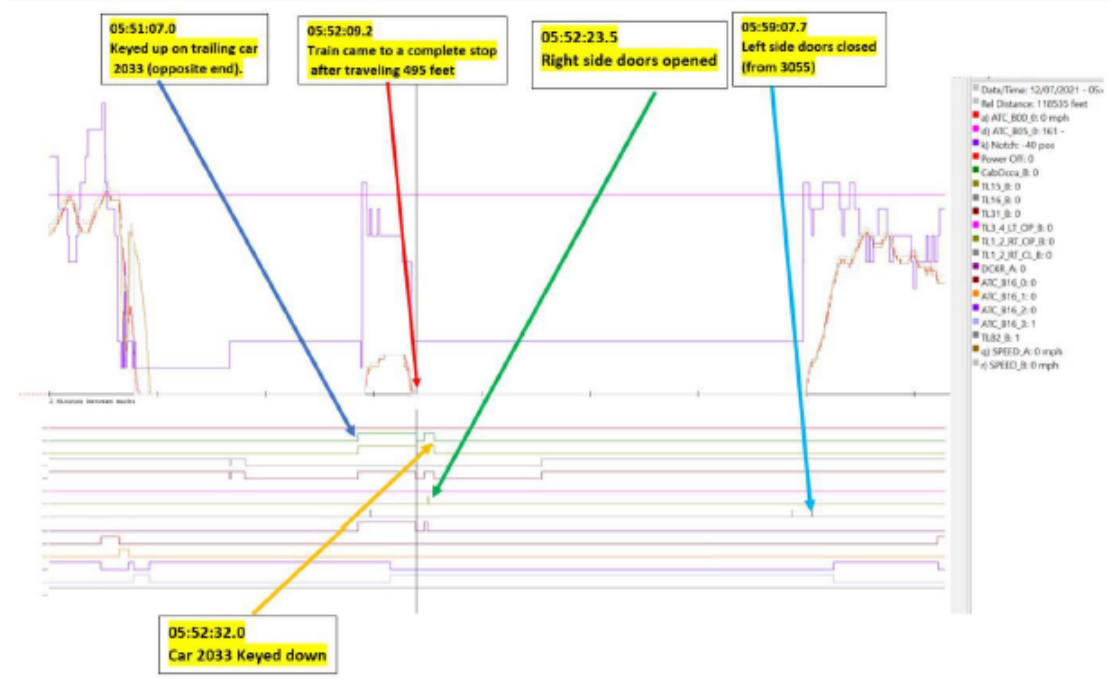

Office of Car Maintenance (CMNT)

CMNT personnel performed an exterior and interior inspection of the affected consist and found wheel flats on all rail cars involved in this incident. Additionally, CMNT performed a post-incident

inspection on the master controller, brake system, and propulsion system. CMNT found these subsystems worked as designed. CMNT identified improper equipment usage as a contributor to the wheel flats.

Interview Findings

Interview findings as presented below reflect statements made by the interviewee and may conflict with other systems of record.

- Train Operator inspected the train at Greenbelt Yard prior to beginning service.
- Train Operator reported no schedule, mechanical or operational issues with the train prior to the Station Overrun.
- On arrival at Suitland Station, the operator reported sliding conditions when they entered a braking mode. They reported Suitland Station as being a known location for sliding conditions.
- They were instructed to key down and go to the Suitland Station end and take the train back to the platform. They informed the customers and walked through the train, once at the opposite end of the train they re-berthed the train on the platform and opened the doors.
- With permission, they took the train to Branch Avenue Station and offloaded. They were instructed to go to the block house and then taken out of service.
- They experienced station overruns in the past and are familiar with the Green Line and they are cautious when entering Suitland Station. The train did not slow down, it picked up speed “maybe due to oil or dew because it was much more slippery than usual.” They noticed small flats on the train while operating and the weather condition was cool, no rain.
- They noticed there is a speed restriction at Suitland Station, the speed readouts are 40 MPH, then goes to 15 MPH, this does not help when the speed drops to 15 MPH it makes the train slide.
- They reported operating lower than 40 MPH before entering Suitland Station and from Naylor Road Station the speed readouts are 55 MPH, 50 MPH, 40 MPH then 15 MPH into the platform at Suitland Station. They entered the platform between 27-28 MPH, applied breaking 2-car lengths before the platform, breaking in B1, B2, B3 and once at B3 the speed increased, and that it felt as if it wasn’t stopping at all they released the brakes and did the same thing again.
    - After sharing the VMS data related to the actual speed of the train, they responded the data is incorrect and denied operating under what the data results displayed.
- The Train Operator admitted that after reversing ends they did not have an absolute block and did not repeat an absolute block before moving the train to the platform. The Train Operator stated that they are aware that an absolute block is needed when moving the train in the opposite direction of normal traffic.

Weather

On December 7, 2021, at the time of the incident, NOAA recorded the temperature as 36° F, with passing clouds. SAFE has concluded that weather was not a contributing factor in this incident (Weather source: NOAA – Location: Suitland, MD)

Human Factors

Fatigue

Signs and Symptoms of Fatigue

Train Operator
We evaluated conditions of at the time of the incident to distinguish whether evidence of fatigue was present. No video of the Train Operator was available to ascertain whether evidence of fatigue was present. The Train Operator reported feeling fully alert at the time of the incident. The Train Operator reported experiencing no symptoms of fatigue in the time leading up to the incident. A risk factor for fatigue was present. The incident occurred at a time of low circadian alertness.

Fatigue Risk

Incident data was evaluated for fatigue risk factors. Although the incident time of day (5:47 hours) may suggest an increased risk of fatigue-related impairment and the employee reported some variation in sleep schedule in the days leading up to the incident, no significant fatigue risk was identified. The employee worked day shift in the days leading up to the incident. Based on the employee's reported bed and wake times the day before the incident, the employee slept a total of 7.5 hours in the sleep period preceding the incident and was awake for 3.78 hours at the time of the incident. The off-duty period preceding the incident was 14.1 hours long, which provides the opportunity for 7-9 hours of sleep. The employee reported usual workday sleep durations of 6.5 hours and no issues with sleep.

Post-Incident Toxicology Testing

WMATA's Drug and Alcohol Program determined that the Train Operator tested in relation to this event was not in violation of the Drug and Alcohol Policy and Testing Program 7.7.3/6.

Findings

- Train ID 504 was operating at approximately 49 MPH when entering Suitland Station, track 2 causing a station overrun event. This action is not in accordance with MSRPH Section 3 – Operating Rules, 3.82.3 Train Operators, operating in manual mode while in revenue service, shall enter the station at speed no greater than 40 MPH and be prepared to properly berth the train at the "8" car marker.
- The Train Operator of Train ID 504 reversed ends and moved the train without permission and an absolute block from ROCC.
- The Train Operator did not verify that the train was properly berthed on the platform before opening the doors short of the 8-car marker.
- The AOM did not report the improper vehicle movement incident to the OM and the IMO.

Immediate Mitigation to Prevent Recurrence

- RTRA removed the Train Operator from service for post-incident toxicology testing.
- The incident consist was removed from service for CENV analysis and CMNT inspection.

Probable Cause Statement

The probable cause of the Improper Vehicle Movement event was stress factors related to the station overrun incident that occurred minutes prior; the Train Operator was involved in a station overrun and the entire consist stopped outside of the platform limits. The Train Operator appears to have experienced performance pressure, taking action beyond what was authorized by the RTC. In addition, the probable cause of the AOM failing to report the Improper Vehicle Movement event to the Operations Manager (OM) and/or the Incident Management Official (IMO) is also likely attributed to performance pressure to maintain service and monitor several concurrent events, including a down track circuit and clamped switch.

SAFE Recommendations/Corrective Actions

Corrective Action Code	Description	Responsible Party	Estimated Completion Date
97233_SAFE CAPS_RTRA _001	Train Operator to complete refresher training for the with emphasis on MSRPH OR 3.22, 1.46, 3.79 and SOP#40.	RTRA/ROQT	Completed
97233_SAFE CAPS_ROQT _002	Development of Train Operator Station Overrun Prevention Strategies Computer-Based Training (CBT).	ROQT	10/01/2022
97233_SAFE CAPS_ROQT _001	Train Operator to complete line familiarization and mainline train operations observation.	ROQT	Completed
97233_SAFE CAPS_ROCC _001	AOM Staff Meeting to discuss the IMO (now MAC) notification process including signed documentation acknowledging comprehension of notification procedures.	ROCC	Completed
97233_SAFE CAPS_RSSC _001	Development of Standard Operating Procedures relating to Station Overruns response.	OOP/RSSC	10/01/2022

Appendices

Appendix A – Interview Summary

RTRA - Train Operator

The Train Operator is a WMATA employee with 16 years of service and 14 years of experience as a Train Operator. The Train Operator holds a Roadway Worker Protection (RWP) Level 2 certification that expires in June 2022.

The below narrative summarizes the interview with SAFE and represents the statements made by the involved individual. As such, times and details may present a conflict with the data contained in systems of record.

During the virtual interview, the Train Operator stated that they received a manifest from the clerk and received the location of their train at the beginning of their shift. The Train Operator stated that they performed an interior and exterior inspection of the train, then boarded and left the yard. The Train Operator stated that their train was the first revenue train to leave Greenbelt Station. Everything was fine, they felt great, and they left on schedule from the terminal. The Train Operator stated that there were no issues with the train. The Train Operator stated that the issues began when entering Suitland Station, a station that's notorious for having issues and that makes them aware before getting to the station. The Train Operator stated that they attempted to break the train and immediately the train started to slide before entering the station. Once in the station the speed readouts went from 40 MPH to 15 MPH while in a breaking mode and the train continued to slide off the platform. The Train Operator stated that they contacted ROCC and reported the station overrun and they couldn't see how many doors were off of the platform because there is a turn. The Train Operator stated that they were instructed to key down and go to the Suitland Station end and take the train back to the platform. The Train Operator stated that they informed the customers and walked through the train, once at the opposite end of the train they re-berthed the train on the platform and opened the doors. The Train Operator stated that they were instructed to go back to the Branch Avenue Station end of the train and stand by. After a while, they contacted ROCC to find out their next instruction which was to continue to Branch Avenue Station. The Train Operator stated that they took the train to Branch Avenue Station and offloaded. The Train Operator stated that they were instructed to go to the block house and was then taken out of service. The Train Operator stated that they experienced station overruns in the past and are familiar with the Green Line. They reported being cautious when entering Suitland Station. The Train Operator stated that the train did not slow down, it picked up speed maybe due to oil or dew because it was much more slippery than usual. The Train Operator stated that they noticed small flats on the train while operating and the weather condition was cool, no rain. The Train Operator stated that they feel they had control of the train before braking to service Suitland Station. The Train Operator stated that they do not wear a smart watch and were not using any electronic devices before entering the station. The Train Operator stated that they noticed there is a speed restriction at Suitland Station, the speed readouts are 40 MPH, then goes to 15 MPH. The Train Operator stated that this does not help when the speed drops to 15 MPH it makes the train slide. The Train Operator stated that they were operating lower than 40 MPH before entering Suitland Station and from Naylor Road Station the speed readouts are 55 MPH, 50 MPH, 40 MPH then 15 MPH into the platform at Suitland Station. The Train Operator stated that they entered the platform between 27-28 MPH, applied breaking 2-car lengths before the platform, breaking in B1, B2, B3 and once at B3 the speed increased, and that it felt as if it

wasn't stopping at all they released the breaks and did the same thing again. After disclosing the VMS data, to the Train Operator they responded the data is incorrect and denied operating under what the data results displayed. The Train Operator admitted that after reversing ends they did not have an absolute block and did not repeat an absolute block before moving the train to the platform. The Train Operator stated that they are aware that an absolute is needed when moving in the train in the opposite of direction of normal traffic.

Appendix B – Written Statements

ROCC Radio RTC #1

To whom it may concern,

I [redacted] am submitting my statement for the incident that occurred on 12/07/2021 at 05:47 A.M. At 05:47 A.M. Operator [redacted] on train 504 contacted ROCC reporting that he had overrun Suitland Station Platform track Number 2 side. I [redacted] was the Radio Controller on OPS 3 that morning, and first question I asked Operator [redacted] was how many cars he had overrun the Platform. In turn he replied he did not know. It was determined he had totally overrun the station at Suitland, and at 05:49 I instructed Operator [redacted] to key down his train and reverse ends in order to take his train back to the platform at Suitland Station. After Giving [redacted] those instructions, me and another controller observed the AIM Screen at 05:52, we saw train 504 had Keyed up, and on its own made its way back to the platform at Suitland Station without an absolute block. Operator [redacted] then proceeded to service the platform at Suitland key down and reverse ends again on the platform. At 05:52 Operator [redacted] continued in service from Suitland Station to Branch Avenue, where he and the train were removed from service.

ROCC Buttons RTC

12.07.2021

Ops 3

Buttons: [redacted]

Radio: [redacted]

0547: Train 504 Operator [redacted] (E99) reported overrunning Suitland track two by an unknown number of cars.

0549: AIM indicated Train 504 with Zero cars on the platform. Train 504 was instructed to make announcements to customers, key down and reverse ends.

0552: AIM indicated Train 504 moving against traffic to Suitland track two. Train 504 operator failed to contact ROCC when keyed up on the trailing car, was moving without speed commands and was never given an absolute block to Suitland. Train 504 serviced Suitland track two and continued in revenue service to Branch Ave where the train & operator was removed from service pending post incident investigation.

[redacted]

Rail Traffic Controller

[redacted]

ROCC Radio RTC #2

From: [redacted]
To:
Subject: STOV 504
Date: Wednesday, December 15, 2021 6:15:22 AM

On December 7, 2021 at approximately 05:50 I, [redacted], was receiving a shift turnover from [redacted] when he informed me train 504 track two at Suitland had overran the station by an unknown amount of doors. He stated they had instructed the operator to key-down, reverse ends, and were waiting on the operator to inform them he was key-up on the Greenbelt end of the train. When I glanced over at AIM System Display I noticed train 504 was moving in the direction of Greenbelt in order to properly berth on the platform. I asked [redacted] if he had already provided the train operator with an absolute block to properly berth on the platform to which he responded he had not. I informed [redacted] he would need to provide the train operator with an incident time for moving on the mainline without speed commands. [redacted] provided the train operator with an incident time. His console partner made her notifications to the Terminal Supervisor at Branch Avenue as well as all of the required personnel. Coordination between the control center and field personnel was done in order to ensure the train operator was removed from service for post incident analysis.

[redacted]

Assistant Operations Manager

From: [redacted]
To:
Subject: Statement for Station Overrun on 12/7/2021
Date: Wednesday, December 15, 2021 7:17:32 AM

Good Morning,

On Tuesday December 7, 2021 at 0549 I was notified by OPS 3 button Controller that Train 504 had overrun the Suitland Station. I saw the indication on the AIM screen and instructed the radio controller to instruct the Operator on train 504 to reverse ends and give them an absolute block back to Suitland station to service the customers. At about 0553 I was notified by the button controller that train 504 was on the platform Suitland and serviced the station but no absolute block was given and the Operator never notified the Controllers that he was on the opposite end of his train ready to move. I then proceeded to find out who the Operator was and what division he was from. I was told by the button controller that it was Operator [redacted] from Greenbelt Division. So I notified his Management team by way of LAN Line who was Assistant Superintendent [redacted] of the incident and she reported to make sure that he comes out of service when he arrives at Branch Ave station.

[redacted]
Assistant Operations Manager
Rail Operations Control Center

Incident Management Official

From: [redacted]
Sent: Wednesday, December 22, 2021 9:12 AM
To: [redacted]@co.pg.md.us>
Cc: [redacted]@wmata.com>; [redacted]@wmata.com>
Subject: Request for Information - Improper Vehicle Movement - Suitland Station 12021207

On Tuesday, December 7, 2021 I was working as the IMO. The best that I can recall. Train 504 (2033-2032 x 3183-3182 x 3054-3055) Operator overran the station Track 2. Train reversed and offloaded. I do not recall anyone telling me or hearing on OPS 3 that it did not have permission. I did not know that a second incident took place. I also believed the Train was Removed from Service for Post Incident Inspection and Train Operator was removed from service for Post Incident Testing.

Appendix C – Maximo Data

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

Work Order #: 16749387
Type: CM

Status: COMP
12/12/2021 12:31

Work Description: Station overrun Suitland Station., 11/5, F10, RTR, STOV, 504
Job Plan Description:

Flats reported on the consist.

Work Information

Asset:	R3055	3055, RAIL CAR, BREDA, 3000 AC, B CAR	**Owning Office:**	CMNT-CMNT-CMNT	**Parent:**
Asset Tag:	R3055		**Maintenance Office:**	CMNT-NEWC-INSP	**Create Date:** 12/07/2021 07:55
Asset S/N:	3055		**Labor Group:**		**Actual Start:** 12/07/2021 07:59
Location:	1230	D99, NEW CARROLLTON YARD	**Crew:**		**Actual Comp:** 12/12/2021 12:31
Work Location:	1437	E99, GREENBELT YARD	**Lead:**		**Item:** L18060002
Failure Class:	CMNT001	RAIL CAR	**GL Account:**	WMATA-02-33393-50499160-041-**********-*****-OPR**	
Problem Code:	2424	N/A CODE (GENERAL SYMPTOM)	**Supervisor:**	[redacted]	**Target Start:**
Requested By:			**Requestor Phone:**		**Target Comp:**
Chain Mark Start:			**Chain Mark End:**		**Scheduled Start:**
Create-Mileage:	2467429.0		**Complete-Mileage:**	2467579.0	

Task IDs

Task ID							
5	SEE DETAILS IIT has completed data downloads on the consist (L 3055/54x3182/83x2032/33 T) ID #504 involved in the station overran at Suitland (F10) track #2. The VMS data confirmed the car 3055 was lead car during the incident. Please perform the following recommendations below: • Perform Master Controller operation checks on lead car 3055. • Perform brake rates check on 3055. • Inspect all wheels for flats on entire consist. • Perform DI on all cars. • Comply with SI #G2 special instruction. (see the attached file). • Document all checks, findings, and repairs in the MAXIMO work order. • Re-establish VMS communication with ATC on car 3054/55. Upon completion of recommendations. IIT has no hold on this consist, IIT will provide further details and analysis						
Component:	000-300 RAIL CAR; 2K/3K/6K/7K	**Work Accomp:** DOWNLOADED	**Reason:** INCIDENT//ACCIDENT	**Status:** CLOSE	**Position:**	**Warranty?:** N	
10	INSPECTED TRAIN IN YARD FOR FLATS. FOUND 2" TO 3" FLATS ON 27.50" WHEELS. WHEELS NEED TO BE REPROFILED.						
Component:	000-300-K03-002 WHEEL; TRUCK; 2K/3K/6K/7K	**Work Accomp:** INSPECTED	**Reason:** FLAT	**Status:** CLOSE	**Position:** 232	**Warranty?:** N	
20	BRAKE RATES & DST, good. Performed brake rates, B5 68.49 / 68.29 - B4 51.17 / 52.67 - B3 46.63 / 47.44 - B2 40.12 / 40.42 B1 20.61 / 22.19 - coast 0 /0 - snow brake 7 /8 - emergency 69.78 / 72.09. good.						
Component:	000-300-E00 SUBSYSTEM; FRICTION BRAKE; 2K/3K/6K/7K	**Work Accomp:** INSPECTED	**Reason:** NO TROUBLE FOUND	**Status:** CLOSE	**Position:**	**Warranty?:** N	
30	VERIFIED THAT ATC AND VMS ARE COMMUNICATING.						

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

Work Order #: 16749387
Type: CM

Status: COMP
12/12/2021 12:31

Work Description: Station overrun Suitland Station., 11/5, F10, RTR, STOV, 504
Job Plan Description:

Task IDs

Task ID						
Component: 000-300-000 SUBSYSTEM: AUTOMATIC TRAIN CONTROL (ATC); 2K/3K/6K/7K	Work Accomp: TESTED	Reason: INCIDENT//ACCIDENT	Status: APPR	Position:	Warranty?: N
40	HAD MECHANICS COMPLETE SI #G2. ALL DEFECTS REPORTED COMPLIED WITH ON MAXIMO WORK ORDERS. W/O 16749630 FLATS W/O 16756063 EXCESSIVE PLAY IN DRAWBAR				
Component: 000-300 RAIL CAR; 2K/3K/6K/7K	Work Accomp: INSPECTED	Reason: INCIDENT//ACCIDENT	Status: APPR	Position:	Warranty?: N

Actual Labor

Task ID	Labor	Start Date	End Date	Start Time	End Time	Approved?	Regular Hours	Premium Hours	Line Cost
5	[redacted]	12/07/2021	12/07/2021	09:00	10:00	Y	01:00	00:00	$48.20
10	[redacted]	12/07/2021	12/07/2021	07:45	08:00	Y	00:15	00:00	$10.65
20	[redacted]	12/07/2021	12/07/2021	13:00	14:30	Y	01:30	00:00	$66.69
30	[redacted]	12/16/2021	12/16/2021	07:00	07:10	Y	00:10	00:00	$7.41
40	[redacted]	12/16/2021	12/16/2021	07:00	07:00	Y	00:00	00:00	$0.00
						Total Actual Hour/Labor:	02:55	00:00	$133.15

Related Incidents

Ticket	Description	Class	Status	Relationship
8574639	Station overrun Suitland Station., 11/5, F10, RTR, STOV, 504	SR	RESOLVED	ORIGINATOR

Failure Reporting

Cause		Remedy		Supervisor	Remark Date
2090	IMPROPER EQUIPMENT USAGE CAUSING FAILURE	3192	TESTED / INSPECTED	[redacted]	12/16/2021

Remarks: COMPLIED WITH SI #G2. FOUND 2-3 INCH FLATS (refer to wo# 16749630). NO OTHER DEFECTS NOTED. SEE W/O 16749630 FOR FLAT REPAIR
SEE W/O 16756063 FOR DRAWBAR REPAIR
SEE W/O 16749388 FOR STATION OVERRUN CHECKS CAR 3054
SEE W/O 16749627 FOR FLATS REPAIR CAR 3054
SEE W/O 16749383 FOR STATION OVERRUN CHECKS CAR 3182
SEE W/O 16749626 FOR FLATS REPAIR CAR 3182
SEE W/O 16749384 FOR STATION OVERRUN CHECKS CAR 3183
SEE W/O 16749626 FOR FLATS REPAIR CAR 3183
SEE W/O 16761041 FOR SNOW BRAKE HIGH REPAIR CAR 3183
SEE W/O 16749385 FOR STATION OVERRUN CHECKS CAR 2032
SEE W/O 16749385 FOR FLATS REPAIR CAR 2032
SEE W/O 16763372 FOR FAILS SLIP SLIDE REPAIR CAR 2032
SEE W/O 16749386 FOR STATION OVERRUN CHECKS CAR 2033
SEE W/O 16749622 FOR FLATS REPAIR CAR 2033
SEE W/O 16763373 FOR FAILS SLIP SLIDE REPAIR CAR 2033

Document 1 - Work Order Details for rail car 3055.

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

Work Order #: 16749388
Type: CM

Status: COMP
12/12/2021 12:29

Work Description: Station overrun Suitland Station., 11/5, F10, RTR, STOV, 504
Job Plan Description:

Flats reported on the consist.

Work Information

Asset:	R3054	3054, RAIL CAR, BREDA, 3000 AC, A CAR	**Owning Office:**	CMNT-CMNT-CMNT	**Parent:**
Asset Tag:	R3054		**Maintenance Office:**	CMNT-NEWC-INSP	**Create Date:** 12/07/2021 07:55
Asset S/N:	3054		**Labor Group:**		**Actual Start:** 12/07/2021 07:59
Location:	1230	D99, NEW CARROLLTON YARD	**Crew:**		**Actual Comp:** 12/12/2021 12:29
Work Location:	1437	E99, GREENBELT YARD	**Lead:**		**Item:** L18050002
Failure Class:	CMNT001	RAIL CAR	**GL Account:**	WMATA-02-33393-50499160-041-**********-*****-OPR**	
Problem Code:	2424	N/A CODE (GENERAL SYMPTOM)	**Supervisor:**	[redacted]	**Target Start:**
Requested By:			**Requestor Phone:**	[redacted]	**Target Comp:**
Chain Mark Start:			**Chain Mark End:**		**Scheduled Start:**
Create-Mileage:	2467429.0		**Complete-Mileage:**	2467579.0	

Task IDs

Task ID	
5	SEE DETAILS

IIT has completed data downloads on the consist (L 3055/54x3182/83x2032/33 T) ID #504 involved in the station overran at Sui land (F10) track #2. The VMS data confirmed the car 3055 was lead car during the incident. Please perform the following recommendations below:
• Perform Master Controller operation checks on lead car 3055.
• Perform brake rates check on 3055.
• Inspect all wheels for flats on entire consist.
• Perform DI on all cars.
• Comply with SI #G2 special instruc ion. (see the attached file).
• Document all checks, findings, and repairs in the MAXIMO work order.
• Re-establish VMS communication with ATC on car 3054/55.
Upon completion of recommendations. IIT has no hold on this consist. IIT will provide further details and analysis

Component: 000-300 RAIL CAR; 2K/3K/6K/7K **Work Accomp:** DOWNLOADED **Reason:** INCIDENT//ACCIDENT **Status:** CLOSE **Position:** **Warranty?:** N

10 INSPECTED TRAIN IN YARD FOR FLATS. FOUND 2" FLATS ON 27.70" WHEELS. WHEELS NEED TO BE REPROFILED.

Component: 000-300-K03-002 WHEEL; TRUCK; 2K/3K/6K/7K **Work Accomp:** INSPECTED **Reason:** FLAT **Status:** CLOSE **Position:** 232 **Warranty?:** N

20 Preformed brake rates on 3055, DI on 3054/55, 3182/83 and 2032/33, good.

Component: 000-300-B00 SUBSYSTEM; CAR BODY; 2K/3K/6K/7K **Work Accomp:** INSPECTED **Reason:** NO TROUBLE FOUND **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
5	[redacted]	12/07/2021	12/07/2021	09:00	10:00	Y	01:00	00:00	$48.20

WT_plust_woprint.rptdesign 12/21/2021 13:18

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MX76PROD

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

Work Order #: 16749388
Type: CM

Status: COMP
12/12/2021 12:29

Work Description: Station overrun Suitland Station., 11/5, F10, RTR, STOV, 504
Job Plan Description:

Actual Labor

Task ID	Labor	Start Date	End Date	Start Time	End Time	Approved?	Regular Hours	Premium Hours	Line Cost
10	[redacted]	12/07/2021	12/07/2021	07:30	07:45	Y	00:15	00:00	$10.85
20	[redacted]	12/07/2021	12/07/2021	12:00	12:20	Y	00:20	00:00	$14.82
						Total Actual Hour/Labor:	01:35	00:00	$73.88

Related Incidents

Ticket	Description	Class	Status	Relationship
8574639	Station overrun Suitland Station., 11/5, F10, RTR, STOV, 504	SR	RESOLVED	ORIGINATOR

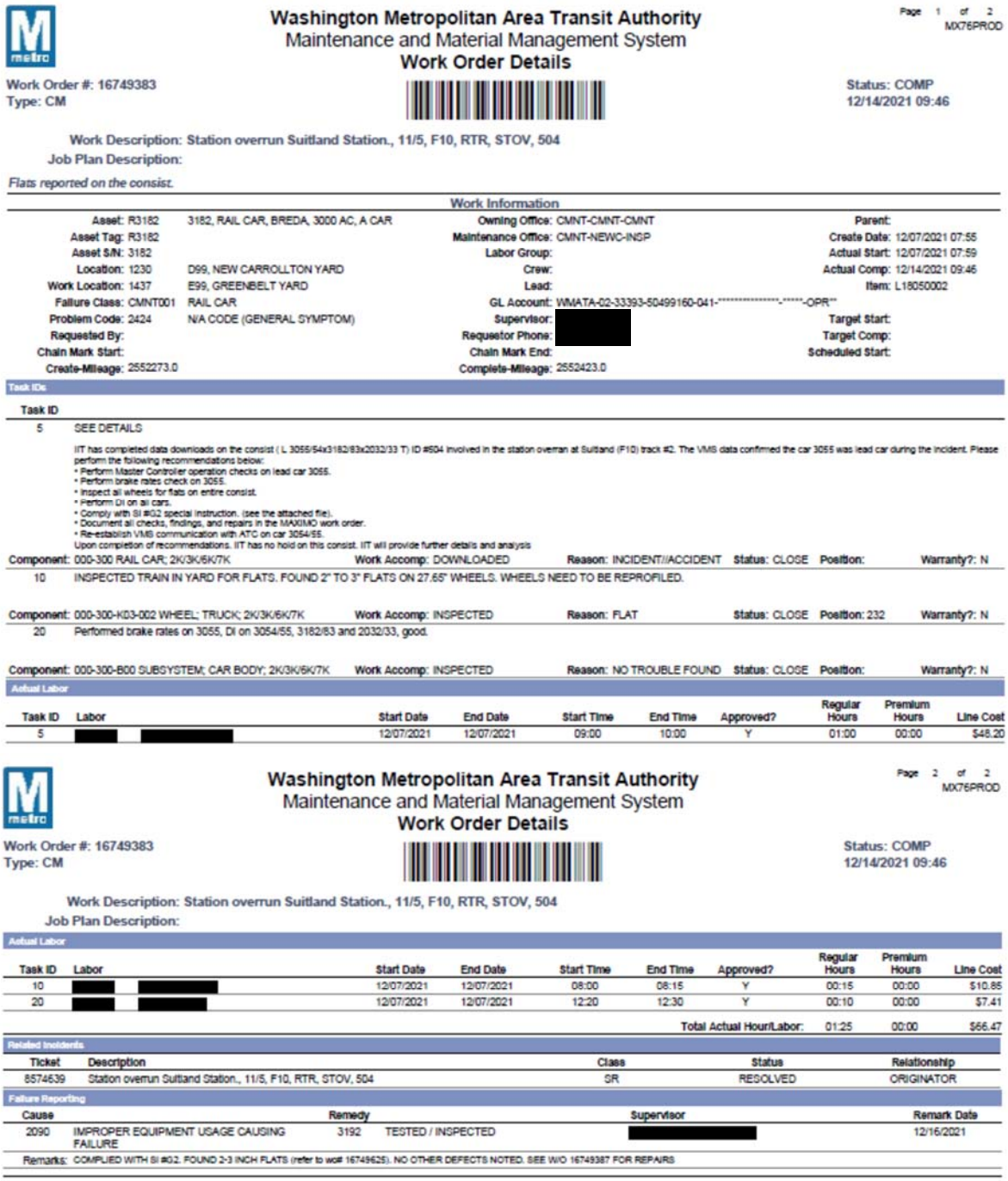
Failure Reporting

Cause		Remedy		Supervisor	Remark Date
2090	IMPROPER EQUIPMENT USAGE CAUSING FAILURE	3192	TESTED / INSPECTED	[redacted]	12/16/2021

Remarks: COMPLIED WITH SI #G2. FOUND 2" FLATS (refer to wo# 16749627). ESTABLISHED COMMS BETWEEN VMS & ATC. N O OTHER DEFECTS NOTED. SEE W/O 16749387 FOR REPAIRS

WT_plust_woprint.rptdesign 12/21/2021 13:18

Document 2 - Work Order Details for rail car 3054.



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

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MX76PROD

Work Order #: 16749383
Type: CM

Status: COMP
12/14/2021 09:46

Work Description: Station overrun Suitland Station., 11/5, F10, RTR, STOV, 504
Job Plan Description:

Flats reported on the consist.

Work Information

Asset: R3182	3182, RAIL CAR, BREDA, 3000 AC, A CAR	Owning Office: CMNT-CMNT-CMNT		Parent:	
Asset Tag: R3182		Maintenance Office: CMNT-NEWC-INSP		Create Date:	12/07/2021 07:55
Asset S/N: 3182		Labor Group:		Actual Start:	12/07/2021 07:59
Location: 1230	D99, NEW CARROLLTON YARD	Crew:		Actual Comp:	12/14/2021 09:46
Work Location: 1437	E99, GREENBELT YARD	Lead:		Item:	L18050002
Failure Class: CMNT001	RAIL CAR	GL Account:	WMATA-02-33393-50499160-041-**********-*****-OPR**		
Problem Code: 2424	N/A CODE (GENERAL SYMPTOM)	Supervisor:	[redacted]	Target Start:	
Requested By:		Requestor Phone:		Target Comp:	
Chain Mark Start:		Chain Mark End:		Scheduled Start:	
Create-Mileage: 2552273.0		Complete-Mileage: 2552423.0			

Task IDs

Task ID	
5	SEE DETAILS

IIT has completed data downloads on the consist (L 3055/54x3182/83x2032/33 T) ID #504 involved in the station overran at Suitland (F10) track #2. The VMS data confirmed the car 3055 was lead car during the incident. Please perform the following recommendations below:
* Perform Master Controller operation checks on lead car 3055.
* Perform brake rates check on 3055.
* Inspect all wheels for flats on entire consist.
* Perform DI on all cars.
* Comply with SI #02 special instruction. (see the attached file).
* Document all checks, findings, and repairs in the MAXIMO work order.
* Re-establish VMS communication with ATC on car 3054/55.
Upon completion of recommendations. IIT has no hold on this consist. IIT will provide further details and analysis

Component: 000-300 RAIL CAR; 2K/3K/6K/7K Work Accomp: DOWNLOADED Reason: INCIDENT//ACCIDENT Status: CLOSE Position: Warranty?: N

10 INSPECTED TRAIN IN YARD FOR FLATS. FOUND 2" TO 3" FLATS ON 27.65" WHEELS. WHEELS NEED TO BE REPROFILED.

Component: 000-300-K03-002 WHEEL; TRUCK; 2K/3K/6K/7K Work Accomp: INSPECTED Reason: FLAT Status: CLOSE Position: 232 Warranty?: N

20 Performed brake rates on 3055, DI on 3054/55, 3182/83 and 2032/33, good.

Component: 000-300-B00 SUBSYSTEM; CAR BODY; 2K/3K/6K/7K Work Accomp: INSPECTED Reason: NO TROUBLE FOUND 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
5	[redacted]	12/07/2021	12/07/2021	09:00	10:00	Y	01:00	00:00	$48.20

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

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MX76PROD

Work Order #: 16749383
Type: CM

Status: COMP
12/14/2021 09:46

Work Description: Station overrun Suitland Station., 11/5, F10, RTR, STOV, 504
Job Plan Description:

Actual Labor

Task ID	Labor	Start Date	End Date	Start Time	End Time	Approved?	Regular Hours	Premium Hours	Line Cost
10	[redacted]	12/07/2021	12/07/2021	08:00	08:15	Y	00:15	00:00	$10.85
20	[redacted]	12/07/2021	12/07/2021	12:20	12:30	Y	00:10	00:00	$7.41
						Total Actual Hour/Labor:	01:25	00:00	$66.47

Related Incidents

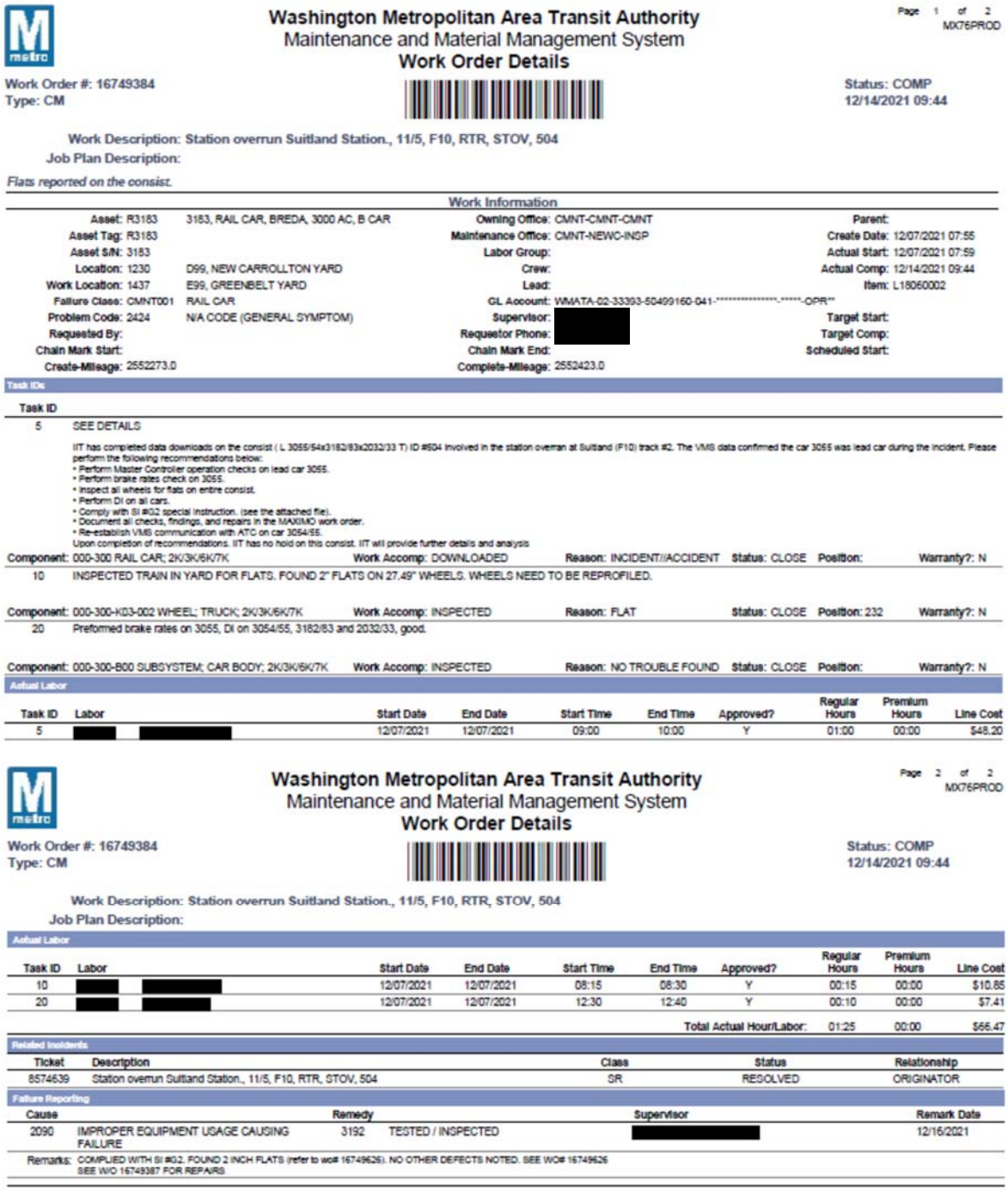
Ticket	Description	Class	Status	Relationship
8574639	Station overrun Suitland Station., 11/5, F10, RTR, STOV, 504	SR	RESOLVED	ORIGINATOR

Failure Reporting

Cause		Remedy		Supervisor	Remark Date
2090	IMPROPER EQUIPMENT USAGE CAUSING FAILURE	3192	TESTED / INSPECTED	[redacted]	12/16/2021

Remarks: COMPLIED WITH SI #02. FOUND 2-3 INCH FLATS (refer to wo# 16749625). NO OTHER DEFECTS NOTED. SEE W/O 16749387 FOR REPAIRS

Document 3 - Work Order Details for rail car 3182.



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

Page 1 of 2
MX76PROD

Work Order #: 16749384
Type: CM

Status: COMP
12/14/2021 09:44

Work Description: Station overrun Suitland Station., 11/5, F10, RTR, STOV, 504
Job Plan Description:

Flats reported on the consist.

Work Information

Asset: R3183	3183, RAIL CAR, BREDA, 3000 AC, B CAR	**Owning Office:** CMNT-CMNT-CMNT		**Parent:**	
Asset Tag: R3183		**Maintenance Office:** CMNT-NEWC-INSP		**Create Date:** 12/07/2021 07:55	
Asset S/N: 3183		**Labor Group:**		**Actual Start:** 12/07/2021 07:59	
Location: 1230	D99, NEW CARROLLTON YARD	**Crew:**		**Actual Comp:** 12/14/2021 09:44	
Work Location: 1437	E99, GREENBELT YARD	**Lead:**		**Item:** L18060002	
Failure Class: CMNT001	RAIL CAR	**GL Account:** WMATA-02-33393-50499160-041-**********-*****-OPR**			
Problem Code: 2424	N/A CODE (GENERAL SYMPTOM)	**Supervisor:** [redacted]		**Target Start:**	
Requested By:		**Requestor Phone:**		**Target Comp:**	
Chain Mark Start:		**Chain Mark End:**		**Scheduled Start:**	
Create-Mileage: 2552273.0		**Complete-Mileage:** 2552423.0			

Task IDs

Task ID	
5	SEE DETAILS

IIT has completed data downloads on the consist (L 3055/54x3182/83x2032/33 T) ID #504 involved in the station overran at Suitland (F10) track #2. The VMS data confirmed the car 3055 was lead car during the incident. Please perform the following recommendations below:
* Perform Master Controller operation checks on lead car 3055.
* Perform brake rates check on 3055.
* Inspect all wheels for flats on entire consist.
* Perform DI on all cars.
* Comply with SI #02 special instruction. (see the attached file).
* Document all checks, findings, and repairs in the MAXIMO work order.
* Re-establish VMS communication with ATC on car 3054/55.

Upon completion of recommendations. IIT has no hold on this consist. IIT will provide further details and analysis

Component: 000-300 RAIL CAR; 2K/3K/6K/7K **Work Accomp:** DOWNLOADED **Reason:** INCIDENT//ACCIDENT **Status:** CLOSE **Position:** **Warranty?:** N

10 INSPECTED TRAIN IN YARD FOR FLATS. FOUND 2" FLATS ON 27.49" WHEELS. WHEELS NEED TO BE REPROFILED.

Component: 000-300-K03-002 WHEEL; TRUCK; 2K/3K/6K/7K **Work Accomp:** INSPECTED **Reason:** FLAT **Status:** CLOSE **Position:** 232 **Warranty?:** N

20 Preformed brake rates on 3055, DI on 3054/55, 3182/83 and 2032/33, good.

Component: 000-300-B00 SUBSYSTEM; CAR BODY; 2K/3K/6K/7K **Work Accomp:** INSPECTED **Reason:** NO TROUBLE FOUND **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
5	[redacted]	12/07/2021	12/07/2021	09:00	10:00	Y	01:00	00:00	$48.20

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

Page 2 of 2
MX76PROD

Work Order #: 16749384
Type: CM

Status: COMP
12/14/2021 09:44

Work Description: Station overrun Suitland Station., 11/5, F10, RTR, STOV, 504
Job Plan Description:

Actual Labor

Task ID	Labor	Start Date	End Date	Start Time	End Time	Approved?	Regular Hours	Premium Hours	Line Cost
10	[redacted]	12/07/2021	12/07/2021	08:15	08:30	Y	00:15	00:00	$10.85
20	[redacted]	12/07/2021	12/07/2021	12:30	12:40	Y	00:10	00:00	$7.41
						Total Actual Hour/Labor:	01:25	00:00	$66.47

Related Incidents

Ticket	Description	Class	Status	Relationship
8574639	Station overrun Suitland Station., 11/5, F10, RTR, STOV, 504	SR	RESOLVED	ORIGINATOR

Failure Reporting

Cause		Remedy		Supervisor	Remark Date
2090	IMPROPER EQUIPMENT USAGE CAUSING FAILURE	3192	TESTED / INSPECTED	[redacted]	12/16/2021

Remarks: COMPLIED WITH SI #02. FOUND 2 INCH FLATS (refer to wo# 16749626). NO OTHER DEFECTS NOTED. SEE WO# 16749626
SEE W/O 16749387 FOR REPAIRS

Document 4 - Work Order Details for rail car 3183.

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

Work Order #: 16749385
Type: CM

Status: COMP
12/14/2021 10:09

Work Description: Station overrun Suitland Station., 11/5, F10, RTR, STOV, 504
Job Plan Description:

Flats reported on the consist.

Work Information

Asset: R2032	2032, RAIL CAR, BREDA, 2000 AC, A CAR	Owning Office: CMNT-CMNT-CMNT		Parent:	
Asset Tag: R2032		Maintenance Office: CMNT-BRWD-INSP		Create Date: 12/07/2021 07:55	
Asset S/N: 2032		Labor Group:		Actual Start: 12/07/2021 07:59	
Location: 1151	B99, BRENTWOOD YARD	Crew:		Actual Comp: 12/14/2021 10:09	
Work Location: 1437	E99, GREENBELT YARD	Lead:		Item: L18050001	
Failure Class: CMNT001	RAIL CAR	GL Account: WMATA-02-33330-50499160-041-[redacted]-OPR			
Problem Code: 2424	N/A CODE (GENERAL SYMPTOM)	Supervisor: [redacted]		Target Start:	
Requested By:		Requestor Phone:		Target Comp:	
Chain Mark Start:		Chain Mark End:		Scheduled Start:	
Create-Mileage: 2212449.0		Complete-Mileage: 2212599.0			

Task IDs

Task ID							
5	SEE DETAILS						
	IIT has completed data downloads on the consist (L 3055/54x3182/83x2032/33 T) ID #504 involved in the station overran at Suitland (F10) track #2. The VMS data confirmed the car 3055 was lead car during the incident. Please perform the following recommendations below: • Perform Master Controller operation checks on lead car 3055. • Perform brake rates check on 3055. • Inspect all wheels for flats on entire consist. • Perform DI on all cars. • Comply with SI #02 special instruction. (see the attached file). • Document all checks, findings, and repairs in the MAXIMO work order. • Re-establish VMS communication with ATC on car 3054/55. Upon completion of recommendations. IIT has no hold on this consist. IIT will provide further details and analysis						
Component: 000-300 RAIL CAR; 2K/3K/6K/7K		Work Accomp: DOWNLOADED	Reason: INCIDENT//ACCIDENT	Status: COMP	Position:	Warranty?: N	
10	INSPECTED TRAIN FOR FLATS IN YARD. FOUND 2" FLATS ON 26.55" WHEELS. WHEELS NEED TO BE REPROFILED.						
Component: 000-300-K03-002 WHEEL; TRUCK; 2K/3K/6K/7K		Work Accomp: INSPECTED	Reason: FLAT	Status: COMP	Position: 232	Warranty?: N	
20	Performed a successful DI.						
Component: 000-300-B00 SUBSYSTEM; CAR BODY; 2K/3K/6K/7K		Work Accomp: INSPECTED	Reason: NO TROUBLE FOUND	Status: COMP	Position:	Warranty?: N	
30	HAD MECHANICS COMPLETE SI #G2. ALL DEFECTS REPORTED COMPLIED WITH ON MAXIMO WORK ORDERS. W/O 16749607 FLATS W/O 16763372 FAILS SLIP SLIDE						
Component: 000-300 RAIL CAR; 2K/3K/6K/7K		Work Accomp: INSPECTED	Reason: INCIDENT//ACCIDENT	Status: APPR	Position:	Warranty?: N	

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

Work Order #: 16749385
Type: CM

Status: COMP
12/14/2021 10:09

Work Description: Station overrun Suitland Station., 11/5, F10, RTR, STOV, 504
Job Plan Description:

Actual Labor

Task ID	Labor	Start Date	End Date	Start Time	End Time	Approved?	Regular Hours	Premium Hours	Line Cost
5	[redacted]	12/07/2021	12/07/2021	09:00	10:00	Y	01:00	00:00	$48.20
10	[redacted]	12/07/2021	12/07/2021	07:00	07:15	Y	00:15	00:00	$10.85
20	[redacted]	12/07/2021	12/07/2021	12:40	12:50	Y	00:10	00:00	$7.41
30	[redacted]	12/16/2021	12/16/2021	06:30	06:30	Y	00:00	00:00	$0.00
						Total Actual Hour/Labor:	01:25	00:00	$66.47

Related Incidents

Ticket	Description	Class	Status	Relationship
8574639	Station overrun Suitland Station., 11/5, F10, RTR, STOV, 504	SR	RESOLVED	ORIGINATOR

Failure Reporting

Cause		Remedy		Supervisor	Remark Date
2090	IMPROPER EQUIPMENT USAGE CAUSING FAILURE	3192	TESTED / INSPECTED	[redacted]	12/16/2021
Remarks:	COMPLIED WITH SI #G2. FOUND 2" FLATS (refer to wo# 16749607). NO OTHER DEFECTS NOTED. SEE W/O 16749387 FOR REPAIRS				

Document 5 - Work Order Details for rail car 2032.

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

Work Order #: 16749386
Type: CM

Status: COMP
12/14/2021 10:10

Work Description: Station overrun Suitland Station., 11/5, F10, RTR, STOV, 504
Job Plan Description:

Flats reported on the consist.

Work Information

Asset: R2033	2033, RAIL CAR, BREDA, 2000 AC, B CAR	Owning Office: CMNT-CMNT-CMNT		Parent:	
Asset Tag: R2033		Maintenance Office: CMNT-BRWD-INSP		Create Date:	12/07/2021 07:55
Asset S/N: 2033		Labor Group:		Actual Start:	12/07/2021 07:59
Location: 1151	B99, BRENTWOOD YARD	Crew:		Actual Comp:	12/14/2021 10:10
Work Location: 1437	E99, GREENBELT YARD	Lead:		Item:	L18060001
Failure Class: CMNT001	RAIL CAR	GL Account:	WMATA-02-33330-50499160-041-[redacted]-OPR		
Problem Code: 2424	N/A CODE (GENERAL SYMPTOM)	Supervisor:	[redacted]	Target Start:	
Requested By:		Requestor Phone:		Target Comp:	
Chain Mark Start:		Chain Mark End:		Scheduled Start:	
Create-Mileage: 2212449.0		Complete-Mileage: 2212599.0			

Task IDs

Task ID	
5	SEE DETAILS

IIT has completed data downloads on the consist (L 3055/54x3182/83x2032/33 T) ID #504 involved in the station overrun at Suitland (F10) track #2. The VMS data confirmed the car 3055 was lead car during the incident. Please perform the following recommendations below:
* Perform Master Controller operation checks on lead car 3055.
* Perform brake rates check on 3055.
* Inspect all wheels for flats on entire consist.
* Perform DI on all cars.
* Comply with SI #02 special instruction. (see the attached file).
* Document all checks, findings, and repairs in the MAXIMO work order.
* Re-establish VMS communication with ATC on car 3054/55.

Upon completion of recommendations. IIT has no hold on this consist. IIT will provide further details and analysis

Component: 000-300 RAIL CAR; 2K/3K/6K/7K	Work Accomp: DOWNLOADED	Reason: INCIDENT//ACCIDENT	Status: COMP	Position:	Warranty?: N	
10	INSPECTED TRAIN IN YARD FOR FLATS. FOUND 2" FLATS ON 26.85" WHEELS. WHEELS NEED TO BE REPROFILED.					
Component: 000-300-K03-002 WHEEL; TRUCK; 2K/3K/6K/7K	Work Accomp: INSPECTED	Reason: FLAT	Status: COMP	Position: 232	Warranty?: N	
20	Performed a successful DI.					
Component: 000-300-B00 SUBSYSTEM; CAR BODY; 2K/3K/6K/7K	Work Accomp: INSPECTED	Reason: NO TROUBLE FOUND	Status: COMP	Position:	Warranty?: N	
30	HAD MECHANICS COMPLETE SI #G2. ALL DEFECTS REPORTED COMPLIED WITH ON MAXIMO WORK ORDERS. W/O 16749622 FLATS W/O 16763373 FAILS SLIP SLIDE					
Component: 000-300 RAIL CAR; 2K/3K/6K/7K	Work Accomp: INSPECTED	Reason: INCIDENT//ACCIDENT	Status: APPR	Position:	Warranty?: N	

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

Work Order #: 16749386
Type: CM

Status: COMP
12/14/2021 10:10

Work Description: Station overrun Suitland Station., 11/5, F10, RTR, STOV, 504
Job Plan Description:

Actual Labor

Task ID	Labor	Start Date	End Date	Start Time	End Time	Approved?	Regular Hours	Premium Hours	Line Cost
5	[redacted]	12/07/2021	12/07/2021	09:00	10:00	Y	01:00	00:00	$48.20
10	[redacted]	12/07/2021	12/07/2021	07:15	07:30	Y	00:15	00:00	$10.85
20	[redacted]	12/07/2021	12/07/2021	12:50	13:00	Y	00:10	00:00	$7.41
30	[redacted]	12/16/2021	12/16/2021	06:30	06:30	Y	00:00	00:00	$0.00
						Total Actual Hour/Labor:	01:25	00:00	$66.47

Related Incidents

Ticket	Description	Class	Status	Relationship
8574639	Station overrun Suitland Station., 11/5, F10, RTR, STOV, 504	SR	RESOLVED	ORIGINATOR

Failure Reporting

Cause		Remedy		Supervisor	Remark Date
2090	IMPROPER EQUIPMENT USAGE CAUSING FAILURE	3192	TESTED / INSPECTED	[redacted]	12/16/2021

Remarks: COMPLIED WITH SI #G2. FOUND 2 INCH FLATS (refer to wo# 16749622). NO OTHER DEFECTS NOTED. SEE W/O 16749387 FOR REPAIRS

Document 6 – Work Order Details for rail car 2033.

Appendix D - Root Cause Analysis