



WMSC Commissioner Brief: W-0129 – Red Signal Overrun – Largo Town Center Station – August 18, 2021

Prepared for Washington Metrorail Safety Commission meeting on December 7, 2021

Safety event summary:

A Terminal Supervisor provided improper instructions to the Train Operator of the first inbound revenue train of the day, Train 403, departing Largo Town Center Station. The Train Operator operated the train beyond a red signal at the end of the station platform, proceeding on an incorrect route through the interlocking toward the opposite track. The Terminal Supervisor had not set the correct route and a lunar (proceed) signal after taking control of the operations board at 4:50 a.m. The Train Operator stopped the train within the interlocking, then continued on toward Morgan Boulevard Station. Neither the Train Operator nor the Terminal Supervisor reported this red signal overrun. The Rail Operations Control Center (ROCC) contacted the Terminal Supervisor and Train Operator for additional information, and the Train Operator was then directed to stop the train between Largo Town Center and Morgan Boulevard stations. The Train Operator was removed from service at Morgan Boulevard Station.

Due to the location of the overrun and the movement of the train through the interlocking which could have damaged switch locations, Metrorail suspended service between Largo Town Center and Morgan Boulevard until the interlocking could be inspected.

Due to radio transmission challenges at Largo Town Center, the Terminal Supervisor provided verbal instruction face-to-face with the Train Operator on the platform. According to the Train Operator, the Terminal Supervisor directed the operator to depart the station at 4:54 a.m. The Train Operator departed without verifying a lunar signal and correct rail alignment, then stopped the train after it began to cross over from Track 2 to Track 1. The Train Operator was able to make this movement without additional protections because they had previously properly used the stop and proceed mode awareness tool to allow movement from the tail track to the station platform to go into service. Because the train did not exceed 15 mph during that movement, the Train Operator was not required to enter a new code to move without speed commands after servicing the station. Approximately 12 seconds after the train began to move, the Train Operator applied emergency braking when the train was moving 15.5 mph. The train stopped 211 feet beyond the end of the station platform and 63 feet beyond the red signal.

The Terminal Supervisor called the ROCC and asked to have Train 403 cross back over to Track 2, and the ROCC controller responded "ok". The Terminal Supervisor then contacted the Train Operator over the radio, and instructed the Train Operator to continue to Morgan Boulevard Station where the ROCC would cross the train back to the normal inbound track. This instruction from the Terminal Supervisor is contrary to Metrorail safety requirements for movements against the normal direction of traffic, including the requirement for an absolute block for this in-service movement. That requirement is intended to provide additional layers of protection against collision.

ROCC controllers then contacted the Terminal Supervisor and Train Operator based on a red signal overrun alarm in the ROCC to gather additional information. A ROCC controller directed the Train Operator to stop the train. Approximately 2 minutes later, the ROCC allowed the Train Operator to continue to Morgan Boulevard Station where the train was taken out of service.

Metrorail conducted inspections of the interlocking at Largo Town Center Station and of the train.



Metrorail restored service at approximately 6:40 a.m.

There was evidence of fatigue risk and reduced performance effectiveness for both the Train Operator and Terminal Supervisor. No conclusive video was available of the Terminal Supervisor, but video of the Train Operator appeared to show instances of falling asleep while at the controls of the train.

The Terminal Supervisor and Train Operator each said in investigative interviews that they felt rushed. Metrorail had adjusted the first train from Largo Town Center to be dispatched from New Carrollton Yard, which reduced available preparation time at Largo Town Center, particularly with late clearing track work that led to the Terminal Supervisor directing the Train Operator involved in this event who was on duty as a yard operator to use a gap train available in the tail track to meet the initial on-time dispatch of this first inbound train of the day in revenue service. The Terminal Supervisor verbally instructed the operator to depart at the scheduled time without setting a proper route and lunar signal.

Probable Cause:

The probable cause of this event was improper direction from a terminal supervisor, and inadequate managerial oversight of terminal supervisors and train operators. Contributing to this event was Metrorail's inadequate controls on fatigue, and schedule changes made without complete consideration of safety impacts.

Corrective Actions:

Rail Transportation will document terminal supervisor observations by division managers.

Rail Transportation will encourage employees to report conditions that lead to deviations in procedures or possible unsafe acts such as feeling rushed or feeling tired.

Rail Transportation will communicate the importance of sleep hygiene and employee safety reporting.

Rail Transportation, as required by open corrective action plans, will implement Metrorail's fatigue management policies, initially including training of all covered personnel and providing a means for self-reporting of fatigue.

As part of corrective actions related to other investigation reports, Metrorail is in the process of implementing recording devices in the blockhouses used by terminal supervisors.

WMSC staff observations:

Metrorail should consider adjusting the design of its stop and proceed mode awareness tools so that the system resets after door operations or extended periods where the train is stopped (also see W-0081).

The Advanced Information Management (AIM) system is displaying "invalid" in relation to whether ROCC or the terminal supervisor have control of the interlocking on the inbound end of Largo Town Center Station. While this did not directly contribute to this event, Metrorail should consider investigating and addressing the root cause of this issue.

Staff recommendation: Adopt final report.



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

FINAL REPORT OF INVESTIGATION A&I E21376

Date of Event:	08/18/2021
Type of Event:	Red Signal Overrun
Incident Time:	04:54 hours
Location:	Largo Town Center Station, Track 2, Signal G5-08
Time and How received by SAFE:	05:08 hours – SAFE/IMO In-Person Notification
WMSC Notification Time:	06:53 hours
Responding Safety Officers:	WMATA: Yes WMSC: No Other: No
Rail Vehicle:	Train ID# 403 L7716.7717-7603.7602-7672.7673-7557.7556T
Injuries:	No
Damage:	No
SMS I/A Incident Number:	20210818#95097MX

Largo Town Center Station – Red Signal Overrun

August 18, 2021

Table of Contents

Abbreviations and Acronyms-----	3
Executive Summary -----	4
Incident Site -----	5
Field Sketch/Schematics -----	5
Purpose and Scope -----	5
Investigative Methods-----	6
Investigation -----	6
Chronological Event Timeline-----	7
Office of Chief Mechanical Officer (CMOR) / Incident Investigation Team (IIT) -----	9
Advanced Information Management System (AIMS) Playback -----	11
Closed-Circuit Television (CCTV)-----	13
Automatic Train Control Maintenance (ATCM)-----	16
Automatic Train Control Engineering (ATCE)-----	16
Office of Car Maintenance (CMNT) -----	16
Office of System Maintenance Communication Section (COMM)-----	16
Interview Findings-----	16
Findings -----	17
Weather -----	17
Human Factors -----	18
Fatigue-----	18
Post-Incident Toxicology Testing -----	20
Immediate Mitigation to Prevent Recurrence -----	20
Probable Cause Statement-----	20
SAFE Recommendations -----	21
Appendices -----	22
Appendix A – Interview Summaries -----	22
Appendix B – ATCM Incident Timeline Report -----	24
Appendix C – ATCM Work Order Details -----	25
Appendix D – ATCE Incident Analysis Report-----	27
Appendix E – COMM Work Order Details -----	28
Appendix F – CMNT Work Order Details -----	29
Appendix G - Root Cause Analysis-----	30

Abbreviations and Acronyms

AIMS	Advanced Information Management System
ATCE	Automatic Train Control Engineering
ATCM	Automatic Train Control Maintenance
ARS	Audio Recording System
CCTV	Closed-Circuit Television
CENV	Office of Vehicle Program Services
CMNT	Office of Car Maintenance
CMOR	Office of Chief Mechanical Officer
COMM	Office of Systems Maintenance Communication Section
ER	Event Recorder
I/A	Incidents/Accidents
IMO	Incident Management Officer
ITT	Incident Investigation Team
MSRPH	Metrorail Safety Rules and Procedures Handbook
NOAA	National Oceanic and Atmospheric Administration
ROCC	Rail Operations Control Center
RTC	Radio Traffic Controller
RTRA	Office of Rail Transportation
SAFE	Department of Safety and Environmental Management
SMS	Safety Measurement System
SRC	Safety Risk Coordinator
VMDS	Vehicle Monitoring and Diagnostic System
WMATA	Washington Metropolitan Area Transit Authority
WMSC	Washington Metrorail Safety Commission

Executive Summary

On Wednesday, August 18, 2021, at approximately 04:54 hours, a Largo Division Train Operator operating **revenue** inbound Blue Line Train ID #403 [L7716.7717-7603.7602-7672.7673-7557.7556T] in Franconia-Springfield Station's direction, overran the G05-08 signal displaying a red aspect on Track 2. After observing the Red Signal Alarm, the Rail Operation Control Center (ROCC) took steps to contact the Train Operator, who had crossed over to Track 1, to stop the train and establish an absolute block to Morgan Boulevard Station. The ROCC initiated emergency notifications to the respective internal departments for support during investigative efforts. Personnel responded to the incident scene, including representatives from Automatic Train Control Maintenance (ATCM), Office of Rail Transportation (RTRA), Office of Car Maintenance (CMNT) and the Department of Safety and Environment Management (SAFE). RTRA Management removed the Train Operator and Terminal Supervisor from service and ROCC dispatched an RTRA Supervisor to assist. The consist was removed from service and taken to the New Carrollton Yard for inspection and systems analysis by CMNT and Office of Vehicle Program Services (CENV) Incident Investigation Team (IIT). No injuries or damages were reported as a result of this incident.

Upon further investigation, Audio Recording System (ARS) playback revealed that at approximately 04:50 hours, the Terminal Supervisor contacted ROCC to request control of the Largo interlocking (board). ROCC responded and stated the Terminal Supervisor had control of the board. After Train ID 403 moved past the red signal, the consist began a crossing move from track 2 to track 1 due to the switch alignment and stopped within the interlocking. At approximately 04:55, the Terminal Supervisor contacted the Train Operator of Train ID 403 via radio and instructed them to standby. The Terminal Supervisor then contacted ROCC and asked if they could cross Train ID 403 back over to Track 2 when they arrived at Morgan Boulevard Station. ROCC asked the Terminal Supervisor if they had set a lunar at Signal G05-08. The Terminal Supervisor responded, "Yes." ROCC Radio Traffic Controller (RTC) called the Terminal Supervisor again to confirm if the Train Operator had passed a red signal at Largo Town Center. The Terminal Supervisor was unsure and responded that they believed they had set a lunar signal. At approximately 04:58 hours, ROCC contacted Train Operator of Train ID 403, via radio, and instructed them to provide their current chain marker. Train Operator of Train ID 403 responded they are still moving. ROCC instructed Train Operator of Train ID 403 to stop their train. Train Operator acknowledged and stopped train. At approximately 05:00 hours, ROCC instructed Train ID 403 to continue to Morgan Boulevard Station. ROCC asked the Train Operator of Train ID 403 to confirm if they had a lunar at Largo G05-08. The Train Operator responded, "Affirm," indicating they had a lunar at Largo Town Center Station.

Based on the Advanced Information Management System (AIMS) display, at approximately 04:53 hours, the Train Operator of Train ID 403 serviced Largo Town Center Station on Track 2. At approximately 04:54 hours, the Train Operator of Train ID 403 departed Largo Town Center Station, Track 2, and passed G05-08 signal (red), traversing Switch 1B in the process and stopping the train within the interlocking. Train ID 403 then traveled through the interlocking at approximately 04:56, crossing over from Track 2 to Track 1 in the direction of Morgan Boulevard Station. See *AIMS Diagrams 1 through 3*.

Following the incident, technicians from the office of Automatic Train Control Maintenance (ATCM) conducted an inspection of the incident area and determined no damage to Switch 1B.

ATCM personnel inspected the interlocking and all switches and found all equipment to be in a state of good repair. They also exercised all switches and set routes to confirm functionality. ATCM personnel performed a switch obstruction test and returned the equipment to service.

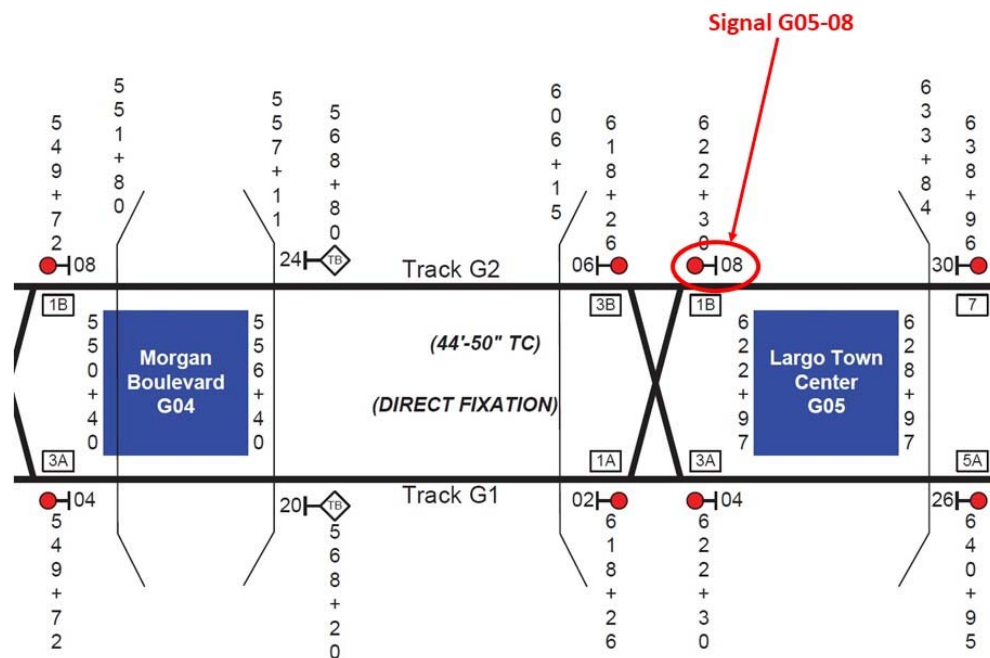
Prior to moving the train from Morgan Boulevard Station, CMNT personnel performed a walk around post-incident inspection of the affected train and reported a good walk around inspection. CMNT personnel remained onboard the incident train as it traveled from Morgan Boulevard Station, Track 1 to the New Carrollton Yard for further inspection.

The probable cause of the incident was human performance difficulty as the Train Operator did not identify that Signal G05-08 was red, did not verify correct alignment and came to a point of power without speed commands, ROCC's permission, or an absolute/permissive block. Contributing factors to the incident were conflicting instructions given to the Train Operator and a failure to set a route and correct alignment before instructing the Train Operator to proceed in revenue service.

Incident Site

Largo Town Center Station, Track 2, Signal G05-08

Field Sketch/Schematics



Purpose and Scope

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

Investigative Methods

The investigative methodologies included the following:

- Site Assessment via records review
- Formal Interviews – SAFE conducted two interviews as part of this investigation. Interviews included persons present at, during, and after the reported incident. Representatives from the Washington Metrorail Safety Commission (WMSC) participated. SAFE interviewed the following individuals:
 - Train Operator
 - Terminal Supervisor
- Informal Interviews – Collected through conversations with individuals during the investigation to provide background and supporting information.
- Documentation Review – A collection of relevant work history information and process documentation in Metro systems of record. These records include:
 - Train Operator Training Procedures & Records
 - Train Operator Certification
 - Train Operator 30-Day work history review
 - Terminal Supervisor Training Procedures & Records
 - Terminal Supervisor Certification
 - Terminal Supervisor 30-Day work history review
 - Metrorail Safety Rules and Procedures Handbook (MSRPH)
 - National Oceanic and Atmospheric Administration (NOAA)
 - Rail Operations Control Center (ROCC) Procedures Manual Review
 - Office of Systems Maintenance Communication Section (COMM)
 - Automatic Train Control Maintenance (ATCM) Data Review
 - Automatic Train Control Engineering (ATCE) Data Review
 - Car Maintenance (CMNT) Inspection Data Review
 - ROCC Incident Report
 - Maximo Data
- System Data Recording Review – A collection of information contained in Metro Data Recording Systems. This data includes:
 - Audio Recording System (ARS) playback [Radio and Landline Communications]
 - Advanced Information Management System (AIMS)
 - Closed-Circuit Television (CCTV)
 - Office of Vehicle Program Services (CENV) Vehicle Monitoring and Diagnostic System (VMDS)

Investigation

Based on findings, at approximately 04:54 hours, RTRA Management removed Train ID 403 [L7716.7717-7603.7602-7672.76737-7557.7556T] Train Operator assigned to Largo Division operating an 8-Car consist in the direction of Franconia-Springfield Station from service for overrunning Signal G05-08 (Red). The Train Operator arrived at the Largo Town Center Station 8-Car Marker, Track 2, at approximately 04:54 hours. The Terminal Supervisor at the Largo Blockhouse stepped out of the blockhouse and provided verbal instructions to the Train Operator to service the station and continue in revenue service at 04:54 hours. The Train Operator

subsequently moved the consist in the direction of Morgan Boulevard Station on Track 2 without verifying a lunar, correct alignment and without speed commands. As Train ID 403 left Largo Town Center, the train consist traveled beyond Signal G05-08, displaying a red aspect, and conducted a left-facing crossing move through the interlocking towards Track 1. The Train Operator of Train ID 403 stopped the train consist within the interlocking and contacted the Terminal Supervisor. The Terminal Supervisor subsequently contacted ROCC via phone and requested to cross Train ID 403 back over to Track 2 once they arrived at Morgan Boulevard station. ROCC acknowledged the request. The Terminal Supervisor then instructed Train ID 403 to continue and that ROCC would cross them back over at Morgan Station. The Train Operator of Train ID 403 continued towards Morgan Boulevard Station on Track 1 until instructed by ROCC to stop the train. ROCC requested the location of Train ID 403 and instructed the RTRA Supervisor to respond to Morgan Boulevard Station to assist with the situation. After verifying location of Train ID 403, ROCC suspended service between Morgan Boulevard and Largo Town Center Station.

Based on the Train Operator's Incident Report, the Train Operator stated, "The Terminal Supervisor instructed me to bring up the train from Tail Track 3 in revenue service with Train ID 403." As the Train Operator approach the 8-car marker, the Terminal Supervisor stepped out and instructed them to leave at 04:54 hours. The Train Operator of Train ID 403 asked the Terminal Supervisor, "Go now?" The Terminal Supervisor responded, "Yes." Once the train started to cross over to Track 1, the Train Operator stopped the train and contacted the Terminal Supervisor. The Train Operator then stated the Terminal Supervisor instructed them to proceed to Morgan Boulevard Station and ROCC will cross them back over. The Train Operator stated they never had speed commands and operated the train below 15 mph to the platform.

ATCM personnel responded and reported no damages occurred to Switch 1B that was near Signal G05-08. ATCM personnel exercised all switches within the interlocking and found no damages. The switch was returned to normal service.

ATCE personnel performed an analysis of the status of the track circuits, switches, and signals at Largo Town Center Station during the hours of 00:39:56 hours to 04:54:51 hours on August 18, 2021. The ACTE analysis revealed Train ID 403 crossed the Insulated Joint (IJ) at Signal G05-08 at approximately 04:54:51 while red. In addition, the analysis identified that Signal G05-08 had been displaying red aspects since 00:34:08 hours on August 18, 2021. See appendix D.

CMNT personnel performed a walk around inspection of the incident train at Morgan Boulevard Station and found no damages. CMNT personnel remained onboard the incident train as it traveled to the New Carrollton yard for further inspection.

Based on ARS playback, the Terminal Supervisor contacted ROCC to request control of the board. ROCC responded and stated the Terminal Supervisor had control of the board at approximately 04:50 hours.

Chronological Event Timeline

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

Time	Description
04:50 hours	<u>Terminal Supervisor:</u> Terminal Supervisor at Largo requests control of the board from ROCC. ROCC acknowledges and gives Terminal Supervisor control.

04:54 hours	<u>Terminal Supervisor:</u> Terminal Supervisor calls and informs ROCC, via landline, Train ID 403 is leaving at Largo Town Center Station in revenue service.
04:54 hours	<u>ROCC RTC 1:</u> AIMS displayed Train ID 403 overran signal G05-08 crossing over from Track 2 to Track 1. ROCC made contact with Train Operator of Train ID 403 and was informed the train was in revenue service. ROCC dispatched a RTRA Supervisor to report to Morgan Boulevard Station to assist with the incident.
04:55 hours	<u>Terminal Supervisor:</u> Terminal Supervisor contacts Train Operator of Train ID 403 via radio and instructs them to standby. Terminal Supervisor contacts ROCC via landline and requests to have Train ID 403 cross back over to Track 2. ROCC acknowledges and responds "ok." Terminal Supervisor instructs Train Operator of Train ID 403 and stated, "Go ahead and cross over. They are going to put you back on Track 2 at Morgan."
04:56 hours	<u>ROCC RTC 1:</u> ROCC contacted the Terminal Supervisor, via landline, and reports they have cancelled Signal G05-02. ROCC asks if the Terminal Supervisor set Signal G05-08? Terminal Supervisor responded stating, "yes, they set Signal G05-08."
04:57 hours	<u>ROCC RTC 2:</u> ROCC contacted the Terminal Supervisor, via landline, and asks if Train ID 403 had overrun a red signal as they received an alert via AIMS. Terminal Supervisor responded and stated, "They thought they set Signal G05-08."
04:58 hours	<u>ROCC RTC 2:</u> ROCC contacts Train Operator of Train ID 403, via radio, and instructed them to stop their train. <u>Train Operator of Train ID 403:</u> Responds they are still moving. <u>ROCC RTC 2:</u> Instructs Train Operator of Train ID 403 to stop their train again. <u>Train Operator of Train ID 403:</u> Acknowledges and stops train.
05:00 hours	<u>ROCC RTC 2:</u> ROCC suspended train service from Largo Town Center Station to Morgan Boulevard Station, Tracks 1 and 2. ROCC instructed Train ID 403 to continue to Morgan Boulevard Station. ROCC asked Train Operator of Train ID 403 to confirm if they had a lunar at Largo G05-08. Train Operator responded, "Affirm."
05:04 hours	<u>ROCC RTC 2:</u> RTRA Supervisor arrives on scene at Morgan Boulevard Station and appointed as the On-Scene Commander (OSC). ROCC instructs the OSC to verify that Train ID 403 is clear of customers and to assist with manual terminal operations at Morgan Boulevard Station.
05:39 hours	<u>ATCM:</u> ATCM personnel arrived at Largo Town Center Station and conducted an inspection of the interlocking under Exclusive Track Occupancy (ETO) protection.
05:44 hours	<u>ROCC RTC 2:</u> SAFE personnel arrived on scene and joined ATC personnel on the roadway.
06:08 hours	<u>ROCC RTC 2:</u> Train ID 403 was changed to Train ID 703. CMNT personnel arrived at Morgan Boulevard and requested permission to enter roadway to perform a ground walk around of incident Train ID 703.

06:16 hours	<u>ROCC RTC 2</u> : ATCM personnel reported all personnel were clear of the interlocking at Largo Town Center Station and the interlocking had no damages. The interlocking was placed back in service.
06:28 hours	<u>ROCC RTC 2</u> : SAFE personnel arrived at Morgan Boulevard Station and was granted permission to board Train ID 703 for inspection.
06:30 hours	<u>ROCC RTC 2</u> : CMNT personnel reported clear of the roadway at Morgan Boulevard Station and verified a good walk around inspection of Train ID 703.
06:40 hours	<u>ROCC RTC 2</u> : Train ID 703 was released by SAFE and departed Morgan Boulevard Station Track 1 headed to New Carrollton Yard for storage. CMNT personnel remained onboard. Normal train service resumed on the Blue and Silver Lines in the direction of Largo Town Center Station.

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

Office of Chief Mechanical Officer (CMOR) / Incident Investigation Team (IIT)

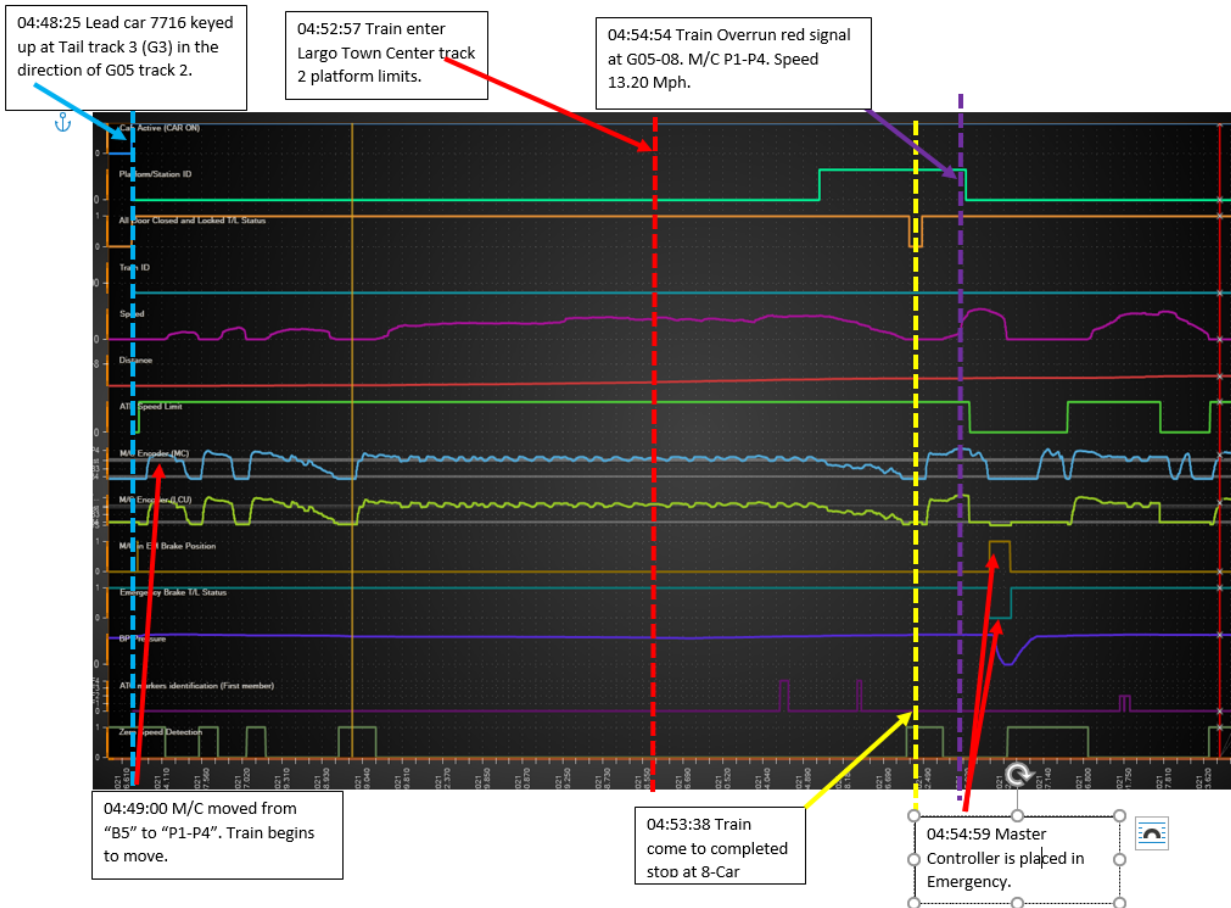
Event Recorder (ER) Data Graph/Sequence of Events

Based on IIT CMOR analysis of the downloaded Vehicle Monitoring and Diagnostic System (VMDS) and ER, IIT determined the VMDS showed no faults during the time of the incident that may have contributed to the cause of this incident. After servicing the station, the Train Operator moved the train while in Stop and Proceed mode and overran the red signal at G05-08, outside platform limits at Largo Town Center Station, Track 2 inbound. Details from the data analysis are as follows:

Time	Description
04:48:25 hours	Lead car 7716 keyed up at Tail Track 3(G3) in the direction of G05 track 2.
04:48:42 hours	ATP Speed limit show 1. Train enter Stop and Proceed Mode.
04:49:00 hours	Master Controller moved from "B5" to "P1-P4" position. Brake "OFF" is achieved. Train begins to move towards Largo Town Center Track 2 (G05).
04:52:57 hours	Train enter Largo Town Center Track 2 platform limits, Master Controller "P1-P4" position, speed 9.749 Mph.
04:53:38 hours	Train comes to complete stop at 8-car marker. Doors are open platform side.
04:54:47 hours	After station is serviced, Doors are closed and locked, Master Controller is moved to "P1-P4" Position. Train begins to move in the direction of signal G05-08.
04:54:54 hours	Train overran red signal in reverse position at G05-08. Master Controller Position "P1-P4" speed 13.20 Mph. 63ft from 8-Car Marker.
04:54:58 hours	Train began switching from Track 2 to Track 1 at the interlocking after overrunning the Reverse Switch at G05-08.
04:54:59 hours	Master Controller is moved from "P1-P4" position to Emergency Brake. Emergency Brake initiate. Speed 15.549 Mph.
04:55:05 hours	Train came to a complete stop at the interlock after Overrun G05-08. 211.232 ft from 8-Car Marker. 63.08 ft from G05-08.
04:55:16 hours	Brake Pipe is recharged. Master Controller Position "B5".
04:55:52 hours	ATP Speed limit shop 1. Train entered Stop and Proceed Mode.

04:55:56 hours	Train continued moving opposite direction Track 1. Master Controller "P1-P4".
04:56:22 hours	Train detected Overspeed Alarm. Train speed 14.93 mph. FSBR dropped. Brake "B4" rate applied.
04:56:33 hours	Train came to a complete stop after traveled 600.91 ft.
04:56:40 hours	Master Controller is placed in "P1." Train continued moving in opposite direction on Track 1.
04:59:06 hours	Master Controller is moved from "P1" to "B5."
04:59:12 hours	Train came to a complete stop after traveled 2,594.86 ft.
05:01:17 hours	Master Controller is placed in "P1." Train continued moving in opposite direction on Track 1.
05:04:22 hours	Train detected Overspeed Alarm. FSBR dropped. Train speed 14.809 mph. Brake "B4" rate applied.
05:04:25 hours	Train entered platform limits at Morgan Boulevard Station. Train speed 13.2 mph. Master Controller in "B4" position.
05:04:30 hours	Train came to a complete stop at Morgan Boulevard Station, Track 1, 46.15 ft off platform limits.

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



Graph 1 – IIT CMOR VMS analysis showing Train Operator's actions.

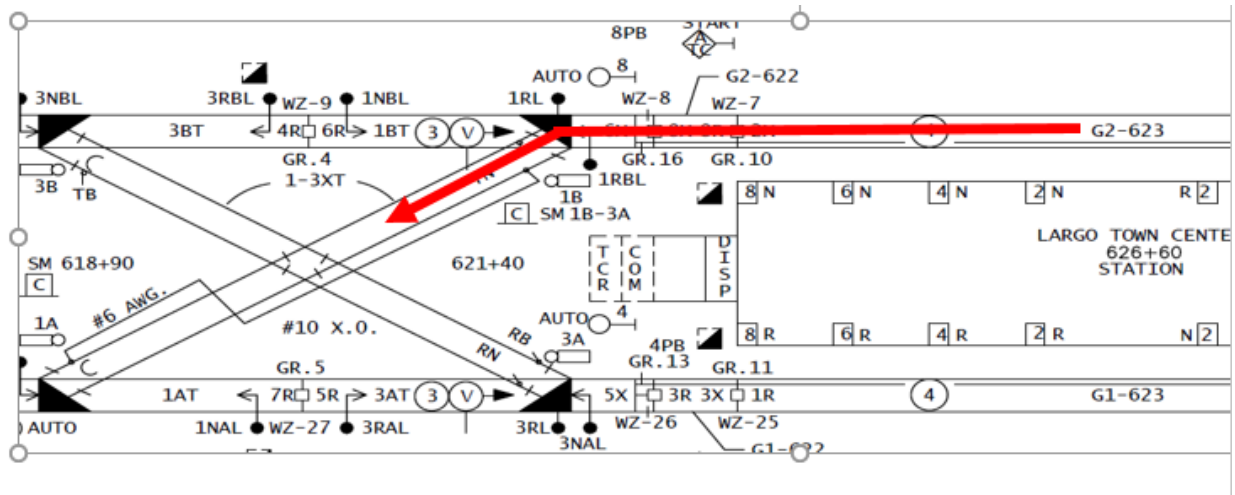


Diagram 1 – Diagram depicting the path of travel for Train ID 403 after crossing Signal G05-08 (red).

Advanced Information Management System (AIMS) Playback

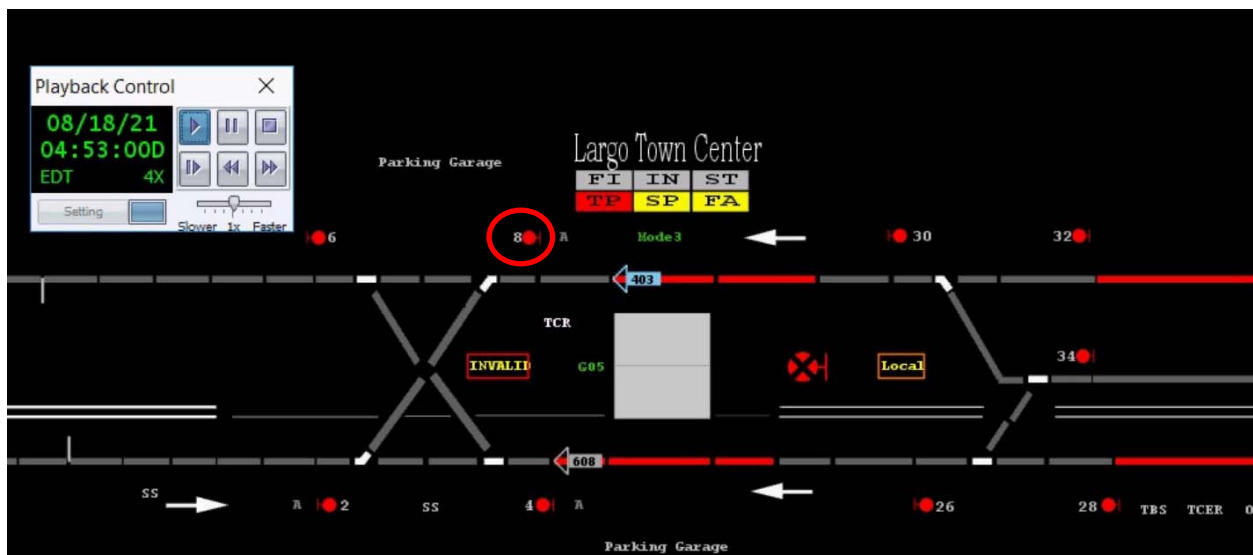


Diagram 1 - At 04:53:00 hours, Train ID 403 serviced Largo Town Center Station, Track 2. G05-08 signal was red.

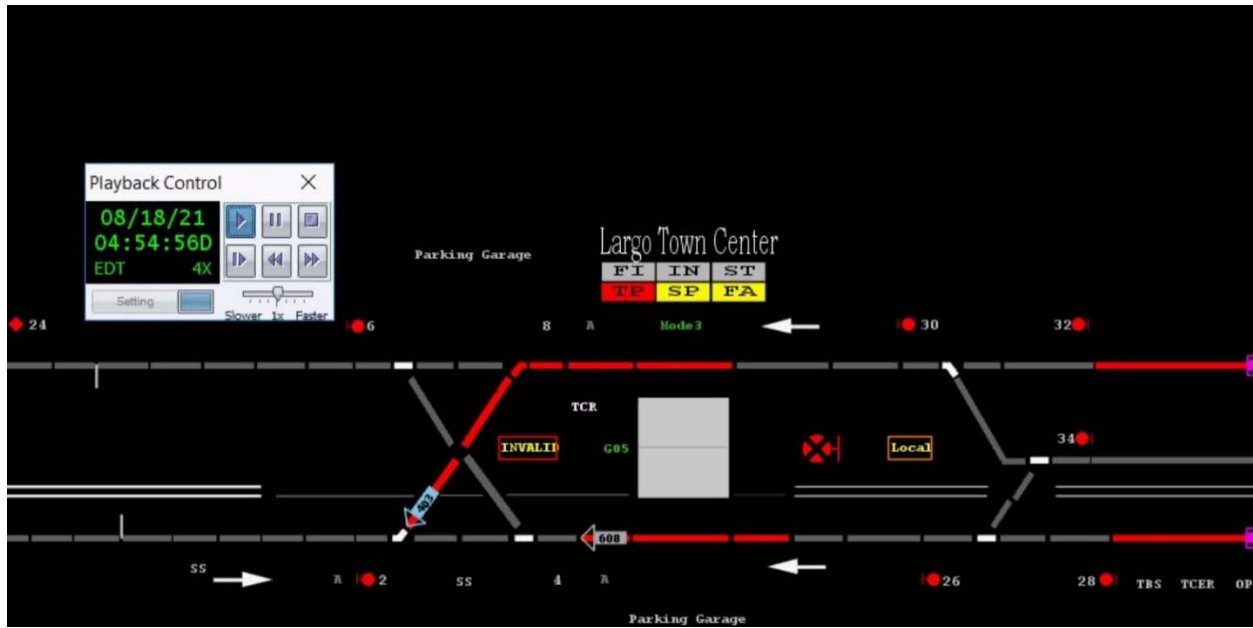


Diagram 2 – At 04:54:56 hours, Train ID 403 overran G05-08 signal (red) and traversed Switch 1B.

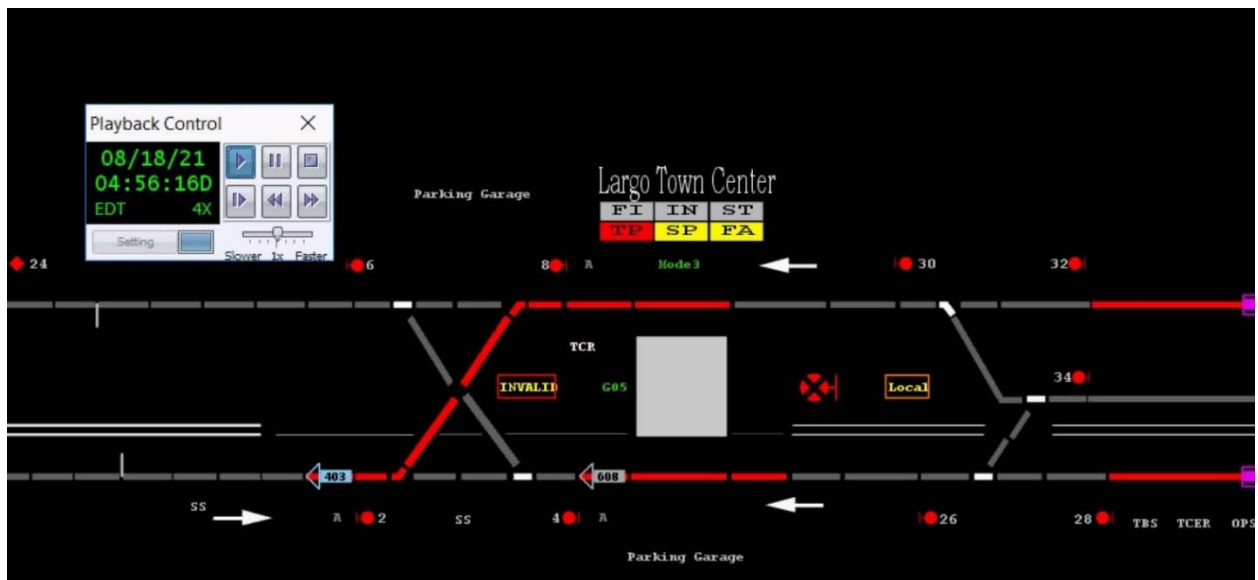


Diagram 3 – At 04:56:16 hours, Train ID 403 continued in the direction of Morgan Boulevard Station, Track 1.

Closed-Circuit Television (CCTV)



Illustration 1 – At 04:50:00 hours, Signal G05-08 was displaying a red aspect prior to Train ID 403 arriving to the platform at Largo Town Center Station, Track 2.

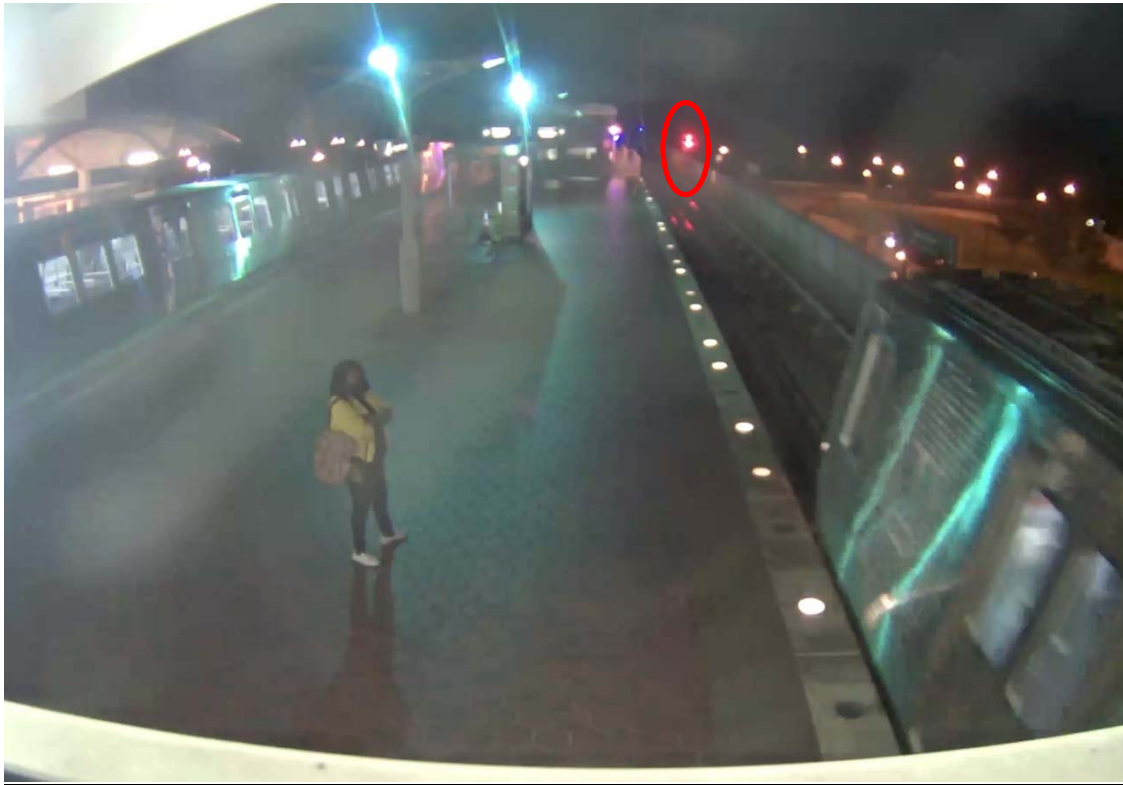


Illustration 2 – At 04:53:19 hours, Train ID 403 arrives within platform limits at Largo Town Center Station, Track 2. Signal G05-08 is displaying a red aspect.



Illustration 3 – At 04:53:34 hours, Train ID 403 berths at the 8-car Marker at Largo Town Center Station, Track 2. Signal G05-08 is displaying a red aspect.



Illustration 4 – At 04:54:44 hours, Train ID 403 departs Largo Town Center Station, Track 2. Signal G05-08 is displaying a red aspect. Note: a close view of the Terminal Supervisor communicating with the Train Operator could not be obtained.

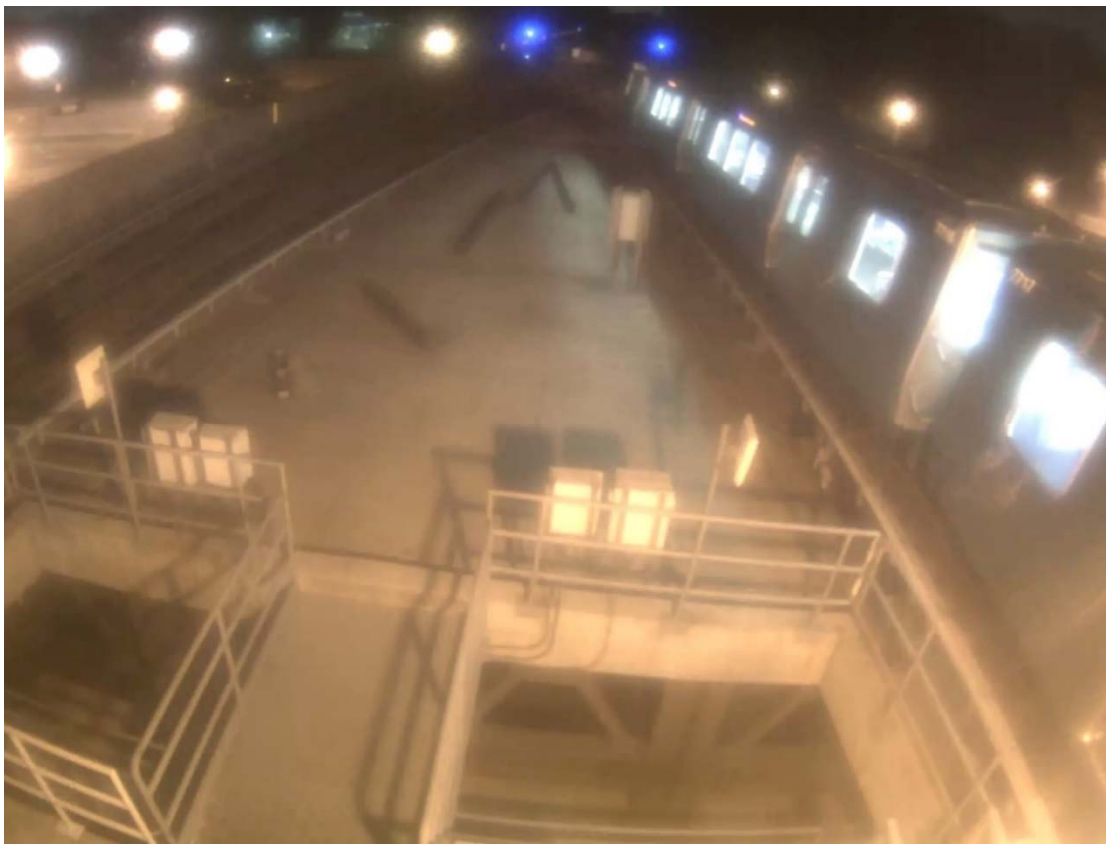


Illustration 5 – At 04:59:34 hours, Train ID 403 comes to complete stop within the interlocking beyond Signal G05-08

Automatic Train Control Maintenance (ATCM)

ATCM personnel conducted an inspection of the incident area and determined no damage to Switch 1B. Based on the ATCM compliance review of the area and of the event, ATCM has determined there was no ATCM equipment in the area to be a contributing factor to the reported event. ATCM personnel inspected the interlocking and all switches. All were in good state. They also exercised all switches and set routes which all were working properly. ATCM personnel performed a switch obstruction test and returned the equipment to service.

Automatic Train Control Engineering (ATCE)

ATCE personnel conducted an incident analysis of Signal G05-08, Switch 1 A/B, Switch 3 A/B and the Interlocking Control. ATCE determined a 2-8 Route was set for Train 491 at approximately 00:39:56 hours. Switch 1 A/B stayed in the reverse position all night. At approximately 04:54:51, the ATCE data revealed Train ID 403 crossed the IJ at Signal G05-08. The data also indicates that Signal G05-08 was displaying a red aspect since 00:34:08 hours. (See Appendix D).

Office of Car Maintenance (CMNT)

CMNT personnel performed the necessary inspections as required by 05 Special Instruction Procedure (SIP) #G2. Also, CMNT personnel inspected all cars for flats; CMNT found no flats. CMNT personnel did not find any abnormalities with the Master Controller. CMNT found the brake rates were within specifications. CMNT performed IIT CMOR recommendations and reported the car good for revenue service. (See Appendix F).

Office of System Maintenance Communication Section (COMM)

COMM personnel performed radio checks of train berthed at the Largo Town Center Station Platform on Tracks 1 and 2, and the tail track area. All radio checks performed resulted in loud and clear. COMM personnel found no defects with radio communications at Largo Town Center Station. (See Appendix E).

Interview Findings

Based on the investigation launched into the red signal overrun at Largo Town Center Station, SAFE conducted two formal interviews with the Train Operator and Terminal Supervisor via Microsoft Teams. Representatives from the WMSC participated. The **interviews** conducted identified the following key findings associated with this event:

The Train Operator stated they were instructed via face-to-face communication by the Terminal Supervisor to depart station and did not verify their lunar or correct alignment before departure. The Train Operator stated they felt rushed as the Terminal Supervisor left the Largo Blockhouse and approached their train while berthed at the 8-Car Marker on Track 2. The Train Operator stated they had no speed commands and used the Stop and Proceed Mode to move the train towards Morgan Boulevard Station on Track 1 after crossing over through the interlocking.

The Terminal Supervisor stated they did not set the route prior to verbally instructing the Train Operator to depart Largo Town Center Station. The Terminal Supervisor reported they do not utilize a checklist to assist with operating the terminal and could not cite or produce a SOP which governs their responsibilities. The Terminal Supervisor also stated they felt rushed as the train leaving Largo Station was late coming from the New Carrollton Yard. They reported after the current pick, revenue trains starting from Largo Town Center Station were being stored in the New Carrollton Yard and required more time to prepare for revenue service.

Findings

- G05-08 signal was set to red prior to the arrival of Train ID 403 and remained in that state until the Train Operator moved beyond it at approximately 04:54 hours.
- The Terminal Supervisor provided a verbal instruction to the Train Operator to proceed but did not give permission to pass the G05-08 signal while red. This action is not in compliance with Operating Rule 3.67 – “Rail Operations Control Center Supervisors or Rail Transportation Supervisors shall advise Train Operators when they are approaching red signals that are positioned just beyond the station platforms.”
- The Train operator did not verify they had a lunar signal, speed commands and correct alignments prior to departing a station in revenue service. This action is not in compliance with Operating Rule 3.13.1 – “Operators shall depress ATO start and verify lunar signal, speed commands and correct alignment one minute prior to their scheduled departure.”
- The Terminal Supervisor did not verify they had set a lunar signal and correct alignment prior to giving the Train Operator instructions to proceed in revenue service. This action is not in compliance with Operating Rule 3.13.3.1 – “Terminal Supervisors shall ensure that the train has a lunar signal, correct alignment before giving the operator permission to depart the terminal with speed commands.”
- The Train Operator moved their train consist without speed commands, while in revenue service, and did not notify ROCC prior to their movement. This action is not in compliance with Operating Rule 3.79 – “Train Operators shall not move trains with zero speed commands except after notifying ROCC and being given permission to move with zero speed commands and either a permissive block for the move going with traffic or an absolute block for the move going against traffic (see SOP #15).”
- The Train Operator operated their train past a signal displaying a red aspect without permission from ROCC. This action is not in compliance with Operating Rule 3.67 – “Rail vehicles shall not be operated past or closer than a point 10 feet in approach of an interlocking signal or lamp displaying a red aspect, a red flag, or a dark interlocking signal, except at a bump post or entering a pocket track, or unless authorized by ROCC or the Interlocking Operator and the move is consistent with customer safety as specified in Rule 3.1.”
- The Train Operator initiated the Close Door button prior to checking for speed commands while servicing a station. This action is not in compliance with SOP #40 - 40.5.3.1 – “Prior to initiating the Close Door button, the train operator shall check the operating console for speed commands and check Roadway ahead of the train to ensure it is clear.”
- Train ID 403 was the first train in revenue service on the Blue Line departing Largo Town Center to Franconia-Springfield Station.
- The first train in revenue service departing Largo travels from the New Carrollton Yard. Before the last pick, the first train was departing from Largo Town Center which required less travel time.

Weather

At the time of the incident, NOAA recorded the temperature at 79° F, mostly cloudy, 88% humidity, north-northwest winds at 7 mph and visibility of 10 miles. SAFE has concluded that weather was not a contributing factor in this incident (Weather source: NOAA – Location: Largo, MD).

Human Factors

Fatigue

Train Operator

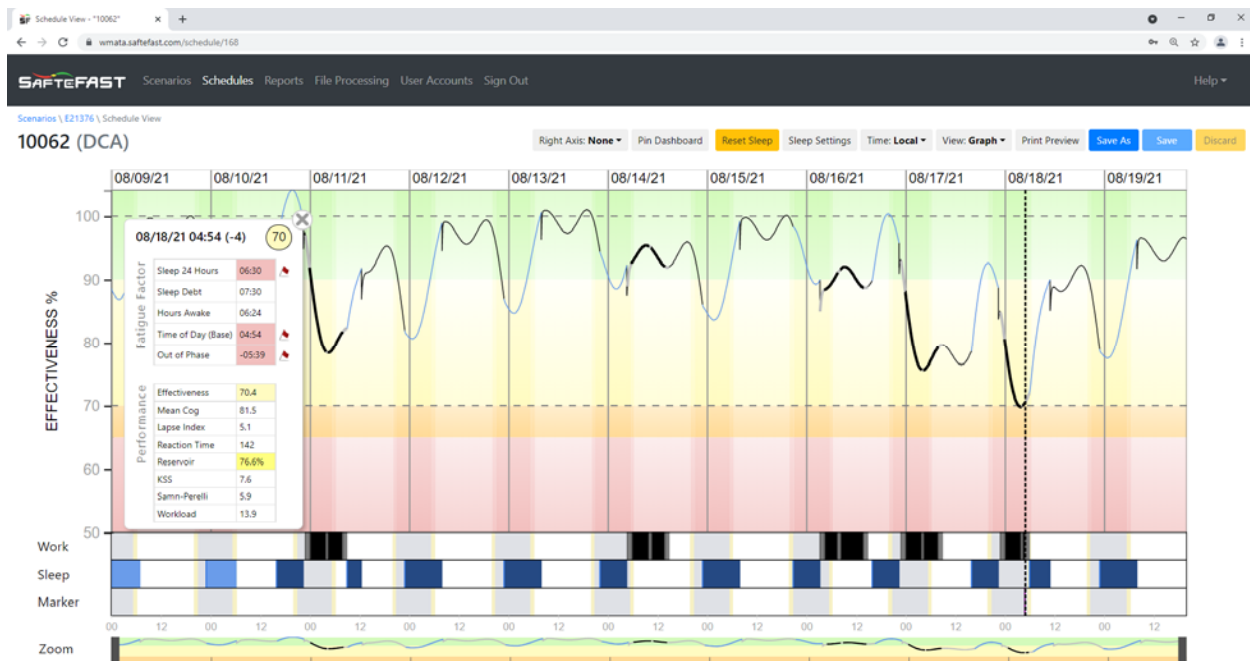
Evidence of Fatigue:

Conditions at the time of the incident were evaluated to distinguish whether evidence of fatigue was present. Video of the incident was reviewed for behaviors suggesting fatigue. The employee demonstrated possible signs of fatigue including appearing to fall asleep and being inattentive while operating the train. The Train Operator reported feeling fully alert at the time of the incident. The employee reported experiencing no symptoms of fatigue in the time leading up to the incident.

Fatigue Risk:

Incident data was evaluated for fatigue risk factors. Risk factors for fatigue were identified. The incident time of day (4:54 hours) suggests an increased risk of fatigue-related impairment. The employee worked both day and overnight shifts in the week leading up to the incident. The two shifts immediately preceding the incident started at 04:25 and midnight, respectively. Based on the employee's reported bed and wake times the day before the incident, the employee slept a total of 6.5 hours in the daytime sleep period preceding the incident and was awake for 6.4 hours at the time of the incident. The off-duty period preceding the incident was 16 hours long, which provided the opportunity for 7-9 hours of sleep. The employee reported usual workday sleep durations of 6.5 hours and no issues with sleep.

A biomathematical fatigue modelling application (SAFTE-FAST WebSFC) was used to further evaluate fatigue risk factors that may have been present in the Train Operator's schedule. The analysis was based on the Train Operator's work schedule, bed and wake times from the day before the incident and reported habitual sleep durations. Estimated performance effectiveness at the time of the incident was 70.4%. Specifically, the analysis identified short sleep duration in the last 24 hours and the circadian effects of night work as factors contributing to an increased risk of fatigue at the time of the incident.



Modeling analysis output shows estimated performance effectiveness during the incident work shift (top), and for the week leading up to the work shift (bottom) based on the employee work and reported sleep schedule. Estimates were based on the Train Operator's work schedule, bed and wake times from the day before the incident and reported habitual sleep durations (6.5 hours a day). Bold portions of the modeled curve show work (in black) and sleep times (in blue). Effectiveness is shown on the vertical axis, with colored fields in the chart background signifying ranges of effectiveness scores including high effectiveness (>90%) in green, and low effectiveness (<65%) in red. Time is shown on the horizontal axis. Markers for work and sleep times are shown in the lanes above the time of day on the horizontal axis.

Terminal Supervisor

Evidence of Fatigue:

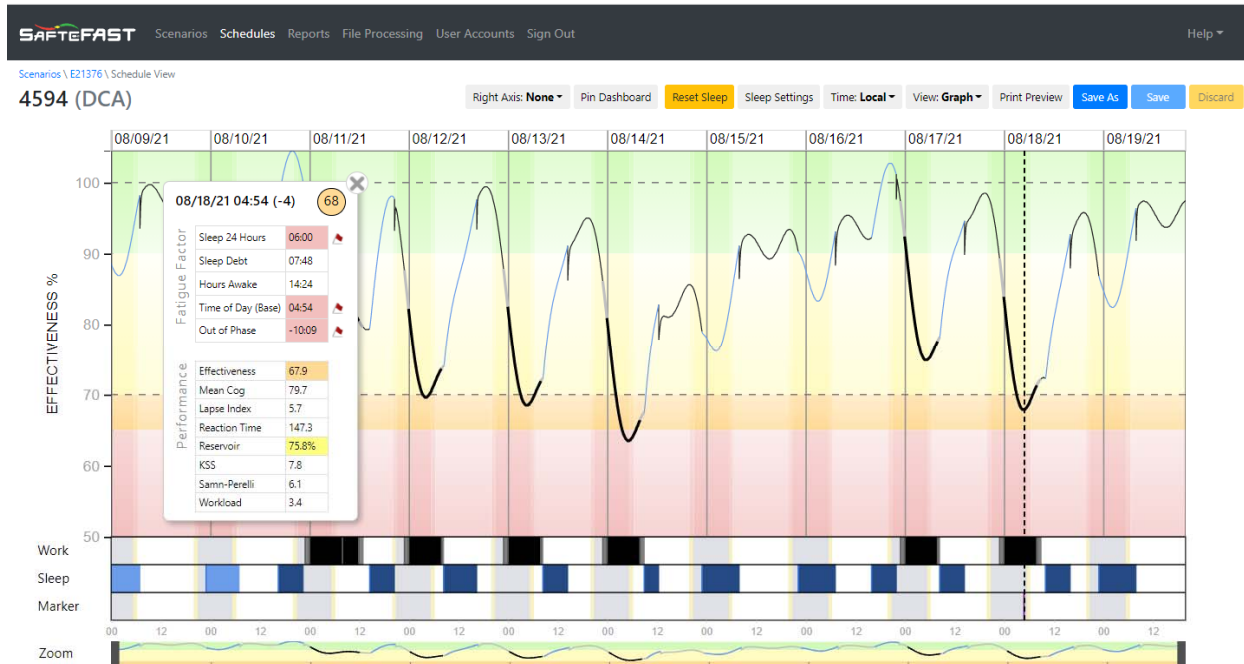
Conditions at the time of the incident were evaluated to distinguish whether evidence of fatigue was present. Video of the involved person was not available to ascertain whether signs of fatigue were present. The Terminal Supervisor reported feeling fully alert at the time of the incident. The employee reported experiencing no symptoms of fatigue in the time leading up to the incident.

Fatigue Risk:

Incident data was evaluated for fatigue risk factors. Risk factors for fatigue were identified. The incident time of day (4:54 hours) suggests an increased risk of fatigue-related impairment. The employee worked overnight shifts (midnight – 08:00) 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 6 hours in the sleep period preceding the incident and was awake for 14.4 hours at the time of the incident. The off-duty period preceding the incident was 16 hours long, which provided the opportunity for 7-9 hours of sleep. The employee reported usual workday sleep durations of 6 hours and no issues with sleep.

SAFTE-FAST WebSFC was used to further evaluate fatigue risk factors that may have been present in the Supervisor's schedule. The analysis was based on the Terminal Supervisor's work schedule, bed and wake times from the day before the incident and reported habitual sleep durations. Estimated performance effectiveness at the time of the incident was 67.9%.

Specifically, the analysis identified short sleep duration in the last 24 hours and the circadian effects of night work as factors contributing to an increased risk of fatigue at the time of the incident.



Modeling analysis output shows estimated performance effectiveness during the incident work shift (top), and for the week leading up to the work shift (bottom) based on the employee work and reported sleep schedule. Estimates were based on the Terminal Supervisor's work schedule, bed and wake times from the day before the incident and reported habitual sleep durations (6 hours a day). Bold portions of the modeled curve show work (in black) and sleep times (in blue). Effectiveness is shown on the vertical axis, with colored fields in the chart background signifying ranges of effectiveness scores including high effectiveness (>90%) in green, and low effectiveness (<65%) in red. Time is shown on the horizontal axis. Markers for work and sleep times are shown in the lanes above the time of day on the horizontal axis.

Post-Incident Toxicology Testing

WMATA's Drug and Alcohol Program determined that both the Train Operator and Terminal Supervisor were not in violation of the Drug and Alcohol Policy and Testing Program 7.7.3/6.

Immediate Mitigation to Prevent Recurrence

- ROCC suspended rail service from Largo Town Center to Morgan Boulevard Stations, Tracks 1 and 2 and requested shuttle bus service.
- ROCC dispatched an RTRA Supervisor to assist with the scene.
- ROCC re-blocked Train ID 403 to Train ID 703 in non-revenue service.
- ATCM conducted interlocking, track and switch inspections and verified the area was safe for service.

Probable Cause Statement

The probable cause of the incident was human performance difficulty as the Train Operator did not identify that Signal G05-08 was red, did not verify correct alignment and came to a point of power without speed commands, ROCC's permission or an absolute/permissive block. Contributing factors to the incident were conflicting instructions given to the Train Operator and a

failure to set a route and correct alignment before instructing the Train Operator to proceed in revenue service.

SAFE Recommendations

The following are the recommendations and corrective actions identified as a result of this investigation. These recommendations and corrective actions are tracked using WMATA's Safety Measurement System Incidents/Accidents (SMS I/A) Module and are verified by SAFE upon completion. The responsible department is identified in the corrective action code, and the respective departmental Safety Risk Coordinator (SRC) will manage the mitigation. Refer to the SMS I/A Module for additional information.

Corrective Action Code	Description	Responsible Party	Due Date
95097_SAFECAPS_RTRA_001	(RC-1, CF-1) RTRA will produce and distribute a Lessons Learned document throughout the department.	RTRA SRC	10/1/2021
95097_SAFECAPS_RTRA_002	(CF-1) RTRA will ensure the Terminal Supervisor conduct refresher training regarding Terminal Supervisor Responsibilities and Operations.	RTRA SRC	11/1/2021
95097_SAFECAPS_RTRA_003	(CF-1) RTRA will establish a program and document Terminal Supervisor observations by Division Managers to ensure adequate supervision.	RTRA SRC	11/1/2021
95097_SAFECAPS_RTRA_004	RTRA will encourage employees to report conditions that lead to deviations in procedures or possible unsafe acts (i.e. Close Call or to the Safety Hotline). This would address reports of feeling rushed, and personnel possibly feeling tired based on symptoms.	RTRA SRC	12/31/21
95097_SAFECAPS_RTRA_005	RTRA will encourage train operators' awareness of the importance of sleep hygiene and employee safety reporting (e.g., safety brief, other awareness activity).	RTRA SRC	12/31/21
95097_SAFECAPS_RTRA_006	RTRA will continue the implementation of Fatigue Management P/I 10.6/1 and (1) ensure training of covered personnel and (2) provide a means for fatigued employees to self-report.	RTRA SRC	3/1/2022

Appendices

Appendix A – Interview Summaries

The below narratives are summaries of the interviews with SAFE and represent the statements made by the involved individuals. As such, times and details may present a conflict with the data contained in systems of record.

Train Operator

This employee is a WMATA Train Operator with a total of 13 years and 10 months of service: seven years as a Bus Operator, six years as a Station Manager and 10 months as a Train Operator. The Train Operator's last certification was in November of 2020. This employee has no history of sleep issues to report.

Based on the SAFE interview, The Train Operator reported they began work at 0:00 hours on August 18, 2021 and conducted daily inspections (DIs) of trains at the beginning of the shift. The Train Operator then stated they were contacted by the Terminal Supervisor and instructed to bring up Train ID 403 to the Largo Town Center Station Platform, Track 2 for revenue service to Franconia Station. As the Train Operator serviced the station, they reported the Terminal Supervisor stepped out of the Blockhouse and instructed them to depart at 04:54 hours. The Train Operator reported they asked the Terminal Supervisor, "Go now?" and they replied, "Yes." The Train Operator stated they did not have speed commands and used the Stop and Proceed Mode, which was still active from their move to the platform, to move their train. They also reported they did not verify if the signal at G05-08 was red and acted based on the Terminal Supervisor's instructions. The Train Operator stated they had no distractions during the incident and were fully alert. The Train Operator reported feeling rushed which could have contributed to this incident occurring. They stated they felt rushed as the Terminal Supervisor instructed them verbally to "go now" and did not take the necessary time to verify their operating procedures before moving the train. The Train Operator stated if they followed their training and verified the if they had a lunar signal would have prevented this incident from occurring.

Terminal Supervisor

This employee is a WMATA Rail Supervisor with a total of 19.5 years of service; Two years as a Bus Operator, two years as a Station Manager, two years as a Train Operator, three years as a Utility Supervisor and 10.5 years as a Terminal Supervisor. The Terminal Supervisor's last certification was in November of 2019. This employee has no history of sleep issues to report.

Based on the SAFE interview, the Terminal Supervisor reported they were assigning train moves and DIs to train operators within the yard prior to the incident occurring. After instructing the Train Operator for Train ID 403 to move up to the 8-Car Marker at Largo Town Center Station, Track 2, the Terminal Supervisor stated they stepped outside of the Blockhouse to verbally inform the Train Operator of the departure time and instructions since they were a new operator. The Terminal Supervisor then stated after departing the station, the Train Operator contacted them and asked if they were crossing over. The Terminal Supervisor then stated they called ROCC to assist with moving the train back to Track 2 at Morgan Boulevard Station. The Terminal Supervisor

reported the ROCC called back to inform them of a red signal overrun alarm G05-08. The Terminal Supervisor reported they do not utilize a checklist to guide them in their daily duties. They also stated they made a mistake and did not set the lunar prior to the train departing. The Terminal Supervisor reported that “rushing” to get Train ID 403 off the line on time may have contributed to the incident occurring. The Terminal Supervisor stated the first train leaving Largo in revenue service comes from the New Carrollton Yard and the train was running late. The Terminal Supervisor informed that if they had set the lunar correctly, they may have prevented this incident from occurring.

Appendix B – ATCM Incident Timeline Report



ATCM INCIDENT TIME LINE REPORT

TO: <input checked="" type="checkbox"/> ATC	
Date of Report: 08/18/2021	Location: G05 LARGO
MAXIMO WORK ORDER#: 16519994	
Problem reported: Operator advanced beyond signal 8 before a clear signal indication causing an over run condition at the 1-3 interlocking.	
Date of Incident: 8/18/2021	Duration of Incident (From-To): 0506hrs to 0644hrs.
Train Delay: unknown	Time Crew Notified: 0506hrs.
Time Crew Arrived: 0520hrs	
Personnel (Name/Call #): ATC 2333, 2470, 2479 and 2489	
Shift/Field Supv. (Name/Call#):	Time Notified: 0528hrs
Description of Problem Found: ATC wayside equipment was found in good working condition and free of damage.	
CHRONOLOGY OF EVENTS (USE CONTINUATION IF MORE SPACE IS NEEDED) List times in "Times" column with information on same line(s) as listed time(s).	
Times	Events
05:06	ATC Yard received call from MOC regarding signal over run
05:20	ATC arrived at largo and made contact with MOC and blockhouse Supervisor Green
05:35	Requested permission from Central to inspect switches and wayside equipment.
05:44	Entered roadway to inspect switch points, switch rods and associated ATC equipment
06:18	Completed roadway inspection, cleared with central
06:40	examined state of relays and recorded relay positions
06:44	Exercised switches and confirmed setting of routes for 1-3 interlocking, attempted to set opposing routes as per ATC 1003. Determined ATC equipment was operational and in good condition. Returned ATC equipment back to service.
06:40	RELAY POSITIONS:
	1RWCPPPR-DN 1NWCPPAR-DN 1B-NWR-DN 3NWCPPBR-DN
	4HGPR-DN 1NWCPPBR -DN 1B-RWR-DN 3RWPR-UP
	2HGPR-DN 1NWPR-DN 1A-NWR-DN 3RWCPR-UP
	6HGPR-DN 1NWCPR -DN 1A-RWR-DN 3RWCPPR-UP
	8HGPR-DN 1NWCPPR -DN 3NWPR-DN 3BRWR-DN
	8HGPPR-DN 1RWPR-DN 3NWCPR-DN 3BNWR-DN
	1-3TPAR-UP 1RWCPR-DN 3NWCPPR-DN 3ANWR-DN
	1-3TPR-UP 1RWCPPR-DN 3NWCPPAR-DN 3ARWR-DN
Corrective Action:	
Follow-Up/Remedial Action(s)	
Supervisor Signature: Date/Time: 08/19/2021 / 0200hrs	
Assistant Superintendent Signature: Date/Time:	

Attachment 1 – Page 1 of 1.

Appendix C – ATCM Work Order Details



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

Page 1 of 2
MX76PROD

Work Order #: 16519994
Type: INSP



Status: CLOSE
08/24/2021 06:15

Work Description: G05, TRAIN OVER RUN A RED SIGNAL 8
Job Plan Description:

Work Information									
Asset: 446094	ATCS, G05 SIGNAL SYSTEM			Owning Office: ATCS-TSSM	Parent:				
Asset Tag:				Maintenance Office: ATCS-TSSM-DRFO	Create Date: 08/18/2021 05:07				
Asset S/N:				Labor Group: ATCSD3D99	Actual Start: 08/18/2021 07:16				
Location: 10555	G05, LARGO TOWN CENTER, STATION, PLATFORM, ROOM 221, TRAIN CONTROL ROOM (G05 OB BT)			Crew:	Actual Comp: 08/23/2021 05:22				
Work Location:				Lead:	Item: ATCSV9989				
Failure Class: ATCS013	SIGNALS / SIGNS			GL Account: WMATA-02-33530-50499270-042-*****-OPR**					
Problem Code: 2894	RUN THRU RED SIGNAL			Supervisor:	Target Start:				
Requested By: E052004				Requestor Phone:	Target Comp:				
					Scheduled Start:				
Create-Mileage: 0.0				Complete-Mileage: 0.0					
Task IDs									
Task ID									
10	Mids 08/18/21								
	D99 Mids 08/18/21 Crew took note of all associated relays positions with their nomenclature, inspected the interlocking and all switches are in good state, exercised all switches, set routes, all working properly as they should and notified OCC that it's safe for train movement.								
Component:	Work Accompl:			Reason:	Status: CLOSE	Position:	Warranty?: N		
20	EVES 08/23/2021								
	Performed switch obstruction test PMI 1008, and returned to service.								
Component:	Work Accompl:			Reason:	Status: CLOSE	Position:	Warranty?: N		
Actual Labor									
Task ID	Labor	Start Date	End Date	Start Time	End Time	Approved?	Regular Hours	Premium Hours	Line Cost
		08/18/2021	08/18/2021	05:00	07:15	Y	02:15	00:00	\$82.01
		08/18/2021	08/18/2021	05:00	07:15	Y	02:15	00:00	\$82.01
		08/18/2021	08/18/2021	05:00	07:15	Y	02:15	00:00	\$84.06
		08/18/2021	08/18/2021	05:00	07:15	Y	02:15	00:00	\$85.71
		08/23/2021	08/23/2021	17:45	18:45	Y	01:00	00:00	\$37.36
		08/23/2021	08/23/2021	17:45	18:45	Y	01:00	00:00	\$37.36
		08/23/2021	08/23/2021	17:45	18:45	Y	01:00	00:00	\$37.36

WT_plust_woprint.rptdesign

08/26/2021 00:25

Attachment 2 – Page 1 of 2.

Incident Date: 08/18/2021 Time: 04:54 hours
Final Report Rev. 1 – Red Signal Overrun
E21376

Rev 1. Drafted By: SAFE 702 – 11/15/2021
Rev 1. Reviewed By: SAFE 70 – 11/26/2021
Rev 1. Approved By: SAFE 70 – 11/26/2021

Page 25



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

Page 2 of 2
MX76PROD

Work Order #: 16519994
Type: INSP



Status: CLOSE
08/24/2021 06:15

Work Description: G05, TRAIN OVER RUN A RED SIGNAL 8

Job Plan Description:

Actual Labor									
Task ID	Labor	Start Date	End Date	Start Time	End Time	Approved?	Regular Hours	Premium Hours	Line Cost
		08/23/2021	08/23/2021	17:45	18:45	Y	01:00	00:00	\$42.17
Total Actual Hour/Labor:							13:00	00:00	\$488.03
Related Incidents									
Ticket	Description				Class	Status	Relationship		
8554264	Train 403 overran red signal G05-08 crossing over from track two to track one.				SR	NEW	RELATED		
Failure Reporting									
Cause	Remedy		Supervisor				Remark Date		
3307	UNKNOWN CAUSE		4303	PM COMPLIANCE INSPECTION COMPLETED				08/23/2021	
Remarks: Performed switch obstruction test PMI 1008, and returned to service.									

WT_plust_woprint.rptdesign

08/26/2021 00:25


Attachment 3 – Page 2 of 2.

Incident Date: 08/18/2021 Time: 04:54 hours
Final Report Rev. 1 – Red Signal Overrun
E21376

Rev 1. Drafted By: SAFE 702 – 11/15/2021
Rev 1. Reviewed By: SAFE 70 – 11/26/2021
Rev 1. Approved By: SAFE 70 – 11/26/2021

Page 26

Appendix D – ATCE Incident Analysis Report

	Washington Metropolitan Area Transit Authority ENG-A-ATCE		Request:					
			Date:	2021 Aug 25				
			From:					
			To:					
Reported Data:		Time:	Train ID					
Description:		G05-08 Red Signal Overrun by Train 403		Interlocking Control: [Central/Dispatch] 403				
Requested Analysis: Investigate Incident; SAFE/WMSC request								
INITIAL STATE AS OF: 00.00.00								
Name	STATE	AUTO	NAME	STATE	AUTO	NAME	STATE	AUTO
[Signal 8]	[Stop]	[N]	[Interlocking Cntrl]	[Disp]		-	-	-
[Switch 1 A/B]	[Normal]	[N]	-	-	-	-	-	-
[Switch 3 A/B]	[Normal]	[N]	-	-	-	-	-	-
RECORDED EVENT DATA								
TIME	LOCATION	STATUS/ CONTROL	AIMS DESCRIPTION				COMMENTS	
2021 Aug 18 00:39:56	G05	Status	Switch	Call	1	Reverse	Dispatcher set a 2-8 Route for Train 491. Switch 1A/B stays in Reverse position all night.	
00:39:56	G05	Status	Switch	Call	3	Normal		
00:40:08	G05	Status	Signal	State	2	Clear		
04:51:53	G05	Status	Track	Circuit	G2-634	Occupy	Train 403 Departs from Pocket Track area	
04:52:51	G05	Status	Track	Circuit	G2-623	Occupy	Train 403 Occupies the platform	
04:52:53	G05	Status	Train	Number	Input	Tk2 403	Train 403 establishes TWC	
04:52:56	G05	Status	Train	Motion	Not	Motion	Train 403 stops on the platform, then proceeds.	
04:53:08	G05	Status	Train	Motion	Motion			
04:53:36	G05	Status	Train	Motion	Not	Motion		
04:54:47	G05	Status	Train	Number	Input	Tk2 0	Train departs platform and loses TWC	
04:54:51	G05	Status	Track	Circuit	1BT	Occupy	Train 403 crosses IJ at Signal 8; Signal was RED at the time and had been RED since 00:34:08	

Circuit Power Failure: Yes ☐ No ☒ Processor Failure: Yes ☐ No ☒ Power Transfer: Yes ☐ No ☒

CONCLUSION

Train 403 did indeed overrun G05-08 Signal RED.

Switch 1 A/B at G05/Largo was in reverse the entire night from a previous move.

Original
08/25/2021

Incident Report 0.0
Page 1 of 1
Incident Analysis Report 0.0-081821.docx

Attachment 4 – Page 1 of 1.

Incident Date: 08/18/2021 Time: 04:54 hours
Final Report Rev. 1 – Red Signal Overrun
E21376

Rev 1. Drafted By: SAFE 702 – 11/15/2021
Rev 1. Reviewed By: SAFE 70 – 11/26/2021
Rev 1. Approved By: SAFE 70 – 11/26/2021

Page 27

Appendix E – COMM Work Order Details



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

Page 1 of 1
MX76PROD

Work Order #: 16547942
Type: INSP



Status: COMP
09/01/2021 12:54

Work Description: Track over run on 8/18, Safe wants checks of G05/G98, see Long
Job Plan Description:

Work Information									
Asset: COMMG05 COMM, G05, COMMUNICATIONS SYSTEM				Owning Office: COMM-TSSM			Parent:		
Asset Tag:				Maintenance Office: COMM-TSSM-DFLD			Create Date: 08/31/2021 18:50		
Asset S/N: COMM G05				Labor Group: COMMR3RADO			Actual Start: 09/01/2021 12:54		
Location: 10554 G05, LARGO TOWN CENTER, STATION, PLATFORM, ROOM 219, COMMUNICATIONS ROOM				Crew:			Actual Comp: 09/01/2021 12:54		
Work Location:				Lead: [REDACTED]			Item: R60000001		
Failure Class: SAMS001 TEST EQUIPMENT				GL Account: WMATA-02-33540-50499280-042-*****-OPR**			Target Start:		
Problem Code: 2500 NO PROBLEM FOUND				Supervisor:			Target Comp:		
Requested By: Ext 81378				Requestor Phone: [REDACTED]			Scheduled Start:		
Create-Mileage: 0.0				Complete-Mileage: 0.0					
Task IDs									
Task ID									
10 See long description									
Do Radio checks of the trains berthed at the Largo Town Center Platform on Tracks 1 and 2, and the Tail Track area at G05 and G98									
Component:		Work Accomp:		Reason:		Status: COMP		Warranty?: N	
20		Performed radio checks at the G05 Bump Post and all tested Loud and clear							
Component:		Work Accomp:		Reason:		Status: COMP		Warranty?: N	
Actual Labor									
Task ID	Labor	Start Date	End Date	Start Time	End Time	Approved?	Regular Hours	Premium Hours	Line Cost
20	[REDACTED]	09/01/2021	09/01/2021	07:00	08:00	Y	01:00	00:00	\$41.55
Total Actual Hour/Labor:							01:00	00:00	\$41.55
Failure Reporting									
Cause	Remedy			Supervisor			Remark Date		
2450 NO DEFECT	3190 TESTED								
Remarks:									

WT_plust_woprint.rptdesign

09/1/2021 17:23

Attachment 5 – Page 1 of 1.

Incident Date: 08/18/2021 Time: 04:54 hours
Final Report Rev. 1 – Red Signal Overrun
E21376

Rev 1. Drafted By: SAFE 702 – 11/15/2021
Rev 1. Reviewed By: SAFE 70 – 11/26/2021
Rev 1. Approved By: SAFE 70 – 11/26/2021

Page 28

Appendix F – CMNT Work Order Details



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

Page 1 of 1
MX76PROD

Work Order #: 16554462
Type: CM



Status: CLOSE
09/02/2021 12:47

Work Description: REPORTED OPERATOR OVERRAN SIGNAL - G05-08 SIGNAL RED
Job Plan Description:

Work Information									
Asset: R7716	7716, RAIL CAR, KAWASAKI, 7000 AC, A CAR	Owning Office: CMNT-CMNT-CMNT	Parent:						
Asset Tag: R7716		Maintenance Office: CMNT-ALEX-INSP	Create Date: 09/02/2021 07:46						
Asset S/N: 7716		Labor Group: CMNT	Actual Start: 09/02/2021 08:00						
Location: 1213	C99, ALEXANDRIA YARD	Crew:	Actual Comp: 09/02/2021 12:47						
Work Location: 1230	D99, NEW CARROLLTON YARD	Lead:	Item: K18050001						
Failure Class: CMNT018	AUTOMATIC TRAIN CONTROL (ATC)	GL Account: WMATA-02-33350-50499160-041-*****-OPR**	Target Start:						
Problem Code: 3079	STATION OVERRUN	Supervisor:	Target Comp:						
Requested By:		Requestor Phone:	Scheduled Start:						
Chain Mark Start:		Chain Mark End:							
Create-Mileage: 143980.0		Complete-Mileage: 143980.0							
Task IDs									
Task ID									
10	CHECKED ENTIRE CONSIST FOR FLATS, NONE FOUND. ALL BRAKE RATES CHECK GOOD AND ARE WITHIN SPECS. RAN TCD FB SELFTEST W/O FAILURE. MC CHECKS GOOD FOR ALL BRAKES AND COAST POSITIONS.								
ENGINEER DOWNLOADED NECESSARY LOGS.									
Component: 000-300 RAIL CAR; 2K/3K/6K/7K	Work Accompl: TROUBLE SHOT	Reason: NO TROUBLE FOUND	Status: CLOSE	Position: 213	Warranty?: Y				
20	ALL VIDEO AND FAULT LOGS WERE DOWNLOADED BY CENV EFRAIN RIVERA. EVENING SHIFT PERFORMED THE DAILY INSPECTION ON THE CONSIST, NO DEFECTS WERE NOTED								
Component: 000-300 RAIL CAR; 2K/3K/6K/7K	Work Accompl: DOWNLOADED	Reason: INCIDENT//ACCIDENT	Status: CLOSE	Position: 213	Warranty?: Y				
Actual Labor									
Task ID	Labor	Start Date	End Date	Start Time	End Time	Approved?	Regular Hours	Premium Hours	Line Cost
10		08/18/2021	08/18/2021	12:00	13:30	Y	01:30	00:00	\$46.47
10		08/18/2021	08/18/2021	12:00	13:30	Y	01:30	00:00	\$67.00
20		08/18/2021	08/18/2021	13:30	13:35	Y	00:05	00:00	\$3.76
Total Actual Hour/Labor:							03:05	00:00	\$117.23
Failure Reporting									
Cause	Remedy	Supervisor					Remark Date		
2477 NO DEFECT; OPERATOR ERROR	3192 TESTED / INSPECTED						08/18/2021		
Remarks: CMNT AND CENV PERFORMED ALL RECOMMENDATIONS ACCORDING TO CMOR SI #3. TRAIN IS GOOD FOR SERVICE.									

WT_plust_woprint.rptdesign

09/2/2021 12:47

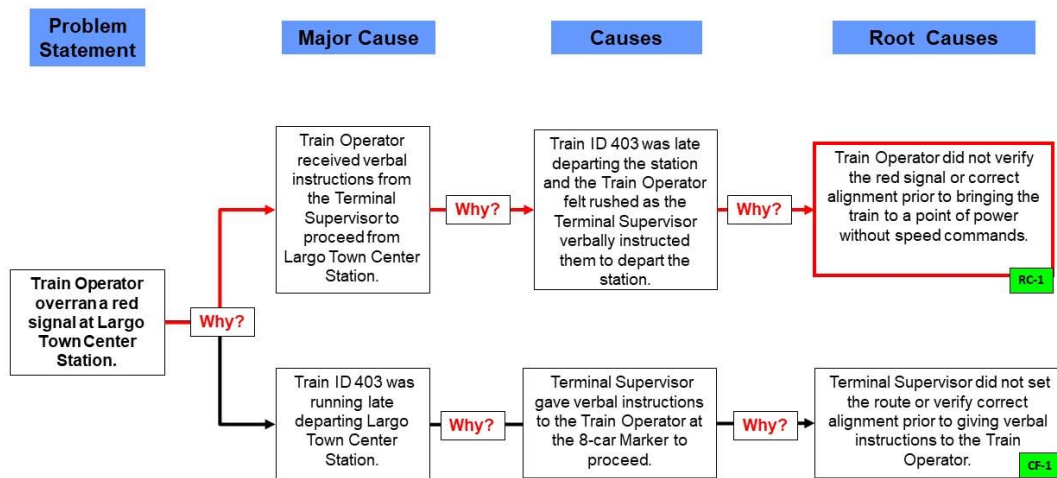
Attachment 6 – Page 1 of 1.

Incident Date: 08/18/2021 Time: 04:54 hours
Final Report Rev. 1 – Red Signal Overrun
E21376

Rev 1. Drafted By: SAFE 702 – 11/15/2021
Rev 1. Reviewed By: SAFE 70 – 11/26/2021
Rev 1. Approved By: SAFE 70 – 11/26/2021

Page 29

Appendix G - Root Cause Analysis



Root Cause Analysis

