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**WMSC Commissioner Brief: W-0091 – Red Signal Overrun – Largo Tail Track – December 30, 2020**

*Prepared for Washington Metrorail Safety Commission meeting on June 29, 2021*

**Safety event summary:**

The Operator of Train 421 moved their train without permission from the Interlocking Operator more than 900 feet beyond a red signal in the Largo Town Center Tail Track to approach the Largo Town Center Station platform. No one at Metrorail identified this red signal overrun for approximately 10 minutes.

The train passed the red signal at up to 16 mph at 2:41 p.m. The signal was red due to a revenue train on Track 2 that was waiting to be dispatched. Signals in the tail track stay red until it is safe to bring a train to the platform.

At 2:50 p.m., the Train Operator contacted the Interlocking Operator and said they were at the station platform. The Interlocking Operator then identified the red signal overrun and reported it to Rail Transportation (RTRA) and the Rail Operations Control Center (ROCC).

In an interview, the Train Operator stated that they thought the Interlocking Operator had provided a permissive block to the station platform, but that they had personal stress-related distractions that they were focused on at the time related to caring for a family member at home.

**Probable Cause:**

The probable cause of this event was Metrorail's lack of non-punitive self-reporting systems and procedures for employees to report distraction or impairment due to stress, fatigue or other issues, which led to an employee working when they were not fit for duty.

**Corrective Actions:**

The Train Operator completed refresher training.

**WMSC staff observations:**

Properly implemented non-punitive self-reporting systems would have allowed this operator to report this stress issue rather than operate distracted.

The interlocking operator's lack of awareness of this event until nearly 10 minutes after it occurred is a concern. Metrorail should consider reviewing interlocking operator procedures to ensure awareness of all vehicle movement within their territory.

The WMSC's investigation also identified a separate issue in the Largo Tail Track area. Interlocking control via the Advanced Information Management (AIM) system has showed as "invalid" for an extended period, indicating issues with the Remote Terminal Unit and wayside equipment in this area. This contributes to Train identification numbers not updating on the platform in AIM, and creates the risk that duplicate Train IDs could be created when trains are re-blocked by Terminal Supervisors. Trains are frequently re-blocked at Largo Town Center. This issue in this area has also been identified during separate ongoing reviews of duplicate Train ID safety concerns. AIM does detect duplicate

IDs when they show up in the system, but it is currently one of a long list of alarms. Metrorail is evaluating IT changes that could be implemented in coming months to mitigate this safety issue.

**Staff recommendation**: Adopt final report.

Washington Metro Area Transit Authority

Department of Safety and Environmental

Management (SAFE)

**FINAL REPORT OF INVESTIGATION A&I E20514**

| | |
|---|---|
| **Date of Event:** | 12/30/2020 |
| **Type of Event:** | Red Signal Overrun |
| **Incident Time:** | 14:41 hours |
| **Location:** | Largo Tail Track, Signal G98-32 |
| **Time and How received by SAFE:** | 15:03 hours, SAFE On-Call Phone |
| **WMSC Notification Time:** | 17:02 hours |
| **Rail Vehicle:** | Train ID #421<br>L7364.7365-7341.7340-7438.7439-7361.7360T |
| **Injuries:** | None |
| **Damage:** | None |
| **SMS I/A Incident Number:** | 20201230#91089MX |

**Largo Tail Track – Red Signal Overrun**

December 30, 2020

Table of Contents

## Abbreviations and Acronyms

| | |
|---|---|
| **AIMS** | Advanced Information Management System |
| **ARS** | Audio Recording System |
| **ATC** | Automatic Train Control |
| **CAP** | Corrective Action Plan |
| **CENV** | Office of Vehicle Program Services |
| **CMOR** | Office of Chief Mechanical Officer |
| **CMNT** | Office of Car Maintenance |
| **ER** | Event Recorder |
| **ERT** | Emergency Response Team |
| **I/A** | Incidents/Accidents |
| **IIT** | Incident Investigation Team |
| **M/C** | Master Controller |
| **MSRPH** | Metrorail Safety Rules and Procedures Handbook |
| **NOAA** | National Oceanic and Atmospheric Administration |
| **ROCC** | Rail Operations Control Center |
| **RTRA** | Office of Rail Transportation |
| **SAFE** | Department of Safety and Environmental Management |
| **SMS** | Safety Measurement System |
| **VMDS** | Vehicle Monitoring and Diagnostic System |
| **WMATA** | Washington Metropolitan Area Transit Authority |
| **WMSC** | Washington Metrorail Safety Commission |

## Executive Summary

On Wednesday, December 30, 2020, at approximately 14:51 hours, the Office of Rail Transportation (RTRA) removed Train ID 421 [L7364-7365.7341-7340.7438-7439.7361-7360T] Train Operator, assigned to Largo Division operating an 8-car consist in the Largo Tail Track, from service for overrunning Signal G98-32 (Red) at 14:41 hours. The Rail Operations Control Center (ROCC) notified SAFE at approximately 15:03 hours and reported the Train Operator operated past Signal G98-32 displaying a red aspect in the Largo Tail Track, Track 2. The Emergency Response Team (ERT), Automatic Train Control (ATC), Department of Safety and Environmental Management (SAFE), and an RTRA Supervisor responded to the scene. An inspection by ERT revealed no damages and a good track inspection. ATC personnel reported Switch 7 was not damaged due to the switch laying in the correct direction for the train to proceed. In addition, there were no injuries reported as a result of this incident.

Based on Audio Recording System (ARS) playback, 421 Train Operator contacted the Interlocking Operator and asked permission to properly berth the platform of Largo Station, Track 2. The Interlocking Operator informed the Train Operator to stand by as they contacted the RTRA Assistant Superintendent. The Interlocking Operator informed the RTRA Assistant Superintendent that Train ID 421 was initially located in the Largo Tail Track behind Signal G98-32 on Track 2 and had moved up to the platform beyond Signal G98-32 (Red) without permission. RTRA management instructed the Interlocking Operator to inform ROCC of the incident and remove the Train Operator from service.

Upon reporting the red signal overrun, SAFE analyzed data collected and reviewed submitted documentation from management staff. Based on a review of the Metrorail Safety Rules and Procedures Handbook (MSRPH), Train Operator was not in compliance with the following General and Operating Rules:

- Section 1 – General Rule: 1.79 – “Personnel shall not take any action until they are positive that all radio transmissions or receptions are heard, fully understood, and acknowledged. Individual radio transmissions shall, at all times, be repeated by the receiver so the transmitter can confirm the message was received completely and by the intended receiver. Whenever the transmitter has completed their transmission and is turning the airtime over to the receiving party for acknowledgment or reply, they are to end their communication with the word “over.” Speed restrictions must always be acknowledged by each Rail Vehicle Operator, even when a blanket message is sent out from Central Control, through 100 percent word for word repeat back from the Rail Vehicle Operators to Central Control of the Tower.”

- Section 3 – Operating Rule: 3.18 – “Employees shall not operate any vehicle in a reckless or unsafe manner.”

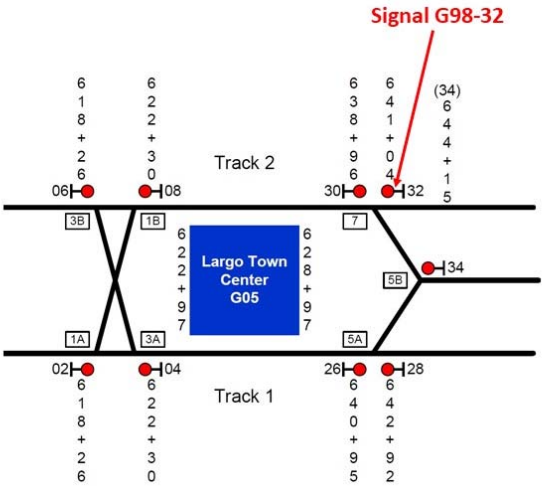
- Section 3 – Operating Rule: 3.67 – “Rail vehicles shall not be operated past or closer than a point 10 feet in approach of an interlocking signal or lamp displaying a red aspect, a red flag, or a dark interlocking signal, except at a bump post or entering a pocket Track, or unless authorized by ROCC or the Interlocking Operator and the move is consistent with customer safety as specified in Rule 3.1.”

SAFE determined that the probable cause of the red signal overrun on December 30, 2020, Largo Town Center tail track was the lack of focus demonstrated by the Train Operator while operating Train ID 421 and the failure to adhere to rules and regulations within the MSRPH. Contributing to the incident was the Train Operator's non-work-related concerns of caring for a family member at home, which prohibited effective listening skills to accurately hear the Interlocking Operator's instructions. These actions resulted in the Train Operator not following the Interlocking Operator's directions and ultimately overrunning the red signal, which is not in compliance with MSRPH General Rule 1.79 and Operating Rules 3.18 and 3.67.

## Incident Site

Largo Tail Track, Signal G98-32

## Field Sketch/Diagram




## 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:

- Physical Site Assessment

- Formal Interview – SAFE interviewed one (1) individual as part of this investigation. Interviews included person(s) present at, during, and after the incident, those directly involved in the response process, and Managers responsible for the process. SAFE interviewed the following individuals:
    - Train Operator

- Documentation Review – Collection of relevant work history information and process documentation contained in Metro systems of record. These records include:
    - Train Operator Training Record
    - Train Operator Certifications
    - Train Operator 30-Day work history review

- Metrorail Safety Rules and Procedures Handbook (MSRPH)
- National Oceanic and Atmospheric Administration (NOAA)
- Incident/Accident Safety Measurement System (SMS)
- Maximo Data

- System Data Recording Review – Collection of information contained in Metro Data Recording Systems. This data includes:
  - ARS [Radio and Landline Communications]
  - Office Vehicle Program Services (CENV) Vehicle Monitoring and Diagnostic System (VMDS)
  - Advanced Information Management System (AIMS)

**Investigation**

Based on findings, at approximately 14:51 hours, RTRA removed Train ID 421 [L7364-7365.7341-7340.7438-7439.7361-7360T] Train Operator assigned to Largo Division operating an 8-car consist in the Largo Tail Track from service for overrunning Signal G98-32 (Red) at 14:41 hours. The Train Operator contacted the Interlocking Operator in the Largo Blockhouse at approximately 14:50 hours and asked for permission to properly berth their train at the platform. The Interlocking Operator instructed the Train Operator to standby. The Train Operator subsequently moved the consist in Largo Town Center Station's direction on Track 2, without permission. The Interlocking Operator notified the ROCC and RTRA Supervisor of the incident. Based on the Managerial Incident Investigation Report, the Train Operator stated, "they thought they were given a permissive block to the platform edge."

ATC personnel responded and reported no damages occurred to Switch 7 that was near Signal G99-32. This switch was lying in the correct position for train movement in that direction.

Office of Car Maintenance (CMNT) personnel inspected the consist and found the brake rates had no discrepancies and no flats or spalling on any of the wheels. The Master Controller (M/C) checks were also completed with discrepancies found. CMNT complied with all CENV recommendations and performed no repairs since no defects were found.

Based on ARS playback, the Interlocking Operator did not give the Train Operator instructions to move past the red signal at G98-32, Track 2. The Train Operator contacted the Interlocking after they were already passed Signal G98-32 and near the Largo Platform. The Train Operator was instructed to identify themselves by the Interlocking Operator. After identifying, the Interlocking Operator contacted the RTRA Assistant Superintendent to notify them of the incident. The Interlocking Operator later notified ROCC.


*Photo 1: Signal DG98-32 and incident consist stationary 930 feet past the signal.*

## Chronological Audio Recording System (ARS) Timeline

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

| Time | Description |
|---|---|
| 14:43:47 hrs. | Train Operator of Train ID 421: Train Operator contacts Interlocking Operator and stated, "standing by." [Radio] |
| 14:43:52 hrs. | Interlocking Operator: Interlocking Operator acknowledges Train Operator is standing-by. [Radio] |
| 14:50:11 hrs. | Train Operator of Train ID 421: Contacted the Interlocking Operator and asked permission to properly berth at the platform, Track 2. [Radio] |

| | |
|---|---|
| 14:50:17hrs. | Interlocking Operator: Contacted RTRA Assistant Superintendent to report the Train Operator moved their consist from the Largo Tail Track to the platform [passing Signal G98-32 (Red)] without permission. [Landline] |
| 14:50:22 hrs. | Interlocking Operator: Asked Train ID 421 to identify. [Radio] |
| 14:50:26 hrs. | Train Operator of Train ID 421: "421." [Radio] |
| 14:51:16 hrs. | Interlocking Operator: Instructed Train ID 421 to standby. [Radio] |
| 14:54:15 hrs. | Interlocking Operator: Reported the red signal overrun to ROCC. [Radio] |
| 14:55:43 hrs. | Interlocking Operator: Instructed Train Operator of Train ID 421 to key down and to come see them. [Radio] |

**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 there were no faults with the train that contributed to the incident. After keying up the train at Signal G98-32, the Train Operator moved the consist approximately 929 feet beyond Signal G98-32 before coming to a complete stop. Details from the data analysis are as follows:

| Time | Description |
|---|---|
| 14:40:09 hrs. | The train keyed up in the direction of Largo Town Center Station at Signal G98-32. |
| 14:41:23 hrs. | M/C was placed in the "P1-P4" position. |
| 14:41:26 hrs. | The train began to move past Signal G98-32 at speeds not to exceed 16 mph. |
| 14:42:38 hrs. | The train came to a complete stop after traveling 929.6 feet beyond the G98-32 Signal. |
| 14:53:26 hrs. | The train is keyed down. |

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

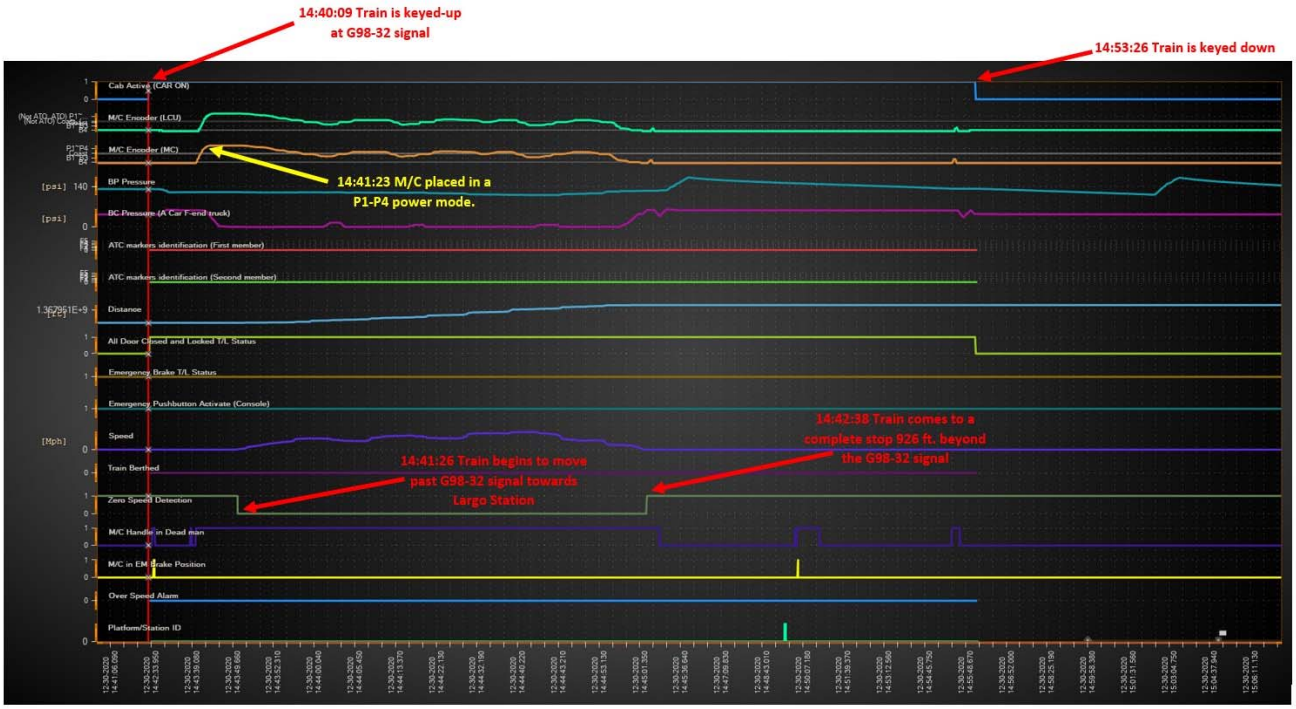



*Figure 1: VMDS Download*

## Advanced Information Management System (AIMS)

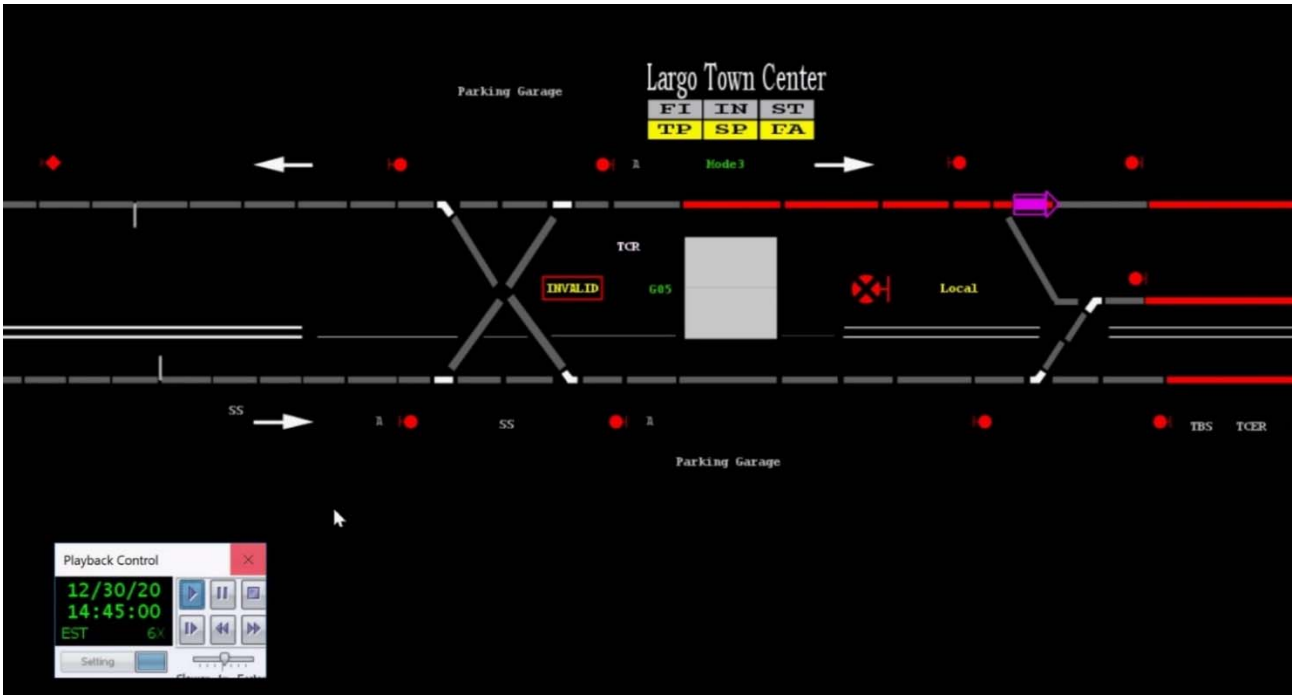



*Illustration 2: Train ID 421 keyed up at Signal G98-32 (Red), Track 2.*

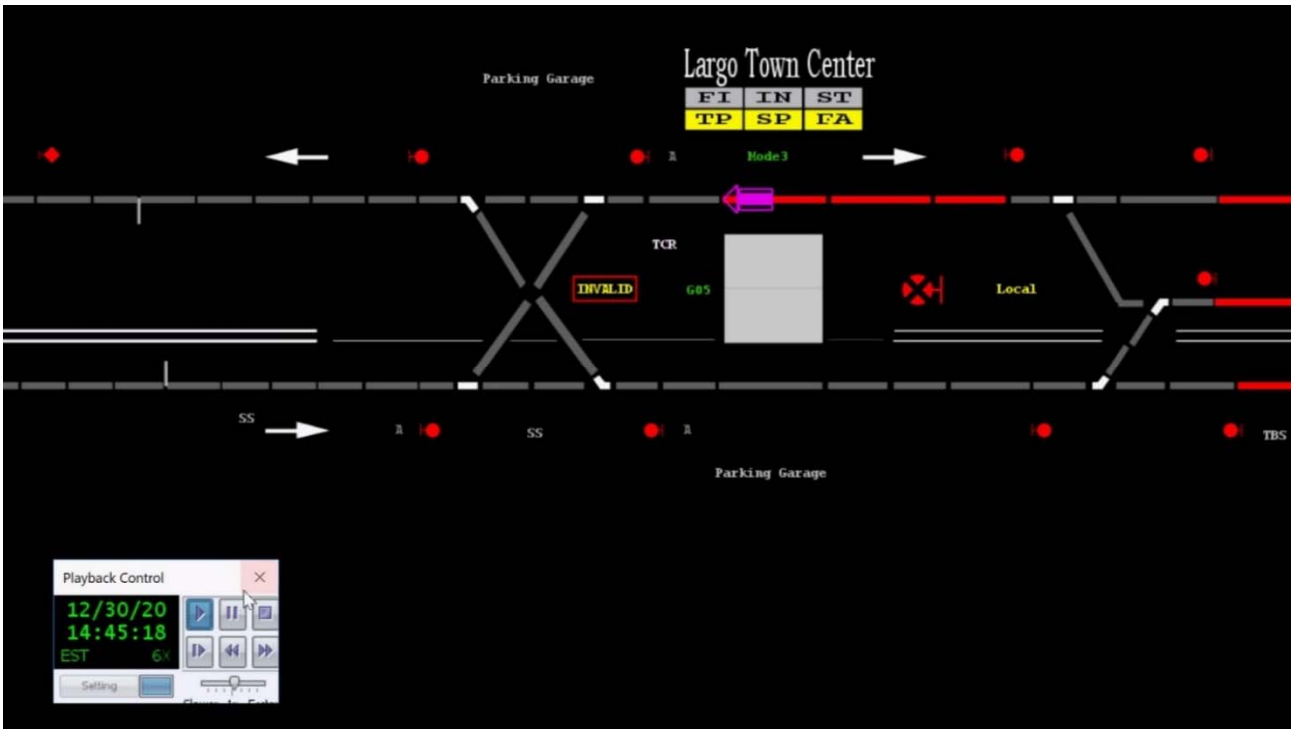



*Illustration 2: Train ID 421 passes Signal G98-32 (Red), Track 2, and arrives at the Largo Town Center Station platform.*

## Interview Findings

Based on the investigation launched into the Largo Town Center Tail Track Red Signal Overrun Incident, SAFE conducted one interview via Microsoft Teams, which included the investigation team, relevant Metro management, and representatives from the Washington Metrorail Safety Commission (WMSC). The interview conducted identified the following key findings associated with this event:

The Train Operator stated they thought they heard the Interlocking Operator instruct them to proceed to the platform with a permissive block. In addition, the Train Operator stated they had personal distractions they were dealing with, and their focus was on those distractions at the time of the incident.

## Findings

- The Train Operator did not verify instructions given by the Interlocking Operator before moving the train consist. This is not in compliance with General Rule 1.79, *"Personnel shall not take any action until they are positive that all radio transmissions or receptions are heard, fully understood, and acknowledged. Individual radio transmissions shall, at all times, be repeated by the receiver so the transmitter can confirm the message was received completely and by the intended receiver. Whenever the transmitter has completed their transmission and is turning the airtime over to the receiving party for acknowledgment or reply, they are to end their communication with the word "over." Speed restrictions must always be acknowledged by each Rail Vehicle Operator, even when a blanket message is sent out from Central Control, through 100 percent word for word repeat back from the Rail Vehicle Operators to Central Control of the Tower."*

- The Train Operator did not safely operate the train consist by overrunning a red signal. This action is not in compliance with Operating Rule 3.18, *"Employees shall not operate any vehicle in a reckless or unsafe manner."*

- The Train Operator overran Signal G98-32 (Red) did not comply with the Interlocking Operator directions. This action is not in compliance with MSRPH 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."*

## Weather

At the time of the incident, NOAA recorded the temperature at 43° F, 42% humidity, and south winds at 8 mph. SAFE has concluded that weather was not a contributing factor in this incident (Weather source: NOAA – Location: Largo, MD)

## Human Factors

### Fatigue

The Train Operator's 30-day work schedule leading up to the incident was compliant with WMATA's Policy/Instruction 10.6/1 Hours of Service Limitations for Prevention of Fatigue. It did not present a significant risk of impairment due to fatigue. Based on the employee interview, there were no personal factors present that would have increased the likelihood of fatigue-related impairment. The employee had no history of sleep issues to report.

### Post-Incident Toxicology Testing

After reviewing the Train Operator's post-incident testing results, SAFE determined the employee complied with the Drug and Alcohol Policy and Testing Program 7.7.3/6.

## Probable Cause Statement

SAFE determined that the probable cause of the red signal overrun on December 30, 2020, Largo Town Center tail track was the lack of focus demonstrated by the Train Operator while operating Train ID 421 and the failure to adhere to rules and regulations within the MSRPH. Contributing to the incident was the Train Operator's non-work-related concerns of caring for a family member at home, which prohibited effective listening skills to accurately hear the Interlocking Operator's instructions. These actions resulted in the Train Operator not following the Interlocking Operator's directions and ultimately overrunning the red signal, which is not in compliance with MSRPH General Rule 1.79 and Operating Rules 3.18 and 3.67.

## SAFE Recommendations/Corrective Actions

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. Refer to the SMS I/A Module for additional information.

| Corrective Action Code | Description |
|---|---|
| 91089_SAFECAPS_RTRA_001 | Schedule and ensure Train Operator completes refresher training on General Rule 1.79 and Operating Rules 3.18 and 3.67. |

## Appendices

## Appendix A – Interview Summaries

Train Operator

This employee is a WMATA Train Operator with ten years of service: four years as a Train Operator and six years of service as a Bus Operator. The Train Operator's last certification was on March 8, 2019, and has no history of sleep issues to report.

Based on the SAFE interview, the Train Operator reported they contacted the Interlocking Operator and stated they were ready for mainline. Next, the Interlocking Operator responded, and the Train Operator stated they thought they heard the Interlocking Operator give them a permissive block to the platform. The Interlocking Operator then told them to identify and later key down. The Train Operator reported they were caring for a parent at home, and this may have contributed to them not paying close attention to the radio transmissions. They were no mechanical issues reported by the Train Operator. The Train Operator stated they do not know anything they could have done to prevent this incident.

**Appendix B – Incident Photos**


*Photo 1: Front of Train ID 421; stationary 930 feet past signal.*

## Appendix C – Maximo Data



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

**Work Order #: 16077323**
**Type: CM**

**Status: CLOSE**
**01/08/2021 01:35**

**Work Description: Report of a red signal over run G98-32., 8/0, G98, RTR, RSIG, 421**
**Job Plan Description:**

**Work Information**

| | | | | | |
|---|---|---|---|---|---|
| **Asset:** | R7364 7364, RAIL CAR, KAWASAKI, 7000 AC, A CAR | **Owning Office:** | CMNT-CMNT-CMNT | **Parent:** | |
| **Asset Tag:** | R7364 | **Maintenance Office:** | CMNT-NEWC-INSP | **Create Date:** | 12/30/2020 20:53 |
| **Asset S/N:** | 7364 | **Labor Group:** | CMNT | **Actual Start:** | 12/30/2020 21:03 |
| **Location:** | 1230 D99, NEW CARROLLTON YARD | **Crew:** | | **Actual Comp:** | 12/31/2020 02:47 |
| **Work Location:** | 1230 D99, NEW CARROLLTON YARD | **Lead:** | | **Item:** | K18050001 |
| **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:** | 240-603-8836 | **Target Comp:** | |
| **Chain Mark Start:** | | **Chain Mark End:** | | **Scheduled Start:** | |
| **Create-Mileage:** | 287451.0 | **Complete-Mileage:** | 287451.0 | | |

**Task IDs**

| Task ID | |
|---|---|
| 10 | C/W CENV recommendations; Looked at this consist in the yard and found the brake rates good on lead trucks and no flats or spalling on any of the wheels.<br>good Master controller checks and good DI; car good for service |

**Component:** 000-300-K03 TRUCK&SUSPENSION: WHEEL & AXLE ASSY; TRUCK; 2K/3K/6K/7K **Work Accomp:** INSPECTED **Reason:** INCIDENT//ACCIDENT **Status:** CLOSE **Position:** 213 **Warranty?:** N

**Actual Labor**

| Task ID | Labor | Start Date | End Date | Start Time | End Time | Approved? | Regular Hours | Premium Hours | Line Cost |
|---|---|---|---|---|---|---|---|---|---|
| 10 | [redacted] | 12/31/2020 | 12/31/2020 | 00:20 | 00:35 | Y | 00:15 | 00:00 | $10.41 |
| 10 | | 12/31/2020 | 12/31/2020 | 00:20 | 00:35 | Y | 00:15 | 00:00 | $7.33 |
| | | | | | | **Total Actual Hour/Labor:** | 00:30 | 00:00 | $17.74 |

**Related Incidents**

| Ticket | Description | Class | Status | Relationship |
|---|---|---|---|---|
| 8518081 | Report of a red signal over run G98-32., 8/0, G98, RTR, RSIG, 421 | SR | CLOSED | ORIGINATOR |

**Failure Reporting**

| Cause | | Remedy | | Supervisor | Remark Date |
|---|---|---|---|---|---|
| 2475 | NO DEFECT; NO REPAIRS PERFORMED | 3192 | TESTED / INSPECTED | [redacted] | 12/31/2020 |
| Remarks: | C/W CENV recommendations; No flats; good brake rates; Good MP checks;Good DI; Train good for service | | | | |

WT_plust_woprint.rptdesign 02/25/2021 23:46

*Page 1 – CMNT Maximo Work Order #16077323 detailing inspections conducted.*