

**FINAL REPORT OF INVESTIGATION A&I E20085**  
February 14, 2020  
Derailment

W-0032

*Adopted by the Washington Metrorail Safety Commission at its meeting on June 18, 2020.*

Washington Metrorail Safety Commission  
777 North Capitol Street, NE, Suite 402  
Washington, DC 20002



**FINAL REPORT OF INVESTIGATION A&I E20085**

**SMS 20200214#86399**

<b>Date of Event:</b>	2/14/2020
<b>Type of Event:</b>	Derailment
<b>Incident Time:</b>	00:48 hrs.
<b>Location:</b>	Brentwood Yard, B99-62 Signal, Switch 65
<b>Time and How received by SAFE:</b>	01:00 hrs., On-Call Phone
<b>WMSC Notification Time:</b>	01:25 hrs. via Phone
<b>Responding Safety Officers:</b>	WMATA SAFE: Yes WMSC: No Other: N/A
<b>Rail Vehicle:</b>	HR 260 (Ford 750)
<b>Injuries:</b>	None
<b>Damage:</b>	No
<b>Emergency Responders:</b>	SAFE, RTRA, ATC, CTEM, PWR

**Executive Summary**

On Friday, February 14, 2020, at 01:00 hrs., the Rail Operations Control Center (ROCC) notified SAFE that at approximately 00:48 hrs., High Rail Vehicle 206 (HR 260), derailed at B99-65 switch in Brentwood Yard. Reportedly, the unit mounted at the grade crossing adjacent to Track and Structures (TRST) trailer and was given authorization by the Interlocking Operator (I/O) to proceed up to B99-62 Signal. While operating in reverse using installed rearview camera en-route to B99-62 Signal, the unit operated through misaligned B99-65 switch and subsequently derailed. No injuries or equipment damage reported. HR 260 was removed and transported to New Carrollton for post-incident investigation processes. The I/O and E/O were removed from service for toxicology testing and subsequently interviewed by SAFE. The WMSC representative was notified of the event at 01:25 hrs., via WMSC On-call phone.

**Incident Site**

Brentwood Yard, B99-62 Signal, Switch 65

## Field Sketch/Schematics



HR 260 Mounted at Grade Crossing (Circle Indication) between B99-24 Signal and B99-66 Signal

## Investigation

### **Reported Accounts of Events:**

Interviews:

Utility Interlocking Operator Trainee (UIOT)

UIOT in training with 15 years

UIOT stated that they gave High Rail (HR) 260 Radio Project permission to mount at a grade crossing, and an absolute block was granted to B99-62 Signal. UIOT stated that they failed to verify the location of HR 260 due to the vehicle, not shunting and identified on the tower board. The I/O then established a route for PM 26, which was holding behind B99-64 Signal displaying a red signal aspect. PM 26 was located on the adjacent track from HR 260. Based on yard video at 00:43 hrs., B99-65 switch moves from a reverse

Date: 2/14/2020 Time: 00:48 hrs.

Final Report - Derailment  
E20085

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Page 2

position to a normal position with HR 260 approximately 20 feet from B99-65 Switch. Approximately, 00:48 hrs., HR 260 moves in the direction of trailing point B99-65 switch and subsequently operated through the misaligned switch.

#### Equipment Operator (E/O)

IRPG E/O operator stated, HR 260 was mounted at the grade crossing adjacent to the TRST trailer and was given instructions by I/O to clear B99-66 Signal and proceed up to B99-62 Signal and contact ROCC. From the location of the grade crossing, a lunar signal could be seen illuminated. Before HR 260 arrived at B99-62 Signal, ROCC gave the unit an absolute block to Judiciary Square.

HR 260 was operating in reverse utilizing working rearview camera in-route to B99-62 Signal, where HR 260 operated through misaligned B99-65 switch. The position of B99-65 Switch in relation to HR 260 movement was in the trailing position and set for normal rail vehicle movement on the adjacent track. Once HR 260 operated through the closed switch points, the rail vehicle derailed. Once the unit was secured, the ROCC and I/O were notified of derailment.

The planned work assignment for HR 260 was to deliver power cable to a crew at Woodley Park station for installation. Job Safety Briefing was projected to be completed at the worksite, and a pre-trip inspection was performed prior to operation. The E/O finally stated there were no radio communication issues that contributed to the event.

#### **Closed Circuit Television (CCTV)**

Review of CCTV footage revealed, HR 260 approaching B99-62 Signal in reverse at low speeds. HR 260 then continues to operate, when the Front End began to transverse through the Switch; HR 260 suddenly lifts and subsequently derails to the field side away from third-rail power. A further review determined, the switch moved from reverse to a normal straight-through move as HR-260 approached the switch point.

#### **Car Track Equipment Maintenance (CTEM)**

CTEM performed a field inspection and determined, HR-260 derailed going through the closed switch point. No visible damage to steering and front end of vehicle was identified. HR-260 was deemed operable for subsequent transport to New Carrollton yard for post-incident investigation processes. HR-260 was certified and approved to operate on WMATA property. No significant findings identified during inspection and document review; to conclude, the unit had inadequate equipment installed on the unit, which may have contributed to this event, e.g., tires.

## **SAFE On-Site Investigation**

SAFE performed an on-site posit incident investigation and identified the following:

Based on field investigation, SAFE determined HR 260 derailed transitioning through B99-65 Switch. The rear axle's wheel flanges operated through the closed switch points. However, the front axle's wheel flanges climbed over the closed switch points and derailed. Based on observation of the position of the switch points in relation to secured HR 260, it was apparent that the rail vehicle traversed through the switch that was improperly aligned. Additionally, the switch was an interlocking tower-controlled switch and not manually set. HR 260 E/O failed-to verify alignment and subsequently derailed when traversing the trailing point switch alignment. Apparent rail markings indicate Point of Derailment (POD) occurred within the switch point while traversing B99-Switch 65. Refer to photo 3.

## **Office of Rail Transportation**

### **Managerial Report**

After investigation, RTRA determined, on February 14, 2020, at approximately 12:57 hrs., Track unit HR-260 (High Rail) derailed at B99-62 signal. The UIOT set a lunar at B99-66 signal and gave an absolute block no closer than ten (10) feet to B99-62 signal red and instructed HR-260 to contact ROCC at that location. The UIOT assumed HR-260 cleared the yard because the signals dropped out. The UIOT then set a lead from B99-82 signal to B99-64 signal for PM-26, which was holding at B99-82 signal. This move caused switch 65 to throw while HR-260 was transitioning through the area, which subsequently caused the unit to derail.

Based on Metro Safety Rule and Procedures Handbook (MSRPH) review:

- the UIOT did not follow proper radio protocol leading up to the derailment
- HR-260 never informed the UITO they cleared B99 yard; therefore, the UIOT should not have set the lead for the next unit until HR-260 gave confirmation HR-260 cleared the Yard tracks.
- the permanent I/O failed to monitor every aspect of the work being performed by the UIOT; (radio communications, setting leads, Interlocking reports/logs, etc.)

### **Automatic Train Control (ATC)**

After investigation, ATC data analysis substantiates SAFE's findings. ATC data determined, the UIOT set a route for a unit waiting at B99-82 to B99 64 signal, which removed the set route for HR-260. This caused the route condition to change from reverse to normal while HR 260 was transitioning through the area subsequently derailing.

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[Final Report - Derailment E20085](#)

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Page 4

- 00:33:12 hrs., - the incident vehicle had correct rail alignment for signal B99-66 to B99-64
  - Due to the LOS, set the route B99-82 to B99-64, resulting in switch 65 to thrown into Normal position, which consequently resulted in HR-260 at track 65T to not have the correct alignment.
  - After 00:45:57 hrs., (B99-62 signal had a solid Lunar aspect) and HR-260 continued to proceed toward 59BT across switch 65.
- 00:48:57 hrs., - track circuit 59BTPR becomes occupied. HR-260 occupied track circuits 65T and 59BTR, indicating movement from B99-66 Signal to B99-64 Signal over an incorrectly aligned switch 65.

Incident timeline and comments:

00:09:22	62HGPR	62HGPR	Off	Sig. 62 is red
00:33:11	65RWPR	65RWPR	On	
00:33:12	65RWCK	65RWCK	On	Sw. 65 Reverse position
00:33:12	65-83LAR	65-83LAR	Off	
00:33:12	66HGR	66HGR	On	Sig. 66 is Lunar (route 66-64 is set)
00:39:17	65-83TPR	65-83TPR	Off	HR 260 enters track circuit 65T
00:39:17	66HGR	66HGR	Off	Signal 66 turns red
00:39:19	65-83TPR	65-83TPR	On	HR 260 LOS
00:39:26	65-83TPR	65-83TPR	Off	
00:39:26	65-83TPR	65-83TPR	On	HR 260 LOS
00:39:27	65-83TPR	65-83TPR	Off	
00:39:28	65-83TPR	65-83TPR	On	HR 260 loses shunt from 00:39:28 to 00:48:20 ATC equipment no longer detects HR 260
00:39:33	65-83LAR	65-83LAR	On	
00:41:32	65RWCK	65RWCK	Off	
00:41:33	65RWPR	65RWPR	Off	
00:41:35	65NWPR	65NWPR	On	
00:41:36	65-83LAR	65-83LAR	Off	
00:41:36	82HGR	82HGR	On	A 82 to 64 route is set
00:41:36	65NWCPR	65NWCPR	On	Switch 65 Normal position.
00:41:37	62HGPR	62HGPR	On	
00:41:59	62HGPR	62HGPR	Off	
00:44:48	62HGPR	62HGPR	On	
00:44:52	62HGPR	62HGPR	Off	
00:45:57	62HGPR	62HGPR	On	Sig.62 solid Lunar
00:48:20	65-83TPR	65-83TPR	Off	After a 9 min LOS the ATC system detects the HR 260
00:48:20	82HGR	82HGR	Off	
00:48:41	65-83TPR	65-83TPR	On	
00:48:42	65-83LAR	65-83LAR	On	
00:48:57	65-83LAR	65-83LAR	Off	
00:48:57	65-83TPR	65-83TPR	Off	

8 Min 52

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Page 5

00:48:57	59BTPR	59BTPR	Off	Track circuit 59BTR drops
00:48:58	62HGPR	62HGPR	Off	
00:48:58	65-83TPR	65-83TPR	On	
00:48:58	59BTPR	59BTPR	On	
00:48:58	65-83LAR	65-83LAR	On	
00:49:02	65-83TPR	65-83TPR	Off	
00:49:02	59BTPR	59BTPR	Off	
00:49:02	65-83LAR	65-83LAR	Off	
00:49:02	65-83TPR	65-83TPR	On	
00:49:02	59BTPR	59BTPR	On	
00:49:03	65-83LAR	65-83LAR	On	

## COMM Section

There were no radio communication discrepancies identified in the affected area; system operated per design.

## Findings

- Lack of proper Radio Communication
  - o HR-260 never informed the Utility Interlocking Operator that he cleared Brentwood yard.
  - o The UIOT should set a lead for PM-26
  - o The UIOT should have waited until HR-260 gave verbal confirmation that he cleared the yard before setting the lead for PM-26. This would have prevented the derailment.
  
- Track unit HR-260 was reportedly not shunting and not showing occupancy on the Interlocking Board
- The permanent I/O failed to maintain oversight of the planned move to subsequently stop the trainee's action immediately, which may have prevented the incident from occurring.
- POD was identified within the switch point resulting from incorrect alignment
- UIOT removed lunar before receiving confirmation from HR 260 was clear
- UIOT set a normal straight-through move for PM 26
- HR 260 failed to verify correct alignment

## Weather

At the time of the incident, the temperature was 43 °F, and SAFE has concluded that weather was not a contributing factor in this incident (Weather source: National Oceanic Atmospheric Administration (NOAA) – Location: Washington, DC.)

## **Human Factors**

### Fatigue

Based on SAFE's review of the UIOT and E/O operators' 30-day work histories, it was determined the persons involved hours of service was in accordance with WMATA's *Fatigue Risk Management Policy 10.6* and *Hours of Service Limitations for Prevention of Fatigue Policy 10.7*.

### Post-Incident Testing

After reviewing the UIOT's post-incident testing results, it was determined that the UIOT was not in violation of the Drug and Alcohol Policy and Testing Program 7.7.3/5, therefore, being under the influence of a controlled substance has been excluded as a contributing factor.

## **Conclusion**

Based on salient facts, CCTV, ATC data, and ARS playback, SAFE assents with RTRA and ATC findings.

1. The UIOT did not await positive radio communication from HR-260 stating, the unit was clear of B99 Yard.
2. The permanent I/O did not adequately oversee operations within the tower to ensure the UIOT was performing their duties accordingly.
3. The UIOT set a route for adjacent track for a straight-through move, which caused HR-260 route to move from reverse to normal, subsequently derailing as a result.
4. E/O failed to identify proper switch alignment for their move

## **Immediate Mitigation to Prevent Recurrence**

- HR-260 was removed from service for post-incident investigative processes
- UIOT removed from service for post-incident toxicology testing and subsequent interview with SAFE



### **Corrective Action**

1. RTRA Management shall take the appropriate action that includes but not limited to, retraining of RTRA personnel involved.
2. IRPG management shall take the appropriate action that includes but not limited to retraining of IRPG personnel involved.

## Photos

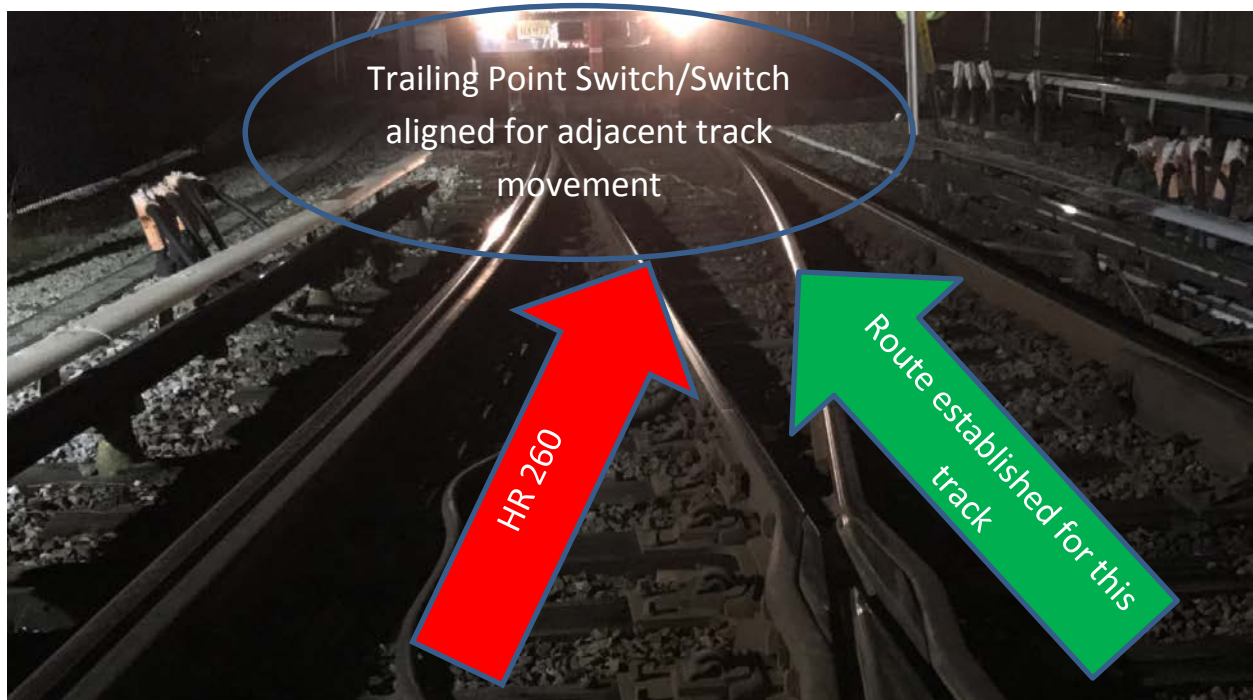


Photo 1 – Trailing point switch move shows alignment established for the vehicle depicted with a green arrow on the right side of photo.



Photo 2 – Rail tucked on the left side of the rail indicating straight through move (Normal Position) for movement on adjacent track.



Photo 3 – POD markings on the head of the left side running rail with flange grease markings within the switch point.



Photo 4 - Final Resting Point (FRP) 3-6 inches away from derailment location.