NATIONAL TRANSPORTATION SAFETY BOARD

OFFICE OF RAILROAD, PIPELINE &

HAZARDOUS MATERIAL INVESTIGATIONS

WASHINGTON, D. C. 20594

HWY15MH006

METROLINK TRAIN COLLISION and DERAILMENT WITH SERVICE TRUCK AND TRAILER NEAR RICE AVENUE HIGHWAY/RAIL GRADE CROSSING

On Union Pacific Santa Barbara Subdivision

Oxnard, California

February 24, 2015

SIGNAL FACTUAL REPORT

Prepared by: Timothy J. DePaepe, Signal Group Chairman

Accident:

Type:	Train & Utility Truck Crash on Railroad Right-of-way (not at a Grade Crossing)
Date and Time:	February 24, 2015 at 5:44 a.m. (PST)[1]
Location:	Oxnard, Ventura County, California
Vehicle #1:	2005 Ford F450 Pick-up towing a 2000 Tandem Axle Utility Trailer
Vehicle #2:	Metrolink Commuter Train #102
Vehicle #3:	1998 Toyota Camry
NTSB #:	HWY15MH006

Signal Group:

Mr. Timothy J. DePaepe
Railroad Accident Investigator – Signals, NTSB Office of Rail, Pipeline & Haz-Mat Investigations

Mr. Glen Ivy, Union Pacific Director of Signal Maintenance, Union Pacific Railroad

Mr. Anthony Loya, FRA Railroad Inspector Signal & Train Control Specialist – FRA

Mr. Joe Petito, FRA Railroad Safety Inspector, Signal and Train Control

Mr. Steve McDowell, Director Communications & Signals, Western Division National Railroad Passenger Corporation – Amtrak

Ms. Heidi Estrada, CPUC Railroad Operations Safety Branch, Signal & Train Control

Mr. Phillip LaBreche, Assistant Director C&S Maintenance and Rehab, Metrolink

Crash Summary

For a summary of the crash, refer to the *Crash Summary Report* in the docket for this investigation.

[1] All times are Pacific Standard Time unless otherwise noted.

Figure 1. Photo taken, north direction, wreckage of trailer associated with utility truck after impact, & warning system devices operating after island gate knock down. The plastic covers for the LED flashers were burned on the cantilever.

Description of Railroad Signal System and the Grade Crossing Signal System:

The UP Santa Barbara Subdivision runs in a timetable north/south direction. The UP track structure in the vicinity of the accident consists of single main track territory with controlled sidings. Rice Avenue crosses the tracks in geographical north and south direction and intersects with 5th Street adjacent to the tracks about 68'. Posted speed limit for Rice Avenue is 55 MPH. The method of operation is by signal indication of a Traffic Control System (TCS). Authorized Train speed through Rice Avenue is 79 MHP Passenger, and 60 MPH Freight.

The grade crossing signal system consisted of 4 Western Cullen Hayes gates with fiberglass and aluminum gate arms. Each gate arm has three lights. When the grade crossing signal system is activated, the first two lights flash alternatively and the third light, or tip light is constantly lit. The two center roadway gates are mounted on a mast, and each mast has 2 12-inch LED flashers. There are also two cantilever signal masts with four flashers mounted above the highway street and four flashers mounted on the mast near the crossing gates. There are a total of 20 12-inch flashers at the crossing.

The train detection system consisted of a Microprocessor Based Grade Crossing Predictor GCP-3000[2].

[2] The 3000 Grade Crossing Predictor (GCP) is a microprocessor-controlled system that is deployed to continually monitor the approach(es) to railroad grade crossings. In operation, the 3000 GCP may function either in the Predictor or Motion Sensor (MS) modes. It detects approaching trains; computes train speed and distance; predicts train arrival time

Grade Crossing Signal System Event Recorders:

Preliminary information received from downloads made from Rice Avenue, showed the train approach the grade crossing with a recorded warning time of 28 seconds and 70 MPH predicted island speed. The predictor event recorder only recorded as far as the train passing through the island circuit. After predicting the movement, the unit recovered the warning devices with a level 2EZ.

Post Accident Inspection Of the Grade Crossing Signal System:

On February 24, 2015, the signal group consisted of UP, SCAX signal employees, CPUC, FRA personnel and NTSB investigators. A job briefing was held and the group began the investigation at the signal control house at Rice Avenue. All grade crossing signal system cases and junction boxes showed no indications of tampering or vandalism that would interfere with the operation of the grade crossing signal system. Time was marked for cutting of the seals for entry.

After the first set was broken and the initial download was taken, investigators had the UP re-seal the case until the "normal" unit download. The GCP was initially on "Stand by", and the first download taken. At 12:18 pm, the second seals were put in place. Left side of case seal # 0120166; Right side of case seal # 0120156. Those were broken again at 4:12 pm, pictures were taken and at 4:15 pm the GCP covers were removed, 4:18 pm the UP connected their laptop to the GCP and began the download at 4:19 pm. The time check with the GCP unit was one minute behind real time.

Investigators had the UP seal the shunt box on the eastbound approach of the crossing, that seal number was 0120164. At 1:17 pm it was broken to confirm an 86 hertz narrow band shunt with a dummy load, per the circuit plans. After all downloads, and the investigation was complete within the case, investigators released the equipment back to the UP at 4:50 pm.

The predictor, a Safetran GCP-3000/D2, operating in auto mode on the Stand-By Unit in operation was downloaded for event recordings. Recording had displayed 28 seconds warning time with the island speed predicted at 70 MPH. Time was 3 minutes past official marked time. IDK display showed a level 2 EZ with 100 EX. There was no external monitor to record relay, & warning devices position of function.

The distance of 121’ was measured from the track leads wire connection, to spot where the locomotive had derailed shunting the track. This measurement is taken to make a shunt verification test for the 2EZ. Photos were taken of relays in service for further test record follow-ups.

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at the crossing; activates crossing-protection equipment at a set (programmed) time prior to the predicted arrival of the train at the crossing threshold of approximately 2 MPH activates crossing-protection equipment at time of train detection.

Cal-trans Traffic Control Division met at the FRA & CPUC at their control case to test pre-emption. Test pre-emption was done during the GCP Transfer and pre-emption was observed to show a 20 second queue of clear out time before changing to allow traffic going east and west on 5th Street. The Traffic Control Unit is made by Dynatrol and is a Model 170. Pre-emption is relayed by a plug in Model 252 component that sends pre-emption control to the Dynatrol. This unit does not have event recording capabilities.

Investigators have made requests for the download of CP CO 406 Oxnard for signal aspect prior to the accident, relay tests, and insulation resistance tests of all cables at Rice Avenue. Download was made to the main modules of the GCP-3000 and determined the last date of function was February 13, 2015.

UP signal personnel tested the activation of the Rice Avenue Safetran-3000 by placing shunts at the termination bonds on both sides of the crossing; at the 90% distance; the 50% percent distance; and within the island circuit of the grade crossing. All shunts properly activated the grade crossing signal system.

On February 25, 2015, investigators went to CP CO 406 Oxnard (GPS Coordinates 34° 11’ 53” N, 119° 9’ 20” W taken at the signal bungalow) and witnessed the download of signal data.

Investigators went to Rice Avenue (GPS Coordinates 34° 11’ 50” N, 119° 8’ 32” W taken at the center of street) and downloaded data for the striking train movement over it. Rice Avenue is the nearest grade crossing to the point of contact with the abandoned service truck and trailer. The Safetran 3000 unit download showed that the grade crossing signal system provided 28 seconds of warning time for the accident train. The Safetran 3000 unit was set to provide 25 seconds of warning.

Investigators went to the SB (Southbound) Signal (the last train signal the accident train prior to the impact with the tractor-trailer) at CP CO 406 Oxnard (GPS Coordinates 34° 11’ 52” N, 119° 9’ 28” W taken right at the base of the signal). Photographs of this signal were also taken.

Investigators then went to Rose Avenue (GPS Coordinates 34° 11’ 50” N, 119° 9’ 35” W taken as the center of street) and downloaded data for the striking train’s movement over it.

The Signal Group worked with Highway investigators performing tests to check the interconnect between the grade crossing signal system equipment and the highway traffic signal systems. Multiple tests were conducted with no anomalies noted.

The Signal Group Chairman viewed the outward facing video of the accident train and it showed the signal displaying a Green aspect and that the gates and lights were functioning at Rice Avenue prior to the collision.

No exceptions were identified with the design of the grade crossing signal system and all systems performed as designed and intended.

Figure 2. Photo taken, east direction, shows wreckage of trailer with island mechanism tangled together.

Documentation

Due to a change in UP protocol for requesting the needed signal documentation, a request was made with Mr. Miller, in UP headquarters in Omaha, NE, for the following documents:

For grade crossing warning system at Rice Avenue:

1. All inspection records for one year prior to the date of the accident (Both Scheduled and unscheduled tests)
2. Last Relay test record prior to the date of the accident.
3. Last cable insulation test record prior to the date of the accident.
4. 1 year Signal trouble tickets prior to the date of the accident.
5. A copy of the event recorder download for the GCP-3000/D2
6. A copy of the event recorder download for CP CO 406 Oxnard.
   (**Please provide an interpretation of events with an explanation of any time differences between recorded times and real time for each event recorder location.)
7. All post-accident test records for all locations.
8. Circuit plans for Rice Avenue highway-rail crossing warning system.
9. Signal maintenance records for the last six months at CP CO 406 Oxnard,
10. Signal installation plans;
11. Straight line plan showing signals approaching the accident area;
12. Signal aspect chart;
13. Operating rules relating to each signal involved;

14. Type and manufacturer of the power switches;
15. The last test record for all tests quarterly, annually, bi-annually, etc., for the grade crossing signal system and the train signal system at Rice and Rose Avenue grade crossings;
16. Grade Crossing Signal Downloads (Safetran 3000 units) from Rice Avenue Grade Crossing;
17. Grade Crossing Signal Downloads (Safetran 3000 units) from Rose Avenue Grade Crossing;
18. Train signal downloads from CP CO 406 Oxnard;
19. Meggering tests for all cables done at Rice Avenue as a result to the damage to the grade crossing signal equipment;
20. Estimate of monetary damages of signals or switches or grade crossing equipment;
21. Any and all tests made after the accident at Rice Avenue;
22. and a copy of the System Time Table.

Grade Crossing Signal System Maintenance Records

UP signal maintenance tests and inspection records were reviewed for the grade crossing signal system. The maintenance records indicate all signal tests and inspections were conducted in accordance with FRA regulations and UP requirements.

UP signal and grade crossing signal system trouble reports for a one-year period were collected. The maintenance records indicate all grade crossing signal tests and inspections were conducted in accordance with UP requirements. The grade crossing signal system was checked for grounds; the system was operated on ac power and stand-by power; lights and signs were inspected and gate heights were noted. Track connections and insulated joints were also inspected. No exceptions were noted that would prevent the grade crossing signal system warning devices from functioning as designed.

The UP trouble tickets were reviewed and no exceptions were noted.

Interviews

The signal group did not conduct any interviews.

Signal Damages

Damage was made to the ‘B’ island foundation, mast, gate mechanism, and flasher assembly. Damage also sustained to the ‘A’ cantilever base. The UP engineering personnel estimated the total grade crossing signal system damage is approximately $40,000.

Party to the Investigation - Acknowledgment Signatures

The undersigned designated *Party to the Investigation* representatives attest that the information contained in this report is a factually accurate representation of the information collected during the investigation, to the extent of their best knowledge and contribution in this investigation.

/s/_____ Date 6-9-15
Timothy J. DePaepe, NTSB

/s/_____ Date 6-9-15
Mr. Glen Ivy, UP

/s/_____ Date 6-9-15
Mr. Anthony Loya, FRA

/s/_____ Date 6-9-15
Mr. Joe Petito, FRA

/s/_____ Date 6-9-15
Mr. Steve McDowell, Amtrak

/s/_____ Date 6-9-15
Ms. Heidi Estrada, CPUC

/s/_____ Date 6-9-15
Mr. Phillip LaBreche, Metrolink