Federal Railroad Administration
Office of Railroad Safety
Accident and Analysis Branch

Accident Investigation Report
HQ-2015-1016

Southern California Regional Rail Authority (SCAX)
Oxnard, CA
February 24, 2015

Note that 49 U.S.C. §20903 provides that no part of an accident or incident report, including this one, made by the Secretary of Transportation/Federal Railroad Administration under 49 U.S.C. §20902 may be used in a civil action for damages resulting from a matter mentioned in the report.

U.S. Department of Transportation
Federal Railroad Administration

FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File #HQ-2015-1016

TRAIN SUMMARY

1. Name of Railroad Operating Train #1	1a. Alphabetic Code	1b. Railroad Accident/Incident No.
Southern California Regional Rail Authority	SCAX	022415

GENERAL INFORMATION

1. Name of Railroad or Other Entity Responsible for Track Maintenance	1a. Alphabetic Code	1b. Railroad Accident/Incident No.
Union Pacific Railroad Company	UP	0215LA023
2. U.S. DOT Grade Crossing Identification Number	3. Date of Accident/Incident	4. Time of Accident/Incident
	2/24/2015	5:42 AM

5. Type of Accident/Incident
Obstruction

6. Cars Carrying HAZMAT	7. HAZMAT Cars Damaged/Derailed	8. Cars Releasing HAZMAT	9. People Evacuated	10. Subdivision
0	0	0	0	Santa Barbara

11. Nearest City/Town	12. Milepost *(to nearest tenth)*	13. State Abbr.	14. County
Oxnard		CA	VENTURA

15. Temperature (F)	16. Visibility	17. Weather	18. Type of Track
46 °F	Dark	Clear	Main

19. Track Name/Number	20. FRA Track Class	21. Annual Track Density *(gross tons in millions)*	22. Time Table Direction
Single Main	Freight Trains-60, Passenger Trains-80	2.92	South

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OPERATING TRAIN #1

1. Type of Equipment Consist:	2. Was Equipment Attended?	3. Train Number/Symbol
Commuter Train-Pushing	Yes	ML102

4. Speed (recorded speed, if available) R - Recorded E - Estimated	Code	5. Trailing Tons (gross exluding power units)	6a. Remotely Controlled Locomotive? 0 = Not a remotely controlled operation 1 = Remote control portable transmitter 2 = Remote control tower operation 3 = Remote control portable transmitter - more than one remote control transmitter	Code
70 MPH	E			0

6. Type of Territory

Signalization:

Signaled

Method of Operation/Authority for Movement:

Supplemental/Adjunct Codes:

7. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded (yes/no)	8. If railroad employee(s) tested for drug/alcohol use, enter the number that were positive in the appropriate box.	Alcohol	Drugs
(1) First Involved *(derailed, struck, etc.)*	ML000645	0	yes		0	0
(2) Causing *(if mechanical, cause reported)*	ML000645	0	yes	9. Was this consist transporting passengers?		Yes

10. Locomotive Units (Exclude EMU, DMU, and Cab Car Locomotives.)	a. Head End	Mid Train b. Manual	Mid Train c. Remote	Rear End d. Manual	Rear End e. Remote	11. Cars (Include EMU, DMU, and Cab Car Locomotives.)	Loaded a. Freight	Loaded b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Train	0	0	0	1	0	(1) Total in Equipment Consist	0	4	0	0	0
(2) Total Derailed	0	0	0	1	0	(2) Total Derailed	0	4	0	0	0

12. Equipment Damage This Consist	13. Track, Signal, Way & Structure Damage
14000000	154754

14. Primary Cause Code

M402 - Object or equipment on or fouling track (motor vehicle - other than highway-rail crossing)

15. Contributing Cause Code

M402 - Object or equipment on or fouling track (motor vehicle - other than highway-rail crossing)

Number of Crew Members				Length of Time on Duty	
16. Engineers/Operators	17. Firemen	18. Conductors	19. Brakemen	20. Engineer/Operator	21. Conductor
2	0	1	0	Hrs: 1 Mins: 20	Hrs: 1 Mins: 20

Casualties to:	22. Railroad Employees	23. Train Passengers	24. Others
Fatal	1	0	0
Nonfatal	2	26	0

25. EOT Device?	26. Was EOT Device Properly Armed?	27. Caboose Occupied by Crew?
N/A	N/A	N/A

28. Latitude	29. Longitude
34.207832000	-119.129833000

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CROSSING INFORMATION

Highway User Involved		Rail Equipment Involved
1. Type		5. Equipment
2. Vehicle Speed *(est. mph at impact)*	3. Direction *(geographical)*	6. Position of Car Unit in Train
4. Position of Involved Highway User		7. Circumstance
8a. Was the highway user and/or rail equipment involved in the impact transporting hazardous materials?		8b. Was there a hazardous materials release by
8c. State here the name and quantity of the hazardous material released, if any.		

9. Type of Crossing Warning	10. Signaled Crossing Warning	11. Roadway Conditions
1. Gates 4. Wig wags 7. Crossbucks 10. Flagged by crew 2. Cantilever FLS 5. Hwy. traffic signals 8. Stop signs 11. Other *(spec. in narr.)* 3. Standard FLS 6. Audible 9. Watchman 12. None		

12. Location of Warning	13. Crossing Warning Interconnected with Highway Signals	14. Crossing Illuminated by Street Lights or Special Lights

15. Highway User's Age	16. Highway User's Gender	17. Highway User Went Behind or in Front of Train and Struck or was Struck by Second Train	18. Highway User

19. Driver Passed Standing Highway Vehicle	20. View of Track Obscured by *(primary obstruction)*

Casualties to:	Killed	Injured	21. Driver was	22. Was Driver in the Vehicle?
23. Highway-Rail Crossing Users			24. Highway Vehicle Property Damage *(est. dollar damage)*	25. Total Number of Vehicle Occupants *(including driver)*

26. Locomotive Auxiliary Lights?	27. Locomotive Auxiliary Lights Operational?

28. Locomotive Headlight Illuminated?	29. Locomotive Audible Warning Sounded?

10. Signaled Crossing Warning

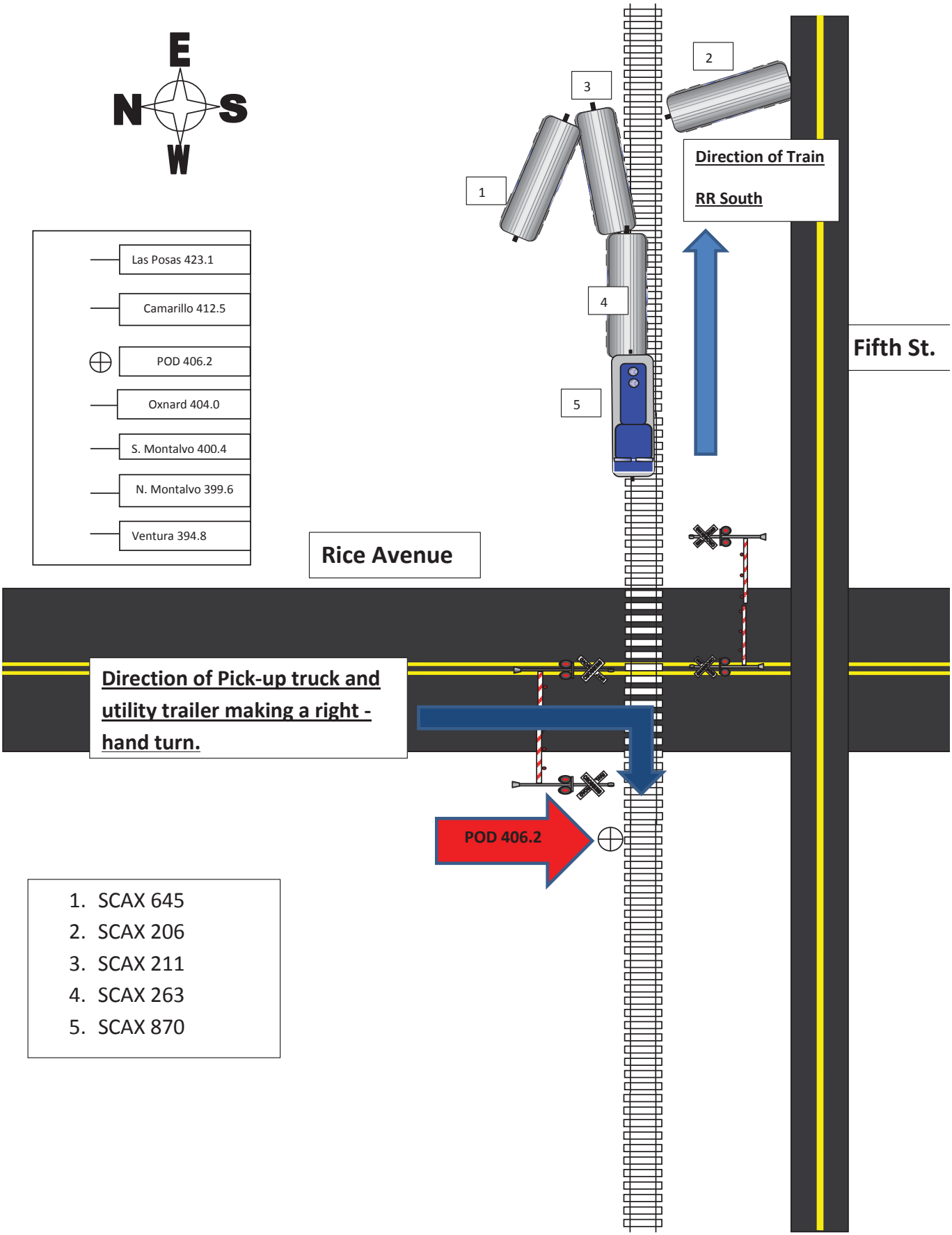
1 - Provided minimum 20-second warning
2 - Alleged warning time greater than 60 seconds
3 - Alleged warning time less than 20 seconds
4 - Alleged no warning
5 - Confirmed warning time greater than 60 seconds
6 - Confirmed warning time less than 20 seconds
7 - Confirmed no warning
N/A - N/A

Explanation Code

A - Insulated rail vehicle
B - Storm/lightning damage
C - Vandalism
D - No power/batteries dead
E - Devices down for repair
F - Devices out of service
G - Warning time greater than 60 seconds attributed to accident-involved train stopping short of the crossing, but within track circuit limits, while warning devices remain continuously active with no other in-motion train present
H - Warning time greater than 60 seconds attributed to track circuit failure (e.g., insulated rail joint or rail bonding failure, track or ballast fouled)
J - Warning time greater than 60 seconds attributed to other train/equipment within track circuit limits
K - Warning time less than 20 seconds attributed to signals timing out before train's arrival at the crossing/ island circuit
L - Warning time less than 20 seconds attributed to train operating counter to track circuit design direction
M - Warning time less than 20 seconds attributed to train speed in excess of track circuit's design speed
N - Warning time less than 20 seconds attributed to signal system's failure to detect train approach
O - Warning time less than 20 seconds attributed to violation of special train operating instructions
P - No warning attributed to signal systems failure to detect the train
R - Other cause(s). Explain in Narrative Description

SKETCHES

MetroLink Oxnard PDF



1. SCAX 645
2. SCAX 206
3. SCAX 211
4. SCAX 263
5. SCAX 870

SYNOPSIS

Synopsis

On February 24, 2015, a southbound Metrolink passenger train, operated by the Southern California Regional Rail Authority (SCAX), traveling at 65 miles per hour (mph) on single main track, collided with a motor vehicle abandoned on the railroad tracks near the city of Oxnard in Ventura County, California. The accident occurred at 5:42 a.m. PST at milepost (MP) 406.2 on the Union Pacific Railroad's (UP) Santa Barbara Subdivision. The speed at impact was recorded at 57 mph. Oxnard is located approximately 60 miles north of Los Angeles, California. The motor vehicle, a pickup truck with trailer-in-tow, was completely destroyed. The collision injured the three crewmembers, one of whom died from his injuries, and also resulted in moderate to severe injuries to 26 passengers. Movements in this part of the railroad are under a Traffic Control System (TCS) operated by a UP dispatcher located in Omaha, Nebraska. The train was operating cab car forward with three additional passenger cars and a trailing locomotive. The three lead passenger cars derailed onto their sides while the rear passenger car and the trailing locomotive derailed but remained upright. This was an Amtrak route. A positive train control system would not have prevented this type of accident. There were no hazardous materials involved or released.

Weather at the time of the accident was dark and clear with a temperature of 46 degrees Fahrenheit.

Damages were estimated at $14 million to equipment and $154,754 to track, signal and structures.

The probable cause of the accident was an object or equipment on or fouling the track (motor vehicle- other than highway-rail crossing).

NARRATIVE

Circumstances Prior to Accident

Metrolink Train 102 (Train #1)

Southbound Metrolink Train 102 (Train #1) was crewed by a locomotive engineer, a conductor and a student engineer, all of whom were Amtrak employees working under contract to Metrolink. The crew came on duty at their home station in Ventura, California, at 4:25 a.m. on February 24, 2015. Their train consisted of four passenger cars and one locomotive configured in push mode at the rear of the train. The lead car, SCAX 645, was equipped with an operating cab. The crew held a job briefing and headed out to their train located on the Montalvo siding. The conductor released the handbrakes and then directed a shoving movement out from the siding before pulling into the station platform at East Ventura. The conductor indicated he made his departure announcements once all passengers were embarked at 5:25 a.m. The crew then shoved out at East Ventura while performing a running air brake test. A full air brake test was performed during the night by mechanical employees, and a notice was left on the train informing the engineer and conductor that the test had been performed. According to the conductor's delay report, they had a station stop at Oxnard passenger station and departed at 5:39 a.m. with 48 passengers.

Approaching the accident site, the student engineer was located on the west side of the cab at the controls of the cab car, and the engineer was seated in the jump seat which, allowed him to monitor the student engineer's performance. The conductor was in the upper passenger section of the cab car. After departing Oxnard southbound and passing a clear signal, the student engineer accelerated the train to 65 mph past Rose Avenue and was nearing Rice Avenue. He sounded his train horn at the whistle board and looked down the main track ahead where he believed he saw something fouling the tracks. Unsure of what he was seeing ahead, he moved the throttle to idle. He asked his engineer, "Is that a car on the tracks?" at which point they both agreed that it was. After applying the emergency brakes, the engineer and student engineer exited the cab car into the main passenger compartment and braced for impact. The student engineer would later state he did not have time to make a radio call to report the emergency before exiting the cab car.

The conductor stated he had concluded a conversation with Metrolink's Director of Special Projects about ticket vending machine issues when he heard the emergency brake application. He then saw the engineer and student engineer exiting the head end of the cab car and running toward him at which time he began to run. When he got about halfway through the car, he said he felt the front end of the cab car start to lift up. He managed to get into a seat on the right side of the cab car and grabbed a hand rail before falling backwards toward the right side of the car at impact.

The Motor Vehicle

A pickup truck and trailer belonging to Harvest Management LLC, located in Somerton, Arizona, was heading geographic southbound on Rice Avenue towards Fifth Street in Oxnard, California. The truck was a 2005 Ford F-450 with a 2000 Wells Cargo tandem axle utility trailer attached. Investigators believed the driver intended to turn right onto Fifth Street, which is immediately adjacent and parallel to the right of way, but inexplicably turned onto the railroad tracks at the highway-rail grade crossing and traveled west which was towards the approaching Metrolink train. When the driver realized he was on the railroad tracks and not the roadway, it appears he panicked, abandoned his vehicle and fled the scene. The motor vehicle was left on the tracks approximately 85 feet west (railroad north) of the Rice Avenue crossing.

The Accident

At 5.42 a.m., Train #1 impacted the pickup truck and trailer at a recorded speed of 57 mph. The impact derailed the locomotive and the passenger cars and pushed the abandoned motor vehicle off the track and across Rice Avenue. The lead three passenger cars came to rest on their side at various angles to the track to the south of Rice Avenue while the rear passenger car and locomotive remained upright. The pickup truck and trailer were completely destroyed. Part of its debris then struck another motor vehicle that was occupied and stopped at the crossing and caused minor damage to it but did not injure the driver.

Among those injured were 26 of the 48 passengers and the three crewmen. Those injured were taken to area hospitals for treatment. The engineer succumbed to his injuries from the accident a week later in the hospital.

Immediately following the accident, local law enforcement, fire departments and emergency services from the surrounding area began arriving to attend to the victims. Those responding included Oxnard Fire Department, Oxnard Police Department, Los Angeles County Sheriff's Office, California Highway Patrol, California Fish and Game and ambulances and emergency services throughout the area.

The National Transportation Safety Board (NTSB) immediately dispatched investigators and assumed control of the accident scene and investigation. Accident investigators from the Federal Railroad Administration (FRA) and the California Public Utilities Commission (CPUC) were dispatched to the scene, as well as Metrolink, Amtrak and UP investigators.

Post-Accident Investigation

NTSB, FRA and CPUC accident investigators in operating practices, track, signal and train control and motive power and equipment offices began the process of examining the accident scene to gather evidence, determine the facts and to obtain records of tests, inspections, qualifications, training and performance of safety and operating systems. Although the actions of a motor vehicle operator are generally outside FRA's authority, the motor vehicle operator's actions were central to the circumstances of this accident and are included to support the findings and probable cause of the accident.

Accident investigators determined that the motor vehicle operator abandoned his vehicle on the tracks after making a premature turn onto the tracks at the Rice Avenue highway-rail grade crossing, with the point of impact approximately 85 feet west of the crossing. Although investigators were unable to establish the exact time the operator turned onto the tracks and abandoned his vehicle, it was well before the Metrolink train entered the approach circuit to activate the crossing warning devices. Measurements taken at the accident scene show the motor vehicle operator turned onto the railroad tracks 68 feet short of Fifth Street. The area surrounding the Rice Avenue and Fifth Street intersection shows municipal street lights at all four corners, which adequately lit the area at the time the pickup truck driver made his pre-dawn approach. The NTSB's investigation of the motor vehicle operator indicates he had been on-duty and driving for nearly 24 consecutive hours, suggesting fatigue might have played a factor in his decision-making, cognitive skills and situational awareness. According to the Oxnard Police Department, the motor vehicle operator was found and taken into custody approximately one mile away from the accident scene. The Ventura County District Attorney's Office considered filing charges against him for his actions leading to the accident and for leaving the scene. On February 22, 2016, County prosecutors filed a misdemeanor vehicular manslaughter charge against the operator of the motor vehicle.

Analysis and Conclusions

Signal and Train Control

Analysis – Highway-Rail Grade Crossing

The highway-rail grade crossing at Rice Avenue, DOT Inventory Number 745855H, is located on UP's Santa Barbara Subdivision at MP 406.23 in Oxnard, California. The grade crossing is an automatic system with warning devices and is equipped with fiberglass and aluminum gate arms with three lights each. There are a total of twenty 12-inch flashers at the crossing; the warning system devices are operated by a GCP 3000 with by shelf-mounted relays.

The nearby intersection of Rice Avenue and Fifth Street has traffic control signals preempted by the Traffic Control Relay (TCR) located inside the grade crossing control case at Rice Avenue. Preemption provides an exit route for vehicles near the tracks. Test of preemption was observed to show a 20-second queue of clear out time before changing to allow traffic going east and west on Fifth Street. Preliminary information received from download of the Rice Avenue event recorder showed proper train approach detection for the grade crossing with a recorded warning time of 28 seconds and 70 mph predicted island speed. The predictor event recorder recorded train approach warning time and train speed passing through the island circuit. An examination of the event recorder download from Control Point CO 406 S. Oxnard west of the accident site indicated the eastbound control signal was clear with a green aspect. Train 102 passed the signal displaying green.

Conclusion - Highway-Rail Grade Crossing

The investigation determined that the controlling signal and advance warning systems did not have a role in the accident because the motor vehicle entered the crossing prior to activation and drove onto the tracks. However, post-accident investigation and testing revealed the devices functioned as intended and would have provided advance warning of the train's approach if the motor vehicle operator arrived at a time closer to the arrival of the train.

Motive Power and Equipment

Analysis - Equipment

Metrolink Train 102 was operating cab car forward at the time of the accident and consisted of a locomotive and four passenger cars, locomotive (SCAX 870), two Hyundai Rotem bi-level passenger coach cars (SCAX 263, SCAX 211), one Bombardier bi-level passenger coach car (SCAX 206), and one Hyundai Rotem bi-level passenger cab car (SCAX 645).

On the day following the accident, FRA, NTSB and CPUC conducted a mechanical inspection on the equipment involved in Moorpark, CA. Their findings are as follows:

Rotem bi-level passenger cab car SCAX 645 was equipped with headlights, auxiliary lights and audible warning devices required by Federal regulations. A functionality test was unable to be performed due to the heavy damage sustained to the front and right sides of the car and the damage to the electrical and air brake systems, resulting from the impact and derailment. An inspection of the wheels, brakes, trucks, exterior, and interior and emergency systems revealed no defective conditions that might have existed prior to the accident.

Bombardier bi-level passenger coach car SCAX 206 sustained heavy damage to the BL and BR corners of the car as a result of derailing onto its side. An inspection of the wheels, brakes, trucks, exterior, and interior to include any emergency systems revealed no defective conditions that might have existed prior to the accident. Reports of the emergency lighting failure after the loss of normal power 480 VAC from the head-end power were investigated. The main car batteries located at the BL location were heavily damaged. These batteries provide the standby power required to keep the emergency lights functioning. An electrical short or open circuit might have occurred as a result of the accident.

Rotem bi-level passenger coach car SCAX 211 sustained moderate damage to the left side of the car as a result of derailing onto its side. An inspection of the wheels, brakes, trucks, exterior, and interior, including any emergency systems, revealed no defective conditions that might have existed prior to the accident.

Rotem bi-level passenger coach car SCAX 263 sustained light damage to the wheels and safety appliances of the car as a result of derailing. An inspection of the wheels, brakes, trucks, exterior, and interior, including any emergency systems, revealed no defective conditions that might have existed prior to the accident.

Locomotive SCAX 870 sustained light damage to the rear truck wheels as a result of derailing. An inspection of the wheels, brakes, trucks, and cab revealed no defective conditions which may have existed prior to the accident.

Equipment damage was estimated at $14 million.

Conclusion - Equipment

A thorough review of the equipment's post-accident condition, previous inspections and maintenance excluded equipment as having been a contributing factor to the accident.

Track

Analysis - Track

In the area of the accident, the track is tangent and relatively level with minor changes in elevation. The track is constructed of 133 lbs. rail on wooden ties on ballast, and the class of track is FRA Class 4. The maximum authorized speed for passenger trains in the area of the derailment is 79 mph. Visibility is unobstructed for several miles in either direction. The track crosses Rice Avenue at a 90-degree angle from north to south. The track in the area of the accident was regularly inspected by UP track inspectors with the latest inspection conducted on February 19, 2015.

A FRA DOTX 217 Geometry Car survey was conducted on November 1, 2012 with no defective conditions noted regarding the track structure. UP's FRA detector car report indicates that surveys were conducted in the area on July 9, 2014 and October 9, 2014, with no defects observed.

Conclusion - Track

A review of all records, tests and inspections on the track in the area of the derailment excludes track as having been a contributing factor to the accident.

Analysis - Operating Practices

A review of the hours of service and duty records of the Metrolink Train 102 crew members indicates this was a regular assignment for the engineer and conductor, while the student engineer had made the run the previous six duty days. Investigators reviewed all records of crew qualification, training, tests and inspections for each of the crewmen and found no defects.

The NTSB's event recorder workgroup downloaded and analyzed the event recorders from cab car SCAX 645 and locomotive SCAX 870. Its findings indicate the train speed prior to braking inputs from the student engineer and impact was 65 mph, the train horn was sounded 10 seconds prior to impact, the throttle was moved to idle 9 seconds prior to impact, and an emergency application of the braking system was induced 5 seconds prior to impact. These findings generally support the statement of the student engineer following the accident. The event recorder indicated the time of impact was 5:42:42 a.m.

Conclusion – Operating Practices

A review of event recorder data obtained from the cab car SCAX 645 revealed no train handling issues on the part of the student engineer that would have contributed to the accident. A review of Metrolink Train 102's crew personnel qualifications files also found no defects and is excluded as having contributed to the accident.

Analysis-Fatigue

FRA uses an overall effective rate of 77.5 percent as the baseline for fatigue analysis, which is equivalent to blood alcohol content (BAC) of 0.05. At or above this baseline, FRA does not consider fatigue as probable for any employee.

FRA obtained fatigue-related information, including a 10-day work history, for the crew members assigned to Metrolink 102:

(E1) Locomotive engineer assigned to Metrolink 102:

Sleep Settings Excellent
Overall Effectiveness 83.45
Lapse index 4.92
Reaction Time 119.84
Chronic Sleep Debt 4.74
Hours of Continuous Wakefulness 2.8
Time of Day 5:42 a.m.
BAC Equivalent <0.05

FRA concluded fatigue was not probable for the engineer.

FRA concluded fatigue was not probable for the engineer.

(C1) Conductor assigned to Metrolink 102:

Sleep Settings Excellent
Overall Effectiveness 83.96
Lapse Setting 4.92
Reaction Time 119.1
Chronic Sleep Debt 4.63
Hours of Continuous Wakefulness 2.8
Time of Day 5:42 a.m.
BAC Equivalent <0.05

FRA concluded fatigue was not probable for the conductor.

(SE2) Student Engineer assigned to Metrolink 102:

Sleep Settings Excellent
Overall Effectiveness 87.0
Lapse Setting 5.22
Reaction Time 114.94
Chronic Sleep Debt 3.4
Hours of Continuous Wakefulness 2.8
Time of Day 5.42 a.m.
BAC Equivalent <0.05

FRA concluded fatigue was not probable for the student engineer.

Conclusions – Fatigue

FRA concluded fatigue was not probable for the crew assigned to Metrolink 102 and was not a contributing factor to the accident.

Overall Conclusions

A review of records of all tests and inspections and post-accident testing indicates the highway-rail grade crossing warning system functioned as intended and was not a contributing factor to the accident.

A review of all records of tests and inspections of the track in the area of the accident, including the operation of geometry and detector cars, excludes track as a contributing factor to the accident.

A review of all records of tests and inspections of the surviving equipment, as well as those components that could be inspected on the destroyed cars, showed no defects and excludes mechanical as a contributing factor to the accident.

A review of all available information from event recorder data and thermal infrared (TIR) video from the lead locomotive directed towards evaluating the actions and performance of the student engineer excludes train handling as contributing to the accident. A similar review of all qualifications, training, tests and inspections of the crew excludes them as being a contributing factor to the accident.

Probable Cause and Contributing Factors

FRA has concluded the probable cause of the accident was an object or equipment on or fouling track (motor vehicle-other than highway-rail crossing).