Federal Railroad Administration
Office of Railroad Safety
Accident and Analysis Branch

Accident Investigation Report
HQ-2015-1063

Amtrak (ATK)
Hartwood, TX
July 4, 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-2015-1063

TRAIN SUMMARY

1. Name of Railroad Operating Train #1	1a. Alphabetic Code	1b. Railroad Accident/Incident No.
Amtrak (National Railroad Passenger Corporation)	ATK	138095

GENERAL INFORMATION

1. Name of Railroad or Other Entity Responsible for Track Maintenance	1a. Alphabetic Code	1b. Railroad Accident/Incident No.
Amtrak (National Railroad Passenger Corporation)	ATK	138095

2. U.S. DOT Grade Crossing Identification Number	3. Date of Accident/Incident	4. Time of Accident/Incident
742684Y	7/4/2015	10:15 PM

5. Type of Accident/Incident
Hwy-Rail Crossing

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

11. Nearest City/Town	12. Milepost *(to nearest tenth)*	13. State Abbr.	14. County
Harwood, TX	144.31	TX	GONZALES

15. Temperature (F)	16. Visibility	17. Weather	18. Type of Track
80 °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/1	Freight Trains-60, Passenger Trains-80	8.3	West

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OPERATING TRAIN #1

1. Type of Equipment Consist:	2. Was Equipment Attended?	3. Train Number/Symbol
Passenger Train-Pulling	Yes	AMT01-03

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
74 MPH	R			0

6. Type of Territory

Signalization:

Signaled

Method of Operation/Authority for Movement:

Signal Indication

Supplemental/Adjunct Codes:

Q

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.)*	ATK161	1	no		0	0
(2) Causing *(if mechanical, cause reported)*	N/A	0		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	2	0	0	0	0	(1) Total in Equipment Consist	0	6	0	0	0
(2) Total Derailed	0	0	0	0	0	(2) Total Derailed	0	0	0	0	0

12. Equipment Damage This Consist	13. Track, Signal, Way & Structure Damage
27454	0

14. Primary Cause Code

M308 - Highway user deliberately disregarded crossing warning devices

15. Contributing Cause Code

M301 - Highway user impairment because of drug or alcohol usage (as determined by local authorities, e.g., police)

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	2	0	Hrs: 7 Mins: 27	Hrs: 7 Mins: 27

Casualties to:	22. Railroad Employees	23. Train Passengers	24. Others	25. EOT Device?	26. Was EOT Device Properly Armed?
				N/A	N/A
Fatal	0	0	3	27. Caboose Occupied by Crew?	
Nonfatal	0	1	0		N/A

28. Latitude	29. Longitude
29.665662600	-97.505185700

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CROSSING INFORMATION

Highway User Involved		Rail Equipment Involved
1. Type: Pick-Up Truck		5. Equipment: Train (Units Pulling)
2. Vehicle Speed *(est. mph at impact)*: 25	3. Direction *(geographical)*: North	6. Position of Car Unit in Train: 1
4. Position of Involved Highway User: Moved over Crossing		7. Circumstance: Rail Equipment Struck Highway User
8a. Was the highway user and/or rail equipment involved in the impact transporting hazardous materials?: Neither		8b. Was there a hazardous materials release by: Neither

8c. State here the name and quantity of the hazardous material released, if any.: N/A

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 3, 1	1, 1	Dry

12. Location of Warning	13. Crossing Warning Interconnected with Highway Signals	14. Crossing Illuminated by Street Lights or Special Lights
Both Sides	No	No

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
47	Male	No	Went around the gate

19. Driver Passed Standing Highway Vehicle	20. View of Track Obscured by *(primary obstruction)*
No	Not Obstructed

Casualties to:	Killed	Injured	21. Driver was	22. Was Driver in the Vehicle?
			Killed	Yes
23. Highway-Rail Crossing Users	3	0	24. Highway Vehicle Property Damage *(est. dollar damage)*: 7500	25. Total Number of Vehicle Occupants *(including driver)*: 3

26. Locomotive Auxiliary Lights?	27. Locomotive Auxiliary Lights Operational?
Yes	Yes
28. Locomotive Headlight Illuminated?	29. Locomotive Audible Warning Sounded?
Yes	Yes

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

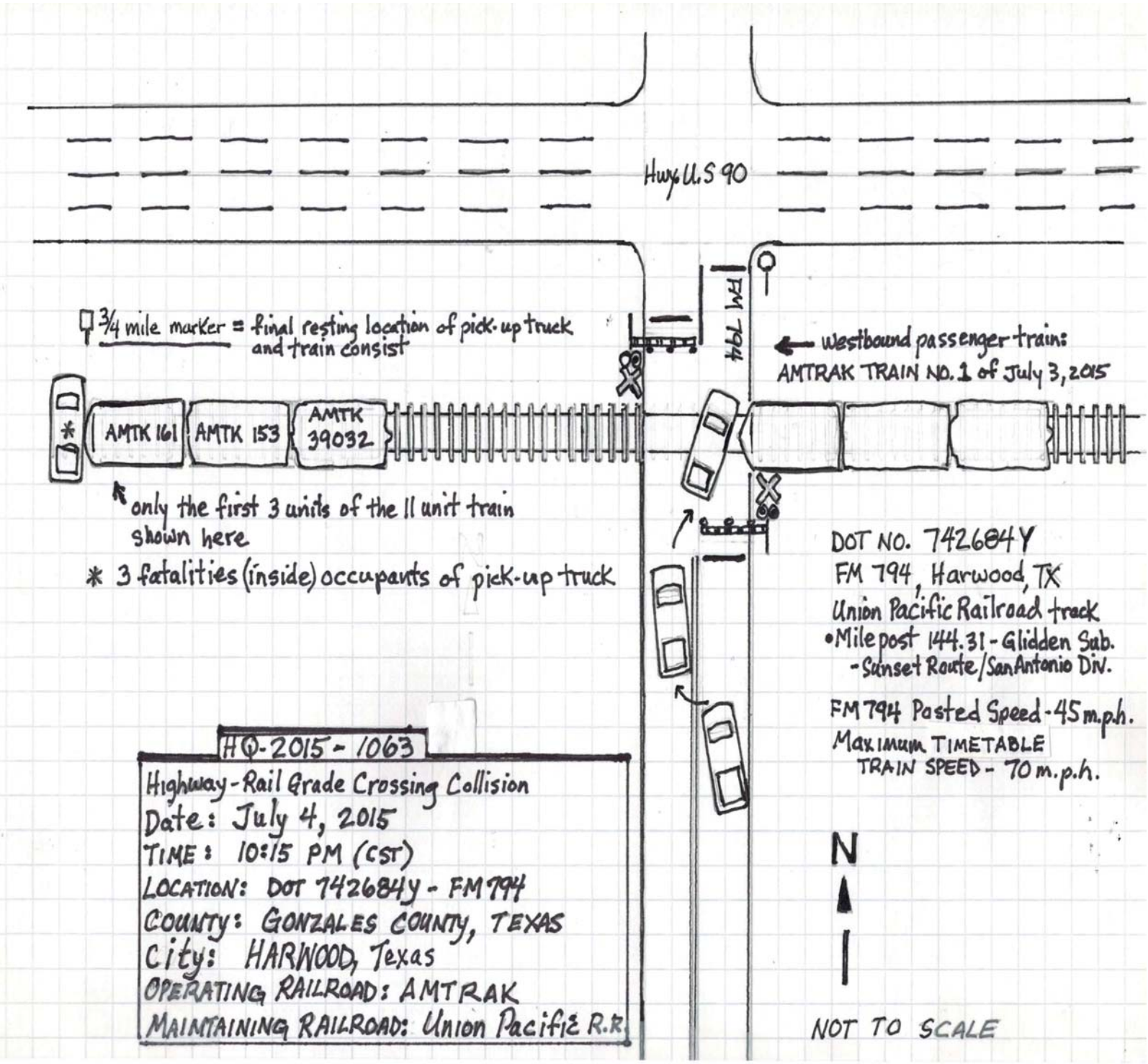
Explanation Code

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

U.S. Department of Transportation Federal Railroad Administration	**FRA FACTUAL RAILROAD ACCIDENT REPORT**	FRA File #HQ-2015-1063

SKETCHES

Sketch of DOT No. 742684Y.



SYNOPSIS

Synopsis

On July 4, 2015, at 10:15 p.m., CST, a westbound Amtrak passenger train, AMT 01-03, in Harwood, Texas, in Gonzales County, collided with a northbound pick-up truck at the highway-rail grade crossing (at Milepost 144.31) on FM 794 (U.S. DOT Crossing Number 742684Y). AMT 01-03, with two locomotives and six cars, was traveling (timetable westbound) at a recorded 74 mph operating on Union Pacific Railroad, San Antonio Division, Glidden Subdivision. The maximum timetable track speed allowed was 79 mph.

The four-door pick-up was driven by a Hispanic male, age 47 years, along with two other occupants—his wife, age 45, and 12-year old daughter. All three were fatally injured on impact. There were no injuries to the crew, but there was one minor injury to a 10-year old passenger who was treated by emergency services' personnel. No other trains and no other highway vehicles were involved in this collision.

AMT 01-03 was delayed for 5 hours and 37 minutes. The train was released at 3:43 a.m., on July 5, 2015. All passengers remained on the train to complete their trip. The train crew was relieved at Harwood, and replaced by a new crew from San Antonio, Texas. The estimated monetary damage to the lead locomotive, Amtrak 161, was $27,454.00. No other equipment or signal damage was reported. No hazardous material was involved, no rail equipment derailed, and no fire resulted. The accident was not PTC-preventable. This is an Amtrak route and no other passenger trains were delayed. The accident was not in a quiet zone.

The cause of the incident was the motor vehicle operator's disregard of the active crossing warning devices (standard mast flashing lights and gates) at the crossing - M308. A contributing cause was alcohol use by the motor vehicle operator, M301, as determined by the Travis County Medical Examiner in Austin, Texas.

The highway-rail grade crossing collision occurred at night; the weather was clear, visibility was dark and the temperature was 80 degrees Fahrenheit. The roadway pavement was dry.

NARRATIVE

Circumstances Prior to the Collision

Approaching the Accident Site

Train AMT01-03, was a passenger train operated by Amtrak (ATK) consisting of two locomotives (ATK 161 followed by ATK 153) and six passenger cars. The train crew consisted of two Engineers (Employee Number One and Employee Number Two), a Conductor, and Assistant Conductor. In addition to the train crew, there were 103 passengers on board. The two Engineers were both on the lead engine and were observing out the cab window on approach to the crossing where the collision occurred at FM 794. Engineer One, operating the train from the Engineer's seat on the right side of the train was sounding the horn for three crossings ahead which were all within .33 of a mile apart. There is a whistle board indication for the three crossings at about Milepost (MP) 143.58. The Belding Road crossing (U.S. DOT Crossing Number 742768U) is easternmost at MP 143.99, the South Dilworth Road crossing (DOT Number 742686M) is at MP 144.23 and the collision location at FM 794 (U.S. DOT Number 742684Y) is at MP 144.31.

Westbound Train AMT01-03 (traveling geographic West) was operating on Union Pacific Railroad (UP) tracks on the UP Houston Service Unit - the Glidden Subdivision. The territory was operated under centralized train control. On the train's approach to the level at-grade crossing at FM 794 in Harwood, TX (MP 0144.31), the track has a slight curve and increasing grade. This portion of track is Class 4 and has a maximum timetable train speed of 79 mph. The Federal Railroad Administration's (FRA) Inventory shows an average of 18 through trains and 8 switching trains operate over the crossing per day.

Highway-Rail Crossing Accident Site

The collision occurred at the FM 794 at-grade highway-rail crossing (U.S. Crossing DOT Number 742684Y) in the unincorporated small community of Harwood, Texas. FM 794 is also known as Lockhart Road, but is referred to here as FM 794. The crossing is not part of any quiet zone and prior to July 4, 2015, no collisions had been reported at this crossing. FM 794 is a 24-foot wide, two lane, asphalt paved road with an average annual daily motor vehicle count of 500 vehicles according to the Texas Department of Transportation (2011). The posted roadway speed is 45 mph. The roadway is classified as a major, rural collector on the state highway system. FM 794 crosses UP single mainline track at a 90-degree angle.

The crossing, at FM 794, is a two-lane paved road equipped with gates and flashing lights. The single mainline track at the crossing typically has 26 trains per day (FRA's Inventory reports eight switching moves). FM 794 intersects U.S. Highway 90 about 100 feet to the north of the crossing and this intersection is controlled only by a stop sign. FM 794 is also intersected by "Job and Lum" Street located about 100 feet to the south of the crossing. Neither of these two intersections was significant in this collision.

The at-grade crossing surface at FM 794 is concrete and in good condition and the profile is level. The crossing was marked with a "no passing zone" and a stop bar located 36 feet from the concrete planking for the crossing. There are no sidewalks at the crossing. An audible bell is installed on each signal mast. There are pavement markings, in good condition, in place at about 935 feet and an Advance Warning Sign at 992 feet from the crossing on the northbound roadway approach zone. There are no street lights at the crossing.

The crossing signal system (Safetran GCP 3000) was equipped with two standard flashing light masts (each with crossbuck signs) each with one pair of lights facing forward and each with one pair of backlights (all LED lights). The signal system was designed to provide 30-plus seconds of warning time prior to a train occupying the crossing.

Train Crew and Railroad Employees

The train crew involved in the collision (two Engineers and both Conductors) went on duty at the Amtrak Station in Beaumont, TX, at 2:48 p.m., on July 4, 2015. The crew had received their statutory off-duty rest period prior to reporting for duty and had been working for 7 hours and 27 minutes prior to the collision at 10:15 p.m. Both Engineers reported that Employee One applied the emergency brake just as they saw the truck going around the gates. This was just before impact with the pick-up truck. Employee Number One was the Engineer at the controls in the lead locomotive (ATK 161) and Employee Number Two was the second Engineer who was in the seat on the left side of the locomotive. The Conductor and the Assistant Conductor were in passenger cars, along with the train attendants, when the collision occurred.

Employee Number One, the Engineer at the controls of the locomotive, reported looking toward the crossing ahead for hazards and reported seeing lights of a vehicle approaching northbound on FM 794. Both Engineers said they saw the vehicle moving slowly and expected it to stop, but then it continued to approach and it became apparent the vehicle was going around the gates.

Train Information

The Amtrak passenger train AMT01-03 originated in New Orleans, LA, on July 3, 2015. The consist, comprised of two locomotives (161 and 153) and six cars, had 1,612 trailing tons, and was 664 feet long. The required mechanical inspection for locomotives and cars on Amtrak 01-03 and the required air brake tests were performed in New Orleans, LA, on July 4, 2015, prior to departure. No EOT device was used by the train.

AMT 01-03 departed New Orleans on July 4, 2016. The only problem encountered was a radio handset was reported malfunctioning en-route and was fixed in Beaumont, Texas. The train crew joined AMT 01-03 at the station at Beaumont and Employee One checked and found the horn, bells, and lights all working before the train departed Beaumont at 3:48 p.m. on July 4, 2016, and arriving at the Amtrak Station in Houston, TX, at 5:30 p.m. Employee Two reported testing the horn, bells, and the lights and found them all working at the Houston, Texas, Station. AMT 01-03 departed Houston at 6:55 p.m. No problems were encountered prior to the collision at Harwood.

Highway-Vehicle

The motor vehicle, a 2004 maroon Dodge RAM 1500 four-door pick-up truck, was operated by a 47-year old, Hispanic male. The vehicle operator's 45-year old spouse was in the front passenger seat and the 12-year old daughter was in the rear seat of the truck. The vehicle was traveling northbound on FM 794 at an estimated 25 mph. According to the Texas Department of Public Safety (DPS) investigating police officer, at the time of the collision, the family was returning from an errand to a relative's house close to their residence on the South side of the tracks. The driver and both passengers were not wearing seat belts.
The Amtrak cab video showed the driver of the pickup did not stop at the grade crossing even though the flashing lights had activated and the gates were down. He drove around the lowered gates at a low speed. The two Amtrak Engineers reported the vehicle operator had no sense of urgency as he drove slowly around the gates. There was no evidence of cell phone use by the vehicle operator reported in the police report.

The Accident

Collision

Train AMT01-03 was recorded to be traveling at 74 mph at the time of the collision at10:15 p.m. (CST) on July 4, 2015, and was confirmed by the event recorder download on the lead and controlling locomotive. The train was gaining speed as it pulled out of a curve about .5 miles east of the crossing where the train was moving about 70 mph. The maximum authorized speed for passenger trains on this area of UP's track is 79 mph. AMT01-03's two Engineers reported, and the event recorder download confirmed, the train horn on the lead locomotive was sounded for 31 seconds prior to the collision. The Texas DPS police officer, assigned as lead investigator, was notified at 10:35 p.m. and arrived on the scene at 10:46 p.m. The DPS officer reported the gates and lights were still in operation when he arrived following the collision.

The Amtrak cab video (from ATK 161), viewed by FRA on July 10, 2015, clearly showed the gates, lights, and audible devices operating as intended at the crossing at the time of the collision. The Amtrak video clearly showed the pick-up truck traveling at a constant speed northbound toward the crossing at FM 794. There were no other highway vehicles in the vicinity of crossing. The pick-up truck never stopped and as it approached the gates and lights, the pick-up driver crossed over the "no passing zone" lines into the southbound traffic lane. The pick-up proceeded around the gates into the crossing proper without speeding up and collided with the lead unit of AMT01-03 near the center of the crossing. The vehicle was impacted by the lead locomotive on the passenger side front door. The train and the pick-up truck traveled about 3,960 feet past the point of impact before both coming to a stop on the tracks west of the FM 794 grade crossing.

At the time of the collision, Employee Number One was operating the train from the Engineer's seat on the right side of the lead locomotive (ATK 161). He reported applying the emergency brake as soon as he saw that the vehicle was going to go around the gates. According to Amtrak, the Event Recorder download indicates an emergency brake application was initiated at
10:14 p.m. Employee Number Two was seated in the "Fireman's Seat" on the left side of the cab approaching the crossing. Neither Engineer said they had time to take cover and remained in their seats during the collision. Immediately after impact, Employee Number Two called 911 and then he called the train dispatcher. The Conductor left the train and went to the scene and confirmed three casualties. The two Engineers remained at the controls of the train until a crew from San Antonio, Texas, relieved them. The Engineers reported that emergency responders were quick to arrive on the scene to secure the site (Gonzales County Sheriff Department, Gonzales Fire and Rescue Emergency Services and Texas DPS).

The two front seat air bags deployed as a result of the collision, but no air bag deployed in the back seat. The two occupants in the front seat remained in the vehicle but the occupant of the back seat was partially ejected out the back window of the truck cab. All three occupants received fatal injuries from the impact.

None of the train crew were injured. A 10-year old Amtrak passenger received a minor shoulder injury. No one was transported for medical care. There were no Amtrak units derailed, no fire occurred, and no hazardous materials release was reported from either the train or highway-vehicle. Some damage to the lead locomotive resulted from the collision. Amtrak reported $27,454.00 in damage. The train was delayed for 5 hours and 37 minutes as a result of the collision. All passengers remained on board. AMT01-03 was released at 3:43 A.M. on July 5, 2015 and continued on to San Antonio.

Analysis and Conclusions

Analysis - Toxicological Testing
The motor vehicle operator was a 47-year old male. The two passengers were female, ages 45 and 12 years. The Travis County Medical Examiner in Austin, Texas, performed toxicological testing on the remains of the driver and the results were positive for alcohol. The Texas DPS police reported the vehicle operator had a blood alcohol level of .18 (Texas' legal limit is .08). There were no toxicological tests performed on the train crew. FRA does not require such testing for this type of accident.
Conclusion: The motor vehicle operator had a blood alcohol level of more than twice the State's legal limit indicating that alcohol intoxication was a contributing factor in this incident.

Analysis - Fatigue Analysis

A fatigue analysis was done by FRA for both Engineers and the Conductor. The Assistant Conductor was not available for the fatigue analysis. FRA uses an overall effectiveness 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, we do not consider fatigue as probable for any employee. Software sleep settings vary according to information obtained from each employee. If an employee does not provide sleep information, FRA uses the default software settings. FRA obtained fatigue related information, including a 10-day work history for three of the four employees involved in this accident, including two Engineers and the Conductor assigned to Train AMT01-03.
Conclusion: FRA concluded that fatigue was not a factor in this event.

Analysis - Train Crew Performance

FRA review of the Amtrak cab video of the collision, investigative interviews with members of the train crew and analysis of event recorder data for the lead and controlling locomotive, found the Engineers' actions to be consistent with safe practices and proper train handling procedures.

Conclusion: The actions of the train crew were not a factor in this event.

Analysis - Motive Power, and Equipment (MP&E)

The lead locomotive was equipped with a headlight, auxiliary lights, and the audible train horn warning device required by Federal regulations. The locomotive engineer tested these safety devices prior to departing the station in Houston, Texas, at about 6:55 p.m. Investigation of records and field inspections for the two locomotives and six cars were reviewed for any contributing factors including applicable safety appliances (i.e., horn, bell lights and brakes were performed). These safety appliances were tested on AMT 161 by Amtrak following the collision in San Antonio, on July 5, 2015. Amtrak's air brake test and check of the safety appliances for AMT 161 found all elements tested to be in working order.

Conclusion: No MP&E FRA compliance issues were found.

Analysis - Wayside Signal System
Investigation of records and field inspection were performed involving the FM 794 highway-rail grade crossing location for any contributing factors.

Conclusion: No signal system issues were found.

Analysis - Highway-Rail Grade Crossing

The level at grade highway-rail grade crossing is equipped with active warning lights, bells, and gates. There is an Advance Warning Sign posted 992 feet from the crossing. There are also pavement markings on the road surface 935 feet from the crossing and they are clearly visible. The roadway is a farm-to-market arterial maintained by the Texas Department of Transportation.

The active warning devices were all working as intended at the time of the incident based on the Amtrak cab video which captured the approach of Train AMT01-03 up to the impact with the vehicle. The active devices, stand-by power and electrical grounds were all tested and maintenance performed by UP's Signal Department on July 1, 2015.

The active devices were tested following the collision on July 17, 2015, in the presence of an FRA Signal and Train Control inspector, and were found to be in good condition. All aspects of the signal system were determined to be operating in good working order at the time of both inspections. The flashing lights were noted by FRA's inspector to be new LED lights providing good visibility in all directions.

Conclusion: The active warning devices functioned as intended.

Overall Conclusions:

Neither Amtrak or UP operations were found to be factors contributing to this collision. The signal system, the MP&E, and the train crew performance were all reviewed and no issues were found.

Probable Cause and Contributing Factors:

The main cause of this collision was the motor vehicle operator's disregard of the crossing warning devices (M308). A contributing factor to this collision was the vehicle operator's impairment due to alcohol use (M301) as supported by toxicology results indicating his blood alcohol level was more than twice the legal limit allowed in the State of Texas.