National Transportation Safety Board

Office of Railroad, Pipeline and Hazardous Materials Investigations

Washington, D.C. 20594

Derailment of Amtrak Passenger Train 4(12)

Cimarron, Kansas

March 14, 2016

Mechanical Group Factual Report

Accident

NTSB Accident Number:	DCA16MR004
Date of Accident:	March 14, 2016
Time of Accident:	12:02 a.m. (CDT)
Type of Trains:	Passenger
Railroad Owner:	BNSF
Train Operator:	Amtrak
Fatalities:	0
Injuries	10-33
Location of Accident:	Cimarron, KS

Mechanical Group Members

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Synopsis

On March 14, 2016, at 12:02am CDT, Amtrak train #4 (Southwest Chief) derailed near MP372.9 in the vicinity of Cimarron, KS. This LA to Chicago train consisted of two locomotives and 10 cars. Four cars were derailed on their sides, one car derailed and was leaning, two cars derailed upright, and one car derailed a single truck. There were approximately 130 passengers and 14 crew members on board. Initial reports indicated that between 10 and 33 passengers were transported and/or treated for injuries at two area medical centers. The American Red Cross responded to assist with passengers.

This event occurred on the Burlington Northern Santa Fe (BNSF), La Junta Division. The maximum allowable speed on this section of rail is 60 mph for passenger trains and 40 mph for freight trains. Estimated damages are $1,463,000.00.

Parties to the investigation were Amtrak, BNSF, FRA, BMWED, SMART, BLET, and the Gray County Sheriff's Office.

Figure 1 Photo Amtrak Train 4(12) at MP 372.9 of the Lajunta Subdivision staged for inspection.

Train Consist

The eastbound AMTK Train 4(12) consisted of two locomotives and ten cars. The train was 988 feet in length and had a dry weight of 1,505,300 pounds. The two locomotive consist had a total of 8,500 horsepower.

Railroad Equipment Involved in the Collision

The locomotives on the eastbound AMTK 4(12) were all positioned in the lead position and were not derailed. The locomotive consist consisted of the following:

1. AMTK 153 Fwd GE P42DC Built 2001 Not Derailed
2. AMTK 152 Fwd GE P42DC Built 2001 Not Derailed

The ten passenger cars consisted of the following:

Car position 1	AMTK 61023	A end fwd	LDSL Baggage
Car position 2	AMTK 39023	B end fwd	Superliner II/Dorm
Car position 3	AMTK 32109	B end fwd	Superliner II/Sleeper
Car position 4	AMTK 32071	A end fwd	Superliner II/Sleeper
Car position 5	AMTK 38044	A end fwd	Superliner II/Dining
Car position 6	AMTK 33020	B end fwd	Superliner I/Lounge
Car position 7	AMTK 34042	B end fwd	Superliner I/Coach
Car position 8	AMTK 31013	B end fwd	Superliner I/Coach/Baggage
Car position 9	AMTK 34056	B end fwd	Superliner I/Coach
Car position 10	AMTK 34046	B end fwd	Superliner I/Coach

Equipment damage was estimated by Amtrak to be approximately $1,000,000.

The Superliner is a bi-level passenger car used on long-haul Amtrak trains that do not use the Northeast Corridor. The initial cars were built by Pullman-Standard in the late 1970s and a second order was built in the mid-1990s by Pullman's successor, Bombardier Transportation. Pullman used a German-designed two axle truck for the Superliner I car. Bombardier used a two axle General Steel Castings truck for the Superliner II car.

Car length 85 feet

Car width 10 feet 2 inches

Car height 16 feet 2 inches

Car weight 148,000 lbs.

Accident Sequence

Preliminary review of event recorder data and physical data from the accident scene indicate the eastbound train AMTK 4(12) was approaching the POD at milepost 372.9 traveling at approximately 60 mph. The throttle was in notch 4 and progressed to notch 1 with no brake pipe reduction just before the engineer induced emergency at 12:02 am.

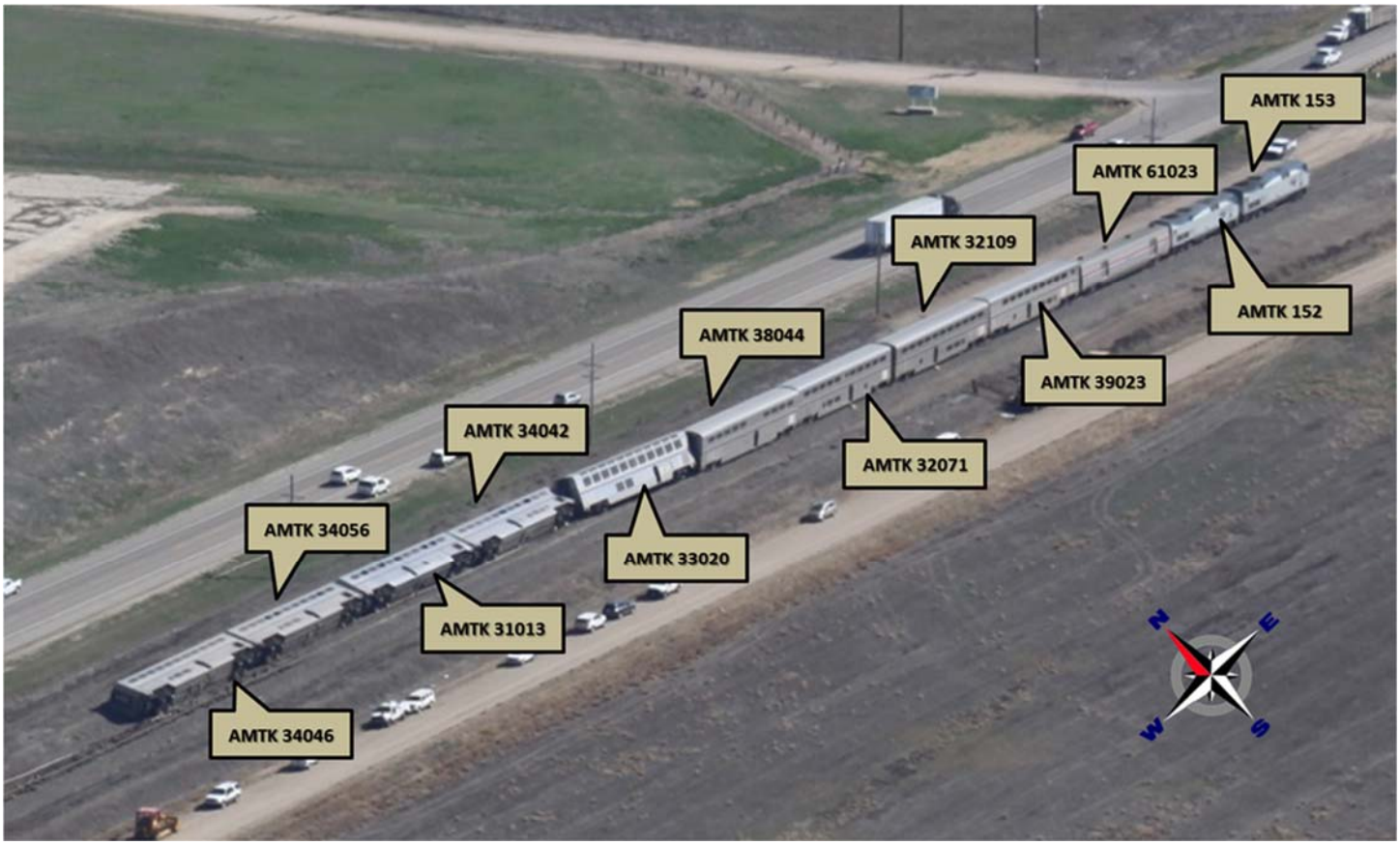

Figure 2-Aerial photograph of derailed Amtrak number 4. (Photo State of Kansas Highway Patrol)

Wreckage Description

Cars AMTK 61023 and AMTK 39023 did not derail and remained in the upright position.

AMTK 32109 remained upright and derailed the rear "A" end truck receiving damages to the brake discs and truck bolster safety hangers due to impacting the ballast, rail ties and spikes.

AMTK 32071 and AMTK 38044 derailed both trucks each and remained upright. Both trucks on each car received damages to the brake discs and truck bolster safety hangers due to impacting the ballast, rail ties and spikes.

AMTK 33020 derailed both trucks and came to a stop leaning approximately 30 degrees towards the right side. Both trucks received damages to the brake discs and truck bolster safety hangers due to impacting the ballast, rail ties and spikes.

AMTK 34042, AMTK 31013, AMTK 34056, and AMTK 34046 derailed all trucks and came to a rest laying on their right side. These cars received damages including car body structure, doors, windows, train line, side lighting, emergency stenciling, and trucks on each car received damages to the brake discs and truck bolster safety hangers due to impacting the ballast, rail ties and spikes. The "B" end coupler of AMTK 34042 was damaged and required replacement.

Pre-Departure Inspections

On March 12, 2016, at 3:30 pm PDT, a Class I Air Brake Test and daily inspections were conducted on the AMTK 4(12) at the Los Angeles, CA, Amtrak mechanical facility by Qualified Mechanical Personnel. These inspections were conducted pursuant to 49 CFR Part 238 Passenger Equipment Safety Standards. This regulation consists of 238.303 Exterior Calendar Day Mechanical Inspection, 238.305 Interior Calendar Day Inspection, and 238.313 Class I Brake test. On March 13, 2016, at 11:53 am MDT, an Intermediate Air Brake Inspection was completed at the Albuquerque, NM, terminal by Qualified Mechanical Personnel.

An Exterior Calendar Day Mechanical Inspection consists of examination of the following components and systems:

- Battery venting
- Coupler systems
- Suspension systems
- Wheels
- Grounding and jumper cables
- High voltage markings
- Air compressor
- Rescue access markings

An Interior Calendar Day Mechanical Inspection consists of examination of the following components and systems:

- Moving parts and electrical system safety guards

- Floors and passageways
- Manual door releases
- Emergency equipment and signage
- Doors
- Public address and intercom

A Class I Brake test consists of the following inspections and tests:

- Friction brakes apply and release as intended
- Brake shoes and pads are properly seated and aligned
- Piston travel
- Communicating signal system
- Operation of the engineer's brake controller
- Brake pipe leakage
- Emergency brake application and dead man pedal
- Air valves are properly aligned
- Brake rigging operation
- Brake disc inspection
- Communication of the brake pipe pressure to the rear of the train

Equipment Post Accident Inspections

On March 16, 2016, the mechanical group conducted an FRA Class I Air Brake Test and Pre-departure inspection on the AMTK 4(12). The train was reassembled in its original configuration from the time of the incident. The following is a summary of the observations:

- The branch pipe to the "AL" side of the A-1 air bracket was repaired due to post-derailment damage
- Brake pipe pressure was 153 psi
- Brake cylinder pressure was 74 psi
- Equalizing reservoir pressure was 111 psi
- Main reservoir pressure was 134 psi
- A successful emergency brake application was conducted from the engineer's automatic brake controller, conductor's emergency brake button, and by opening the brake pipe at the rear of the rear car (AMTK 34046)
- The brake pipe was reduced by 20 psi and the engineers automatic brake was put into test mode to check for brake pipe leakage.

- The brake pipe had a 1 psi leakage in 90 seconds.
- The air brakes were re-charged and given another 20 psi brake pipe reduction to conduct an inspection of the trains brake application.
- There were no exceptions noted.
- An alerter functionality test was conducted to verify operation. With all the brakes released and the isolation switch in the run position, the alerter was initiated and successfully put the train into emergency after running its 25 second cycle.

Documentation Received

- Train list
- Weight list
- Any diagrams and photos of the accident scene
- Event recorder data
- Car repair history for the 10 derailed cars
- Blue cards for the locomotives
- Locomotive daily inspection records
- Air brake test record
- Hot box data
- WILD data
- TPD data
- Dragging equipment data
- Train repair/inspection records
- Training records for the carmen performed train inspection
- Mechanical damage estimates
- Air gage certifications
- Wheel location identification

The mechanical group reviewed and took no exceptions to the documentation received nor to the maintenance history of the equipment.

Group Member to the Investigation - Acknowledgment Signatures

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

_____ Date _____

Joey Rhine, NTSB

_____ Date _____

Patrick Merritt, FRA

_____ Date _____

Ryan Miller, BNSF

_____ Date _____

David Cowan, AMTK