OPERATIONS GROUP
FACTUAL REPORT

National Transportation Safety Board

Office of Railroad, Pipeline and Hazardous Materials Investigations

Washington, D.C. 90594

Derailment of CSX Key Train X41518

Alexandria, Virginia

May 19, 2018

Accident

LOCATION:	Alexandria, VA
TRAIN 1:	Southbound X41518
OPERATOR:	CSX Transportation (CSX)
DATE:	May 19, 2018
TIME:	7:02 a.m.
NTSB #:	RRD18MR007

Operations Group

Mike Hiller
NTSB Accident Investigator
490 L'Enfant Plaza East, SW
[redacted]
Cell: [redacted]

John Ranschaert
FRA OP Safety Inspector
Cell: [redacted]

D. Scott Kuhner
General Manager
CSX NE-Region
Cell: 3[redacted]

Steve Ammons
Director of Train Handling & Practices
CSX
Cell: [redacted]

Accident Summary

For a summary of this accident see the *Accident Summary* located in NTSB docket, RRD18MR007.

Narrative

On Saturday May 19, 2018 at about 7:02 a.m., CSXT Train Symbol X41518 derailed 31-cars at Milepost CFP (MP) 102.85 in Alexandria, VA on the RF&P Subdivision. Train X41518 was traveling south on No. 1 Track at the time of the derailment. There are three tracks on the RF&P in this area numbered east to west No(s). 1, 2, and 3.

Train X41518 two-person crew went on duty in Brunswick, MD at 12:50 a.m. the day of the accident. The train had three locomotives on the head end (no distributed power) and was a Key train with assorted commodities.[1] Train X41518 consisted of 167 cars with 91 loaded and 76 empty units. It was 9,910 feet in length and had 14,394 trailing tons. Car positions 42 through 66 (25 cars) derailed and car positions 89 through 94 (6 cars) also derailed for a total of 31 cars.

The initial derailment (behind the locomotives) occurred at Milepost CFP 102.85 at a subgrade slide-out from under the track structure in a fill section with the train continuing movement. The derailed equipment encountered the under-grade No. 1 Track bridge at Milepost CPF 102.80 causing that structure to fail. The point of derailment is 238 feet north of the bridge on No. 1 track and about 60 feet south of the slide-out. The slide-out was limited to the east (field side) of No. 1 track causing it to suddenly and severely warp under movement.

The No. 1 Track destroyed bridge is a two-span 205 feet long open deck through plate girder structure built 1947. Tracks No. 2 and No. 3 are each on a two-span 226 feet long ballast deck through plate girder in a side by side arrangement built in 2010.[2]

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[1] Definition of "key train" is provided by Association of American Railroads (AAR) publication OT-55-P, Recommended Railroad Operating Practices for Transportation of Hazardous Materials, January 19, 2016. "Key trains" have speed restrictions and other operating criteria. CSX defines a Key Train as - Any train as described in either a, b, or c below:

a. One or more loads of spent nuclear fuel (SNF) or high-level radioactive waste (HLRW) moving under the following Hazardous Materials Response Codes 4929142, 4929143, 4929144, or 4929147, or
b. One or more loaded tank cars containing materials that require the phrase POISON/TOXIC-INHALATION HAZARD on the shipping papers (Hazard Zone A, B, C, or D), anhydrous ammonia (UN 1005), or ammonia solutions (UN 3318), or
c. Twenty or more loaded hazardous materials shipments or intermodal portable tank loads having a combination of materials that require the phrase POISON/TOXIC - INHALATION HAZARD on the shipping papers (Hazard Zone A, B, C, or D), anhydrous ammonia (UN 1005), ammonia solutions (UN3318), flammable gas (2.1), Class 1.1 or 1.2 explosives, or environmentally sensitive chemicals (see Table 3 in United States Hazardous Materials Instructions for Rail).

Exception: Do not count box cars, trailers, containers carrying mixed loads of hazardous materials when determining Key train status.

[2] Bridge Milepost CPF 102.8 location: https://www.google.com/maps?q=loc:38.806460,-77.105889

Train Crew

The train was crewed by an engineer and a conductor. No other persons were in the cab of the locomotive at the time of the derailment.

Engineer	**Conductor**
John R. McCandless	Kevin Briggs
Date of hire: March 14, 2005	Date of hire: March 5, 2012
Certificate: June 27, 2012	Certificate: July 6, 2012
Recertified: 12/31/2017	Recertified: 12/31/2017

Investigators completed an interview of the train crew on May 19, 2018. The transcripts appear in NTSB docket RRD18MR007.

The crew reported no issues with their train during the trip up to the point of an un-commanded emergency brake. The engineer commented that he felt a "little shift in the cab" at MP103. He said he intended to contact the CSX dispatcher and advise of the condition when he crested the hill he was climbing. He then said he never got the chance. [The un-commanded emergency brake was activated soon after his observation] More on the crew interview appears below.

The cell phone numbers, and respective carriers of the engineer and conductor were obtained. Both members of the crew were asked if they were on their cell phones or texting at the time of the accident. Both replied no. NTSB's evaluation of the train crew's records showed no use.

Accidents or events for which toxicological tests samples are required are outlined in 49 *Code of Federal Regulations* (CFR) Part 219.201. No test is required for an accident or incident the cause and severity of which are wholly attributable to a natural cause (e.g., flood, tornado, or other natural disaster), as determined on the basis of objective and documented facts by the railroad representative responding to the scene. In this accident and based on the circumstances, the crew was not tested.

NTSB investigators examined the work and rest history for both the engineer and the conductor.[3] The investigation determined that the engineer and conductor had been on duty for 6 hours 12 minutes at the time of the accident. The engineer last worked on May 10, 2018. The engineer reported to investigators during his interview that he normally slept 7 to 8-hours per sleep period and naps before his shift. He reported he napped 4-hours before his shift on the day of the accident. The engineer said he has no diagnosed sleep disorders and took no prescription medication. He did report he took Zantac on occasion, last dosing on May 11, 2018.

The conductor's 72-hour work history is shown in the table below.

[3] Hours-of-service requirements are outlined in 49 CFR Part 228, Appendix A, "Requirements of the Hours of Service Act: Statement of Agency Policy and Interpretation."

Date	On Duty	Off Duty	Total Time on Duty (hrs:mins)
May 15, 2018	10:30 a.m.	7:31 p.m.	9:01
May 16, 2018	Not work	Not work	0:00
May 17, 2018	1:30 a.m.	10:24 a.m.	8:24
May 18, 2018	9:00 a.m.	12:46 p.m.	Deadhead[4]
May 19, 2018	12:50 a.m.	7:02 a.m.[5]	6:12

Table 1. Train conductor's work history.

The conductor reported to investigators during his interview that he normally slept 5-hours per sleep period and naps before his shift. He reported he napped 4.5-hours before his shift on the day of the accident. The conductor said he has no diagnosed sleep disorders and took no prescription medication. He did report he took allergy medication (Xyzal) on occasion, last dosing at 11:00 p.m. on May 18, 2018.

Both crewmembers had more than the required 10 hours off duty from the previous day before reporting to work on May 19, 2018 and both said they felt fully rested before going on duty.

Method of Operations

On the RF&P Subdivision, where the derailment occurred, trains are governed and authorized by signal indications. The territory was Traffic Controlled (TC) with the train dispatcher stationed at Network Operations Center, Jacksonville, FL.

At the accident site there are three main tracks, each signaled for train movement in both directions and part of a TC system. The tracks are primarily parallel and oriented in an north and south direction. The eastern most track is designated main track 1 and the western most track designated as main track 3. This configuration is often referred to as multiple main.

The timetable track speeds at this location were listed at 60 mph on track 1 for freight trains between MP 104.4 to 98.0 (mileposts decrease in the southbound direction). The event recorder data indicate the train (lead locomotive) was traveling at 32 mph with the throttle in position T8 about 2-seconds before an un-commanded emergency brake was activated (7:02:44 am[6]). The lead locomotive came to a stop 7:03:17 am, 33-seconds after the emergency brakes activated.

The crew reported in NTSB interviews that they went on duty at 12:50 am. The crew arrived at their train at about 2:30 am and departed Brunswick, MD shortly thereafter. The crew report no concerns with their trip until the point of the un-commanded emergency brake. When asked if the crew saw felt anything unusual when they went through the area of the slide out, they

[4] Deadheading means the physical relocation of a train employee from one point to another following a verbal or written directive from the railroad.

[5] Accident time.

[6] This timestamp and all other event recorder timestamps are referenced from the event recorder download completed on-scene. The CSV file appears in the docket as Attachment 1 to this report.

did say they felt “a little shift in the cab [of the locomotive]” but observed no indications of a track disturbance. The crew did say they planned to contact the dispatcher when the train had cleared the location but did not notify the dispatcher.

After the train’s emergency brakes activated the crew began to bail off the locomotive independent brake, transition from throttle position T8 to idle and bring the train to a controlled stop. The conductor was communicating the emergency brake activation over the radio making everyone nearby aware of the situation. The engineer contacted the dispatcher notifying him of the emergency brake activation. After the lead locomotive came to a stop the conductor made a ground inspection and identified that there were cars that had derailed.

According to the crew, local emergency responders arrived at the scene and made contact with the crew within 5-minutes. The crew notified the emergency responders they were a key train and provided them with the manifest.

CSX estimated accident costs are as follows:

- Car damages: $895,000
- Track: $200,000
- Bridge: Estimated to be between $5-7 million
- Total damages: Unknown at this time, but estimated to exceed $5 million

Operating Rules

Timetables and Rule Books in effect at the time of the incident:

- CSX Operating Manual, dated April, 2017 which includes:
  - Operating Rules,
  - Safeway Rules,
  - Equipment Handling Rules, and
  - Air Brake & Train Handling Rules

- System Bulletin Reissue, dated April 1, 2018

- RF&P Time Table & Special Instructions, dated September 1, 2017

- RF&P Subdivision Bulletin 100 dated April 2, 2018

- RF&P Subdivision Bulletin 101 dated April 19, 2018

Cell Phones

A review of electronic records shows that neither crew member had used a personal electronic device while on duty the day of the accident.

Attachments in NTSB Docket RRD18MR007

1. Hours of service information – McCandless
2. Hours of service information – Briggs
3. Medical qualifications – McCandless
4. Medical qualifications – Briggs
5. Employee transcript – McCandless
6. Employee transcript - Briggs
7. Training histories – McCandless
8. Training histories - Briggs
9. Timetable, Bulletins and Notices in effect
10. Interview of train crew
11. Train Crew Phone records – OUO[7]

[7] Official use only.