



# National Transportation Safety Board

## Railroad Accident Brief

### Collision of Union Pacific Railroad Freight Train MSIDV 16 with Standing Railroad Cars in Hays, Kansas

**Accident No.:** DCA13FR008

**Location:** Hays, Kansas

**Date:** July 16, 2013

**Time:** 1:20 a.m. central daylight time

**Train:** MSIDV 16

**Railroad:** Union Pacific Railroad

**Property Damage:** \$1.4 million

**Injuries:** 3

**Fatalities:** 0

**Type of Accident:** Collision

## The Accident

On July 16, 2013, at about 1:20 a.m., central daylight time, westbound Union Pacific Railroad (UP) freight train MSIDV 16 unexpectedly encountered a hand-operated main track switch at MP 288 in the reverse position diverting the train from the main track onto two adjacent tracks at the Sharon Springs subdivision in Hays, Kansas.<sup>1,2</sup> The switch was not equipped with technology to warn oncoming trains that it was in the reverse position. At the time of the accident, the train was traveling in nonsignaled track warrant territory at a timetable speed of 49 mph. The lead locomotive collided with standing cars on the spur track. (See figure 1.) Diesel fuel leaked from the ruptured locomotive fuel tanks, ignited, and burned. The three crewmembers were injured. Damage was estimated by the UP to be \$1.4 million.

<sup>1</sup> All times in this brief are central daylight time; in this brief, all train movements and track references will refer to timetable direction.

<sup>2</sup> Reverse position means for movement on a track other than the main track.

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**Figure 1.** Train wreckage. (Photo by Union Pacific.)

### The Investigation

About 45 minutes before the accident, local UP train LDG89 15 used the main track switch to enter onto siding track 141 in Hays, Kansas. The crew of the local train, comprised of an engineer, conductor, and brakeman, went on duty at Salina, Kansas, at 1:00 p.m. and made numerous stops along the way to pick cars up and set others out.

Upon arrival at Hays, the crew conducted a job briefing to discuss the work plan and the limited time available to complete the tasks that remained. They decided to secure the train off the main track and complete the remaining tasks the next day before the planned return trip to Salina.

The brakeman proceeded to line the main track switch so the train could move off the main track and enter onto track 141. (See figure 2.) He then walked west to a derail on the siding track.<sup>3</sup> He lined the derail off of the rail and made a radio call to the engineer advising him to move the train onto the siding track. As the train entered the siding track, the brakeman returned east toward the main track switch while continuing to watch to the west so he could tell the engineer when the train had cleared past the derail. When the brakeman reached the first switch he stopped. He was standing at the switch that connected siding track 141 with spur track 740, not the main track switch. Spur track 740 contained parked rail cars. The train cleared the derail and the brakeman called the engineer and told him the train was in the clear. He then changed the position of the switch where he was standing and inadvertently lined the switch for track 141 to track 740, rather than realigning the intended main track switch.

The brakeman's last task was to reset the derail on track 141. Because this was his final task, he then walked west toward the locomotives, announcing on the radio he had returned the main switch to the normal position and set the derail. The conductor and engineer heard the

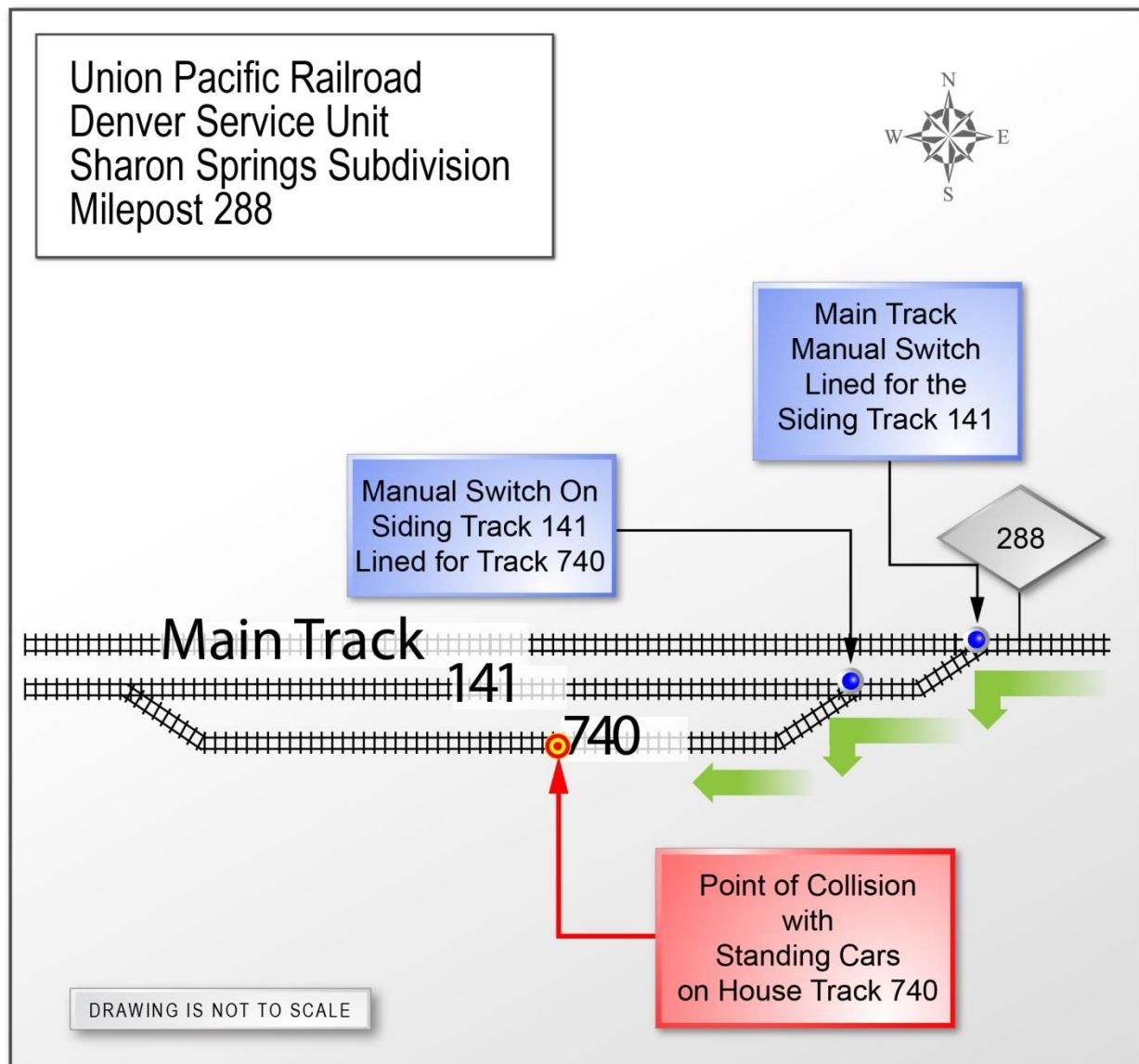
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<sup>3</sup> A derail is a track safety device designed to guide a car off the rails at a selected spot as a means of protection against collisions or other accidents; commonly used on spurs or sidings to prevent cars from fouling the main track.

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brakeman's radio call and the conductor, in turn, called the dispatcher to report the main track switch returned to the normal position and to release track warrant authority for the main track.<sup>4</sup> However, the conductor's report to the dispatcher was incorrect because the brakeman had incorrectly lined the switch from track 141 to track 740, instead of lining the main track switch to the normal position.

Around 1:10 a.m., after securing the train, the crew of LDG89 15 left the area. About 10 minutes later, UP train MSIDV 16 encountered the reversed switch, entered siding track 141 and spur track 740, and collided with the standing cars on track 740. Locomotive event recorder data indicates the MSIDV 16 train crew applied emergency braking as they approached the misaligned main track switch.



**Figure 2.** Track layout at accident site.

<sup>4</sup> Normal position means lined for main track movement.

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NTSB investigators observed the accident site at the same time of night with similar visibility conditions as the night of the accident. The main track switch was not visible from the track 740 switch without direct illumination from a lantern or other light source. If the brakeman for train LDG89 15 had shined his lantern toward the switch target as he was lining the track, it would have been visible.

In accordance with Title 49 *Code of Federal Regulations* (CFR) Section 219.201, the crew members of MSIDV 16 submitted specimens for drug and alcohol testing. The results were negative. The crew of local train LDG89 15 did not undergo drug or alcohol testing because they had gone off duty under normal procedures before the collision occurred. The railroad had an opportunity to recall this crew for testing under the provisions of 49 CFR 219.203; however, UP did not decide to do so.

## Compliance with Rules and Regulations

### Operating Documents

The following railroad operating rules and supplements were applicable at the time of the accident:

- *General Code Of Operating Rules*, Sixth Edition, Effective April 7, 2010, Updated July 2, 2013
- *Union Pacific System Special Instructions*, Effective July 2, 2013
- *Union Pacific Railroad, Timetable No. 4, Salina Area, Sharon Springs Subdivision*, Effective October 25, 2010
- *Union Pacific Railroad Safety Rules*, Effective July 2, 2013
- *Track Warrants and Track Bulletins for UP 7276 West (MSIDV 15)*
- *Track Warrants and Track Bulletins for UP 2327 West (LDG89 15)*

### Train Movement Control

The dispatcher authorized trains to occupy the main track by a track warrant initially issued at Salina. Later during the trip the dispatcher provided updates and new track warrant authority by radio. The track warrant authorized train movements from one named station to another or to a designated point. Upon clearing a section of track, the crew would release the track behind them by calling the dispatcher.

### Hand-Operated Switches

After using the hand-operated switch to route the train from the main track to the siding track, the crew was required to realign and lock the switch and report to the dispatcher the lining and locking of the switch in the normal position before releasing the track warrant authority on the main track.

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### Portable Electronic Device Records

NTSB reviewed portable electronic device (PED) records for all crew members from both trains and found no evidence of prohibited use.<sup>5</sup>

### Train MSIDV 16

The crew of train MSIDV 16 was qualified on the territory. The appropriate predeparture and intermediate air brake tests were conducted. The crew was in compliance with the Hours of Service Act, with sufficient off-duty time before reporting for work. The crew reported feeling rested when reporting for duty on the day of the accident.

### Train LDG89 15

The crew of train LDG89 15 had been on duty for 11 hours and 35 minutes. None of the crewmembers expressed feeling fatigued at the end of the shift. The crew was in compliance with the Hours of Service Act, with sufficient off-duty time before reporting for work. The crew reported feeling rested when going on duty on the day of the accident.

All of the crewmembers were qualified on the territory. Much of their work included the physical activity of switching cars on the trip from Salina to Hays. The conductor stated that work went very smoothly and the brakeman seemed proficient, knowing where to locate himself at the right time during switching operations.

### Postaccident Testing

NTSB investigators examined the cars in train MSIDV 16 that did not derail. The air brakes were applied and released as required by UP air brake rules and Federal Railroad Administration (FRA) regulations. There was no visible binding or chafing observed between any underframe braking components or between the trucks and their respective car body. The braking components were within tolerance and wear limits and the braking surfaces had no indication of excessive thermal stress.

### Prior NTSB Investigations

Prior accidents due to switch misalignment have resulted in serious consequences. On January 6, 2005, a Norfolk Southern freight train collided with a standing local train near Graniteville, South Carolina.<sup>6</sup> A railcar containing chlorine ruptured, resulting in nine fatalities. The NTSB determined the probable cause of the accident was the failure of the crew of Norfolk Southern train P22 to return a main line switch to the normal position after the crew completed work at an industry track. Contributing to the accident was the absence of any feature or mechanism that would have reminded crewmembers of the switch position and thus would

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<sup>5</sup> Union Pacific Railroad, *System Special Instructions*. "Rule Revisions". *General Code of Operating Rules*, "2.21 Electronic Devices, B. Personal Electronic Devices". Omaha, Nebraska: Union Pacific Railroad, 2013.

<sup>6</sup> National Transportation Safety Board, *Collision of Norfolk Southern Freight Train 192 With Standing Norfolk Southern Local Train P22 With Subsequent Hazardous Materials Release at Graniteville, South Carolina, January 6, 2005*, [RAR-05/04](#) (Washington, DC: National Transportation Safety Board, 2005).



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have prompted them to complete this final critical task before departing the work site. Contributing to the severity of the accident was the puncture of the ninth car in the train, a tank car containing chlorine, which resulted in the release of poisonous chlorine gas.

On September 15, 2005, a Union Pacific freight train collided with a standing train in a siding in nonsignaled territory near Shepherd, Texas.<sup>7</sup> The train had entered the siding at a hand-operated switch. The engineer on the standing train died. The NTSB determined the probable cause was the failure of the previous train crew to return a main track switch to the normal position after they had secured the train on the siding and departed the area.

Similarly, on July 14, 2009, southbound Dakota, Minnesota & Eastern Railroad freight train B61-13 went into Bettendorf Yard in Bettendorf, Iowa, due to a misaligned switch and struck 19 stationary railcars.<sup>8</sup> The locomotive engineer and the conductor died from the impact. The NTSB determined the probable cause was the BNSF Railway local train RCHI4274-13I crew releasing track warrant authority before returning the north yard hand-operated switch to the correct position.

All of these accidents resemble the accident at Hays, Kansas. In each instance, a crewmember failed to return a main track switch to the normal position. More significantly, these accidents occurred in nonsignaled territory where there is only local indication of switch alignment. The brakeman of LDG89 15 erred when he failed to return the main track switch to the normal position before he and the rest of the crew departed the accident area. A single errant act on the part of an individual that can lead to an accident is a single point failure in system safety analysis. If the single point failure is significant and the potential consequences are severe, the risk should be mitigated by additional layers of protection.

## Previous NTSB Recommendations

Following the January 6, 2005, accident at Graniteville, South Carolina, the NTSB made the following safety recommendation to the FRA:

Require that, along main lines in non-signaled territory, railroads install an automatically activated device, independent of the switch banner that will, visually or electronically, compellingly capture the attention of employees involved with switch operations and clearly convey the status of the switch both in daylight and in darkness. (R-05-14)

After completing the Bettendorf, Iowa, accident investigation, the NTSB reclassified Safety Recommendation (R-05-14) from “Open—Acceptable Alternate Response,” to “Closed—Superseded” by Safety Recommendation (R-12-27), and issued the following new recommendations to the FRA, aimed at addressing the hazard of switch misalignments:

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<sup>7</sup> National Transportation Safety Board, *Collision of Two Union Pacific Railroad Trains at Shepherd, Texas, September 15, 2005*. [NTSB/RAB-06/01](#). (Washington, DC: National Transportation Safety Board, 2006).

<sup>8</sup> National Transportation Safety Board, *Collision of Dakota, Minnesota & Eastern Railroad Freight Train and 19 Stationary Railcars Bettendorf, Iowa, July 14, 2009*. [NTSB/RAR-12/03/SUM](#) (Washington, DC: National Transportation Safety Board, 2012).

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Require railroads to install, along main lines in non-signaled territory not equipped with positive train control, appropriate technology that warns approaching trains of incorrectly lined main track switches sufficiently in advance to permit stopping. (R-12-27)

Revise Title 49 *Code of Federal Regulations* Section 218.105(d) (1) to require that, until the appropriate switch position technology is installed on main track switches in non-signaled territories that are not equipped with positive train control, train crews releasing track authority to the dispatcher must hold job briefings with the dispatcher and clearly convey the position of all main track switches that were used prior to releasing track warrant authority. (R-12-28)

Require that until appropriate switch position warning technology is installed on main track switches (in non-signaled territory not equipped with positive train control), when a main track switch has been reported relined for a main track, the next train to pass the location approach the switch location at restricted speed. That train crew should then report to the dispatcher that the switch is correctly lined for the main track before trains are allowed to operate at maximum authorized speed. (R-12-29)

These recommendations are for additional layers of protection intended to prevent accidents due to single point failures.

However, in response to these recommendations, the FRA responded by letter to the NTSB on December 28, 2012, stating in part, “The preliminary cost-benefit analysis conducted related to this recommendation shows that rulemakings cannot be justified as having benefits outweighing cost.”

The NTSB replied to the FRA on April 18, 2013, “...we urge the FRA to consider an appropriate alternate means of warning approaching trains of incorrectly lined main track switches.” Pending completion of a plan for doing this, Safety Recommendation R-12-27 is classified “Open—Unacceptable Response.”

### Probable Cause

The National Transportation Safety Board determines that the probable cause of the accident was the failure of the brakeman of train LDG89 15 to return a main track switch to the normal position after the crew had secured the train on a siding track. Contributing to the accident was the inability of the crew of train MSIDV 16 to determine the position of the main track switch in nonsignaled territory.

For more details about this accident, visit [www.nts.gov/investigations/dms.html](http://www.nts.gov/investigations/dms.html) and search for NTSB accident ID DCA13FR008.

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**Adopted: April 14, 2015**

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The NTSB has authority to investigate and establish the facts, circumstances, and cause or probable cause of a railroad accident in which there is a fatality or substantial property damage, or that involves a passenger train. (49 U.S. Code § 1131 - *General authority*)

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties . . . and are not conducted for the purpose of determining the rights or liabilities of any person.” 49 *Code of Federal Regulations*, Section 831.4. Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report. 49 *United States Code*, Section 1154(b).

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