



PRELIMINARY REPORT

Railroad Rear-End Collision Between UP Freight Trains

**Granite Canyon, Wyoming
October 4, 2018
RRD19FR001**

The information in this report is preliminary and will be either supplemented or corrected during the course of the investigation.

On October 4, 2018, at 7:38 p.m. mountain daylight time, an eastbound Union Pacific (UP) freight train MGRCY04 (striking train) collided with the rear of a stationary UP freight train MPCNP03 (stationary train) in Granite Canyon, Wyoming. Prior to the accident, the crew of the striking UP freight train reported problems with the train's airbrake system and radioed the UP Harriman Dispatch Center to advise them they had accelerated to 50 mph and were unable to stop. At the time of the accident, the striking train was traveling on a descending grade leading up to the point of collision. In the accident, the engineer and conductor of the striking train were killed, and 3 locomotives and 57 cars of the striking train derailed while 9 cars of the stationary train derailed. No hazardous materials were released. The crew of the stationary train had deboarded and cleared the area after receiving instructions from the dispatcher about the impending danger and were unharmed. The accident occurred near milepost (MP) 527 on the Laramie Subdivision, about 18 miles west of Cheyenne, Wyoming. (See figure 1.) At the time of the accident, the sky was clear, the wind was from the southwest about 10 mph, and the temperature was about 45°F. Accident damage was estimated at \$2.4 million.



Figure 1. Drone image of resting location of the head-end locomotive from the striking train. Photo provided by UP.

The trains were authorized and governed by signal indication. The territory was under centralized traffic control with the train dispatcher located in Omaha, Nebraska, at the Harriman Dispatch Center. The operations were governed by the General Code of Operating Rules and the modifications provided by the Special Instructions, General Orders, and Track Bulletins specific to the train.

There were two main tracks oriented in a geographical east and west direction. Both tracks had wayside signals to enable trains to operate in both directions on each track. Positive train control was active at the time of the accident. The north track was main track 1 and the south track was main track 2. The striking train was eastbound on main track 1 at the time of the accident.

Preliminary event recorder data from the striking train's lead locomotive showed changes in the air flow from the locomotive to the brake pipe at specific locations. Between MP 550 and MP 545, the grade changed from ascending to descending and returned to ascending. To control the train speed, the engineer went from power to dynamic braking and then back to power to negotiate the change in grade. This caused the train slack to change from stretched to bunched as the train entered the descending grade, and the air flow changed from 24 cubic feet per minute

(CFM) to 0 CFM.¹ When the engineer reapplied the power on the ascending grade at MP 544, the train was changed from bunched to stretched, and the air flow returned to about 24 CFM. At this location, the engineer was able to control the train without using the train brakes.

About 3 miles later, the striking train reached the top of Sherman Hill. The engineer gradually applied dynamic braking after cresting Sherman Hill at 14 mph near MP 541. From MP 541 to MP 539, the train slack changed from stretched to bunched as more of the rear of the train came over the top of the hill and pushed against the dynamic braking being applied on the locomotives. The striking train's event recorder indicated that the air flow went from a steady 28 CFM to 0 CFM when the slack in the train changed from stretched to bunched.

The air flow meter shows how much air the locomotive is providing to the brake pipe to compensate for leakage and maintain the required pressure. If the air flow suddenly drops to 0, the locomotive is no longer providing air to the brake pipe. When the train slack was bunched or compressed after MP 540 and the air flow changed from 28 CFM to 0 CFM, the air pressure at the rear of the train was 87 pounds per square inch (psi). While the engineer was controlling the train speed with just the dynamic braking, the pressure at the rear of the train slowly dropped. Between MP 540 and MP 536, the pressure at the rear of the train dropped to 83 psi. Normally, the rear-end brake pipe pressure would have remained at 87 psi and the air flow would have continued to read 28 CFM.

Approaching MP 536, the engineer applied the train air brakes when the train's speed was slowly increasing from 18 mph to 19 mph. The engineer reduced the brake pipe from 89 psi to 84 psi on the locomotive. According to the event recorder, the rear-end brake pipe pressure remained at 83 psi before and after the reduction on the head end of the train. The rear-end brake pipe pressure should have normally dropped an equivalent 5 psi, lowering the pressure to 78 psi. Investigators are examining the failure of the brake pipe pressure to drop at the rear of the train when the engineer applied the brakes.

Between MP 536 and MP 530.5 the train accelerated, and the engineer continued to apply more braking. Near MP 530.5, the engineer applied the brakes with an emergency application when the train reached 29 mph. Normally, the locomotive would send a message to the end-of-train device to also apply the brakes with an emergency brake application. According to the event recorder, the end-of-train device did not make an emergency application of the brakes. Investigators are researching the reason for the communication failure. After the engineer applied the emergency application, the train continued to accelerate until reaching 56 mph as the last recorded speed.

The NTSB investigation is ongoing. Future investigative activity will focus on components of the striking train's air brake system, head-of-train and end-of-train radio-linked devices, train braking simulations, and current railroad operating rules. Investigators will also determine if the railroad's air brake and train handling instructions address monitoring air flow readings and recognizing the communication status with the end-of-train device.

¹ There is a physical space between the couplers of freight cars. Furthermore, some of the cars are equipped with hydraulic devices to cushion the impact of longitudinal forces in the train. As a result, the train is like an accordion and it can be stretched and compressed (bunched). This movement is referred to as the "slack" in the train.

Parties to the investigation include UP, the Federal Railroad Administration, the Brotherhood of Locomotive Engineers and Trainmen, and the International Sheet Metal, Air, Rail, and Transportation Workers-Transportation Division.