

NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C.

Railroad Accident Brief Report

ATL97FR020

REAR-END COLLISION/DERAILMENT

CONRAIL

HUMMELSTOWN, PENNSYLVANIA

SEPTEMBER 29, 1997

On September 29, 1997, about 5:45 p.m. eastern daylight time, eastbound Consolidated Rail Corporation (Conrail) train PIBE-8, consisting of 2 locomotive units and 136 cars, passed a stop and proceed signal at 30 mph and struck the rear locomotive unit of eastbound Conrail train ENS-103, consisting of 5 locomotive units. Train ENS-103 was stopped at signal 1081E (milepost 104.2 at control point [CP] Tara) in Hummelstown, Pennsylvania. Each train was crewed by a conductor and an engineer. The conductor on train PIBE-8 sustained fatal injuries in the accident. No other injuries were reported. Damages were estimated at \$571,700. Weather conditions were clear, with bright sunlight and a temperature of 65° F.

The train ENS-103 crew went on duty at 2:30 p.m. at Enola Yard near Harrisburg, Pennsylvania. The crew picked up five locomotive units at the diesel shop and began a trip to Oak Island Yard in Newark, New Jersey. According to event recorder data, the train had been halted at a stop signal at 1081E for 28 minutes when the rear-end collision occurred.

Train PIBE-8 departed Harrisburg about 4:15 p.m. en route to Allentown, Pennsylvania. As the train approached signal 1061E, the signal was displaying a stop and proceed (red over red signal aspect) indication.¹ The engineer stated that both he and the conductor observed and called the signal as “approach medium” (yellow over green signal aspect).² The engineer said the train was traveling about 10 mph when he and the conductor observed the signal; the engineer then allowed the train to increase speed to about 30 mph, which would have been an appropriate response to an approach medium signal. He stated that as train PIBE-8 came around the lefthand curve, he observed train ENS-103 stopped at CP Tara. The train PIBE-8 engineer put his train into emergency braking but was unable to stop short of train ENS-103.

¹ This indication calls for the train crew to stop and then proceed at restricted speed.

² An approach medium indication calls for the train crew to proceed to the next signal not exceeding medium speed.

Postaccident tests revealed that signal 1061E, located about 2 miles west of signal 1081E, was coded to display a stop and proceed signal. The tests also confirmed that the signals were properly wired. Postaccident inspection of signal 1061E revealed that the stop and proceed signal was out of focus. Rusty water was found in the signal lens. When viewed from the track, the signal was partially obscured by tree foliage.

On October 1, 1997, National Transportation Safety Board investigators, with representatives of the Federal Railroad Administration, the Brotherhood of Locomotive Engineers, the United Transportation Union, and Conrail, used a locomotive to replicate the preaccident events. In sunny conditions, the test locomotive traveled eastbound toward signal 1061E at the same time of day that the incident occurred. Signal 1061E was set to display a stop and proceed signal.

When the test locomotive had moved to within about 1,500 feet of signal 1061E, the signal could not be clearly distinguished by persons on the locomotive. As the locomotive approached the signal more closely, the top aspect of the signal appeared to be yellow and the bottom aspect appeared to be green. Eventually, as the locomotive moved still closer to signal 1061E, the signal aspect could not be distinguished at all. Persons on the test locomotive variously reported seeing yellow, red, and green aspects.

The out-of-focus condition of signal 1061E, in combination with the late afternoon sun shining on the signal face and the water in the lens, probably made the signal aspect appear to the train PIBE-8 train crew to be yellow over green instead of its actual display, which was a red over red aspect. The result was a “phantom signal.” A phantom signal is defined by the *Association of American Railroads Signal Manual* as “an aspect displayed by a light signal, different from the aspect intended, caused by a light from an external source being reflected by the optical system of the signal.”

PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of the accident was a phantom signal indication that resulted because the Consolidated Rail Corporation failed to ensure that the signal aspects displayed could be properly seen by train crews.

Adopted: December 1, 1998