

**NATIONAL TRANSPORTATION SAFETY BOARD
OFFICE of RAILROAD, PIPELINE &
HAZARDOUS MATERIALS INVESTIGATIONS
WASHINGTON, DC 20594**



DCA 05 MR 008
Norfolk Southern Corporation
Graniteville, South Carolina
Head-on Collision
January 6, 2005

Track Group Factual Addendum Report

Accident Synopsis

About 2:40 a.m. eastern standard time on January 6, 2005, northbound Norfolk Southern Railway (NS) freight train 192, while traveling about 47 mph through Graniteville, South Carolina, encountered an improperly lined switch that diverted the train from the main line into an industrial siding where it struck a parked and unoccupied train (NS train P22). The collision derailed both locomotives and 16 of the 42 freight cars of train 192 as well as the locomotive and both cars of train P22. Among the derailed cars from train 192 were three tank cars containing chlorine, one of which was breached, releasing chlorine gas. The train engineer and eight other persons died as a result of chlorine gas inhalation. About 554 people were taken to local hospitals complaining of respiratory difficulties. Of these, 75 were admitted for treatment. Because of the chlorine release, about 5,400 people within a 1-mile radius of the derailment site were evacuated for 7 days.

Accident Identification

Location: Graniteville, South Carolina
Date: January 6, 2005
Carrier: Norfolk Southern Corporation
Train Symbols: NS 192P005 (Striking Train)
NS P22005 (Parked Train)
Location: Avondale Mills / Gregg Plant
NTSB Number: DCA 05 MR 008

Graniteville - Track Group

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Accident Location Description

The switch on the Norfolk Southern Corporation (NS) main track that led to the industry track toward Avondale Mills / Gregg Industry plant was located at milepost (MP) R178.3. See NS Plan of Existing Track Layout for additional information. The following distances were measured from the point-of-switch (PS) toward the plant:

- The NS #10 turnout¹ was approximately 125-feet long
- PS to the eastern edge of Canal Street road crossing = 136-feet
- PS to the western edge of Canal Street road crossing = 236-feet
- PS to the newly installed² universal derail³ = 284-feet
- PS to the eastern edge of Hickman Street = 564-feet
- PS to the western edge of Hickman Street = 655-feet
- PS to the eastern edge of Hard Street = 719-feet
- PS to the western edge of Hard Street and the plant gate = 771-feet

Between the western edge of Canal Street and the eastern edge of Hickman Street there was approximately 328-feet of available space to park the struck train. The parked train consisted of one locomotive unit and two freight cars, with an approximate length of 172-feet, and that left about 156-feet of unoccupied space. Based on available space, train crew statements placing the locomotive unit about 5-railcars lengths north of the switch and postaccident aerial photography, the collision occurred approximately 342-feet from the PS on the industry track owned by Avondale Mills / Gregg Industry. A track survey provided by the NS shows that NS owns the first 141 feet of the Avondale Industrial Track, which by agreement with the industry is the limit of NS's maintenance at this location. In addition, the NS right-of-way is located 65-feet from the centerline of the NS main track in the east and west directions.

The NS main track and Canal/Aiken Street intersected each other at a grade crossing that was located approximately 393-feet north of the PS for Avondale Mills / Gregg Industry track. The grade crossing was protected with flashing lights and bells. In addition, because the NS main track was paralleled on each side by a street, there were eight pairs of red flashing lights protecting the intersection. The main track electrical circuit that activated this crossing by an approaching train was located 1,927-feet south of the crossing. In addition, approximately 281-feet north of the PS and just east of the main track was the location of a wayside approach signal light for the switch point position at Vacluse Siding. There were no electrical circuits present on the switch to activate the crossing signals when the switch was lined for Avondale Mills / Gregg Industry. Also, there was no wayside signal to indicate the switch point position of the NS main track to the Avondale Mills / Gregg Industry track. See photo 0248 of the intersection and approach signal.

¹ The turnout was measured from the point-of-switch to the point-of-frog, plus 46.6-feet from the point-of-frog through the switch ties and rail.

² The derail was installed postaccident on January 31, 2005. No derail was present prior to the accident.

³ A Universal derail is designed to derail an errant train or car from coming out of the plant or going into the plant. See photo #0253.

Between MP R178.65 and MP R178.45 the main track curved to the left one-degree, and then continued straight through the switch and past the grade crossing at MP R178.22 (Aiken/Canal Street). The main track grade approaching the switch at MP R178.3 from the southward direction at MP R178.67 had an average ascending grade of 0.51 percent.

The diverging Avondale Mills / Gregg Industry track curved to the left, and the degree of curvature was about eight percent. In addition, grade descended at an average of 1.14 percent.

Turnout Description

The left hand turnout that was installed at MP R178.3 was built in accordance with NS standard plan for a No. 10 turnout with 16-foot, 6-inch switch points. See Attachment B. The switch points were thrown and locked in position by a mechanical means with a New Century Model 51-B Switch Stand. See Attachment C. Protruding in the vertical direction from the top of the switch stand was a steel mast. Near the top of the mast was a reflectorized target. The reflectorized material exhibited a white surface for the main track direction and a red surface for the turnout direction. See Attachment D. The mast extended 82-inches from the top of the tie to the top edge of the target.

Switch Target Conspicuity

During a switch target sight observation in dark/evening conditions; the track group lined the switch target red for the main track movement, and shunted the main track signal circuit to activate the grade crossing at Aiken/Cannel Street. The group started their observation from about 1,800 feet south of the switch target. It was a consensus agreement that the red target was in line with the flashing red lights at the grade crossing. As the track group approached the switch, the red target remained in line with the flashing red lights until about 500-feet south. At that point the red target appeared to go towards its actual position, and extending away from the flashing red crossing lights in the eastward direction. See video clips.

Damage

A total of 14 track pannels (39-feet each) were installed to repair both tracks after the collision occurred. Six pannels went on the main track and 8 pannels went on the Avondale Mills / Gregg Industry track. In addition 10 ballast cars of stone was spread to re-surface both tracks. Total cost of track damage was \$79,638. There was no signal damage.