

SUMMARY FOR FE-17-02
SELECTED AND POSSIBLE CONTRIBUTING FACTORS

SELECTED FACTORS

Railroad: Norfolk Southern Corporation
Location: Bonlee, North Carolina
Region: 3

Month: July
Date: July 16, 2002
Time: 11:59 a.m., EST

Data for Fatally Injured Employee(s)

Brakeman
55 years old
34 years of service
Last rules training: Jan. 27, 2002
Last safety training: July 5, 2002
Last physical: April 16, 1998

Data for All Employees (Craft, Positions, Activity)

Craft: Transportation and Engine

Positions:

Switching Crew

Engineer
Conductor
Brakeman
Conductor Trainee

Pomona Yard Car Inspectors
General Yard Master
Greenville Dispatcher

Activity: Switching

EVENT

A Brakeman was fatally injured when crushed between a locomotive
he was riding (holding the hand rail) and a standing rail car.

SUMMARY FOR FE-17-02 CONTINUED

POSSIBLE CONTRIBUTING FACTORS

PCF No. 1

The crew members did not use proper radio procedures. They made the following series of errors: The Brakeman attempted to use the locomotive radio to communicate with Engineer, but this caused a squealing feedback from the radios of the Conductor and Trainee. Consequently, they all turned off their portable radios. The Brakeman then gave instructions to the Engineer for movements via the locomotive radio; the Engineer did not acknowledge the communications, but seemed to make the correct movements. This was in violation of the railroad operating rules and Federal regulations which state that when instructions are not acknowledged or understood, the movement shall be stopped immediately, and may not be resumed until the misunderstanding has been resolved, radio contact has been restored, or communication achieved by hand signals or other procedures in place.

Subsequently, upon approaching the standing cut of cars (with the Brakeman on the hand rail), the Brakeman called a slow order to the Engineer. The Engineer later denied hearing the communication. The Brakeman started to exit the locomotive when the Conductor looked up and saw they were approximately one and one half car lengths from the standing cars. Because he could not hear the Brakeman on his radio, he attempted to use his portable radio, forgetting it was turned off, to notify the Engineer, saying "That'll do." The collision then occurred.

PCF No. 2

In non-compliance with the railroad's general regulations, crew members did not give undivided attention to their duty and were distracted at critical times during the switching activity. Just prior to the fatal collision, the Conductor and Trainee were having a private conversation and did not look out for the Brakeman who had told them he was going out to make the coupling on the train, as he started to exit the locomotive. The Conductor also was getting his paperwork together and looking down at the console desk.

PCF No. 3

Had the crew decided to swap ends prior to beginning the reverse move of the lite engine, communication between the Locomotive Engineer and other crew members would not have been necessary.

REPORT: FE-17-2002

RAILROAD: Norfolk Southern Corporation (NS)

LOCATION: Bonlee, North Carolina

DATE & TIME: July 16, 2002; 11:59 a.m., EST

EVENT¹: A Brakeman was fatally injured when crushed between the locomotive he was riding (holding onto the hand rail) and a standing rail car.

EMPLOYEE:

Craft:	Transportation and Engine (T&E)
Activity:	Switching
Occupation:	Brakeman
Age:	55 years
Length of Service:	34 years
Last Rules Training:	Jan. 27, 2002
Last Safety Training:	July 5, 2002
Last Physical Examination:	April 16, 1998

CIRCUMSTANCES PRIOR TO ACCIDENT

On July 16, 2002, at 6 a.m., a 3-person train crew, comprising an Engineer, Conductor, and Brakeman reported for duty for their regular assignment (Train number E12P7) at the Pomona Yard Office, milepost CF69.3, in Greensboro, North Carolina. A Conductor Trainee also reported to work for her second day on the job assignment. Prior to reporting for duty, all crew members including the Trainee received 13 hours and 30 minutes off duty, exceeding the statutory off-duty requirements.

While at Pomona Yard, the crew held a short and general job briefing concerning their work assignments and the bulletins issued. The Conductor, Brakeman, and Trainee discussed their anticipated switching moves with each other as the Engineer listened. During their job briefing, they discussed the unusual number of cars in their train. Train No. E12P7 comprised 108 loads for this trip. They normally handled approximately 50 to 60 rail cars. The crew members determined it would be difficult to start their train from a complete stop with trailing tonnage of 14,183 tons, at the ascending grade of 1.37 percent for four tenths of a mile, beginning at milepost CF110.3. It was decided that all but the six head cars in their train, for delivery to Gold Kist Industries, would be left at milepost CF109.0, a location approximately 410 feet west of the Mt. Vernon highway-rail grade crossing at milepost CF109.1. The Brakeman would ride the rear locomotive of their 4-locomotive consist from Pomona Yard to milepost CF109.0, a distance of approximately 39 miles.

¹ “Event” is defined as “occurrence that immediately precedes and directly results in the fatality.” Possible contributing factors are identified in the following report and attached summary.

The Trainee did not understand the moves to be made at Gold Kist Industries, at milepost CF110.3, and asked the Conductor to explain the moves again, which he did. The Trainee stated she did not understand the moves and did not ask for further explanation. The job briefing made no mention of the details of the Mt. Vernon grade crossing move, i.e. use of hand signals or radio communications, the number of hand brakes required to hold their train on the grade, and how the move would be protected upon returning to their train from Gold Kist Industries.

At 6:41 a.m., the Engineer and Brakeman doubled their train at Pomona Yard and received an initial terminal air brake test by the Pomona Yard Car Inspectors. At 7:37 a.m. the Brakeman received and copied a track warrant authorizing movement from Greensboro, east to milepost CF 102. At 8 a.m., the General Yard Master transported the Brakeman and the remainder of the crew to the head end of the train located at the Wye track at milepost CF69.0. The General Yard Master conducted an additional job briefing concerning the switching operations at Gold Kist Industries.

The "CF" Line segment extended from Pomona Yard at Greensboro, North Carolina to milepost CF130.0 at Sanford, North Carolina. The method of operation for this line segment was Track Warrant Control (TWC) and was non-signaled. Train No. E12P7 departed eastward at 8:05 a.m., July 16, 2002.

At 10:17 a.m., Train number E12P7 stopped at milepost CF100.5 to receive another track warrant. At 10:21 a.m., the Conductor received a track warrant authorizing movement from milepost CF102.0 to milepost CF114.0, and Train No. E12P7 proceeded east. At about 11:05 a.m., Train No. E12P7 stopped at milepost CF109.0 where the Brakeman secured their train and cut off the four locomotives and six head cars. They then proceeded east to Gold Kist Industries at milepost CF110.3. Upon arrival at Gold Kist Industries, they pulled five empties and spotted the six loads. At 11:40 a.m., they shoved their five empties to the Bonlee Passing Track also at milepost CF110.3. The Brakeman used his portable radio, tuned to Norfolk Southern Channel One, to protect the shove move and make the setoff.

At 11:45 a.m., at the Bonlee Passing track, the Trainee boarded the trailing locomotive NS 9264, short hood facing west, while the Engineer was located on the east end of the 4-lite-locomotive consist on NS 8211, short hood facing east. The lite locomotives were coupled as in a push-pull configuration with locomotives NS 8211, NS 9490, NS 8774 and NS 9264. The Conductor transmitted from outside the locomotive cab, via portable radio, to the Engineer who was on locomotive NS 8211, and stated "All right, NS E12, lined through the crossover. Let's start 'em back about ten cars, ten or eleven, [the Brakeman] has got your rear back there, over." At 11:47 a.m., the Conductor transmitted from outside the cab, via portable radio, to the Engineer, saying "All right, going to need about six more to clear." Within the next minute and 15 seconds, the Conductor had counted down to one car length, and the Trainee took over radio communications from inside the cab using the locomotive radio, and said "Half, E12."

At 11:49 a.m., the Brakeman boarded the locomotive consist with the Conductor and Trainee in the cab of the rear locomotive (NS 9264). The Brakeman attempted to use the locomotive radio on NS 9264 to communicate with the Engineer. However, when he tried to transmit from the locomotive radio, it caused a squealing feedback from each of their portable radios. All three employees riding inside of the cab of the rear locomotive turned off their portable radios. This allowed communication clarity using the rear locomotive radio. The Engineer later stated that at 11:52 a.m., he heard, "Let's go back to the train," and did not acknowledge this radio transmission. According to the Conductor and Trainee, the Brakeman told the Engineer to "Come on back, we are good for 30." The Conductor and Trainee stated the Engineer did not

acknowledge this transmission, but began movement. At this point, the Brakeman was controlling the movement with the locomotive radio to their standing cut of cars located 1.3 miles away. The Brakeman was standing on the Engineer's side (north side) with his back slightly turned toward the north. He was operating the engine horn, as needed for crossing protection, and facing the other two crew members who were seated on the opposite side of the locomotive cab. The Conductor was seated in the front chair, the Trainee sitting directly behind him. The Brakeman could see forward in a westward direction when he turned his head to the right.

The movement westward began near milepost CF110.3. All crew members agreed that no other radio communication would be used until nearing milepost CF109.7, when the Conductor told the Brakeman to remind the Engineer about the permanent slow order of 20 m.p.h on the curve between milepost CF109.7 and CF109.5. The Brakeman called the slow order to the Engineer, however, the Engineer denied hearing the communication. According to the Engineer, he slowed for the curve because he could see it coming up. According to the Conductor and Trainee, the final radio communication with the Engineer was approaching milepost CF109.7.

The movement approached the grade crossing at milepost CF109.1. The Brakeman was at the locomotive console, as he was when the movement began. He was sounding the engine horn for the crossing and talking with the other two crew members simultaneously. The Trainee stated that she and the Brakeman were having a conversation with each other about their families. According to the Conductor and Trainee, the Brakeman activated the horn over the entire crossing. After the Brakeman stopped sounding the horn for the crossing, he and the Trainee continued to talk, and he (the Brakeman) began moving inside the cab of the locomotive toward the steps leading to the inside door of the locomotive. He then told the Conductor and Trainee he was going out to make the coupling on the train. While going down the steps inside the locomotive and still looking toward the Trainee, they continued their conversation. The Conductor said at that time he was getting his paperwork together and was looking down at the console desk. The Brakeman exited the inside door of the locomotive cab, closing the door behind. He apparently was in the process of positioning himself on the locomotive deck platform on the front of the short hood end of the rear locomotive.

The sky was clear; the temperature was 90° F.

THE ACCIDENT

As the Brakeman exited the inside cab door of locomotive NS 9264, the Trainee looked up and saw the standing train about 80 feet away, and told the Conductor, "We are moving too fast, and I can't hear (the Brakeman) on the radio." "We're getting kind of close, ain't we." The Conductor immediately looked up and saw they were approximately one and one half car lengths from the standing cars. He attempted to use his portable radio and said, "That'll do." However, his radio was turned off. The locomotive (NS 9264) struck the standing cut-of-cars at a speed of 13 mph, as determined by the locomotive event recorder. The impact occurred at milepost CF109.03 at 11:59 a.m.

Locomotive NS 9264 struck the east car (NW 177859) of the standing cut of cars; NW 177859 was a covered hopper. The impact resulted in the locomotive coupler riding over the top of the end coupler of NW 177859, causing the engine to strike the slope sheet of NW 177859, and pinning the Brakeman between the locomotive hand rail and the locomotive body. The Conductor called the Greenville Dispatcher at 11:59 a.m, and requested help from carrier

officers and an ambulance. At 12:01 p.m., the Dispatcher called Chatham County 911. Chatham County Emergency Medical Services received the first call at 12:06 p.m. and arrived on the scene at 12:15 p.m. Chatham County's Medical Examiner pronounced the Brakeman dead at the scene.

POST-ACCIDENT INVESTIGATION

Sight distance measurements were obtained for the lite locomotives (which operate without rail cars attached) that were approaching the standing cut of cars. The sight distance was 947 feet from where the crew occupying locomotive (NS 9264) first could have seen the standing cut of cars, after coming out of a right-hand curve. Visibility from the locomotive, occupied by the Brakeman, Conductor, and Trainee, to the standing train, was not impaired by vegetation or other physical obstructions from the distance of 947 feet.

The distance from the west side of the Mt. Vernon road crossing to the lead car of the standing cut of cars was measured to be about 410 feet.

The total distance traveled by the lite locomotives without radio communication from the curve restriction at milepost CF109.7 until the impact at milepost CF109.03 was a distance of about seven tenths of a mile. There had been no radio communication from the Engineer to the rest of the crew for the distance of the reverse movement, a distance of about 1.3 miles.

All radios, including both locomotive and portable radios, were checked and found to be in good working order. The Brakeman's portable radio was retrieved from his person and was found to be on a different channel than each of the other radios, however, it could not be determined if the Brakeman's radio had been positioned on channel 4 by him or if the impact may have caused a channel change. No portable radios were turned on prior to the impact. All radio communications were required to be set to the same channel, channel 1. Locomotive event recorders were downloaded and records produced in both evaluation modes of analog-graph and digital. Locomotive brake tests for all systems were made. No defects were noted.

Postmortem toxicology tests were negative for drugs and alcohol.

APPLICABLE RULES

NORFOLK SOUTHERN CORPORATION OPERATING RULES Effective December 15, 1999

General Regulations

- GR-6: Employees must . . . They must be alert and attentive and devote themselves exclusively to the Company's service while on duty. . . .
- GR-27: Undivided attention to duty is required. While on duty, employees must not engage in any activity that will interfere with or distract their attention from their work.

Operating Rules

- 103: When shoving cars or engines at any location, crew members must take action to prevent damage . . .

106: The Conductor, Engineer, and pilot are jointly responsible for safety of the train and engine and for observance of the rules. Under conditions not provided for by the rules, they must take every precaution for protection. When necessary, they must instruct members of their crew as to proper performance of duties.

Other members of the crew must call the attention of the Conductor or Engineer immediately to any apparent failure to observe requirements of rules, timetable, train orders, messages, or other instructions.

When conditions require stopping the train or reducing speed and the Engineer or Conductor fails to take proper action to do so, or should the Engineer become incapacitated, other crew members must take necessary action to stop the train.

505.3: An employee who receives a transmission will repeat it to the transmitting party unless the communication (a) relates to yard switching operations; (b) is a recorded message from an automatic alarm device; or (c) is general in nature and does not contain any information or advice that could affect the safety of a railroad operation.

508: Shoving, Backing, or Pushing Movements

508.1: When radio communication is used in connection with the shoving, backing, or pushing of a train, locomotive, or on-track equipment, the employee directing the movement must give complete instructions or keep in continuous radio contact with the employees receiving the instructions.

508.2: The distance of the movement must be specified in 50-foot "car lengths" and the movement must stop in one-half the remaining distance unless additional instructions are received.

Exception: When within five car lengths of the coupling or stop, the person directing the move will call out distances in car lengths, as: "five cars," "four cars," "three cars," etc. After acknowledging "five cars," the Engineer will not be required to further acknowledge countdown if so doing would interfere with safe operation. During this countdown, the Engineer will stop the move immediately after moving one car length unless he is receiving additional signals from the person directing the move.

508.3: If the instructions are not understood or continuous radio contact is not maintained, then the movement will be stopped immediately. The movement may not be resumed until (a) the misunderstanding has been resolved, (b) radio contact has been restored, or (c) communication has been achieved by hand signals or other procedures.

CODE OF FEDERAL REGULATIONS
Part 220 - Radio Standards and Procedures
Subpart B - Radio and Wireless Communication Procedures

220.33: Receiving a radio transmission

(b) An employee who receives a transmission shall repeat it to the transmitting party unless the communication: (1) Relates to yard switching operations.

220.49: Radio communication used in shoving, backing or pushing movements

When radio communication is used in connection with the shoving, backing, or pushing of a train, locomotive, car, or on-track equipment, the employee directing the movement shall specify the distance of the movement, and the movement shall stop in one-half the remaining distance unless additional instructions are received. If the instructions are not understood, the movement shall be stopped immediately and may not be resumed until the misunderstanding has been resolved, radio contact has been restored, or communication has been achieved by hand signals or other procedures in accordance with the operating rules of the railroad.