

REPORT: FE-2009-04
RAILROAD: Burlington Northern Santa Fe Railway (BNSF)
LOCATION: Sunshine, AZ
DAY, DATE, TIME: Friday, January 23, 2009, 10:24 a.m. MT
EVENT: Struck by on-track equipment
PROBABLE CAUSE: Employee assisting machine operator worked foul of the track and was struck by passing train

CONTRIBUTING FACTORS: Failure to cease work when sight distance was reduced below minimum; lack of audible warning devices; failure to properly clear all work crew members from right of way

EMPLOYEE:

Occupation	Truck Driver
Activity	Spiking in a curve
Age	52
Length of Service	15 years, 9 months
Last Rules Training	November 11, 2008
Last Safety Training	March 11, 2008
Last Physical Exam	N/A
Last Efficiency Test	N/A

Circumstances Prior to the Accident/Incident

At approximately 10:24 a.m. MT, January 23, 2009, westbound BNSF train ZWINPHX9-23, traveling at a recorded speed of 70 mph, struck and killed a BNSF Railway employee at milepost 304.8, in Sunshine, Arizona. The accident occurred on BNSF's Southwest Division, Seligman Subdivision. Movements in this part of the railroad are under Centralized Traffic Control (CTC) by a dispatcher located in Fort Worth, TX. The Maintenance of Way crew was working under the protection of a BNSF watchman/lookout using train approach warning as their means of on-track safety.

The Winslow Maintenance of Way (MOW) Section crew, consisted of a foreman, a truck driver, and a machine operator. The crew reported on duty at 6:30 a.m. at Winslow, AZ. After a morning job briefing, the MOW section crew was notified that they would not be able to work in Winslow Yard as planned until 2:30 p.m. because the track was being worked and cleared operating train crews. The MOW crew was instructed to go to milepost 304.7, the site of curve # 304, a 0 degree 59mm curve in CTC territory on double main track, and tamp and re-spike rail joints on Main Track 1. Thereafter, if time allowed, they were to re-spike the high side of curve 304 at milepost 304.8 on Main Track 2. Both locations of work were within 200 feet of each other. At 8:40 a.m., an on-track safety form was filled out by the foremen for work, indicating watchman/lookout protection, location between milepost 304.5 and 305.0, sight distance was marked at 1,980 feet and the method of notification was verbal. Track speed at this location is 79 mph for freight trains and 90 mph for passenger trains. Work was complete at about 9:30 a.m. on Main Track 1. The MOW section crew then backed the truck west to work at milepost 304.9 on Main Track 2. At 10:20 a.m. westbound BNSF freight train, HKCKBAR8-21 pulled alongside of the MOW section crew on Main Track 1. BNSF Train HKCKBAR8-21 had one train in front of it and was waiting to follow it at B. Canyon Diablo. The locomotives were estimated to be at milepost 305.3 and the train extended around curve 304 adjacent to MOW section.

At 7:30 a.m. MT, January 23, 2009, two operating crew members, an engineer and conductor, reported for duty at the Crew Station in Winslow, Arizona, after receiving 22 hours and 40 minutes off-duty time, the required statutory rest period. Their assigned train was BNSF ZWINPHX9-23 to operate between Winslow and Phoenix, AZ. The crew had a morning job safely briefing and discussed speed restrictions and Forms A, B, and C on the BNSF Seligman and Phoenix subdivisions. The Form B that was in effect for the day did not include the area or the mileposts in which the MOW section crew was working. They departed on Main Track 3 and were lined Main Track 1. They received a clear signal indication to proceed east to Yard 1 where they coupled their train and performed an train air brake test. After departing Winslow at approximately 10:05 a.m., they operated BNSF Train ZWINPHX9-23 with three locomotives and eleven cars westward on Main Track 1 to Phoenix, AZ. Operating on signal indication, BNSF Train ZWINPHX9-23 approached CP Dennison (control point) and had a diverging clear signal indication crossing over from Main Track I to Main Track 2. At this time the engineer noticed the westbound BNSF Train HKCKBAR8-21 ahead of him on Main Track 1. The plan was to hold BNSF HKCKBAR8-21 in place on Main Track 1 until BNSF ZWINPHX9-23 passed on Main Track 2.

The Maintenance of Way (MOW) section crew was working on Main Track 2 when BNSF HKCKBAR8-21 ahead of BNSF ZWINPHX9-23 operating on Main Track 1 approached and the MOW section crew cleared the tracks for the passing train moving westward on Main Track 1. When the train stopped alongside the MOW section crew, they went back to work on Main Track 2 to complete the work assignment under watchman/lookout authority. With westbound BNSF train HKCKBAR8-21 occupying Main Track 1, the sight distance was reduced from 1,980 feet to 849 feet. According to the interviews, there was no indication that the watchman/lookout knew what trains were heading his way and on what track they would be on. In this part of the railroad, trains can operate in either direction on either track.

The weather was overcast, winds were from the southeast at 8mph, and the temperature was approximately 51 degrees Fahrenheit.

THE ACCIDENT

BNSF Train ZWINPHX9-23's locomotive engineer stated as he was traveling westbound on Main Track 2 coming out of the # 304 curve, he observed a white MOW truck. Initially he only saw a small portion of the truck and could not see the MOW employees. As he continued westward he saw the MOW truck and he sounded the horn and rang the bells for approximately 1,000 feet. The engineer then saw two men up on the track ahead of him, positioned approximately five feet apart. One of the men was straddling the south rail on Main Track 2 and the other was standing between the rails on Main Track 2. This is verified by interviews from the MOW foreman and the machine operator. The man straddling the rail was driving down high spikes with the use of hydraulic spiker PB-8 and was facing eastward and the man standing between the rails was holding the hydraulic hoses facing westward. The watchman/lookout saw the westbound train come around the curve on Main Track 2 and communicated "hot rail". This is a common method of notifying roadway workers that a train is within sight and to clear the tracks. At this time the machine (spiker) operator heard something, threw the hydraulic spiker off the track and stepped off the track. As he turned around to see if the truck driver who was holding the hydraulic hoses was clearing the tracks, he saw the train strike the truck driver.

The locomotive engineer placed the train into an emergency brake application and came to a stop approximately one quarter of a mile from where the MOW employee was struck. As the train was coming to a stop the engineer notified the dispatcher that they were stopping and that they had just struck an MOW employee. The conductor got off the train and walked back to the accident scene. The truck driver was severely injured but conscious, asked for water, and was attended to by co-workers. The dispatcher then placed a call to the Coconino County Sheriffs Office and an officer and ambulance were dispatched. After arriving at the scene, emergency personnel administered first aid and requested a life-flight helicopter. Their efforts were unsuccessful and they pronounced the employee deceased at 11:10 a.m. They then notified the Coconino County Medical Examiner, who arrived at 1:44 p.m.

POST ACCIDENT INVESTIGATION

FRA and BNSF representatives conducted a post-accident investigation. Interviews were conducted with MOW employees working at the site and the train crew members.

When interviewed following the accident, the watchman/lookout stated the train approach warning to be used was verbal notification. He said he positioned himself approximately 15-20 feet east on the south side of the Main Track 2 along the white MOW truck because he thought he would have a better view of any approaching trains. He was contacting workers audibly and was close enough that he could make contact with all of them. He then saw the approaching train and told the MOW men to clear the track area. According to his statement, the machine (spiker) operator looked up, threw the spiker off to the side of the track and cleared Main Track 2. When he looked up the truck driver was still between the rails and did not clear in time. The truck driver was then struck by the train. The watchman/lookout then placed his jacket over the

injured employee and contacted the supervisor to get an ambulance.

Following the accident, the machine (spiker) operator was interviewed and stated he heard a noise, looked up, saw the train and threw the hydraulic spiker off to the side of the track, stepped into the clear and turned around toward the truck driver just as the train passed.

FRA interviews of the watchman/lookout and machine (spiker) operator conducted on January 23, 2009 provided more detailed information concerning the audible and visual hand signal communications between the watchman/lookout and the two men in the work group. As described, the watchman/lookout would yell "hot rail, hot rail" as the train approached and the workers would then move to the designated safe location, which was to be the field side of Main Track 2. A re-creation of the incident showed that with a train occupying Main Track 1, sight distance was 849 feet from where the watchman/lookout could initially see the train to the point of impact. This represented a reduction in sight distance from 1,980 feet when Main Track 1 was not occupied.

The investigation revealed that the watchman/lookout was using voice commands and hand signals to notify the roadway workers of approaching trains but did not have a whistle, air horn, or any other type of warning device that should be used to warn employees of an approaching train or other on-track equipment regardless of noise or distraction of work. At the time of the incident, one employee was using a hydraulic spiker that created a loud noise, which most likely rendered the use of hand signals and vocal warnings ineffective in warning him of the oncoming train. It was determined that the job briefing conducted that morning did not include a discussion of the type of on-track safety required when the sight distances changed.

Training and work history records were reviewed for the watchmen/lookout, the machine operator, and the decedent. The watchman/lookout had 24 years of service and the machine (spiker) operator had 11 years of service. Their last recorded Roadway Worker Protection safety training was completed March 12, 2008. The decedent had 15 years of service and his last recorded training on maintenance of way operating rules was January 30, 2008; his last safety-related training was March 11, 2008.

BNSF obtained and reviewed the watchman/lookout's cell phone records and determined he received a call seven minutes prior to the accident and the call ended 4 minutes prior to the accident. A time line of the events indicated that those three minutes correlate to the time that the MOW section was not working and were off the track and in the clear.

The event recorder indicates from the time the engineer saw the MOW section crew to the point of impact, BNSF ZWINPHX9-23 locomotive engineer sounded the horn and rang the bells for nine seconds. The data excludes train handling as contributing to the accident.

Post-accident toxicological tests were not administered to either the locomotive engineer or conductor of BNSF ZWINPHX9-23. The watchman/lookout and the machine operator were tested and the results were negative. The Coconino County Coroner conducted an autopsy and determined the cause of death was multiple blunt force injuries resulting from the train's impact. The coroner also conducted a post-mortem alcohol and drug screening on the decedent. The results were negative.

ANALYSIS AND CONCLUSIONS

The accident investigation included a review of the rules training, efficiency training, discipline and work history of the decedent, the watchman/lookout, and the machine operator.

APPLICABLE RULES:

CFR Title 49, Part 214 (Railroad Workplace Safety) Subpart C, Section 214.329(a):

Train approach warning shall be given in sufficient time to enable each roadway worker to move to and occupy a previously arranged place of safety not less than 15 seconds before a train moving at the maximum speed authorized on that track can pass the location of the roadway worker.

CFR Title 49, Part 214 (Railroad Workplace Safety) Subpart C, Section 214.329(e):

Watchman/lookout shall communicate train approach warnings by a means that does not require a warned employee to be looking in any particular direction at the time of the warning, and that can be detected by the warned employee regardless of noise or distraction of work.

CFR Title 49, Part 214 (Railroad Workplace Safety) Subpart C, Section 214.315(b):

A job briefing for on track safety shall be deemed complete only after the roadway worker has acknowledged understanding of the on-track safety procedures and instructions presented.

It is also apparent that the watchman/lookout did not respond to the changing on-track conditions at the time BNSF HKCKBAR8-21 arrived to await the passage of BNSF ZWINPHX9-23 operating in the same westward direction. BNSF HKCKBAR8-21 's presence reduced the watchman/lookout's sight distance from 1,980 feet to 849 feet. This 58% reduction in distance translates to a reduction in warning time at 70mph (102 feet/second) from approximately 19 seconds to slightly more than 8 seconds. At the moment the sight distance was reduced below the 15 seconds warning time, work should have stopped, the employees moved to a safe place and re-briefed, and another form of protection used, such as requesting track and time for sole ownership of the track.

A check of the watchman/lookout's cell phone records indicate the MOW section crew was not performing work and was clear of the track during the three minute duration of the call.

Following the accident, BNSF made procedural changes on the Southwest Division for lookouts and a second job briefing will be conducted prior to changing protection when sight distance changes. The instruction also discussed the method of warning, which would include audible warning devices such as a whistle or horn when conditions warrant. BNSF Officials terminated the employment of the watchman/lookout at the conclusion of its investigation.

FRA has concluded the probable cause of the fatality is the truck driver (decedent) continued working foul of the tracks and was struck by a passing train. Contributing to the accident were the watchman/lookout's failure to properly clear the work crew from the area, his failure to use a proper warning signal that could be heard over the noise of the machinery; and his failure to cease work at the site and secure sole ownership of the work area when the sight distance was reduced below the 15 second warning time.