U.S. Department
of Transportation
**Federal Railroad
Administration**

Railroad Employee Fatalities Investigated by the Federal Railroad Administration in 1983

Office of Safety

DOT/FRA/ORRS

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INTRODUCTION

This report represents the Federal Railroad Administration's findings in the investigation of railroad employee fatalities during 1983. Not included are fatalities that occurred during train operation accidents; these are reported under another type of investigation.

The purpose of this report is to direct public attention to the hazards inherent in day-to-day operations of railroads. It provides information in support of the overall Federal program to promote the safety of railroad employees. It also furthers the cause of safety by supplying all interested parties information which will help prevent recurrent accidents.

Joseph W. Walsh
Chairman
Railroad Safety Board

CAUSE DIGEST

CAUSE DIGEST

SUMMARY OF ACCIDENTS INVESTIGATED
INVOLVING ONE OR MORE FATALITIES

RAILROAD	ACCIDENTS
AMTRAK	3
ATSF	4
BN	3
BO	2
CAGY	1
CIRR	1
CGA	1
CO	2
CR	1
CSS	1
ICG	1
KCS	1
LA	1
MKT	1
MP	5
NW	1
PATH	1
PBR	1
RFP	1
SOU	2
SP	4
TT	1
UP	2

Accident Investigation Reports

REPORT: 1

RAILROAD: Columbus and Greenville Railway Company

LOCATION: Indianola, Mississipi

DATE: January 11, 1983

The Accident

A 37-year-old mechanic working in the mechanical department was fatally injured on January 11, 1983, at about 9:30 a.m., in Indianola, MS. Employed by the Columbus and Greenville Railway Company, the mechanic had 4 years of service.

Background

The accident occurred north of the main track near the west end of a siding designated as the new passing track.

On December 31, the east truck of a loaded 100-ton covered hopper car derailed to the south, toward the main track, on the siding about 215 feet east of the west siding switch.

The Columbus and Greenville Railway uses the Illinois Central Gulf Railroad Operating Rules and Safety Rules.

The mechanic last attended safety rules classes on April 17 and 18, 1982. His last physical examination was administered on January 9, 1979.

An engineer also involved in the accident was last examined on the carrier's operating rules and safety rules in May 1982. Carrier officials stated that all operating department employees attended classes between May 1 and May 7, 1982.

Circumstances of the Accident

At 8:30 a.m., the engineer went on duty in Greenville, MS, and was told to go to Indianola, MS, to assist in re-railing the derailed car. Driving a carrier-owned truck, he reached the derailment at about 9:15 a.m.

The mechanic instructed the engineer to bring locomotive 606 to the scene of the derailment for use in re-railing the east truck. Another employee drove the engineer to the house track to get the locomotive. Before he left the scene of the derailment, the engineer aligned the west siding switch for entry to the siding.

A mechanical department truck with rail wheels extended was standing on the main track. The front, or west, end of the truck stood about 2 feet east of the east end of the derailed car.

The mechanic and other employees were unloading an air-operated jack from the north side of the truck. The mechanic was facing east with his back toward the arriving locomotive. As the locomotive approached the west siding switch, the engineer realized that its locomotive brakes were not working. He immediately sounded the horn as the locomotive was entering the siding.

The lead carman shouted a warning just before the collision. All the employees except the mechanic were able to flee to safety.

The locomotive struck the derailed car; the impact pushed the derailed car about 25 feet to the east and south toward the main track and pushed the mechanical department truck about 5 1/2 feet to the east. The mechanic caught between the derailed car and the truck was fatally injured.

Post-accident examination of the locomotive disclosed that its brakes were cut out on both the front and rear trucks. (When rear truck brakes are cut out, no air pressure registers on the independent brake gauge in the locomotive cab when the brakes are applied with either the automatic or independent brake valve. This is a warning that the brakes are inoperative.)

The cut-out cock of the dead engine fixture was found in an open position, the proper position for moving the locomotive dead or idling in train. The locomotive was not equipped for a multiple locomotive operation and had been previously moved from Greenville to Indianola. It could not be determined why the brakes were cut out and why they were not cut back in before service at Indianola.

Applicable Rules

Part 229 - RAILROAD LOCOMOTIVE SAFETY STANDARDS

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Sub-part B - Safety Requirements

Brake System

Section 299.46 Brakes: General

The carrier shall know before each trip that the locomotive brakes and devices for regulating all pressures, including but not limited to the automatic and independent brake valves, operate as intended and that the water and oil have been drained from the air brake system.

(49 CFR 200-399)

813. Engineer must know that air brakes are working properly when approaching a railroad crossing, drawbridge, or other imperative stop, and before descending a heavy grade.

M. Employees must exercise care to prevent injury to themselves or others.

They must observe the condition of equipment and tools which they use in performing their duties and when found defective will, if practical, put them in safe condition, reporting defects to the proper authority.

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(Operating Rules - Illinois Central Gulf Railroad)

GENERAL RULES

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F. Employees must:

Exercise care and judgement to avoid risk of injuries.

Take time to work safely.

Exercise care to prevent injury to themselves and others.

Report to those in authority any dangerous condition or unsafe practice where such is found to exist.

(Safety Rules - Illinois Central Gulf Railroad)

Analysis

As the locomotive entered the siding, the engineer discovered that its brakes were inoperative.

The brakes had been cut out at the trucks and had not been restored to operating condition prior to using the locomotive.

Cause

The accident was caused because the engineer failed to check the locomotive's air brakes and verify that they were working.

A contributing factor was the failure to place the air valves in the proper position prior to service.

REPORT: 2

RAILROAD: Burlington Northern

LOCATION: Beardstown, Illinois

DATE: January 18, 1983

The Accident

A 56-year-old conductor was fatally injured on January 18, 1983, at about 2:25 p.m., in Beardstown, IL. Employed by the Burlington Northern, the conductor had 39 years of service.

Background

In Beardstown, the main track extends north and south in a geographical direction. A lead track parallels the main track on the west, and a series of nine yard tracks diverge southwesterly from the lead. The tracks are numbered 1 through 9, with track No. 1 being the first track to diverge at the north end of the lead. The switch stands to these yard tracks are on the east side of the lead track.

The conductor was last examined on the Consolidated Code of Operating Rules on February 24, 1982. His last physical examination was administered on November 14, 1982.

Circumstances of the Accident

The conductor was a member of a road switching crew, consisting of himself, two brakemen, an engineer, and a fireman. The crew had been on duty 7 hours 25 minutes, after completing the required off-duty period.

A locomotive was coupled to eight cars on track No. 6, and the cars were pulled northward onto the lead track, with the eighth, or southernmost, car stopped on the lead adjacent to the switch on track No. 2. The conductor instructed the front brakeman to shove the eight cars southward on the lead and stop clear of the track No. 6 switch. The cut of cars was shoved southward and stopped with the lead car on the switch points on track No. 6. The conductor next told the brakeman to have the cars moved northward to clear the switch and told the brakeman that the two lead cars were to be placed on track No. 6. The conductor did not explain why the two cars were to be returned to the track from which they had been pulled and the front brakeman did not question him. The conductor crossed the lead to the east side,

paused a short time, then returned to the west side of the lead and started walking southward between track Nos. 5 and 6. He gave the engineer a "kick" signal (shove and cut off in motion) for the cars to be moved southward. The front brakeman uncoupled the two lead cars as the cut was being shoved southward, permitting them to roll onto track No. 6. As the two cars were moving southward on track No. 6, the front brakeman saw the conductor step across track No. 6 directly in front of the approaching cars. The conductor was struck, knocked down, and run over by the lead car of the two-car cut. He died about 1 hour later at the Beardstown Hospital where he had been taken by emergency medical personnel.

Applicable Rules

General Rules

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M....

Employees must expect the movement of trains, engines, cars or other movable equipment at any time, on any track, in either direction.

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(The Consolidated Code of Operating Rules)

ON OR ABOUT TRACKS

58. Employees Must:

a. Expect the movement of trains, locomotive, cars, or other movable equipment at any time, on any track, in either direction.

b. Before crossing tracks or stepping out from between equipment, look in both directions for approaching equipment.

c. Move to a place of safety upon approach of moving equipment on the track upon which they are working or on the adjacent track.

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59. Employees must not:

Cross tracks immediately in front of moving equipment.

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(Burlington Northern Railroad Safety Rules and General Rules)

Analysis

It could not be determined why the conductor issued the instruction to switch the two cars back to track No. 6, or why the brakeman failed to question these instructions. The conductor exhibited confusion when he crossed over the lead and then returned, before giving the engineer the "kick" signal. He next walked southward between tracks 5 and 6, gave the "kick" signal, then turned and started walking west toward tracks 7, 8, and 9.

Cause

This accident occurred because the conductor failed to remain clear of moving equipment.

REPORT: 3

RAILROAD: Baltimore and Ohio Railroad Company

LOCATION: Pittsburgh, Pennsylvania

DATE: February 27, 1983

The Accident

A 52-year-old yard foreman was fatally injured on February 27, 1983, at about 10:35 a.m., in Glenwood Yard, Pittsburgh, PA. Employed by the Baltimore and Ohio Railroad Company, the foreman had 15 years of service.

Background

Glenwood Yard is a classification yard extending east and west; the yard tracks are connected on both ends by switching leads. At the east end of the yard, the lead to tracks 15 through 23 is known as the crossover lead, and the lead to tracks 25 through 35 is known as the back ladder. The switch connecting both leads is called the crossover switch. The track in the accident area is almost level.

The accident occurred 8 feet west of the crossover switch, about 25 feet west of the yardmaster's office. The eastern part of the classification yard was unobstructed at the time of the accident.

The foreman was a member of a yard switching crew consisting of himself, two brakemen, an engineer, and a fireman. The crew had been on duty 3 hours 34 minutes, after completing the required off-duty period.

The foreman last attended a Safety Rules Class on January 25, 1983, and attended an Operating Rules Class on April 23, 1982.

Circumstances of the Accident

The crew was classifying nine cars to move to various tracks at the east end. Before the switching began, the foreman told the two brakemen that the first west car was to go to track No. 28, and the second car to track No. 20. The foreman threw the crossover and lead switch toward track No. 20 instead of track No. 28 and was corrected by the brakeman. The foreman then crossed over to the north side of the track and gave the engineer a signal to proceed. As the movement began and the brakeman made the cut behind the first car, the foremen, for some unknown reason, stepped back and

walked southward toward the crossover switch into the path of the oncoming car. The foreman was struck and run over by all the wheels on the south side of the first car and the lead truck of the second car.

Applicable Rules

ON OR ABOUT TRACK

. . . . . .

45. Expect movement of equipment on any track, at any time, in either direction. Always look in both directions before crossing or getting close to any track. Crossing tracks immediately in front of moving trains, locomotives, or cars is prohibited. When crossing tracks near standing equipment, always allow sufficient room to avoid injury in case of sudden or unexpected movement.

(Chessie System - Safety Rules)

Analysis

The yard foreman crossed the track and gave the engineer a "Proceed" signal. The brakeman uncoupled the first west car, and, as it proceeded, saw the yard foreman walk directly in front of the moving car. The brakeman immediately signaled the engineer to stop the movement. The brakeman making the cut behind the first car was the only witness to the accident. It could not be determined why the foreman walked in front of the moving equipment.

Cause

The accident was caused by the yard foreman's failure to stay clear of moving equipment.

REPORT: 4

RAILROAD: Union Pacific Railroad

LOCATION: Omaha, Nebraska

DATE: March 5, 1983

The Accident

A 28-year-old carman was fatally injured on March 5, 1983, at about 11 a.m., in Omaha, NE. Employed by the Union Pacific Railroad, the carman had 5 years of service.

Background

The accident occurred in the Omaha car shop, a dismantling facility consisting of four dismantling positions within a fenced, level yard. Forklifts and a mobile crane are used in the dismantling operation.
The carman received a copy of the Union Pacific Railroad Safety Rule Book on June 2, 1977. As a member of the mechanical department, the carman was not required to pass an examination on safety or other carrier rules. He last attended a safety meeting on February 26, 1983.

Circumstances of the Accident

The employee was one of two carmen assigned to dismantle a boxcar (UP 912490). The carmen's foreman instructed both men on proper dismantling procedure at the beginning of their work shift at 7 a.m. and again at 10 a.m. The foreman was concerned because on the previous day the roof, upper corner of the "A" end, and the side plate above the right door had been cut from the car. He instructed the subject (first) carman to make his horizontal cut from the inside of the car and leave a side post for support, because the "AR" side sheet was cut from the "A" end sheet.

At about 11 a.m., the second carman, who was cutting the "BL" side sheet, heard the "AR" side sheet fall. He finished his cut and walked around the "B" end to look for the first carman. When he did not see him, he assumed the first carman had gone to the locker room. Not finding him there, the second carman returned to the car and found the missing carman under the side sheet, in a crouched position facing away from the car. A forklift raised the side sheet, and the first carman was taken by ambulance to St. Joseph

Hospital, where he was pronounced dead. There were no witnesses to the accident. The Union Pacific Railroad has no written instructions for the proper procedure to dismantle freight cars.

Applicable Rules

SAFETY INSTRUCTIONS
GENERAL

4000. In case of doubt or uncertainty the safe course must be taken; in all cases, the safest available methods must be followed.

4001. Employees must take every precaution to prevent injury to themselves and other persons under conditions not provided for by the rules.

Employees must not rely entirely upon others, but must protect themselves when their own safety is affected.

(Union Pacific Railroad--Rules Governing Duties and Deportment of Employees, Safety Instructions and Use of Radio)

Analysis

The roof of the car with the side plate still attached, separating the "BR" and the "AR" side sheets, had been removed.

The foreman stated that he twice reminded the first carman that the upper corner of the "A" end and the side plate above the right door had been cut. He also told the first carman to make his horizontal cut from the inside and leave a side post for support because the "AR" side sheet was cut loose from the "A" end sheet. The foreman said he was assured by the first carman that he could handle the job.

Cause

The accident was caused by the failure of the first carman to leave adequate material to support the side sheet of the boxcar he was dismantling.

REPORT: 5

RAILROAD: Toledo Terminal Railroad Company

LOCATION: Toledo, Ohio

DATE: March 27, 1983

The Accident

A 30-year-old conductor was fatally injured on March 27, 1983, at about 12:20 p.m., in Toledo, OH. Employed by the Toledo Terminal Railroad Company, the conductor had 7 years of service.

Background

The accident occurred on an industrial yard track owned by the Standard Oil Company. The yard consists of four stub-end tracks. The track is level in the accident area, with a curve to the left. The carrier describes direction of movement by direction "A" or direction "B."

The conductor was last examined on the Book of Operating Rules and Safety Rules on March 23, 1983. His last physical examination was administered on November 7, 1981.

Circumstances of the Accident

The accident occurred on the lead track. The conductor was a member of a yard switching crew consisting of himself, two brakemen, and an engineer. The crew had been on duty 2 hours 20 minutes after completing the required off-duty period.

Nineteen hopper cars were being shoved in an eastward direction toward track No. 31. The engineer was at the controls on the right side of the locomotive cab; the front brakeman was on the left side of the locomotive cab relaying signals from the conductor to the engineer. The conductor was riding on the left side of leading end of the lead car. The rear brakeman was in the caboose outside the Standard Oil plant.

The leading car was approaching a manually operated switch that provides access to track No. 31, when the front brakeman saw the conductor give a "reduce speed" hand signal, which the front brakeman relayed to the engineer. At the same time, the conductor dismounted the leading car. After that, the front brakeman lost sight of the conductor; and for reasons not determined, the train air brakes went

into emergency application. When the conductor failed to reappear within a very short period, the front brakeman walked to the rear of the cars. He found the conductor face down, straddling the left rail with the lead wheel of the lead car on his pelvic area. Although the conductor was conscious, he made no statement about the accident. The conductor was taken by ambulance to the local hospital, where he died on March 30, 1983.

In the accident area, the surface of the ground is reasonably level, free of debris, and unusual track conditions. Post-accident inspection of hopper car CR 432858 revealed no defects that might have contributed to the accident.

Applicable Rules

Not applicable.

Analysis

A post-accident investigation revealed no unusual track or footing conditions in the accident area, and there were no equipment defects. The conductor had maintained eye contact with the front brakeman during the movement. The front brakeman received a "reduce-speed" hand signal from the conductor immediately before the conductor disappeared from sight.

Cause

There were no witnesses to the accident, and the exact cause could not be determined.

REPORT: 6

RAILROAD: Baltimore and Ohio Railroad Company

LOCATION: Good Hope Junction, West Virginia

DATE: April 6, 1983

The Accident

A 57-year-old trainman was fatally injured on April 6, 1983, at about 1 a.m., near Good Hope Junction, WV. Employed by the Baltimore and Ohio Railroad Company, the trainman had 33 years of service.

Background

The accident occurred between Clarksburg and Weston, WV, 15.6 miles west of Clarksburg. A siding known as the empty-mine track parallels the main track at the south end and connects to the main track at the east and west ends. The grade is 2.1-percent descending westward, and there is a 7-degree curve to the right.

The trainman last attended an Operating Rules and Timetable class on January 17, 1983, and a Safe Job Procedures class on March 23, 1983. His last physical examination was administered on March 15, 1982.

Circumstances of the Accident

The accident occurred at the west switch of the empty-mine track. The trainman was a member of a switching crew consisting of himself, a conductor, two brakemen, and two engineers. The crew had been on duty for 3 hours after completing the required off-duty period. The train was made up of two road locomotives, 47 empty hopper cars, two helper locomotives, and a caboose. The locomotives were being operated with the long hood forward.

Upon arriving at the McWhorter Mine, the trainman cut off the two helper locomotives and the caboose, which returned with the conductor to the three empty hoppers standing on the empty-mine track. The trainman then lined the west crossover switch to the empty-mine track and by radio instructed the road locomotive engineer to back up. The conductor protected and coupled the rear 17-car setoff against the cars on the empty-mine track. The conductor then radioed the helper engineer to move ahead and clear the crossover. The trainman, after setting off the 17 rear

cars, told the road locomotive engineer to go ahead. As the movement progressed, the helper locomotives, moving westward at a speed of about 10 mph, fouled the west switch crossover and struck the rear hopper near the east end on the north side. The accident occurred 88 feet east of the crossover switch.

The trainman riding on the northeast trailing corner of the car was fatally crushed. Death was instantaneous; the body fell from the side of the hopper 100 feet west of the crossover switch near the north rail of the main track. The trainman was pronounced dead by the coroner. There was no witness to the accident.

Post-accident inspection of the helper locomotives and caboose revealed no defects that could be considered contributing factors to the accident. Also, a reenactment of the accident using the helper locomotives and a caboose revealed that the locomotives could be stopped within 20 feet by applying the independent brake, after sighting the last hopper on the empty track approaching the crossover switch at 10 mph.

Applicable Rules

101-C. When movement is to couple to standing car, it must be made to avoid accident and at a speed prepared to stop within one-half the range of vision.

. . . . . .

104-C. A train must not foul a track until hand-operated switches and derails connected with the movement and the route is seen or known to be clear.

(Chessie System Railroads - Operating Rules)

Analysis

The trainman was riding on the side of the last car of a cut of cars as it was approaching the crossover switch onto the main track, when the car was struck by one of the helper locomotives.

The engineer on the helper locomotives failed to stop the movement before the clearance point, and the locomotives struck the side of the last car in which the trainman was riding.

Cause

The accident was caused because the engineer on the helper locomotives failed to stop clear of a proceeding movement in the crossover.

REPORT: 7

RAILROAD: Missouri Pacific Railroad Company

LOCATION: Handley, Texas

DATE: April 8, 1983

The Accident

A 29-year-old trackman was fatally injured on April 8, 1983, at about 1:50 p.m., in Handley, TX. Employed by the Missouri Pacific Railroad Company, the trackman had 4 years of service.

Background

A track crew consisting of a foreman, two machine operators, and a trackman reported for duty at 7:30 a.m. at Centennial Yard, Fort Worth, TX. The crew was assigned to spot surface the north main track near Handley, where maximum authorized speed is 60 mph. The foreman received permission to occupy the track from 11:35 a.m. to 4:01 p.m.

The accident occurred on the south main track 1 mile east of Handley Station. Preceeding the point of the accident, the main tracks curve about 1 degree in the direction of train movement for a distance of 2,360 feet.

The trackman last attended a safety meeting on February 24, 1983.

Circumstances of the Accident

At approximately 1:30 p.m., the crew started tamping operations between Milepost 238 and Milepost 237, working eastward. The trackman was assigned to the south side of the tamper to keep ballast in the crib and to signal the tamper operator. The trackman had stood in the center of the south main track four separate times since work began and was warned of the danger and told to move. One warning was given by the tamper operator; three warnings were given by the foreman.

Train TAZ-07, going westward at about 53 mph on the south main track, approached the track crew. The engineer stated that its headlight was on "bright," the bell was ringing, and the whistle was sounding. The engineer of the train observed the maintenance equipment on the north main track

and saw someone standing near the equipment. At a distance of about 750 feet from the trackman, he determined the person was standing in the center of the south main track. When he saw that the trackman remained in this position, the engineer put the train brakes in emergency.

The train struck the trackman, throwing him about 20 feet down the track. Four locomotives and 18 cars passed over the trackman, dragging his body about 394 feet west of the point of impact. The train stopped approximately 1,200 feet beyond the point of impact.

The trackman was pronounced dead from multiple injuries at the scene of the accident, by representatives of the coroner's office.

Applicable Rules

SAFETY RULES

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S2. Constant presence of mind to insure safety of themselves and others is the primary duty of all employees and they must exercise care to avoid injury to themselves or others. When employees are on or near the track, they must expect the movement of trains, engines, or cars at any time, on any track, in either direction....

. . . . . .

S4. Look in both directions for approaching trains, engines or cars before crossing tracks and when crossing tracks in front or behind standing cars or engines allow sufficient distance, at least 25 feet, to cross safely.

. . . . . .

S8. On the approach of a train, employees must not remain nearer than 15 feet, farther if practicable, to the track as coal, stone, car doors, or other articles are liable to fall from the train. Watch for steel strappings, swinging doors or wires hanging from cars. In multiple track territory or in yards or at stations where there are adjacent tracks, they must not stand on any track while trains are passing. Employees must not stand within 50 feet of switches while trains are approaching or passing; nor must they stand in such position, either in front or in rear of switch stand so that view of switch target will be obscured to engine crew or trainman.

(Missouri Pacific Railroad Company -- Rules and Regulations for the Maintenance of Way and Structures)

Analysis

While working at this location during the operation of the machines, the trackman had been seen standing in the center of the south main track on four different occasions, and had been warned to stand clear of the track. The trackman returned to this position on the south main track where he was struck by the westbound train.

Cause

The trackman failed to stand clear of an oncoming train.

A possible contributing cause was the failure of the trackman to hear the approaching train because of the noise of the tamping machine.

REPORT: 8

RAILROAD: Missouri Pacific Railroad Company

LOCATION: Malvern, Arkansas

DATE: April 12, 1983

The Accident

A 54-year-old conductor was fatally injured on April 12, 1983, at about 7:13 p.m., in Malvern, AR. Employed by the Missouri Pacific Railroad Company, the conductor had 32 years of service.

Background

The Malvern main track is tangent and the gradient is 2-percent descending southward. Track No. 21 parallels the main track on the east side. The Camden main track is connected to the Malvern main track from the west, and there is a 12-degree 30-minute curve to the left.

The employee was last instructed on the Uniform Code of Operating Rules and Safety Rules on April 8, 1982. The carrier does not require periodical physical examinations for conductors.

Circumstances of the Accident

On the day of the accident, the switching crew consisted of an engineer, a conductor, and two brakemen. The crew went on duty at 6 p.m. after having completed the required off-duty period.

The crew was coupling 40 cars (25 loaded plus 15 empties) and three locomotives to a caboose and 6 cars that were standing on the Camden main track. The engineer was in the lead locomotive control compartment; the head brakeman was standing on the ground on the south side of the caboose, and the rear brakeman was standing on the ground north of the caboose. The conductor was on the ground standing opposite the caboose between the Malvern main track and track No. 21. A brakeman assigned to another switching crew stood next to the conductor.

The rear brakeman directed the engineer, via radio, to back up. As the cars were shoved, the rear brakeman radioed the engineer that the distance to the coupling was 5 carlengths.

According to the head brakeman and the engineer, this was the last radio transmission before the moving cars struck the standing caboose and started derailing.

The head and rear brakemen ran to avoid injury when they saw the cars derailing. The brakeman who was standing next to the conductor between the main track and track No. 21 stated that he went around the conductor and crossed under a stationary car on track No. 21. The brakeman also stated that the conductor had either slipped or tripped and fell to the ground while trying to move clear of the derailing cars. As the conductor was crossing track No. 21 under the stationary car, the derailing cars struck the standing cars on that track. The impact caused the standing cars to move, and the conductor was run over by one of the moving cars. He was found lying over the west rail of track No. 21 and was pronounced dead at the scene by the county coroner.

A post-accident inspection of the radios and the air brakes on the locomotives and cars disclosed no defects that could have contributed to the accident.

Inspection of the locomotive event recorder indicated that a 6-lb service reduction of the air brakes was increased to 14 lbs before the impact. The locomotive event recorder also showed that the locomotive was coupled to the caboose at 13 mph.

The brakeman who crossed under the standing cars on track No. 21 stated that he did not know why he and the conductor crossed under the standing cars instead of running directly south. There was no obstruction that would have prevented the two employees to go in that direction.

Applicable Rules

MOVEMENT OF TRAINS AND ENGINES

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103 (a). Precautions in Switching....

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(2) When coupling or shoving cars, take proper precaution to prevent damage or fouling of other tracks by stretching coupling, and setting sufficient hand brakes. Make couplings at a speed of not more than 4 miles per hour.

(Uniform Code of Operating Rules)

MISSOURI PACIFIC RADIO RULES

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423. When radio is being used in lieu of hand sign signals, both the direction and distance to be traveled must be given. Movement must be stopped in one-half the distance specified unless additional instructions are received.

(Missouri Pacific Lines, Rules and Instructions Governing the Operation of a Railroad Radio Communication System.)

PART 220-RADIO STANDARDS AND PROCEDURES

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Subpart B - Radio Procedures

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Section 220.49 Switching, backing or pushing.

When radio communication is used in lieu of hand signals in connection with the switching, backing or pushing of a train, engine, or car, the employee directing the movement shall give complete instructions or keep in continuous radio contact with the employees receiving the instructions. When backing or pushing a train, engine or cars, the distance of the movement must be specified, and the movement must stop in one-half the remaining distance unless additional instructions are received. If the instructions are not understood or continuous radio contact is not maintained, 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.

(49 CFR 200-399, Revised October 1, 1982)

Analysis

The rear brakeman directed the engineer, by radio, to shove the 40 cars toward the caboose and the cars on the Camden main track. As the cars were being moved to couple onto the caboose, the rear brakeman told the engineer that the distance to the coupling was 5 carlengths. This was the last radio transmission. The coupling was made at about 13 mph, as indicated on the event recorder.

It could not be determined why the conductor crossed under the standing car on track No. 21. No obstruction prevented him from moving directly south to be clear of the derailing equipment.

Cause

The crew failed to control the train movement on a 2-percent descending grade and coupled the cars onto the caboose at excessive speed causing the equipment to derail.

REPORT: 9

RAILROAD: Southern Pacific Transportation Company

LOCATIOn: Victoria, Texas

DATE: April 20, 1983

The Accident

A 57-year-old conductor was fatally injured on April 20, 1983, at about 10:15 a.m., in Victoria, TX. Employed by the Southern Pacific Transportation Company, the conductor had 38 years of service.

Background

At the accident area, a spur track extending east and west intersects U.S. Highway 87 at about 90 degrees. The crossing is protected by standard advance warning signs about 750 feet from the crossing; standard pavement markings about 550 feet from the crossing; painted stoplines about 15 feet from the crossing; and two standard crossbucks at the crossing. The crossing is marked "DOT SP 746 4865."

The highway in the accident area is a two-lane, undivided road paved with bituminous material. Each lane, 10 feet 6 inches wide, has an improved shoulder 8 feet wide.

An eight-wheel, diesel engine dump truck was traveling to a gravel yard south of Victoria. In this type of truck, the first view of the crossing for a southbound driver is estimated to be at a point 765 feet north of the crossing. The highway speed limit is 50 mph from 1/2-mile north through the crossing.

The conductor was last examined on the carrier's operating and safety rules on May 15, 1981.

The driver of the dump truck worked for a local trucking firm for about 9 months. He held a valid Texas Commercial Operator's Permit, and his driving record showed no convictions or accidents. He drove this route several times each work day; this trip was his second of the day.

Circumstances of the Accident

The conductor was a member of a crew assigned to operate a local freight train from Victoria to Cuero, and return. The crew, consisting of himself, an engineer, two brakemen, and a fireman, had been on duty for 1 hour 15 minutes after completing the required off-duty period.

An attorney and a claims agent representing the carrier were at the scene to photograph the locomotive at various locations on the spur track west of the highway. The photographs were part of a pending lawsuit arising from a 1978 truck-train crossing accident.

The locomotive was detached from the train on the main track and entered the spur track, stopping clear of the east side of the highway. After a briefing by the attorney and the claims agent, the train crew took the following positions: one brakeman carrying a red flag was stationed about 500 feet north of the crossing to protect against southbound traffic; the other brakeman stood just south of the crossing to protect against northbound traffic. The conductor remained near the locomotive on the east side of the highway. The claims agent, preparing to take photographs, was about 300 feet north of the crossing on the west side of the highway. The attorney remained at the crossing on the west side of the highway.

After the brakemen were positioned to provide protection, the conductor signaled the engineer to proceed west. The engineer sounded the whistle and, with the engineer's bell ringing, the locomotive proceeded onto the crossing. After walking about three-fourths of the width of the highway, the conductor boarded the right front steps of the locomotive and began to climb the walkway. As he reached the level of the walkway, the dump truck, traveling at an estimated 15 to 20 mph, struck the front of the engine on the right side, crushing the conductor. The conductor was pronounced dead at 10:40 a.m. at Citizen's Memorial Hospital.

Applicable Rules

VICTORIA SUBDIVISION

. . . . . .

Rule 103. Cars must not be kicked or dropped over the following crossings and before making train, engine or switching movement over such crossing, a member of crew must take position to afford warning to traffic while movement is being made:

Foster Field -- Highway 59
Dupre --------- Highway 87 on Heldenfeld's Spur
Aloe --------- Highway 59

(Southern Pacific Transportation Company - Houston Division Timetable No. 3)

GENERAL RULES

. . . . . .

P....

When equipment is moving over street crossings or in a street, employees must not ride on sill steps, lower rungs of ladders, leading end of engines, caboose steps or vestibule steps of cars.

(Southern Pacific Transportation Company, Rules and Regulations of the Transportation Department)

ARTICLE XI

SPECIAL STOPS AND RESTRICTED SPEEDS REQUIRED

Sec. 86. Obedience to signal indicating approach of train. Whenever any person driving a vehicle approaches a railroad grade crossing, the driver of such vehicle shall stop within fifty (50) feet but not less than fifteen (15) feet from the nearest rail of such railroad and shall not proceed until he can do so safely when:

. . . . . .

(b) A crossing gate is lowered, or when a human flagmen gives or continues to give a signal of the approach or passage of a train;

(c) A railroad engine approaching within approximately fifteen-hundred (1500) feet of the highway crossing emits a signal audible from such distance and such engine by reason of its speed, or neafness or such crossing; is an immediate hazard;

(d) An approaching train is plainly visible and is in hazardous proximity to such crossing.

ARTICLE XIX

SPEED RESTRICTIONS

Sec. 166 (a)....

(b) No person shall drive a vehicle on a highway at a speed greater than is responsible and prudent under the conditions and having regard to the actual and potential hazards then existing. In every event speed shall be so

controlled as may be necessary to avoid colliding with any person, vehicle or other conveyance on or entering the highway in compliance with legal requirements and the duty of all persons to use due care.

(TEXAS MOTOR VEHICLE LAWS - UNIFORM ACT)

Analysis

The crew of the train provided the required crossing protection but the driver of the dump truck took no action to control the speed of his vehicle.

Cause

The accident occurred because the conductor failed to place himself in a safe position on the leading end of the locomotive.

Failure of the truck driver to control the speed of his vehicle and stop short of collision with the engine was a contributing factor.

REPORT: 10

RAILROAD: Patapsco & Back Rivers Railroad

LOCATION: Sparrows Point, Maryland

DATE: April 22, 1983

The Accident

A 60-year-old brakeman was fatally injured on April 22, 1983, at about 10:45 p.m., in the North Central District Yard, Sparrows Point, MD. Employed by the Patapsco & Back Rivers Railroad, the brakeman had 32 years of service.

Background

In the North Central District Yard, the "A" yard lead extends east and west and is located directly in front and north of the North Central Yard Office. Track No. 388 turns from the lead in a southwesterly direction at a switch located approximately 100 feet west of the northwest corner of the yard office. The 388 switch stand is on the south side of the lead. Track No. 388 encircles the yard office in an elliptical configuration to another turnout from the lead in a southwesterly direction at a switch located approximately 350 feet west of the 388 switch. In level terrain, both the 388 and 375 switches are facing point switches for westbound movements on the lead.

The carrier does not conduct formal rules classes. Instead, the yardmasters, who are considered officials, hold safety meetings with the switch crews to discuss safety rules. Safety observations are made to determine employee compliance with the safety rules, and written reports are submitted. The carrier's records indicated that officials had conducted safety meetings and observations with the brakeman, and the records showed no safety rule discrepancies. The most recent observation was made in March 1983.

Circumstances of the Accident

The accident occurred on the lead approximately 3 feet east of the 388 switch. The brakeman was a member of a yard switching crew consisting of a conductor, two brakemen, an engineer, and a fireman. The crew had been on duty 7 hours 45 minutes after completing the required off-duty period.

Throughout the evening, the crew had been performing switching operations and was completing its final switching

assignment when the accident occurred. The assignment required the crew to bring 24 empty flatcars westward on the lead track with the engine coupled to the west end of the cars; the 24 cars were to be left on track No. 388. After that, the crew was told to move the engine eastward on track No. 388 to the lead, then move it westward on the lead to reenter track No. 388, couple it to the 24 empty flatcars and move the 13 cars from track No. 388 to track No. 375. Finally, the crew was instructed to uncouple the engine, return it to the yard office, and their period of duty was finished.

At the time of the accident, the conductor and the engineer were in the yard office locker room. The subject (first) brakeman was at the 388 switch; the second brakeman stood at track No. 375 to uncouple the 13 empty flatcars; and the fireman was operating the engine from the engineer's seat on the south side of the control compartment. After the engine returned from track No. 388 to the lead, with the 13 empty flatcars, the brakeman used lantern hand signals to stop the movement. The west end of the 13th car stopped on the lead approximately 18 feet east of the 388 switch. The brakeman lined the 388 switch for the lead and signaled the fireman to back the cars westward on the lead. The firemen stated that the three turns of the lantern he received from the first brakeman as the back-up signal were clearly visible. The fireman also stated that he never again saw the first brakeman's lantern after he received the back-up signal. The fireman backed the 13 empty flatcars westward on the lead and onto track No. 375. Then he and the second brakeman returned to the yard office with the engine. The fireman and the second brakeman could not find the first brakeman and began a search. A member of the 11 p.m. switching crew found the body of the first brakeman on the lead, approximately 3 feet east of the 388 switch. He had been run over by a car and was pronounced dead by the medical examiner.

A post-accident investigation disclosed no unusual conditions in track, equipment, or surrounding terrain that could have contributed to the accident.

Applicable Rules

4.0 PRECAUTIONS IN TRACK AREA

. . . . . .

4.2 In yard areas, employees must expect switching movements, at any time, on any track, in either direction. Always be on the alert for moving engines or cars, and keep a sharp lookout in both directions....

(Patapsco & Back Rivers Railroad Company, Safety Rules)

Analysis

The first and third wheels on the north side of the westernmost car (the 13th car from the locomotive) showed evidence of having passed over the brakeman. There were no witnesses, and more exact circumstances could not be determined.

Cause

The brakeman failed to stand clear of rolling equipment and was run over by a freight car.

REPORT: 11

RAILROAD: Chesapeake and Ohio Railway Company

LOCATION: Concord, Kentucky

DATE: April 28, 1983

The Accident

A 33-year-old off-duty trackman was fatally injured on April 28, 1983, at about 11:30 p.m., near Concord, KY. Employed by the Chesapeake and Ohio Railway Company, the trackman had 12 years of service.

Background

The accident occurred on the main track of the Ohio Division, approximately 81 miles east of Cincinnati, OH. At Concord, a siding 3 miles long parallels the main track on the south side. A spur track 1,440 feet long diverges from the west end of the siding about 2,650 feet from the west siding switch. The grade in the area is level.

The trackman was a member of a rail crew billeted for the night in camp cars spotted on the spur track. He joined the rail crew the day before the accident and had worked from 8:30 a.m. to 5:30 p.m. on the day of the accident.

The trackman had attended a Maintenance-of-Way safety meeting before starting work on the day of the accident.

Circumstances of the Accident

Members of the rail crew stated that at about 9 p.m., they observed the trackman walking along the track toward the town of Concord. He appeared alert and in good spirits. Since he did not return to the camp cars, his whereabouts until the time of the accident were unknown.

Train No. 91, a westbound freight train consisting of one locomotive, 48 cars, and a caboose (2,758 tons), approached the Concord area on the main track at a speed of 25 mph. The engineer and the front brakeman were in the control compartment of the locomotive at the forward end.

As the train came to the Washington Street grade crossing, just west of the west siding switch, both the locomotive horn and bell were sounded as a warning to persons using that crossing. Just before this crossing, the engineer saw

something lying across the south rail and detected some movement of the object.

The train air brakes were placed in emergency by the engineer; however, the speed was not materially reduced before the train struck the trackman. His body was dragged about 97 feet from the initial point of impact; he was pronounced dead on arrival at a local hospital.

An autopsy indicated that the trackman died from multiple injuries to the head and chest. Chemical examination of the blood revealed an Ethyl Alcohol content of 0.29 percent by weight. The State of Kentucky considers a blood alcohol concentration of 0.10 percent to be presumptive evidence of intoxication.

Applicable Rules

GENERAL NOTICE

. . . . . .

G. The use of intoxicants, narcotics, or dangerous drugs by employees subject to duty, while on duty, or on company property is prohibited....

(Chessie System--Operating Rules)

ON OR ABOUT TRACKS

. . . . . .

50. Employees are prohibited from being on rails, ties or any other part of track structure, except when necessary in performance of duty....

(Chessie System--Safety Rules)

Analysis

It is reasonable to presume that the trackman's sense of direction and mobility was impaired by the ingestion of alcohol.

Visibility and train weight and speed prevented the engineer from stopping the train after he saw the trackman lying on the track.

Cause

The accident was caused by the failure of the trackman to remain clear of the main track.

A contributing factor was the blood alcohol level of the trackman.

REPORT: 12

RAILROAD: The Atchison, Topeka and Santa Fe Railway Company

LOCATION: Edmond, Oklahoma

DATE: May 2, 1983

The Accident

A 23-year-old relief communications maintainer was electrocuted on May 2, 1983, at about 3:35 p.m., in Edmond, OK. Employed by the Atchison, Topeka and Santa Fe Railway Company (ATSF), the employee had 3 years of service.

Background

At milepost 370.42, a 25-foot 11-inch-high communications signal pole stands about 64 feet east of the main track. Attached to the pole are two cross-arms supporting wires for the signal circuits, and three cross-arms supporting the wires for the communication circuits. On the west side of the top cross-arm, a transposition bracket supports four communication wires. The top pin of the transposition bracket is 9 inches above the cross-arm and nearly level with the top of the pole. In the same place, the city of Edmond has a three-phase, 225 KV electrical transmission line which crosses above and is nearly perpendicular to the ATSF communication wires.

The relief communications maintainer, first employed February 11, 1980, as a groundsman, was promoted through various steps to relief communications maintainer on July 6, 1981. During this period he attended weekly safety classes and meetings. His last safety class was in June 1982. When he began working, he was issued ATSF Rules Maintenance-of-Way and Structures and Safety Rules for Santa Fe Employees but was not required to take any tests or examinations on these rules.

Circumstances of the Accident

On May 1, 1983, the ATSF dispatcher phone circuit was broken, examination of the broken wire showed that a wire belonging to Edmond's electrical transmission line had touched and burned the dispatcher phone wire, breaking the wire and opening the circuit. On May 2, 1983, the relief communications maintainer went to repair the open circuit. At approximately 3:30 p.m., he arrived at milepost 370.42 and found the broken wire lying on the ground. He attached wire grips with wire-stretching blocks to the loose end of

the wire. An ATSF signal maintainer stated that he saw the relief communications maintainer start to climb the pole with the loose end of the rope in his hand. The signal maintainer then went into his office, approximately 200 feet from the pole. Three to five minutes later, the signal maintainer heard a loud noise, stepped out of his office, and did not see the relief communications maintainer. The signal maintainer then started across the tracks and saw the relief communications maintainer lying face down at the base of the pole. As the signal maintainer ran towards the pole, he asked some people coming from an adjacent building to call an ambulance. The signal maintainer then turned the relief communications maintainer face-up and using CPR attempted to revive him. However, the relief communications maintainer was pronounced dead at 4:30 p.m., at Edmond Hospital.

There were no witnesses to the accident. The relief communications maintainer had climbed the pole at milepost 370.42, and probably touched Edmond's 7,500-volt conductor with his left hand, as well as a grounding wire with his back and neck, which caused him to fall to the ground.

Shortly after the accident, but before the investigation, the Edmond Electrical Department cut 7 inches from the 7,500-volt conductor and spliced the wire, raising the level of the conductor. When the accident investigation was conducted on May 6, 1983, the lowest wire of the 7,500-volt wires above the highest wire of the ATSF communication line was 11 to 14 inches, and the 7,500-volt wires were 24 feet 5 inches above the rails of the ATSF track. Neither height was in compliance with the National Electrical Safety Code which Edmond had inserted into its City of Edmond Electrical Ordinance.

Applicable Rules

296. Employees must consider wires to be alive unless positively known that they are not energized.

. . . . . .

304. Avoid working on equipment or lines from any position which might tend to bring body toward exposed energized parts.

(The Atchison, Topeka and Santa Fe Railway Company, Safety Rules for Santa Fe Employee)

1055. The National Electrical Safety Code was adopted by the city of Edmond as Ordinance No. 10.55 on August 1, 1979.

(City of Edmond Electrical Ordinance)

233-1. Vertical clearance of open supply line conductors, 750 volts to 817 KV, above communication conductors--4 feet.

232-1. Minimum Vertical Clearance of Wires, Conductors, and Cables Above Ground, Rails, or Water-Open supply line conductors, 750 volts to 15 KV, above track rails of railroads--28 feet.

(National Electrical Safety Code)

Analysis

On the day before the accident the 7,500-volt conductor was so close to the communication wires that it touched and burned both wires.

After the accident, a 7-inch portion was cut from the 7,200-volt conductor, but it still failed to conform to the vertical specifications of the National Electrical Code and the city of Edmond Electrical Ordinance. This failure constituted an extremely hazardous condition.

When viewed from ground level, it is difficult to judge vertical clearance between two wires. The relief communications maintainer probably saw the 7,500-volt conductor but thought the vertical clearance was sufficient to safely repair the communication wires.

Cause

The accident was caused because the relief communications maintainer brought his body into contact with exposed, energized wires.

A contributing factor was the failure of the city of Edmond to maintain its 225-KV electrical line at a minimum of 4 feet above the ATSF communication conductors.

REPORT: 13

RAILROAD: Missouri Pacific Railroad Company

LOCATION: Villa Grove, Illinois

DATE: May 3, 1983

The Accident

A 31-year-old conductor was fatally injured on May 3, 1983, at about 10:05 p.m., in Villa Grove, IL. Employed by the Missouri Pacific Railroad Company (MP), the conductor had 11 years of service.

Background

The accident occurred on a siding track which parallels the main track on the east. The siding is 13,173 feet long, tangent, and on a slightly descending grade northward.

On October 5, 1982, the conductor was last examined on the Uniform Code of Operating Rules. At that time he received a eye and ear test. His last physical examination was administered in January 1973. He attended one safety class in 1980, eight in 1981, and none in 1982.

Circumstances of the Accident

The conductor was part of a crew assigned to operate Train CL southward from Villa Grove to Salem, IL. The crew consisted of an engineer, a front brakeman, a rear brakeman, and a conductor. It went on duty at 8:30 p.m. after the required off-duty period. Earlier, the conductor had been observed playing pool and drinking beer in a restaurant lounge, according to a statement by a waitress.

Inbound train CL arrived at Villa Grove at 9 p.m. Before the train appeared a trainman saw the conductor sitting on a bench outside the yard office holding his head in his hands. The conductor said he thought he was getting the flu or something. The trainman observed the conductor leave the bench, walk to a nearby garbage can, and then spit or cough into the garbage can.

When train CL reached Villa Grove, the engineer and the two brakemen boarded the locomotive. The train was moved southward on the siding and was stopped when the caboose was

adjacent to the yard office. The conductor then informed the engineer, via radio, that he was on the caboose and would remain there. He radioed the engineer to move the train southward on the siding and to perform the switching operations.

The caboose and 88 cars stayed on the siding. The caboose was about 800 feet south of the yard office. The engineer and the two brakemen performed the required switching and coupled 43 cars to the south end of the 88 cars and the caboose.

In the meantime, southbound train CHZ arrived at Villa Grove on the main track. It departed southward from Salem, IL., at 9:17 p.m. The crew members at the rear end of train CHZ reported that as their train passed train CL, they saw that the rear-end marking device was lighted, but the caboose interior lights were not. They saw no one either in the caboose or walking near the main track or the siding.

At about 9:40 p.m., a yard clerk boarded the caboose to deliver the train list and waybills. He did not see any light in the caboose, and there was no response when he called to the conductor. The clerk left the material in the caboose and departed, without having seen or heard the conductor.

After the 43 cars were attached to train CL, the rear brakeman instructed the engineer to pull the train southward to perform the air brake test out of the way of a road crossing. The completed train consisted of three locomotives, 131 cars, and a caboose, in that order.

The rear brakeman boarded the caboose, noticed that the conductor was not there, and told the engineer to stop the train. He did not perform the air brake test, as planned. He said he thought the conductor may have walked back to the yard office, so he instructed the engineer to shove the train northward toward the yard office.

The caboose was equipped with a track inspection spotlight, which the rear brakeman turned on for the reverse movement. While moving northward at about 6 to 8 mph, the brakeman saw the body of the conductor lying on the field side of the east rail of the siding track. Using his radio, the rear brakeman told the engineer to stop the train, use the radio in the locomotive to call the yard office and request an ambulance and to notify a carrier officer. The train was stopped with the ninth car ahead of the caboose at the location of the body. The body was about 3,000 feet south of the yard office.

The coroner was called and arrived shortly. He examined the scene and reported the position of the body as parallel to

the rail, chest down, head toward the south, with the face turned toward the rail. The left arm was extended slightly toward the south, the right arm was bent back behind the body, with the palm up and the elbow on top of the rail. The elbow was crushed as if it were run over by a freight car wheel. The coroner also reported he detected the odor of alcohol from the body during this examination. The conductor's wrist was discovered in the center of the siding track five ties south of the body. His suitcase with his darkened lantern attached was found in the caboose.

An inspection of the cars in the train found no defects that would have caused the accident, and no trace of clothing or human matter was found on any of the cars.

An autopsy on the body of the conductor revealed a blood alcohol content of 0.18 percent.

Applicable Rules

G. The use of intoxicants is prohibited....

. . . . . .

L.

When employees are on or near tracks, they must expect the movement of trains, engines or cars at any time, on any track, in either direction.

(Uniform Code of Operating Rules)

Vehicle Code Section IIg-501.1

. . . . . .

(7) That a reading of .10% or more by weight of alcohol in the blood establishes a presumption of being under the influence of intoxicating liquor....

. . . . . .

(1982 Illinois Vehicle Code)

Analysis

As there were no witnesses to the accident, the exact circumstances could not be determined. After the switching operation began there was no further communication with the conductor. It could not be determined why he left the

caboose on a dark night without his lantern or why he went toward the head end of the train.

Apparently he failed to stay clear of the moving train on the siding.

Cause

This accident was caused by the failure of the employee to remain clear of moving equipment.

The employee's blood alcohol content was 0.18 percent and may have impaired his facilities and caused disorientation.

REPORT: 14

RAILROAD: Burlington Northern

LOCATION: Cicero, Illinois

DATE: May 13, 1983

The Accident

A 23-year-old trackman was fatally injured on May 13, 1983, at about 12:33 p.m., in the Cicero Yard, Cicero, IL. Employed by the Burlington Northern (BN), the trackman had 3 1/2 years of service.

Background

The accident occurred on the South Lead track and Fence track. The tracks are designated from the south as the Fence track, South Lead track, and the Classification Yard tracks. Extending from east to west, the tracks are tangent and practically level. The Fence track and the South Lead track are connected by a crossover at the west end of the tracks.

On the day of the accident, a track crew, consisting of a foreman, 10 trackmen, and a speed-swing crane operator, went on duty at 7:30 a.m. The crew was replacing ties and rail on the South Lead track.

The Pettibone Speed-Swing Crane (Model 441-B) uses a rubber-tired, four-wheel-drive unit and is designed for use on or off the track. A boom attachment for handling heavy objects extends from the forward end of the machine, and the crane is operated from an enclosed cab. Workmen on the ground use hand signals to direct the movement of the crane and the lifting of materials.

The trackman was last examined and passed the BN Rules of the Maintenance of Way Department on June 7, 1981. He attended a safety meeting on May 12, 1983, and his last physical examination was administered on August 27, 1979. In addition the BN conducts Monday safety meetings.

The crew of the east train-yard engine assignment consisted of a yard conductor, two helpers, and an engineer. They went on duty at 6:30 a.m., after completing the required off-duty period. The engineer was operating the locomotive from the south side of the Fence track; the other crew members were also on the south side, before they made their westward movement.

Circumstances of the Accident

The accident occurred about 196 feet east of the west end of the South Lead track. Before the accident, the maintenance-of-way-crew had placed a 39-foot rail and a 78-foot rail on the ties of the south rail of the South Lead track. The foreman instructed eight members of the crew to start spiking these rails. Then the foreman, two trackmen, and the speed-swing crane operator put a second 78-foot rail into position. The west end of the second rail had just been placed on the ties upside down (ball of rail on ties), when the foreman saw a cut of cars move eastward and stop east of where he stood on the Fence track. The crew of the east train-yard switch engine warned the trackmen they were going to move the cars westward on the Fence track.

The speed-swing crane was removed and placed about 15 feet from the east end of the 78-foot rail on the South Lead track. The subject (first) trackman told the foreman he was going to get a rail fork after which the foreman paid no further attention to him. The foreman then attached rail tongs to the base of the second 78-foot rail, which was lying on the ballast 4 to 5 feet north of the north rail, on the Fence track.

The first trackman was standing on the South Lead track near the west end of the second 78-foot rail. The foreman, one trackman, and the speed-swing crane operator noticed the cut of cars being shoved in a westward direction on the Fence track as the foreman gave the hand signal for the speed-swing operator to lift the rail. When it was raised, the 78-foot rail drifted southward, horizontally, 2 to 3 feet off the ground. The east end of the rail struck the jacking pad (B-End) on flatcar TTAX 981704, the 9th west car of a 21-car cut of cars being moved at 3 mph on the Fence track. The rail started falling from the rail tongs, and at its easternside, it caught the L-3 wheel of the TTAX 981704; it was drawn under the wheel and came to ride in a westward direction on top of the north rail of the Fence track.

The west end of the 78-foot rail struck the first trackman on his right leg, knocking him down on the ties of the South Lead track. After the foreman heard his scream, the first trackman stood up, and the rail knocked him down again. The rail then hit the 78-foot rail that was being spiked down and both rails created a scissor's effect. The trackman was pinned between the rails; the rails were rolling toward the Fence track; and the cut of cars were continuing to move westward. The foreman first tried unsuccessfully to pull the trackman from the two rails, then he climbed over a flatcar to warn the switchmen on the opposite side of the

cut of cars to stop the movement, which they did. But, before the movement could be halted, the trackman was dragged under the moving cars and run over. He was killed instantly and pronounced dead at the scene.

The first trackman's body was dragged under the flatcar (TTAX 981704) 84 feet east; there, the lower part of his body was found on the north side of the Fence track. The upper part of his body was found 12 feet further west between the west wheels ("B"-end) of this flatcar. The body was severed just below the waist.

The foreman, another trackman, and the speed-swing crane operator did not recall if they were informed of the movement of cars on the Fence track; however, they could see the cut of cars moving westward when they picked up the east end of the 78-foot rail.

On the 10th flatcar (BN 635603), on the cut of cars moving westward on the Fence track, the east track was derailed by running over the 78-foot rail.

The post-accident investigation of the equipment failed to reveal any defects that would have contributed to the accident.

Under simulated conditions, carrier officers conducted a test with a 78-foot rail (129 pounds per yard), the same speed-swing crane, and the same operator. The 78-foot rail, when raised with rail tongs at the base of the rail, had a horizontal swing of approximately 3 to 4 feet to the south.

Applicable Rules

GENERAL RULES

. . . . . .

M. Employees must exercise care to prevent injury to themselves or others.

. . . . . .

(Burlington Northern, Rules of the Maintenance of Way Department, Operating Department)

ON OR ABOUT TRACKS

58. Employees Must:

a. Expect the movement of trains, locomotives, cars or other moveable equipment at any time, on any track, in either direction.

. . . . . .

c. Move to a place of safety upon approach of moving equipment on the track upon which they are working or on the adjacent track.

d. Keep a safe distance from passing cars and trains to avoid falling objects and projections on equipment.

59. Employees must not:

c. Rely on others to warn them of the approach of moving equipment but instead be alert for their own safety.

301. Operators will be responsible for the safety of employees who are working with their equipment. Employees working adjacent to the equipment must see that no unsafe work practices are used in connection with the equipment operation.

(Burlington Northern Railroad--Safety Rules and General Rules)

Analysis

The foreman, a trackman, and the crane operator observed the car movement in a westward direction when the foreman gave the hand signal to the crane operator to lift the rail. The rail drifted southward and struck the jacking pad of a flatcar (TTAX 981704). The rail then dropped from the rail tongs, was drawn under the wheel, and slid on top of the rail ahead of the wheel when it struck the first trackman.

It could not be determined why the trackman was standing with a rail fork at the west end of the 78-foot rail.

Cause

The accident occurred because a piece of rail was lifted onto the path of an oncoming cut of cars, and the rail struck the trackman's body, causing him to be drawn underneath moving freight cars.

REPORT: 15

RAILROAD: Consolidated Rail Corporation

LOCATION: Cleveland, Ohio

DATE: May 26, 1983

The Accident

A 47-year-old bridge and building foreman was fatally injured on May 26, 1983, at about 12:45 p.m., in Cleveland, OH. Employed by Consolidated Rail Corporation (Conrail), the foreman had 17 years of service.

Background

The accident occurred on bridge No. 183.24 on the Cleveland Division of Conrail on the Buffalo-Chicago main line. Two main tracks extend in an east-west timetable direction and trains operate under a Traffic Control System (TSC).

The north track is designated track No. 1; the south, track No. 2. From the west end of the 189-foot-long bridge, there is a 1-degree 7-minute curve to the right 949 feet long.

The accident occurred on track No. 1 at the east end of the bridge. The grade in the area is 1 percent, descending to the east; the maximum authorized speed is 70 mph.

The bridge and building foreman last attended a Safety Rule meeting March 3, 1983. His last physical examination was administered on February 8, 1980.

Circumstances of the Accident

The bridge and building foreman and three mechanics were removing spacer blocks between the ties on track No. 2. The mechanics were 53 feet from the west end of the bridge, and the foreman was about 22 feet west of the mechanics, acting as a watchman to alert the mechanics of approaching trains. The foreman did not have a whistle or any other audible device that could warn the mechanics. In the accident area, trains operate by means of a TSC on either track in either direction. This is a high-density traffic area, and several trains had passed through without mishap before the accident.

An eastbound freight train moving at about 50 mph on track No. 1 approached the bridge area. The engineer sat at the controls on the south side of the locomotive cab. The front brakeman was seated on the north side of the cab. The

locomotive headlight was displayed. The engineer sounded the horn and the bell, as the train rounded the curve and approached the bridge. The engineer made an emergency brake application when he realized that the foreman would not clear the track.

When the foreman saw the eastbound train coming, he called out, "A train is coming," and the mechanics hurriedly moved east, clear of the bridge. The foreman was seen running eastward on the center walkway between the two main tracks,when he stepped between the rails of track No. 1. He stopped momentarily, and looked eastward before he was struck. It was not determined why the foreman decided to clear the bridge on the east instead of the west end. He was pronounced dead at the scene.

Applicable Rules

WALKING

3035. Expect equipment to move on any track, in either direction, at any time. Therefore, employees must look in both directions before:

(a) Fouling or crossing track.

. . . . . .

PROTECTION AGAINST MOVING EQUIPMENT

3206. Before permitting men to be on track, the foreman or man in charge will have an understanding with all the men as to where they will go when necessary to clear for trains.

3207. Designated employed must have the equipment indicated below, in good order and readily accessible for use, the warning whistle to be on the outer side of the clothing, while in charge of a man or men engaged in work on or about the track:

Visibility	Asst. Foreman or Person in Charge
Good	Warning whistle

. . . . . .

3208. When required, a watchman will if practicable, be stationed clear of all tracks at a point where they will have the best view of approaching trains in both directions, and a sufficient distance from the gang to prevent their attention being distracted by the work, but no farther than his warning whistle can be distinctly heard....

3209. Gang watchmen (or foreman, when watchman is not required) must on approach of a train from either direction, warn gang in time for it to clear all tracks at least 15 seconds before train reaches point of work....

(Conrail Safety Rules, Maintenance of Way Employees)

Analysis

The foreman was standing about 22 feet to the west of the workmen, and he could have cleared the bridge to the west in less time than it took to clear the bridge to the east.

Apparently, the foreman thought the approaching train was moving east on track No. 2, not track No. 1.

Cause

The accident was caused by the failure of the foreman to properly protect himself from an oncoming train.

REPORT: 16

RAILROAD: Southern Pacific Transportation Company

LOCATION: Coos Bay, Oregon

DATE: May 26, 1983

The Accident

A 59-year-old conductor was fatally injured on May 26, 1983, at about 10 a.m., in Coos Bay, OR. Employed by Southern Pacific Transportation Company, the conductor had 33 years service. The weather was clear; the temperature, 65° F.

Background

That portion of Coos Bay train yard where the accident occurred consists of five classification tracks, numbered 1 through 5, located to the north of the main track. Yard limits are established.

The conductor was a member of a train crew consisting of an engineer, a conductor, and two brakemen. The crew had been on duty for 1 hour after completing the required off-duty period.

The conductor was last examined on the carrier's operating rules on July 8, 1982. The carrier does not normally require train service employees to take physical or visual examinations after their initial employment.

Circumstances of the Accident

At the west end of the yard, the crew was working with two locomotives, switching cars and assembling the train. The engineer was in the control compartment at the west end of the locomotive compartment; the two brakemen were in different parts of the yard performing switching duties. When last observed, the conductor was standing next to the main track checking car numbers. There were no witnesses to the accident. As the locomotives backed out of track No. 3, the engineer saw the conductor's body being ejected from under the leading end of the second locomotive near the lead track switch. The conductor had multiple injuries including traumatic amputation of both legs. He was transported to a local hospital where he died while being treated.

Marks on the rail and on the track indicated that the conductor was struck and run over, then dragged under the locomotives for about 350 feet to the point where his body was ejected as the locomotives passed over the lead switch

frog. It could not be established why the conductor placed himself foul of a track on which the locomotive was moving.

Applicable Rules

GENERAL RULES

. . . . . .

N. Employees must expect the movement of trains, engines, or cars at any time, on any track, in either direction.

Employees must know that it is safe before fouling, walking between or crossing tracks by looking in both directions....

(Southern Pacific Transportation Company -- Rules and Regulations of the Transportation Department)

Analysis

The conductor was standing next to the main track checking car numbers as the locomotive backed out of track No. 3. He was struck and run over by the locomotive.

Cause

The accident occurred because the conductor failed to remain clear of moving equipment.

REPORT: 17

RAILROAD: Illinois Central Gulf Railroad

LOCATION: Harvey, Illinois

DATE: May 31, 1983

The Accident

A 29-year-old assistant foreman was fatally injured on May 31, 1983, at about 2:08 p.m., in Harvey, IL. Employed by the Illinois Central Gulf Railroad (ICG), the employee had 8 years of service.

Background

The accident occurred on tangent track in multiple track territory. There were no visibility restrictions. The employee was last examined on the rules for the Maintenance of Way and Structures in June 1978. He attended an in-depth safety seminar in January 1980 and in April 1983. His last physical examination was administered in January 1982.

Circumstances of the Accident

The assistant foreman reported to his duty station in Stunkel, IL, on the morning of the accident. The employee who was qualified to act as a pilot received instructions from the track supervisor to pilot Tamper MT-450 from Sauk Trail to milepost 18.7 and to raise the approaches on tracks 4 and 5 to the Little Calumet River Bridge.

When the deadhead move of Tamper MT-450 was completed, the assistant foreman helped by the Harvey section crew (one foreman and two laborers) raised and tamped both approaches to the Little Calumet River Bridge on track 5. The Tamper MT-450 was then moved to track 4. The men had just completed the initial raise on the south end of the bridge on track 4 and were tamping the run off when the assistant foreman was struck by a back-up movement of a southbound freight train operating on track 3. Tracks 4 and 5 were out of service.

The assistant foreman was found near the tamper between tracks 4 and 3. He was last seen shoveling ballast to the tamping blades.

The crew of the southbound train, consisting of an engineer, a switchman, a flagman, and a conductor, was returning to Harvey Yard after making an interchange delivery to the Baltimore and Ohio at Barr Yard. The engineer was at the controls, and the switchman was seated in the fireman's seat opposite him. The conductor and the flagman were standing on the "B"-end platform of the caboose.

The flagman and the conductor said they continuously sounded the warning whistle on the rear platform of the caboose, as the train moved towards the section crew. When it became apparent the subject assistant foreman did not hear the train, the flagman and the conductor attempted to stop the train movement by using the conductor's outside brake valve. Both men declared that the outside brake valve did not operate. The conductor then ran back to the center of the caboose to activate the emergency valve; however, not enough time remained to avoid striking the assistant foreman.

Notified of the accident by radio, the Harvey yardmaster immediately telephoned the Harvey Fire Department paramedic team. The paramedics arrived 4 minutes after receiving the call. The assistant foreman was pronounced dead on arrival at Ingalls Memorial Hospital.

Post-accident tests by the carrier disclosed that the "B"-end whistle and conductor's emergency valve were working.

Track-side measurements of the overhang of the caboose and the tamper in relation to the 13-foot track centers showed a possible 3-to-4 foot clearance--depending on the asistant foreman's exact position when he was struck.

Applicable Rules

ON OR ABOUT TRACKS

. . . . . .

131. Track work must not be started until foreman or employee in charge makes certain that employees know where to go when it is necessary to clear passing trains, locomotives, or cars.

132. The foreman or employee in charge must be alert and watchful, keeping a lookout for approaching locomotives or cars and giving warning upon the approach of locomotives or cars in time for all to reach a place of safety.

133. All employees must be alert for approaching equipment for their own safety and the safety of their fellow workers.

134. Employees must move to a place of safety upon approach of moving equipment on the track upon which they are working or on adjacent tracks.

(Safety Rules, Illinois Central Gulf Railroad)

N. DANGEROUS POSITIONS.

. . . . . .

Employees must not remain near the track when trains are passing. Where there are two or more tracks, they must, when practical, stand outside and clear all such tracks....

(Illinois Central Gulf Railroad Company, Rules for the Maintenance of Way and Structures)

Analysis

The assistant foreman was struck first by the front vertical handhold of the caboose on the right side and second by the back vertical handhold opposite the steps. He was standing next to the tamper between tracks 4 and 3, shoveling ballast between the ties for the tamping blade.

Cause

The accident was caused by the failure of the assistant foreman to keep a lookout for approaching trains on adjacent tracks.

Extraneous noise may have been a contributing factor.

REPORT: 18

RAILROAD: Richmond, Fredericksburg and Potomac Railroad Company

LOCATION: Alexandria, Virginia

DATE: June 4, 1983

The Accident

A 54-year-old car inspector was fatally injured on June 4, 1983, at about 7:30 a.m., in Alexandria, VA. Employed by the Richmond, Fredericksburg and Potomac Railroad Company (RF&P), the car inspector had 28 years of service.

Background

The southbound classification yard, an automated hump yard, consists of 39 parallel tracks extending north and south. Tracks are numbered from west to east. The apex of the hump is on the north end of the yard, and cars roll into the classification tracks from north to south. In the following order, five group retarders control the speed of the cars: tracks 1 through 7; 8 through 15; 16 through 23; 24 through 31; and 32 through 39. A car foreman's building is approximately 423 feet north and 350 feet east of the hump apex. The control tower for the southbound classification yard is situated about 500 feet south of the hump apex near the group retarder for tracks 1 through 7. In the accident area, the terrain is practically level.

The carrier conducts periodic safety meetings with mechanical department employees, but does not maintain a written attendance record. Data from the carrier indicated that the car inspector received: a copy of the RF&P Safety Rules effective March 1, 1979, on April 12, 1979; Blue Signal Protection Instructions effective May 27, 1976, on May 28, 1976; and a padlock for blue signal protection requirements on January 6, 1978. The annual eye and ear tests conducted by the RF&P since 1977 indicated that the car inspector had 20/20 vision in both eyes and normal color perception; the use of an ear protection device was recommended for noise.

Circumstances of the Accident

The accident occurred on track No. 10 approximately 1,921 feet south of the apex of the hump. The car inspector reported to the car foreman's building before his regular 7 a.m. assignment in the southbound classification yard.

As usual, the car inspector was assigned to work in the southbound classification yard and the procedures were routine. He customarily oiled the journal boxes on cars in tracks 10 through 12, and a second car inspector oiled journal boxes on cars in tracks 1 through 9 -- until specific instructions were received from the crew foreman. The foreman could also block out the classification tracks when blue signal protection was requested by the car inspectors. The foreman stated he had no request from the first car inspector to block out any tracks in the southbound classification yard. The first car inspector was last seen by a yard brakeman who was walking north toward the apex of the hump near the north end of track 17. The brakeman saw the first car inspector walking in a southwesterly direction near track 12.

At approximately 7:30 a.m., as the second car inspector walked northward between tracks 6 and 7, he saw the first car inspector caught between the couplers of two cars on track 10. Using his portable radio, he promptly advised the foreman of the emergency; and the classification of cars was stopped.

The first car inspector's body was discovered in a standing position facing south; it was caught between the couplers of the third and fourth cars from the south end of track 10. Inside the east rail, an oil can was on the ground below his left hand. His tool belt had been severed and his radio and hardhat were on the ground under his right side, inside the west rail. The cause of death was listed by the medical examiner as an abdominal crush injury.

A post-accident investigation disclosed no unusual conditions of track, equipment, or surrounding terrain. An autopsy was performed and other than the injuries from the accident, no significant physical irregularities were noted by the pathologist.

At the time of the incident, track 10 contained nine cars and was an active classification track. The southernmost car was on a skate, and a hand brake was applied. This car had been classified at 2:35 a.m., on June 4, 1983. The second and third cars from the south were classified at 2:40 a.m., and were coupled to the southernmost car. The fourth car from the south (the first car north of the accident point) was classified at 2:46 a.m. The fifth car from the south was classified at 3:32 a.m. and was coupled to the fourth car. The sixth car from the south was classified at 5:20 a.m. and was coupled to the fifth car. The seventh car from the south was classified at 7:06 a.m. but was not coupled to the sixth car. The eighth and ninth cars from the south end were classified together at 7:30 a.m., and although they struck the seventh car, did not couple to it.

Applicable Rules

GENERAL

. . . . . .

F. Employees must exercise care to avoid injury to themselves or others....

. . . . . .

They must expect the movement of trains, engines, or cars at any time, on any track, in either direction.

. . . . . .

16. Using short cuts over dangerous places is prohibited. Use authorized routes in and about yards, shops, stations, etc.

(Richmond, Fredericksburg and Potomac Railroad Company Safety Rules)

Analysis

There were no witnesses to the accident, and the exact circumstances could not be determined. However, it appears that an opening existed between the third and fourth cars from the south end of track 10, and the car inspector chose to cross through this opening rather than to walk south for 3 carlengths to the end of track 10 where a crossing could have been safely made. The opening closed when the two cars classified into track 10 at about 7:30 a.m. struck the four cars north of the opening.

Cause

The accident occurred because the car inspector placed himself in an opening between two freight cars standing on an active classification track, and he was crushed between the freight car couplers when the opening closed.

REPORT: 19

RAILROAD: Atchison, Topeka and Santa Fe Railway Company

LOCATION: Romeoville, Illinois

DATE: June 14, 1983

The Accident

A 28-year-old lineman was fatally injured on June 14, 1983, at about 10:10 a.m. in Romeoville, IL. Employed by the Atchison, Topeka and Santa Fe Railway Company, the lineman had 2 1/2 years of service.

Background

At the accident site, a 25-foot 9-inch railroad telephone pole line runs parallel to a double main track 45 feet north of the westward main track. The poles supporting the telephone line wires have two cross-arms mounted near the top. Eight telephone wires were attached to the upper cross-arm of each pole; the wires had been removed from the lower cross-arm.

The lineman's last physical examination was administered July 30, 1982. He passed a written examination on the Rules for Maintenance of Ways and Structural Department for a machine operator August 20, 1982. The lineman was issued copies of Safety and General Rules for Line and Electrical Work on December 17, 1980.

Circumstances of the Accident

Two linemen and a chief lineman were assigned to remove wires from the railroad telephone pole line in Romeoville. The chief lineman and the subject (first) lineman had climbed the poles and were removing the wires. The second lineman began climbing the pole next to the first lineman's pole, and stopped a few feet from ground level to shake his pole to test its stability. The pole began falling with the wires attached, causing the adjacent pole (with the first limenan on it) to also fall. The first lineman hit the ground so forcefully that he sustained critical head and neck injuries, and later died in the hospital.

When the pole line was examined after the accident, each pole had eight line wires tied to the upper cross-arm; and each pole showed evidence of center rot at ground level.

Applicable Rules

GENERAL SAFETY RULES

1. Safety is the first importance in the discharge of duty.

2. Employee must know and obey safety rules.

. . . . . .

298. Before climbing, standing, or working on poles or cross arms employees must determine that these parts are strong enough to permit safe performance of the work....

309. Poles should be inspected before climbing. If it is not obvious from visual inspection that a pole is safe to climb additional precautions should be taken....

(The Atchison, Topeka and Santa Fe Railway Company, Safety Rules for Santa Fe Employees)

Analysis

As described by the chief lineman, it was common practice for linemen to remove wires by climbing a few feet up the pole and shaking the pole to check for stability. If the pole seemed stable, the lineman would continue climbing to the top and remove the line wires. This method was followed on the day of the accident.

Cause

This accident was caused because a pole became unstable as a result of center rot at ground level.

REPORT: 20

RAILROAD: Chattahoochee Industrial Railroad

LOCATION: Cedar Springs, Georgia

DATE: July 2, 1983

The Accident

A 35-year-old conductor was fatally injured on July 2, 1983, at about 5 a.m., near Cedar Springs, GA. Employed by the Chattahoochee Industrial Railroad, the conductor had 7 years of service.

Background

The accident occurred on a clear, dark morning on the main track at the switch to "C" track, an industrial track owned by the Great Southern Paper Company. From west to east, the layout consists of an auxiliary track and the main track. Two industrial tracks (with facing point switches for northward movements) diverge eastward from the main track and are designated, from south to north, "A" and "C." The "A" track switch stand is on the east; the "C" track switch stand is on the west side of the main track, 98 feet north of the "A" track switch stand. The grade for northward movements is 0.79 percent descending.

The conductor, a member of a yard crew consisting of himself and an engineer, was assigned to perform switching movements at the Great Southern Paper Company. They had been on duty 4 hours 30 minutes after completing the required off-duty period.

The conductor had originally worked as a utility man in the Mechanical Department, but transferred to the Transportation Department and was promoted to extra board conductor on April 19, 1982. He received a copy of the carrier's "Employees Safety Manual" and last attended a safety meeting in February 1982. His last physical examination was administered on March 22, 1983.

Circumstances of the Accident

Shortly before the accident, the crew operated a two-locomotive consist southward on the main track to "A" track to pick up two empty boxcars. (About that time, another yard switcher pulled a cut of cars moving southward on the auxiliary track and stopped the locomotive near the "A" track switch.)

Using hand signals from the conductor, the locomotive consist on the main track proceeded northward into "A" track and coupled to the two boxcars. The conductor made the air hose coupling between the locomotive and boxcars, radioed the engineer to "back up," and boarded the trailing boxcar on the east side of the north end. As the consist proceeded southward to the main track, the engineer received continuous radio transmissions from the conductor regarding the remaining distance to "A" switch. After the movement cleared the switch and stopped, the conductor lined the switch for movement on the main track. The engineer looked away momentarily and lost sight of the conductor. Moments later, the conductor radioed the engineer to "come ahead." The engineer released the brakes and increased the throttle, and the consist moved northward on the main track. After traveling several car lengths, the engineer stopped the movement because there were no further transmissions from the conductor.

About the same time, the yard switcher on the auxiliary track began shoving northward. As the switcher passed the northbound movement on the main track, the engineer on the switcher saw track ballast moving and then saw the conductor's legs hanging from beneath the locomotive on the main track. The engineer immediately halted his train on the auxiliary track and tuned his radio to the channel being used by the yard switcher on the main track. The engineer called the engineer working on the main track and told him to stop; but the movement had already stopped. Both engineers climbed down and found the severed body of the conductor under the first, or west, wheel of the north locomotive. Apparently, the west wheels of both boxcars had passed over him, and he was pronounced dead at the scene.

Post-accident investigation including track, terrain, and equipment disclosed no unusual conditions that could have caused or contributed to the accident. The conductor's portable radio was functioning when it was tested.

There were no witnesses, and the exact cause of the accident could not be determined. An autopsy could not be conducted because of the condition of the body.

Applicable Rules

66. Employees must avoid going between or immediately ahead of standing or moving locomotives, cars, or other equipment except at a safe distance.

(Employees Safety Manual, Chattahoochee Industrial Railroad)

Analysis

After traveling several car lengths without further radio transmissions from the conductor, the engineer of the northward movement on the main track stopped the consist.

There were no witnesses, and the exact circumstances of the accident could not be determined.

Cause

The accident ocurred because the conductor failed to remain clear of moving equipment.

REPORT: 21

RAILROAD: Atchison, Topeka and Santa Fe Railway Company

LOCATION: Elkhart, Kansas

DATE: July 7, 1983

The Accident

A 32-year-old brakeman was fatally injured on July 7, 1983, at about 12:15 a.m. in Elkhart, KS. Employed by the Atchison, Topeka and Santa Fe Railway Company (ATSF), the brakeman had 5 years of service.

Background

In November 1971, approximately 300 feet of the center portion of track No. 1904 was destroyed in a derailment. Crosstie "bumpers" were installed at both ends of the destroyed section of track, which left about 800 feet of serviceable track at the west end and approximately 1,000 feet at the east end.

Until 1974, this change was covered by a train order and a Superintendent's Bulletin but was never metioned after that year. A track diagram of Elkhart (page 29 of ATSF, Colorado Division, Car Location Identity Code (CLIC) Bulletin No. 5., dated June 1983) shows track 1904 as intact and accessible from either end and parallel to the siding on the south side.

The brakeman was a member of a crew consisting of a conductor, himself, and an engineer. The crew had been on duty for 6 hours 15 minutes after completing the required off-duty period.

The brakeman was last examined on the ATSF operating rules on October 10, 1981. His last physical examination was administered on August 9, 1982.

Circumstances Prior to the Accident

The train crew arrived in Elkhart about 11:45 p.m. and performed several switching moves. Part of their work assignment included picking up cars on both ends of track No. 1904.

Pushing five loaded cars ahead of the locomotive, the train was coupled onto an empty car on the west end of track No. 1904. The brakeman made the coupling and then protected the

movement as the crew continued pushing the cars eastward onto track No. 1904. The brakeman radioed the conductor to uncouple the moving cars from the locomotive. The conductor last saw the brakeman boarding either the trailing end of the first car or the leading end of the second car, in the cut of freely rolling cars.

The conductor then moved the locomotives to another track to perform additional switching. A few minutes later, he made two attempts to radio the brakeman, but when no contact was made, he stopped the switching and looked for the brakeman.

He found that the first and second cars of the cut the brakeman had been riding had gone through the crosstie bumper and off the end of the track. Although the first car remained upright, the second car had turned over on its side, to the north side of track 1904. The brakeman was found under the overturned car, near the east end.

The engineer stated that before they reached Elkhart, he and the brakeman had consulted CLIC Book No. 5 and discussed the various switching moves at Elkhart. From a description of the manner in which the moves were to be made, the crew was evidently unaware the center portion of track No. 1904 was out of service. The brakeman had intended to ride the free-rolling cars onto track No. 1904 until they were coupled to the cars standing on the east end of that track.

The State of Kansas considers intoxication as a blood alcohol level of 0.10. Analysis of a blood sample taken from the brakeman's body revealed 995 milligrams of alcohol per deciliter of blood. Because of the very high blood alcohol level indicated, the county coroner ordered another test; the results were the same. In the coroner's opinion, the brakeman was extremely intoxicated.

The other crew members stated that they had not seen the brakeman drinking alcoholic beverages nor did he appear to be intoxicated.

Applicable Rules

GENERAL RULES

. . . . . .

G. The use of alcoholic beverages, intoxicants, and narcotics by employees subject to duty, or their possession or use while on duty or on Company property, is prohibited.

. . . . . .

K. Employees must not be careless of the safety of themselves and others. They must remain alert and attentive and plan their work to avoid injury.

(Santa Fe--Rules Operating Department)

Analysis

The engineer stated that before reaching Elkhart, he and the brakeman consulted had CLIC Book No. 5 and discussed the various switching moves that were to be made at Elkhart. The book did not mention the out-of-service portion of track No. 1904.

Cause

This accident occurred because the moving cars derailed.

Contributing factors were:

1. The brakeman's consumption of alcohol to the point of extreme intoxication.

2. Failure of the ATSF to indicate in the CLIC book that the center portion of track 1904 was not in service.

REPORT: 22

RAILROAD: Louisiana & Arkansas Railway Company

LOCATION: East Baton Rouge Parish, Louisiana

DATE: July 13, 1983

The Accident

A 25-year-old engine foreman was fatally injured on July 13, 1983, at about 2:57 p.m., near Baton Rouge, LA. Employed by the Louisiana & Arkansas Railway Company (LA) the engine foreman had almost 5 years of service.

Background

The engine foreman was assigned to direct a switching operation in the Union Tank Car Company Yard. The four-track yard parallels Brooklawn Drive, which is crossed by switching leads that connect the yard tracks on both ends. The tracks are numbered 130, 230, 330, and 430.

The yard crew, consisting of the engine foreman, two switchmen helpers, and an engineer, had been on duty 7 hours 12 minutes after completing the required off-duty period.

The engine foreman last attended an operating rules class on June 21, 1982, and a safety rules class on May 16, 1982. His last physical examination was administered on August 2, 1978.

Circumstances of the Accident

After several cars were switched to a run-around track, one car, KCS 151815, was coupled to the locomotive. The movement stopped clear of Brooklawn Drive crossing to allow a truck to pass.

Standing on the fireman's side, the engine foreman radioed that car KCS 151815 was to be shoved into track No. 430 and said that he would ride to the switch at track No. 330. Just before the accident, the engine foreman was seen getting on the car.

Using hand signals relayed to the engineer, the crew switched the car onto track No. 430. As the locomotive was returning from track No. 430, the decapitated body of the engine foreman was discovered lying between the tracks.

There were no witnesses to the accident, and although the cause could not be determined, evidence indicated that the lead wheel of KCS 151815 had run over the engine foreman.

There were no defective conditions on either the equipment or the track that could have contributed to the accident.

Applicable Rules

GETTING ON OR OFF EQUIPMENT

. . . . . .

750. When getting on or off moving or standing equipment, employees must always be on the alert for and avoid:

(d) Losing hand grip or balance.

. . . . . .

WORKING ON OR ABOUT ENGINES, CARS OR TRAINS

. . . . . .

759. When using ladders on cars or engines, employees must:

. . . . . .

(b) Grasp grab iron firmly.

. . . . . .

761. Be prepared constantly for sudden start on stop and for shock of brake or slack action.

(Kansas City Southern Lines, Operating Rules)

Analysis

The engine foreman was last seen climbing on the moving KCS 151815. He had prearranged to get off the moving car at the switch to track No. 330. There were no witnesses to the accident; and post-accident inspection by carrier officials revealed no defective conditions on locomotive KCS 4347, boxcar KCS 151815, or on the track.

Cause

The accident occurred because the engine foreman was either unable to maintain a secure hold and footing on the car or was unable to safely alight from the car.

REPORT: 23

RAILROAD: Norfolk and Western Railway Company

LOCATION: Roanoke, Virginia

DATE: July 14, 1983

The Accident

A 57-year-old electrician was fatally injured on July 14, 1983, at about 3:45 p.m., at the Roanoke Shop Foundry, Roanoke, VA. Employed by the Norfolk and Western Railway Company (NW), the electrician had 35 years of service.

Background

Adjoining a substation, the NW Roanoke foundry receives 34,500 volts of alternating electrical current, which is first sent into the substation, converted to 4,160 volts and fed into the foundry's three high-voltage electrical cabinets. Situated at the main service entrance to the foundry, the second cabinet is energized by the first cabinet, and the third by the second. The electrical equipment in the foundry needs frequent service and cleaning.

Known for his professional expertise, the electrician was familiar with the operation of the foundry. Carrier records indicate the deceased had performed maintenance assignments at the foundry for 5 years.

The employee last attended a safety meeting on July 14, 1983, and his last physical examination was administered on June 1, 1977.

Circumstances of the Accident

On July 14, 1983, the electrician began cleaning the electrical cabinets. At the third cabinet, he turned several electrical switches to deenergize the direct current electrical circuits. Then he returned to the first cabinet where he disconnected three electrical cutouts using a wooden hot stick. The electrician next reentered the second cabinet to clean a high-voltage switch. After removing the protective arc shield, the electrician's right hand came into contact with the No. 1 phase of the 3-phase circuit, sending 4,160 volts through his body. Although First Aid

was administered by an ambulance crew, the electrician was pronounced dead at the Community Hospital.

Deenergization can only occur outside the foundry; either at a substation where the alternating current to the entire complex can be shut off, or atop a 50-foot pole where there are three electrical cutouts. None of these current sources was disconnected.

Applicable Rules

ELECTRICAL AND LINE WORK

. . . . . .

1249. Before beginning work on high-voltage lines or equipment when decision has been made to deenergize them, employees shall positively know that the current source has been disconnected. The deenergized lines or equipment shall then be grounded on both sides of the employees who will perform the work.

. . . . . .

1252. Before making repairs to a transformer, disconnecting switches on both sides must be opened and the transformer grounded. If the transformer is not equipped with disconnecting switches, the primary and secondary shall be disconnected.

. . . . . .

1259. All wires and circuits are to be considered energized at all times unless the employee has positive knowledge to the contrary. The insulation on tools or wires must not be relied upon for protection.

(Norfolk and Western Railway Company, Safety Rules)

Analysis

The employee was cleaning a high-voltage switch when his right hand came in contact with the No. 1 electrical phase of the 3-phase circuit, sending 4,160 volts into his body. The resulting short circuit threw the employee to the floor.

Cause

The accident occurred because the employee failed to make sure that the current source was disconnected.

REPORT: 24

RAILROAD: National Railroad Passenger Corporation (Amtrak)

LOCATION: Three Oaks, Michigan

DATE: July 25, 1983

The Accident

A 23-year-old trackman was fatally injured on July 25, 1983, at about 7:25 a.m., near Three Oaks, MI. Employed by Amtrak, the trackman had 2 months 22 days of service during 1982 and 1 month 15 days in 1983.

Background

The accident occurred on an access road that runs parallel to the main track on the north side. The ballast-constructed road, formerly the roadbed of a westward main track, is tangent through the accident area. The slightly irregular driving surface slopes gently northward from the base of the existing track roadbed towards a ditch that parallels the access road.

An off-track mobile Grove Crane Model RT-58, manufactured by the Grove Manufacturing Company, is equipped with a long, retractable boom that extends several feet beyond the front end of the frame of the crane. (The boom makes the crane tend to bounce over the road, especially over an irregular surface.) Mounted on four rubber-tired wheels, the crane operates on the roadway or on other flat surfaces. It has hydraulic brakes and outriggers that are used for stability, while the crane is hoisting heavy objects. In four-wheel drive, it can be operated in forward or in reverse at 12.5 mph in third gear. In two-wheel drive, it can be operated at 29.5 mph.

On June 10, 1983, the trackman attended a 4-hour safety rules class. Films were shown covering the safe handling of tools, slipping, tripping, and falling hazards, and working on or about equipment. Amtrak requires a track foreman to discuss a safety rule with the employees each day. A monthly calendar is kept with the rule-of-the-day displayed. Carrier representatives said that a safety meeting is conducted every month.

The trackman received a physical examination on June 7, 1983, prior to his employment.

Circumstances of the Accident

On the day of the accident, the trackman reported for duty at 5 a.m., in Three Oaks. He was taken by bus about 5 miles to milepost 215.20.

The Pettybone Speed-Swing Crane usually used to hoist small track machinery on the track and remove it at the end of the day was broken and a Grove Crane not normally used for laying rail was brought in. When the bus arrived at the work site, the Grove Crane operator was waiting.

Before relaying new rail, a foreman must get track time from the train dispatcher. On the day of the accident, the foreman was unable to get immediate authority to place the track machinery on the track.

While waiting for authorized track time, the Grove Crane operator and the trackman backed the crane eastward along an access road to a point 624 feet east of a local north-south road, at milepost 214.87. (Each day as jointed rail is removed from the track roadbed, it is strung along the south side of the access road and at the base of the north side of the track roadbed.) The crane operator and the trackman moved the old rail joints to a new location north of the access road.

When the foreman received track time authority, he instructed the crane operator to stop moving the old rail and take the Grove Crane back to the private crossing to place the small track equipment on the rail.

The crane operator was in the one-man operating cab of the crane, and the trackman was standing on the steps of the crane to the left and behind the view of the crane operator, when the crane proceeded westward along the access road. After the crane had passed the road crossing, the rail tongs fell from the crane hook and the trackman dismounted to replace the tongs on the hook.

The crane was being operated in four-wheel drive forward at about 6-10 mph. Shortly after the crane continued its movement westward, the operator was alerted by a call to stop from the trackman. The operator applied the brakes and at the same time saw the body of the trackman shoot forward on the surface of the left-front tire.

The trackman's head was crushed between the large left-front tire and the frame of the outrigging. The left-front tire had passed over his body. When the crane stopped, the trackman's body was about 1 foot behind the left-front wheel.

A manufacturer's representative and a general service manager of a machinery company inspected the Grove Crane but found no defects that could have contributed to the accident.

Applicable Rules

HOISTING EQUIPMENT

4280 The following shall govern with respect to being on, riding on or performing maintenance or repair work on hoisting equipment, or the car on which it is mounted:

(a) Get on or ride on the hoisting equipment or the car on which it is mounted only after obtaining permission from the operator to do so.

(c) The operator must assign such employees a riding location that will permit them to be in his view at all time, have firm footing and secure handholds. He must be prepared to stop, if necessary to protect them and assure himself that they are off the equipment and car before operating hoisting equipment.

. . . . . .

(Amtrak - Safety Rules and Instructions, Maintenance of Way Employees)

Analysis

Since the trackman could not be seen by the crane operator while the crane was moving, the exact circumstances of the accident could not be determined.

Because the crane bounced as it moved, it is possible that the trackman riding on the steps slipped or fell off the crane.

Cause

The accident occurred because the trackman did not have a secure hold on the steps of the crane.

A contributing factor was the crane operator's failure to have the trackman in view at all times.

REPORT: 25

RAILROAD: Southern Railway Company

LOCATION: Knoxville, Tennessee

DATE: July 25, 1983

The Accident

A 35-year-old machinist was fatally injured on July 25, 1983, at about 1 p.m., in the grit blast building, Coster Shops, Knoxville, TN. Employed by the Southern Railway Company, the machinist had 12 years of service. He attended weekly safety meetings; in 1983, there were 26 such weekly safety meetings. No other training was recorded.

Background

In an automated control room at the grit blast facility, freight cars are blasted in a closed area where there is no danger to personnel. The car blasting is done by a mechanical boom which has a rotating head that can be moved laterally and longitudinally by energizing the boom carriage, or it can be moved vertically up and and down by using the elevator carriage. Freight cars are also moved along by an endless cable so that all lengths of cars can be blasted automatically in this area.

Employee protection in the blast area is provided by door-limit switches that shutdown the system should any door be opened while the blast is on. Also, whenever a cable breaks or loosens, safety pawls automatically engage a rack bar to prevent the carriage from falling.

The grit blast boom carriage and elevator operate on a 29-foot elevator-type shaft suspended by four double 5/8 inch cables tied to take up drums through two sheave wheels and powered by a 22,000-pound-capacity motor drive hoist.

Limited lighting is supplied by side-wall flood lights about 10 feet above the floor. When maintenance is being performed, lantern, flashlight, or drop light furnish added lighting.

Circumstances of the Accident

The accident occurred as the machinist and four other employees were repairing the steel-frame support carriage of

the grit blast machine. This carriage, including the mechanical boom and the roto-blast, weighs 8,000 pounds.

On July 22, 1983, the cable supporting the platform on the southeast corner of the carriage slipped from the combination clamp and thimble, and this corner of the carriage fell about 1 foot before the automatic safety pawl engaged the rack bar.

On July 25, 1983, the machinist and four other employees prepared to repair the grit blast machine by shutting off the automatic controls and manually leveling the carriage, using the manual controls. Once the carriage was level, they moved the blast head toward the west side of the carriage to take the maximum weight off the southeast corner. The crew made repairs to the cable at the southeast corner and added extra clamps to prevent the cable from pulling out again. Then they raised the combination clamp and thimble, using cable attached to the top platform to fasten it in place; about 2 inches were needed. The machinist, on the bottom platform at the southeast corner, placed a porta-power under the carriage to gain slack. Shortly after, the cable supporting the southwest corner of the carriage slipped out of the combination clamp and thimble, and the southwest corner and entire south side of the carriage fell about 8 feet to the bottom platform of the grit blast machine.

An electrician on the top platform was the first to reach the injured man. He found the machinist under the southeast corner of the carriage. There was no movement or pulse.

Knoxville Ambulance Service and City Rescue Squad were called and took the injured machinist to Saint Mary's Hospital, where, at 2:45 p.m., he was pronounced "dead on arrival" of multiple trauma.

Applicable Rules

No carrier rules or Federal regulations were violated.

Post-accident Investigation

Post-accident investigation of the cable showed that the cable supporting the southwest corner of the carriage had slipped out of the combination clamp and thimble. There was no evidence that the safety pawl in the southwest corner engaged the rack bar, as no marks were visible. The rack bar at the southeast corner, where the safety pawl had previously been engaged, showed evidence that, as the south side of the carriage was falling, this safety pawl had tried to engage other rack bar teeth on this rack, but failed to hold. The support and safety system at the north side of the carriage were in good condition.

Analysis

Apparently, as the south side of the carriage was falling, its weight and hinge effect caused the side walls of the grit blast machine (where the rack bars are fastened) to push outward. This could explain why the safety pawls on the south side of the carriage did not hold or engage the rack bar, and the south side of the carriage fell.

Cause

The accident occurred because a cable slipped from the southwest combination clamp and thimble and allowed the south side of the grit blast carriage to fall on the machinist working below.

A contributing factor was the failure of the safety pawl in the back-up system to engage the rack bar when the cable had slipped.

REPORT: 26

RAILROAD: Southern Railway Company

LOCATION: Danville, Virginia

DATE: August 1, 1983

The Accident

A 35-year-old bridge and building foreman was fatally injured on August 1, 1983, at about 1:30 p.m., in Danville, VA. Employed by the Southern Railway, the foreman had 13 years 8 months of service.

Background

On a hot and stormy day, a bridge and building crew was replacing bridge timbers on a single-track bridge over the Dan River. The foreman was standing near a metal telephone box awaiting other members of the crew to clear the track of equipment before giving a waiting train permission to cross the bridge.

The foreman, who reached foreman seniority on November 15, 1973, had his only required physical examination at the time of his employment, December 8, 1974. He attended an operating rule and general safety rule meeting on May 17, 1983. He attended a bridge and building safety rules meeting (required every 2 years) on July 14, 1983.

Circumstances of the Accident

On June 27, 1983, a metal telephone box was installed on the first pole east of the bridge to permit the bridge foreman to contact the train dispatcher while he was working on the bridge.

On the day of the accident, a rain storm began at about 12:30 p.m. The crew worked through the storm to make the necessary repairs so that an approaching train could move without undue delay. At approximately 1:25 p.m., a crew member saw lightning hit the telephone line, heard a loud noise near the phone box, looked, and noticed the foreman lying on the ground. Moments before, the foreman was seen standing next to the phone box with his right hand touching the box.

Efforts to revive the foreman with CPR were futile. A local rescue squad was immediately called but was blocked by a train from reaching the scene. The foreman was taken on a track-push car to the rescue vehicle and transported to the Danville Memorial Hospital where he was pronounced dead.

The metal phone box, wired according to the carrier's standard drawing, included lightning protector blocks. However, the ground rod had never been driven nor had a ground wire been connected to the box. A 55-gallon metal drum with spare screws was found 27 inches in front of the phone box and could have provided a good path to ground if simultaneous contact were made with it and the phone box.

Applicable Rules

There are no applicable Rules.

Analysis

The foreman was last seen standing next to the phone box moments before lightning struck the box.

A ground rod had not been placed nor was a ground wire connected to the box.

Cause

The foreman was electrocuted, probably a result of lightning striking the phone box. The lightning protection blocks were not grounded, and that could have been a contributing factor in the foreman's death.

REPORT: 27

RAILROAD: Port Authority Trans Hudson

LOCATION: Jersey City, New Jersey

DATE: August 12, 1983

The Accident

A 21-year-old trackman was fatally injured on August 12, 1983, at about 2:33 p.m., in Jersey City, N.J. Employed by the Port Authority Trans Hudson (PATH), the trackman had 2 1/2 months of service.

Background

The accident occurred on a wet, rainy day in Conrail's No. 40 electric substation (maintained through conveyance by Amtrak), adjacent to PATH facilities. Access to the substation, on the southwest end of PATH's Journal Square passenger platform, is restricted on the north by a concrete retaining wall and a building over 75 feet high. Access to the rest of the substation is restricted, primarily, by a placarded, 8-foot-high chain-link fence, topped by barbed wire. At the west end of the substation, the fence ends at the south side of a compressor building. It begins again at the north side of the compressor building and continues approximately 5 feet to the aforementioned concrete retaining wall. Where the fence and the retaining wall meet, the fence had broken off the fence post, providing enough room for a person to penetrate the substation area.

Circumstances of the Accident

A 6-man track crew was performing switch maintenance duties at the west end of the passenger platform. The crew consisted of four trackmen, one power rail maintainer, and a crew leader. Although their tour of duty extended from 7 a.m. to 3 p.m, at about 1:40 p.m., crew members were told to go to the tool shed and put their tools away. After they did this, the four trackmen started playing ball. The crew leader stopped the game, took the ball, and threw it towards the substation. Three trackmen started searching for the ball, but as they were going toward the substation, the power rail maintainer called out a warning. Subsequently, two of these men returned to the area of the tool shed.

Before leaving the tool shed area to go to the locker room, the two trackmen called out to the third man. Receiving no response, the two trackmen went to the substation at the

break in the fence. There, they saw the third trackman lying at the back of the substation. One man stayed at the fence, and the other went to use a telephone in the signalmen's shed adjacent to the tool shed. The phone was in use but he told the caller of the accident and requested help. The PATH Police were notified at 2:33 p.m., and administered CPR to the victim. An ambulance arrived at 2:49 p.m. and took the injured man to Jersey City Medical Center at 3:35 p.m.; but the victim was pronounced dead on arrival.

Applicable Rules

6. Employees must devote themselves exclusively to PATH service while on duty. . . .

(From Port Authority Trans Hudson Corporation)

Analysis

The first trackman entered a dangerous area after a verbal warning. The exact spot of the accident could not be determined, but evidently the employee contacted some high-voltage apparatus.

Cause

The trackman died because he was electrocuted after he entered an area specifically designated as dangerous.

REPORT: 28

RAILROAD: Union Pacific Railroad

LOCATION: Cheyenne, Wyoming

DATE: August 28, 1983

The Accident

A 44-year-old switchman was fatally injured on August 28, 1983, at about 5:30 a.m., in Cheyenne, WY. Employed by the Union Pacific Railroad (UP), the switchman has 5 years of service.

Background

The accident occurred on the Camp Carlin Spur, an industrial lead track within the switching limits of the Cheyenne Yard. Movements there are authorized by the yardmaster, timetable, special instructions, and the superintendent's bulletin. The first switchman was a member of a switch crew consisting of an engineer, a switch foreman, and two switchmen. The crew had coupled a locomotive to a boxcar (UP-172409) and moved the car 275 feet south, stopping to realign the spur track switch. They noticed open plug doors on the east side of the car, and the switch foreman radioed the yardmaster to ask for a carman to close the car doors.

The first switchman was last examined on the Operating Rules and Train Orders on September 10, 1982. His last physical examination was administered on October 25, 1982.

Circumstances of the Accident

The engineer told the switch foreman that he had previously been a carman with the UP and had closed many plug doors. He said that he could close the plug door, and it was unnecessary to notify the yardmaster.

The engineer left the locomotive and began to close the car door. When the door was nearly aligned with the opening, the first switchman stepped to the center of the door and began to help the engineer. As the first switchman shoved the door inward, another switchman noticed that the door starting to fall outward from the top, and shouted a warning. The engineer reacted by jumping backward; the 1,100-pound plug door fell, landing on top of the first switchman and striking him.

The other crew members raised one end of the door and maneuvered it sideways, uncovering the switchman's body.

The switchman was later pronounced dead at the scene by the county coroner.

Post-accident investigation and tests of car UP 172409 revealed a 3-inch torch-cut opening, 8 feet 3 3/4 inches from the "A" end of the top retainer. The door crank arms and safety hanger had apparently slipped out of the top retainer during the opening and closing procedure. No other defects were noted on the door.

No member of the switch crew had noticed the position of the car door's operating arms or its safety hanger before the accident. For the door to have fallen outward from the top, the cranks must have slipped through the 3-inch opening in the top retainer. The UP repair records showed the car last had door repairs on May 11, 1983, at the carrier's Seattle, WA (ARGO), repair track.

When the door was tested after the accident, the reenactment showed that when opened, the left and right operating arms came out of the top retainer through the 3-inch opening. When the door was closed, the safety hanger came out through this opening, allowing the door to fall outward from the top.

It is common practice to torch cut openings in the top retainers of plug-door boxcars to effect door removal. After repairs are completed, doors are replaced through this opening, and the opening is closed and reinforced by welding angle iron to the retainer at the flap-opening areas. This procedure is faster and more economical than removing the door-end stops.

Applicable Rules

TRAIN AND YARD SERVICE

. . . . . .

804(H)....

Cars with plug-type doors and refrigerator cars must not be moved unless doors are closed and properly secured.

(Union Pacific Railroad Company, Operating Rules)

Analysis

Crew members did not notice that the doors were not closed on boxcar (UP-172409) before they moved the car. The engineer told the switch foreman that he had been a carman and could close the door.

Cause

The accident occurred because an incompletely repaired door fell on the switchman and crushed him.

As a contributing factor, the engineer and the first switchman tried to close the plug door without first inspecting the car.

REPORT: 29

RAILROAD: Chicago South Shore and South Bend Railroad

LOCATION: Gary, Indiana

DATE: August 30, 1983

The Accident

A 33-year-old conductor was fatally injured on August 30, 1983, at about 11:30 a.m., in Gary, IN. Employed by the Chicago South Shore and South Bend Railroad (CSS), the conductor had 12 years of service.

Background

The CSS side tracks 290, 289, and 289-A, in that order, are located north of and parallel to the main track at milepost 61 in Gary. Cars on track 290 that are to be placed on track 289-A must first be moved from track 290 to track 289 and then to track 289-A. The three tracks are connected by manually operated switches.

The conductor last attended a biannual instruction class on the carrier's operating rules on May 7, 1982. His last physical examination was administered on September 30, 1976.

Circumstances of the Accident

The conductor was a member of a switching crew that consisted of an engineer, himself, a front brakeman, and a rear brakeman. It had been on duty for 2 hours 45 minutes after completing the required off-duty period.

Shortly before the accident, the switching crew pulled five cars on track 290 eastward past the 289 switch in order to place two cars on track 289 for further movement to track 289-A. The conductor instructed the rear brakeman to ride the two cars into track 289 and to stop the two cars short of the switch to track 289-A because the switch was not positioned for movement to that track. The conductor gave the front brakeman a hand signal to cut off the two cars in motion. Both brakemen followed instructions, and as the two cars cleared the switch points, the conductor positioned the switch for a westward movement on track 290 and gave a hand signal to the front brakeman to cut off the three remaining cars in motion. The front brakeman obeyed, and the three cars moved onto track 290 at about 2 mph.

The front brakeman then noticed the conductor bend down to remove some sand burrs from his pants leg, look up, and run

toward the three moving cars. The track curvature prevented the front brakeman from seeing the conductor board the cars.

When the conductor was found lying across track 290, 3 feet west of the west car on track 290, he had not been run over by the equipment. About 20 minutes later, an ambulance arrived and the conductor was transported to a local hospital where he died approximately 2 1/2 hours later.

Post-accident investigation showed a fully applied handbrake in the area where the cars would have come into contact. The conductor apparently was pinched where the cars contacted, and he then fell to the ground. Inspection of the handbrakes disclosed no malfunction.

Applicable Rules

103(f). Employees in switching must observe the position of cars on other track and must know such cars are in the clear before permitting engine or other cars to move past them.

. . . . . .

104(d). A switch must not be lined in its normal position until the conflicting route is cleared.

(Chicago South Shore and South Bend Railroad Rules for the Government of the Operating Department)

Analysis

The two cars moving onto track 289 were stopped when the rear brakemar applied the handbrake on the west end before the east end of the east car cleared track 290.

Because of track curvature, the front brakeman and the engineer could not see the conductor, and the rear brakeman was walking on the north side of the two cars on track 289.

The conductor positioned the switch for track 290 as soon as the two cars cleared the switch points. He gave the signal to cut off the remaining three cars before the two cars had cleared track 290. After a momentary distraction, the conductor saw that the first cars were not clear and apparently attempted to stop the three cars by applying the handbrakes on the west end of the three cars.

Cause

The accident occurred because the conductor failed to stand clear of moving equipment.

REPORT: 30

RAILROAD: Southern Pacific Transportation Company

LOCATION: Alpine, Texas

DATE: September 2, 2983

The Accident

A 58-year-old track foreman was fatally injured on September 2, 1983, at about 8:50 a.m. in Alpine, TX. Employed by the Southern Pacific Transportation Company, the foreman had 30 years of service.

Background

From the east of the accident site, alignment of the main track is tangent for 1.3 miles; with a 3-degree 01-minute curve to the right, for 0.3 mile; a tangent 0.2 mile to the accident location and 0.3 mile beyond. The track has a 0.8-percent ascending grade. The east switch at Alpine siding is 8 feet west of the accident location. Trains operate by signal indications from a centralized traffic control system at a maximum speed of 50 mph.

The foreman last attended a safety meeting on June 1, 1983.

Circumstances of the Accident

Track crew No. 365, consisting of a track foreman and two laborers, was tamping ballast under the crossties at an insulated joint in the south rail 8 feet east of the east switch. The tamping guns were operating with compressed air coming through hoses from an air compressor about 220 feet south of the track.

The foreman was raising the ties; the two laborers were using the tamping guns to tamp ballast under the crossties. After the foreman had excused a laborer to use a bathroom about 150 feet north of the track, the foreman took the man's place operating the tamping gun. The foreman was facing west, and the second laborer was facing east.

Train MBS-MF, approaching at 40-45 mph from the east with an engineer, a fireman, and a head brakeman in the operating compartment of the lead locomotive sounded the horn about 0.3 mile from the accident location to alert the maintenance crew. The train's brakes were placed in emergency about 300 feet from the workers' location after the train crew realized that the two maintenance men were not clearing the track. At the last instant, the laborer saw the train and

sustained a minor injury when he jumped from the train's path. However, the foreman was struck by the train and pronounced dead at the scene by the county coroner.

Applicable Rules

M850. Trains are to be expected at all times. Employees must not assume that a train may not come before any certain time, nor act under the assurance of any person to that effect, but must at all times protect themselves with proper signals as required by Rules M200 to M208, inclusive. Foremen will be held responsible for the proper understanding and strict observance of these rules by themselves and those under them....

. . . . . .

M871. Foremen or others in charge of men working on or about tracks must guard their men against impending danger or injury.

. . . . . .

A lookout equipped with a police whistle must be provided to warn of approaching trains, engines or cars under the following conditions:

. . . . . .

(d) When noise from tools, machinery and equipment, or other source interferes with the hearing.

. . . . . .

(Southern Pacific Transportation Company, Rules and Regulations for the Maintenance of Way and Structures.)

Analysis

The foreman and the laborer were unaware of the approaching train because of the noise from the car compressor and the tamping guns.

The foreman, normally, raised the ties and watched for trains while the two laborers operated the tamping guns. When one laborer was excused, the foreman took his position, and no one was left to watch for trains. The second laborer jumped away from the train; however, the foreman remained working.

Cause

The accident was caused by the failure of the foreman to move to a place of safety. Contributing factors were the

absence of an employee to watch for trains and the noise from the tamping guns and the air compressor.

REPORT: 31

RAILROAD: Central of Georgia Railroad Company

LOCATION: Camp Hill, Alabama

DATE: September 6, 1983

The Accident

A 55-year-old communication maintainer was fatally injured on September 6, 1983, at about 2 p.m., near Camp Hill, AL. Employed by the Central of Georgia Railroad Company, the communication maintainer had 28 years of service.

Background

The accident occurred on a cloudy afternoon, in a light rain, on the Alabama Division of the Central of Georgia Railroad Company. At milepost 339.1., a pole line stands at the bottom of a 70-foot hill on the south side of single line main track. The line has two crossarms; the bottom crossarm contains two 110-volt AC wires.

At the time of the accident, the communication maintainer (first maintainer) had been on duty about 13 hours 45 minutes.

The carrier issues a Book of Safety Rules to its employees. The maintainer was last instructed on the carrier's safety rules on August 29, 1983. A physical examination was administered at the time of his employment on August 20, 1955.

Circumstances of the Accident

The communication maintainer went on duty to make emergency repairs at 12:15 a.m. At about 9 a.m., three more communication maintainers arrived to assist in the repairs. At about 1:30 p.m., a test of the communication lines at Camp Hill revealed line trouble east and west of there. The first maintainer and another maintainer drove east for a short distance and began walking along the track until they found a tree that had fallen across the pole line, pressing the wires to the ground. The first maintainer descended the bank to the downed wires while the other maintainer went to the truck to get repair equipment. When the second maintainer returned, the first maintainer commented that the wires were too hot to work on. Then, the first maintainer slipped on the bank and slid underneath the wires, with his right arm wrapped over the wires. The second maintainer cut the wires and administered CPR, but without success. The fatally injured employee was transported by locomotive to Camp Hill where a coroner pronounced him dead.

Applicable Rules

GENERAL RULES

. . . . . .

F. The company furnishes rubber gloves and protective equipment to all employees needing them. These rubber goods must be used whenever necessary, and as provided in these rules.

. . . . . .

SAFETY RULES AND METHODS OF PROCEDURE TO BE FOLLOWED WHEN WORKING ON ELECTRICAL TRANSMISSION LINES, CIRCUITS AND EQUIPMENT.

15. Rubber gloves with leather protectors must be worn when on 110-220 volt power and signal control wires, circuits and equipment which are located on poles. Rubber gloves must also be worn when standing on the ground and picking up or splicing a wire hanging from a pole or line which carries 110-220 volt power or signal control circuits.

. . . . . .

30. Unless special precautions have been taken, employees working in substations or in the vicinity of line wires must remain at a safe distance from wires and equipment.

(Southern Railway System, Communications and Signal Department)

Analysis

There heavy growth of wet vegetation on the bank and under the pole line, and the first maintainer, trying to reach the pole line from above, slipped and slid on the wet vegetation.

Cause

The accident was caused by failure of the first communication maintainer to remain a safe distance from the live wires.

Contributing factors included the failure of the maintainer to wear prescribed rubber gloves, the steep embankment, wet vegetation, and the fact that the pole line had to be approached from above. Fatigue may also have been a factor.

REPORT: 32

RAILROAD: Southern Pacific Transportation Company

LOCATION: Deer Park, Texas

DATE: September 16, 1983

The Accident

A 57-year-old conductor was fatally injured on September 16, 1983, at about 9:45 p.m., in Deer Park, TX. Employed by the Southern Pacific Transportation Company, the conductor had 35 years' service.

Background

The accident occurred on the Alkyl Lead track. The Alkyl Lead and runaround track parallel the Houston Light and Power Lead east to west, as well as Battleground Road. The Houston Light and Power Lead track provides access from Strange Yard (approximately 3 1/2 miles southeast) to the industrial area north of U.S. Highway 225. The Alkyl Lead runaround track, 3,352 feet long, joins the Alkyl Lead track at a point 860 feet from the Houston Light and Power Lead switch. The runaround track parallels the lead track westward for its entire length where it rejoins the lead. In the accident area, both tracks descend slightly west to east.

The crew, a conductor, two brakemen, and an engineer, had been on duty 2 hours 60 minutes after completing the required off-duty period.

The conductor was last examined on the Southern Pacific Transportation Company's Rules and Regulations of the Transportation Department on May 5, 1983. He attended a safety class on September 9, 1983. A physical examination was administered on May 31, 1962.

Circumstances of the Accident

The crew of switcher No. 2 planned to switch eight cars from the runaround track and spot them into the USS Chemical Company track. The conductor stayed with the cut cars in the runaround track, the rest of the crew entered the track from the east end, with two locomotives, a caboose, and three cars. The conductor made the cut on 25 cars and remained on the runaround track to apply the handbrakes on the cars being switched to the lead and those returning to the runaround track. The head brakeman stood at the switch separating the Alkyl Lead and the runaround track. The rear

brakeman stood ready to make the necessary cuts to switch the eight cars to the lead. The engineer was operating the lead locomotive from the south side of the cab. Movements were coordinated by radio, as the brakemen were on the ground opposite the engineer on the north side of the Alkyl Lead track. The head brakeman said he saw the conductor's light two or three times during the movement.

After switching the eight cars out of the lead, movement was then made against the cars switched into the runaround track. Subsequent to coupling, the 17 cars were kicked clear of the Alkyl Lead. The crew next coupled the eight cars on that track, shoved west, and spotted the cars at the USS Chemical Company. When the men returned to the lead from the USS Chemical Company, they found the conductor with his legs and lower torso lying between the rails of the runaround track. His upper body was found between the runaround and lead tracks, 855 feet from the clearance point at the east end of the tracks. There were no witnesses to the accident; the conductor was pronounced dead at the scene.

When the conductor's body was found, the 17 cars handled by the crew were on the east end of the runaround track. A distance of 203 feet separated these cars from the 18 cars left in the west end of the runaround track. The brakeman had cut eight cars out to the lead track. The 17 cars were put back in the runaround in cuts of three, four, four, one, with the last five joined to the 12; then all the cars were kicked into the clear. On the first cut of the three cars, two of the cars showed signs of passing over the body of the conductor from right to left. All the wheels of the next nine cars showed evidence of blood and tissue. The body was discovered underneath and between the west trucks of the 13th car of the 17-car cut. No blood or tissue was found on the wheels of the 13th car.

Apparently, the conductor had walked between the first and second cut of cars to open a knuckle on the east end of the first cut of cars. He probably slipped and was run over by this cut of cars. Post-accident examination of the equipment revealed no defects that could have contributed to the accident.

Applicable Rules

Rule M. Carelessness by employees will not be condoned and they must exercise care to avoid injury to themselves or others . . . .

Rule N. Employees must expect the movement of trains, engines or cars at any time, on any track, in either direction.

Employees must know that it is safe before fouling, walking between or crossing tracks by looking in both directions. When crossing tracks in front of standing engine or cars, they must provide at least 20 feet clearance and be prepared for unexpected movement of equipment.

Analysis

The head brakeman stated he saw the conductor's light two or three times during the switching movement.

There was a separation of 203 feet between the cars on the runaround track and apparently the conductor stepped between the cars to open a knuckle.

Cause

The accident was caused by the conductor's failure to maintain a safe distance from moving equipment.

REPORT: 33

RAILROAD: Kansas City Southern Railway Company

LOCATION: Richards, Missouri

DATE: September 20, 1983

The Accident

A 48-year-old laborer and a 23-year-old laborer were fatally injured on September 20, 1983, at about 5:55 p.m., near Richards, MO. Employed by the Kansas City Southern Railway (KCS) Company, the laborers each had 5 years of service.

Background

The accident occurred on a clear, windy day in the west lane of Vernon County Road Z, a straight, slightly descending roadway surfaced with bituminous material. An unobstructed view for about 0.2 mile precedes the point of the accident. The shoulders of County Road Z slope down from the edge of the pavement at a 2-to-1 ratio to drainage ditches approximately 3 feet from the edge of the pavement. The drainage ditches are approximately 12 inches deep and 2 to 3 feet wide.

The foreman held a valid Oklahoma driver's license with no record of traffic citations, and none was issued as a result of this accident. The section foreman had 3 years' service; his last physical examination was administered in November 1980. He was last examined on the KCS Company Maintenance of Way Rules on June 23, 1983.

Circumstances of the Accident

A section foreman was driving two section laborers from their worksite in Eve, MO to their headquarters in Stotesbury, MO. All three wore seatbelts in the cab of the 1982, Form F600, diesel 2-ton flatbed truck. Traveling north on Vernon County Road Z at approximately 55 mph, the foreman was attempting to pass a northbound truck, when he lost control and his truck went into ditch parallel to the southbound lane. The truck traveled 448 feet in the ditch before it overturned twice and came to rest on its top, 528 feet from the point of entry into the ditch. As the truck overturned, the two section laborers were ejected; one laborer was found underneath the truck and pronounced dead. The other laborer, found 25 feet north of the truck, was taken to a local hospital where he died 6 hours later.

The section foreman suffered minor contusions, but did not require medical treatment.

A Missouri State trooper interviewed the section foreman immediately after the accident. The foreman said that as he was pulling alongside to pass the other truck, his rear dual wheels dropped off into the ditch; he could not explain why.

The trooper further stated that there was a very strong cross wind from the northwest, and the truck being passed was carrying a tall box bed, which could have caused wind pockets between the two trucks. The two section laborers were fatally injured as a result of their ejection from the overturning truck.

Applicable Rules

. . . . . .

835. Drive at a safe speed, considering weather, traffic, road, vehicle, and other prevailing conditions. Legal speed limits must not be exceeded.

(Kansas City Southern Railway Lines--Rules and Regulations for the Maintenance of Way and Signal Department)

Analysis

The flatbed truck was traveling north in the southbound lane, to pass another truck, on a straight, downhill-grade highway with an unobstructed view and no oncoming traffic. The vehicle was not exceeding the posted speed limit.

The foreman stated that when he started to pass the other vehicle, the rear wheels of his truck dropped into the ditch and caused him to lose control of the truck.

Cause

The accident occurred because the foreman failed to control his vehicle. A possible contributing factor was the strong, gusty winds, which could have contributed to the driver's loss of control.

REPORT: 34

RAILROAD: Burlington Northern

LOCATION: Ft. Smith, Arkansas

DATE: September 23, 1983

The Accident

A 56-year-old carman was fatally injured on September 23, 1983, at about 4:30 p.m., in Ft. Smith, AR. Employed by the Burlington Northern, the carman had 28 years of service.

Background

A double-door boxcar (SLSF 9114) arrived at the Ft. Smith Yard on September 21, 1983, and was placed on the North 7 track.

The carman, experienced in car repairs and aware of the hazards of plug-type doors, was assigned to make repairs and check the interiors of various cars before the cars were placed for loading at local industries.

The carman was issued a copy of the carrier's Safety Rule Book. As a member of the mechanical department, he was not required to pass examinations on safety or other carrier rules.

Circumstances of the Accident

The carman, who went on duty at 3 p.m., was last seen at the freight yard office at about 3:15 p.m. He told an operator there that he could be reached by radio if needed. It is assumed that the carman was working on SLSF 9114, the first car on North 7 track. When he tried to open the left plug-door on boxcar SLSF 9114, the top-roller assemblies and operating cranks were detached from the top retainer, which had two slots cut out; the door fell outward. The carman may have jumped backward, but he was unable to avoid the falling door and was crushed.

The left door on SLSF 9114 had two slots cut out on the top of a rusted, old retainer. The door had no safety securement at the top; so when it was opened and aligned with the two open slots in the top retainer, it fell out. The car had neither a bad order tag nor stencilling to indicate repairs were needed.

Applicable Rules

84. It must be known that roller-type doors and side doors on cars and locomotives are properly tracking or are

securely hinged before operating them, and if not properly tracked or secured, take necessary action to safeguard their use.

(Burlington Northern Safety Rules and General Rules)

Analysis

The door on boxcar SLSF 9114 had slots cut out in the top retainer and no safety securement. The car was not bad-ordered and had no stencilling to indicate that repairs were needed.

Cause

The accident occurred because the carman failed to make sure the door was secured before he opened it.

As a contributing factor, the two slots were cut in the top retainer, which reduced the retaining feature of the door at these points.

REPORT: 35

RAILROAD: National Railroad Passenger Corporation (AMTRAK)

LOCATION: Kearny, New Jersey

DATE: September 30, 1983

The Accident

A 34-year-old trackman and a 24-year-old trackman were fatally injured on September 30, 1983, at about 11:59 p.m., at Portal Moveable Bridge, in Kearny, N.J. Employed by Amtrak, the employees had 6 and 2 years of service, respectively.

Background

In the accident area, there are two main tracks, No. 1 and No. 2, which run east and west and cross the Hackensack River at Portal, an interlocking and moveable bridge. Track alignment is tangent, and the track grade is level. The accident occurred on a rainy night on westbound main track, No. 2, and on the moveable bridge section at Portal, milepost 6.1.

Train operations are governed by timetable, bulletins, train orders, interlocking rules, and by automatic block and cab signals. Trains move with and against the current of traffic by signal indications, and Amtrak's Rule 261 is in effect. Timetable No. 4, effective October 31, 1982, shows maximum operating speeds as 45 mph for freight trains; 60 mph, for passenger trains.

The trackmen were issued a copy of the carrier's safety rules and instructions. The senior (first) trackman last attended a safety rules class on February 16, 1982. The other (second) trackman last attended a safety rules class on March 24, 1983. Amtrak requires each foreman to conduct a safety rules meeting at the beginning of each tour of duty.

Circumstances of the Accident

Approximately 25 bridge and building (B&B) and track employees were arriving at Portal to begin their tours of duty. The employees were assigned to remove the track structure on the eastbound main track No. 1 at the east portion of the moveable bridge. At about 11:54 p.m., a burro crane foreman at Bergen Interlocking, milepost 3.8, asked for and received the order to place main track No. 1 out of service. The employees at the bridge site were not told that main track No. 1 was placed out of service.

Upon arriving at the work site, three track employees started eastward on the bridge walkway adjacent to and north of main track No. 2, and continued walking eastward on the track structure of main track No. 2.

At milepost 8.2, eastbound Amtrak train No. 96 (one locomotive and five cars) was diverted from main track No. 1 to main track No. 2 -- against the current of traffic. As train No. 96 approached the work site traveling at about 50 mph, the locomotive headlight was on, and the engineer sounded the whistle. The engineer said that he saw an employee on the west side of Portal Bridge walk first in the center of the track and then jump to the north to get clear of the train. The engineer also said that the locomotive struck something that sounded like tools near or on the track. This occurred just before the train passed other employees standing close to the track and within the lighted area of the bridge. There was no sign of damage to the locomotive, so the engineer continued to Penn Station, in New York City. There, the engineer was told that two trackmen were struck by his train. An inspection of locomotive No. 911 showed blood stains on the north front ladder of the locomotive.

The accident occurred at about 11:59 p.m. The gang watchman, standing on the lighted area of the bridge, had sounded his airhorn before the train reached the work area. Visibility toward the west was approximately 1 1/2 miles.

The senior trackman was found lying underneath the bridge deck on the north girder. He was taken to the hospital and pronounced dead. The other trackman was thrown into the Hackensack River; his body was recovered 3 days later approximately 2 miles south of the accident site.

Applicable Rules

4127. When necessary to walk on track:

(a) Walk against current of traffic, unless:
  (1) The track is out of service and unprotected.
  (2) On a single or other track where there is no current of traffic.
(b) Maintain sufficient lookout in both directions to see on which tracks trains approach.
(c) Upon the approach of a train on any main track clear the train-occupied track and the near adjacent track, preferably clear of all main tracks. When not clear of all tracks stand erect and maintain sufficient lookout in both dierctions to see on which tracks other train approach, in order to clear if necessary, to prevent being trapped.

(Amtrak Safety Rules and Instructions)

Analysis

The trackmen walking eastward on main track No. 2 were facing the current of traffic, as instructed by the carrier's safety rules, but they did not know that eastbound main track No. 1 was out of service. The burro crane operator, several miles away, requested that track No. 1 be placed out of service. He made no attempt to notify the employees at the work site of the status of track No. 1. The engineer on the eastbound train sounded the train whistle, and the gang watchman sounded his airhorn, but the trackmen facing east apparently assumed that the train was running on the eastbound main track No. 1 and did not look back to determine the track.

Cause

The accident was caused by the failure of the two trackmen to clear their positions on the track.

Contributing factors were:

(1) The failure of the trackmen to maintain a sufficient lookout in both directions.

(2) The failure to notify employees of the change in train traffic direction.

REPORT: 36

RAILROAD: National Railroad Passenger Corporation (Amtrak)

LOCATION: Newark, New Jersey

DATE: October 1, 1983

The Accident

A 37-year-old welder was fatally injured on October 1, 1983, at about 1:49 a.m., in Newark, NJ. Employed by Amtrak, the welder had 10 years of service.

Background

In the accident area, at Hunter interlocking (milepost 10.3), there are four main tracks extending east to west geographically, and various crossovers. The timetable direction for Track Nos. 1 and 2 is eastbound; for Track Nos. 3 and 4, westbound.

The welder received a copy of the Amtrak's safety rules and instructions on October 13, 1978, and passed an oral examination of the rules pertaining to clearing for trains during 1982. He last attended a safety rules class during the summer of 1983.

Circumstances of the Accident

Maintenance-of-way employees were replacing the west switch of the crossover that connects Tracks 2 and 3. Track 3 was placed out of service at 8:35 p.m., September 30, 1983. At about 1:09 a.m., on October 1, the Burro Crane foreman placed Track 4 out-of-service for the purpose of sliding new paneled sections of the switch across Track 4 and placing the sections into Track 3. The foreman did not tell the other crew members that Track 4 was out of service.

At about 1:46 a.m., westbound New Jersey Transit Commuter Train No. 3853 consisting of four multiple electric locomotives left Newark Station. The train was diverted from Track 3 to Track 2, and was traveling against the current of traffic. As the train approached the work site at about 60 mph, the engineer stated that the headlight was on and that he had sounded the whistle. Near the lighted area of the work site, the engineer saw a Burro Crane standing on Track 3. When the train was passing the crane, the engineer saw an employee standing adjacent to and north of Track 2. He immediately applied the emergency brake, but the right front portion of the locomotive struck the employee before the train could stop, and the welder was pronounced dead at the scene.

The welder and a trackman saw Train 3853 advancing and assumed it was on Track 4. After they told the Burro Crane operator of the approaching train, the two men placed themselves in front of the crane in the center of Track 3. However, the Burro Crane blocked their view of the train coming up behind them. The crew watchman sounded his airhorn, and the Burro Crane operator sounded the crane whistle to warn of the approaching train. One witness saw the welder move from the center of Track 3 and toward Track 2, as the train neared the work site. It could not be determined why the welder moved from the center of Track 3 as the train was approaching.

Applicable Rules

4123 Look in both directions for approaching train. . . before performing any of the following acts associated with track. . . .

. . . . . .

(b) . . .coming out from between self-propelled equipment. . . .

(c) Any other operation or situation where [a] moving train. . . hazard exists.

4146 On receiving warning or knowing of approach of a train all men in gang must clear tracks at least 15 seconds before train reaches point of work, discontinue all activity and remain clear until receiving signal from the gang watchmen. . . .

. . . . . .

(b) Main Track

1. Upon the approach of a train on any main track clear the train-occupied track and the near adjacent track, preferably [stand] clear of all main tracks. When not clear of all main tracks, stand erect and maintain sufficient lookout for trains in both directions to see on which tracks other trains approach, in order to clear tracks if necessary, to prevent being trapped. IN HIGH SPEED TERRITORY AND WHERE VIEW IS RESTRICTED CLEAR ALL MAIN TRACKS ON APPROACH OF A TRAIN ON ANY MAIN TRACK. IN SO DOING KEEP CLEAR OF ANY TRACK ADJOINING MAIN TRACKS.

2. When the track on which the men are working is out of service with the permission of the Superintendent and protected, in this case men

must stop work and stand in center of track on which working.

(Amtrak Safety Rules and Instructions - Maintenance of Way Employees)

Analysis

Before the engineer sounded the train whistle and the gang watchman sounded his airhorn, the welder was aware of the approaching westbound train. However, the welder and a trackman assumed that the westbound train was advancing on Track 4, because they were unaware that Track 4 was out of service. For some unknown reason, the welder stepped backward toward Track No. 2 just as the train was passing the Burro Crane.

Cause

The accident occurred because the welder failed to remain clear of the moving train.

A contributing factor, may have been the foreman's failure to tell the crew that Track 4 was out of service and that Westbound trains would be operating against the current of traffic on track 2.

REPORT: 37

RAILROAD: Atchison, Topeka and Santa Fe Railway Company

LOCATION: Kings Mill, Texas

DATE: October 7, 1983

The Accident

A 20-year-old machine operator was fatally injured on October 7, 1983, at about 11 a.m., near Kings Mill, TX. Employed by the Atchison, Topeka & Santa Fe Railway Company (ATSF), the machine operator had 2 1/2 years' service. The day was cloudy with fog and misting rain; and visibility was about 120 feet.

Background

The accident occurred on the south main track, 1.6 miles east of Kings Mill at a public rail-highway crossing. The four ATSF tracks in the area are designated: North Track, South Track, Track 18, and an industry track. The tracks are tangent and ascend 0.29 percent westward.

The employee's last physical was administered on April 20, 1982, and he last attended a safety meeting on September 19, 1984.

Circumstances of the Accident

On the morning of October 7, 1983, two machine operators were moving their machines westward on the south track from Pampa, TX, to Kings Mill, a distance of 7.1 miles. The leading machine, a anchor squeezer, was operating forward. The trailing machine, a ballast regulator, was operating in reverse, about 120 feet behind the anchor squeezer.

As the machines neared a rail-highway crossing, the operator of the ballast regulator noticed that the operator of the anchor squeezer was standing and observing motor traffic at the crossing. The operator of the ballast regulator looked away from the crossing to see if the plow on his machine was in the raised position for the move over the crossing. As he looked back toward the crossing, he saw the operator of the anchor squeezer lying on the ground at the east end of the crossing. The ballast operator set the handbrake on the regulator but was unable to stop before the ballast regulator struck the operator of the anchor squeezer, whose body either rolled or was knocked across the crossing by the regulator. The body fell between the rails just west of the crossing, and the ballast regulator machine passed over it.

The ballast regulator stopped 241 feet west of the crossing after it struck the operator of the anchor squeezer and had collided with the anchor squeezer and moved it 1,740 feet west of the crossing.

A witness who heard the ballast regulator whistling for the crossing said that the ballast regulator appeared to have been traveling at about 25 to 30 mph.

The injured operator of the anchor squeezer was transported by ambulance to Coronado Hospital at Pampa, where he died of massive chest injuries 4 hours 40 minutes later.

Applicable Rules

256. When riding on track cars, employees must be seated. . . .

. . . . . .

260. When riding on track cars, employees must watch for obstructions, approaching trains, vehicular traffic at public crossings. . . .

(Safety Rules for Santa Fe Employees, April 15, 1956)

K. Employees must not be careless of the safety of themselves and others. They must remain alert and attentive and plan their work to avoid injury.

. . . . . .

1256. Track cars must be run with caution, always keeping [a] lookout for trains or other track cars. . . .

. . . . . .

1258. Operators must use extreme caution when running over. . . crossings. . . .

(Santa Fe Rules for Maintenance-of-Way and Structures, January 5, 1975)

Analysis

The operator of the anchor squeezer machine was struck by the ballast regulator machine and either rolled or was knocked across the crossing and then run over. The ATSF has no rules governing the distance between moving machines.

Cause

The accident was caused by the failure of the ballast regulator operator to safely operate his machine.

REPORT: 38

RAILROAD: Missouri Pacific Railroad Company

LOCATION: Muskogee, Oklahoma

DATE: December 3, 1983

The Accident

A 21-year-old switchman was fatally injured on December 3, 1983, at about 7:05 p.m., in Muskogee, OK. Employed by the Missouri Pacific Railroad Company (MP), the switchman had 3 years' service.

Background

In the accident area, the main track is tangent and level. An industrial spur track with a facing point switch to the north diverges northeastward from the main track and leads to the River Port Industrial Park. The level track has a 12° 30" curve to the right, and the manually operated switch stand is on the east side of the main track. The south end of an open deck railroad bridge, 851 feet spanning the Arkansas River, is 910 feet north of this industrial track switch. The bridge does not have a walkway.

On the day of the accident, the switchman was assigned to an extra yard switcher, as part of a crew consisting of an engineer, a switch foreman, and two switchmen. The crew went on duty at Muskogee's Shopton Yard at 5 p.m., after completing the required off-duty period. The locomotives were operated to the Junction Yard and performed some switching. At about 6:15 p.m., with nine cars, the train left for the River Port Industrial Park, about 7 miles north. En route, one car was added at an industry track.

The employee last attended a Uniform Code of Operating Rules class on April 4, 1983. He regularly attended safety meetings, the last on September 27, 1983. Carrier records show his last physical examination occurred on July 28, 1981.

Circumstances of the Accident

Arriving at the River Port spur track switch at about 6:50 p.m., with 10 cars and two locomotives, the crew planned to make a running drop of the cars to position the locomotives at the opposite, or south, end of the train so that the cars could be shoved into the industrial park. When the train stopped, its front end was south of the switch to allow ample distance to gain speed to complete the drop. The

locomotives were to occupy the River Port spur track, and the cars were to occupy the main track.

As the train was about to make the drop, the engineer was seated at the controls of the lead locomotive; the foreman was manning the switch; and the subject (first) switchman was between the fifth and sixth cars, standing on the hand-brake step at the north end of the sixth car from the locomotive. The second switchman stood at the uncoupling device on the southeast switching step of the trailing locomotive.

Knowing that the open deck railroad bridge was only a few hundred feet north of the switch, the foreman radioed the first switchman to brake the cars to a stop and release the handbrake, but not get off until the cars were pulled from the bridge.

After the drop was made, the locomotives were coupled to the cars at the south end. The engineer then radioed the switchman that the brakes were being cut in. When he received no response, the foreman also attempted to contact the switchman but received no response. The train was moved south of the bridge, and the crew began searching for the switchman. The foreman radioed the MP operator at Muskogee that the switchman was missing and could have either stepped off or fallen from the bridge.

The crew members began looking along the river bank, under and downstream from the bridge. They found the first switchman's body about 180 feet downstream, face down in the river, and lodged against a highway bridge pier. The switchman had fallen from the bridge through the limbs and foliage of a tree and landed 33 feet below, on the sloping enbankment of the river, and rolled into the water. He sustained multiple head and body injuries.

Applicable Rules

GETTING ON OR OFF ENGINES,
CARS OR OTHER EQUIPMENT

. . . . . .

123. Have foot firmly placed on ground or other support before releasing handhold when getting off standing engines, cars or other equipment.

(Uniform Code of Safety Rules)

Analysis

Investigation disclosed that when the cut of cars stopped, the end of the car on which the first switchman was riding

was about 19 feet on the south end of the bridge. What appeared to be footwear scuff marks were found on the end of a crosstie at the east side of the bridge, 19 feet 2 inches from the south end.

Inspection of the equipment involved disclosed no condition or defect that could have contributed to the accident.

The handbrake used to stop the cut of cars was found in a "Released" position, indicating that the switchman had braked the cars to a stop and released the handbrake.

The switchman dismounted from the car, apparently unaware that the end on which he was positioned was on the bridge.

Cause

The accident was caused by the switchman's failure to insure a firm footing before he released his handhold.

REPORT: 39

RAILROAD: Missouri Pacific Railroad Company

LOCATION: Marshall, Missouri

DATE: December 12, 1983

The Accident

A 60-year-old conductor was fatally injured on December 12, 1983, at about 9 a.m., in Marshall, MO. Employed by the Missouri Pacific Railroad Company (MP), the conductor had 36 years of service.

Background

The accident occurred at Marshall on that portion of the MP's industrial lead track that lies east-to-west between Brunswick and Allen roads, a distance of 926 feet. The grade there descends eastward at 1.18 percent, and a storage track lies to the north of the industrial lead, running parallel for 746 feet.

The conductor was last examined on Uniform Code of Operating Rules on April 21, 1982. He was promoted to conductor May 2, 1960. His last examination by a carrier physician occurred in March 1972.

Circumstances of the Accident

On December 12, 1983, after the required off-duty period, the conductor, two brakemen, and an engineer went on duty at 5:30 a.m. as the crew for MP Extra 520 East. The train, consisting of a locomotive, nine cars, and a caboose, left Neff Yard, in Kansas City, MO, at 6:15 a.m., after the prescribed air brake test. It reached Marshall at 8:50 a.m., entered the Miami Siding west switch, continued to the west leg of the wye en route to the Marshall industrial lead track, and stopped at Brunswick Road.

The front brakeman lined the switch point derail near the eastern end of the industrial lead. At this time, the rear brakeman closed the angle cock on the east end of the fifth car, UP 76243, and uncoupled the rear two cars and caboose, leaving them (with the air brakes applied) on the industrial lead approximately 25 yards east of Brunswick Road. The locomotive and five loaded hopper cars were pulled west on the industrial lead. The rear brakeman was on the northeast side of the fourth car ready to cut off the fifth car between Brunswick Road and Allen Road to facilitate prearranged switching moves.

When the train stopped west of Allen Road, the fifth car, UP 76243, was on the industrial lead about two cars east of the west storage track switch, which lies parallel to the industrial lead. The rear brakeman closed the angle cock on the eastern end of the fourth car. He then uncoupled the fifth car, UP 76243, which resulted in an emergency application of its air brakes, but no hand brake or wheel chocking was applied. The grade at this location is 1.8 percent descending eastward toward Brunswick Road. At that time, the conductor was seen walking west, away from the rear three cars which were left.

The train then pulled west with the four remaining cars past the west storage switch. The switch was lined for the storage track, and the fourth car was shoved eastward onto the storage track. As the front brakeman was riding on the eastern end of the fourth car, he looked eastward and saw covered hopper UP 76243, which had previously been set on the industrial lead, rolling eastward toward Brunswick Road. The front brakeman said that UP 76243 appeared to be stopping when he saw the conductor move around the eastern end of the car, start down the northeast ladder, and fall to the ground. The front brakeman immediately set the handbrake for the car which he was riding and ran to the conductor. He found the conductor lying on his back with most of his body on the north side of the rail and his feet toward the east. His head, part of his upper body, and his right arm were on the south side of the rail.

Evidence showed that all four wheels on the north side of UP 76243 went over the victim, and the car continued rolling about 28 feet east, beyond the victim. The conductor was pronounced dead at the scene by the acting county coroner.

Inspection of UP 76243 at the accident site revealed no defects in safety appliances or in the air brake system. Subsequent tests conducted by mechanical department officials of the MP agreed with these initial findings.

Applicable Rules

11. Face object, use both hands, have secure handholds and firm footing when climbing on or off engine, car, scaffold, trestle, ladder or other object. Carrying tools, material or any object which prevents secure hold with both hands or interferes with safe movements while climbing is prohibited.

(Uniform Code of Safety Rules)

100. Leaving Trains, Engine, or Cars. When for any reason an engine leaves its train or part of its train on the main track, a sufficient number of hand brakes must be set, when necessary, to keep train from moving.

The automatic air brake must not be depended upon to hold an engine, cars or train, when standing on a grade, whether engine is attached or detached from cars or train. When required, a sufficient number of hand brakes must be applied to hold train, cars, or engine, before air brakes are released. When ready to start, hand brakes must not be released until it is known that the air brake system is properly charged.

(Uniform Code of Operating Rules)

Analysis

An eyewitness account by the front brakeman revealed that the conductor fell under car UP 76243 while he was stepping off the northeast ladder on the eastern end of the car. Circumstances indicated that the conductor may have tried to apply the handbrake on the south side, at the eastern end of the rolling car. It could not be determined why the conductor attempted to dismount on the north side of the car while it was still moving eastward.

Cause

The accident was caused by the failure of the crew to apply the handbrake on UP 76243 to assure that it was properly secured before leaving it unattended on the industrial lead, and the failure of the conductor to take adequate precaution while disembarking from a moving car.

REPORT: 40

RAILROAD: Chesapeake and Ohio Railway Company

LOCATION: Ronceverte, West Virginia

DATE: December 13, 1983

The Accident

A 31-year-old fireman was fatally injured on December 13, 1983, at about 12:05 a.m., in Ronceverte, WV. Employed by the Chesapeake and Ohio Railway Company (C&O), the fireman had 8 years of service.

Background

The accident area consists of two main tracks extending east and west and a passing siding and two yard tracks parallel to the main tracks on the south side. At milepost 324.0 (W. R. Cabin), the two main tracks converge and become a single main track. From the east, the main tracks are tangent 5,280 feet to the end of double track. Westward on the single main track, there is a 200-foot tangent to the point of the accident and a 1° 39" curve to the right for several hundred feet beyond. The grade for westward trains is 0.11 percent, descending.

The fireman was last examined on the carrier's operating rules on July 1, 1982, and attended a safety rules class on October 8, 1983. His last physical examination was administered on June 2, 1979.

Circumstances of the Accident

Extra 4288 West received instructions to pick up LN 241305, an empty covered hopper car, at Ronceverte. On arrival at Ronceverte, the crew stopped the train on Track No. 1 about four carlengths east of the westbound signals.

The head brakeman and the fireman uncoupled three locomotives from the train and proceeded towards Greenbrier Valley Farm Track to pick up the empty covered hopper. After coupling the locomotives to the car, with the car trailing, the consist proceeded westward through the turnouts from Greenbrier Valley Track to Main Track No. 1. While the train was going through the turnouts on No. 1 Main, the brakeman got off to make the coupling to the train. The crew had planned to have the fireman get off at the power switch from No. 2 Main Track to No. 1 Main Track to protect the reverse movement through the power switch, as

required. The brakeman last saw the fireman when he (the brakeman) dropped off at the pick up point.

When the movement neared the power switch, the engineer received what he thought was a go-ahead signal and continued the westward movement for some distance. Then, the engineer became concerned and stopped the westward movement because he received no more signals, and the fireman's light had disappeared from view.

The engineer walked back along the side of the track and found the fireman lying on his back underneath LN 241305, his right leg on the rail between the L1 and L2 wheels. There were no witnesses to the final actions of the fireman.

Applicable Rules

General Notice

Safety is of the first importance in the discharge of duty.

73. When getting on or off equipment, employees must face the equipment and have secure handhold and footing. Watch for equipment on adjacent tracks, close clearances, obstructions, irregularities, or opening, on the ground. Get on or off side away from main track or close clearance when conditions permit.

75. Getting on or off equipment while carrying anything that will prevent a secure handhold or otherwise interfere with safe movement is prohibited.

(Chessie System Safety Rules)

Analysis

The fireman was last seen by the head brakeman standing on the rear platform of 4148, the trailing locomotive. While the forward movement was being made, the brakeman walked to the train on No. 1 Main Track and did not continue to observe the fireman. Since there were no witnesses to the accident, the actual circumstances could not be determined.

Post-accident inspections of the equipment involved showed no defects that would have contributed to the accident. An autopsy was not performed.

Cause

The accident was caused by the fireman's apparent loss of balance, footing, or handhold while attempting to dismount a moving locomotive.

REPORT: 41

RAILROAD: Missouri-Kansas-Texas Railroad Company

LOCATION: St. Charles, Missouri

DATE: December 30, 1983

The Accident

A 40-year-old carman was fatally injured and a 36-year-old mechanical foreman was severely burned on December 30, 1983, at about 2:30 p.m. in St. Charles, MO. Employed by the Missouri-Kansas-Texas Railroad (MKT), the carman had 20 years of service, and the foreman had 15 years of service.

Background

On December 24, 1983, Locomotive MKT 3139, an EMD GP-40 locomotive, had been dispatched from Baden Yard in St. Louis, MO, as the hauling locomotive for MKT Train 101. The temperature was about - 14° F., and the locomotive's diesel fuel had congealed, causing the engine to fail shortly after leaving Baden Yard. A following train moved the entire train onto a nearby siding. On December 26, two locomotives were sent from Baden Yard to move the train south, but air pressure could not be transmitted properly through MKT 3139, and the failed locomotive was set out on the siding at St. Charles. By December 30, the inoperative locomotive had been on the St. Charles siding for 5 days, and the air brake system was depleted.

Both employees had been issued the Uniform Code of Safety Rules and last attended a safety meeting in October 1983.

Circumstances of the Accident

According to the mechanical foreman, he and the carman went from Baden Yard to the locomotive at about 2 p.m. on the day of the accident. They intended to generate smoke and some pressure into the air brake system to locate broken piping or leakage. At the front of the locomotive, they removed the air brake hose and pipe coupling, leaving a 10-inch pipe nipple and angle cock valve in place. The housing for the angle cock consisted of two castings bolted together with four 3/8-inch-diameter bolts. A 1 1/4-inch-diameter pipe nipple with threaded pipe couplings and a pipe plug in one end was used as a fusee container. The piping with the lighted fusee was then threaded into the air line. On three separate occasions, individually lighted fusees of standard, 10-minute duration were placed inside this piece of pipe to build up air pressure. The angle cock was closed

between the burning of the fusees to retain accumulated pressure.

At about 2:30 p.m., about 10 pounds of pressure appeared to be in the brake pipe, and it was decided to use two fusees at the same time.

With the angle cock closed, two lighted fusees were placed in the pipe nipples. The foreman crouched low, turning the bottom pipe by hand from the sides to make the connection. The standing carman was facing the end of the locomotive. He was reaching for the handle to open the angle cock when the explosion occurred. The carman grabbed his chest and fell backward across the east rail.

An ambulance was called and took both men to St. Joseph Health Center in St. Charles, where the carman was pronounced dead. The mechanical foreman was hospitalized for severe burns to the left leg caused by the burning fusee ingredients.

Applicable Rules

33 (t). Use torpedoes and fusees for signaling only. Care must be exercised to avoid injury from explosion or burning material.

(Uniform Code of Safety Rules)

Analysis

In the explosion, the pipe plug was blown out of the bottom pipe, the two pipes separated at their threaded connection, and the bolted angle cock housing was blown apart. The outer portion, attached to the upper pipe, was found about 20 feet away. Three of the four bolts securing the angle cock castings were missing. On the outer casting, two lugs containing the bolt holes were broken off. The broken lug piece at the top left, a triangular-shaped segment measuring roughly 1 1/2 inches by 1 1/2 inches by 2 inches was missing.

According to the coroner's report the metal fragments struck the carman in the chest, causing two wounds very close together. The missing lug segment and a bolt, quite likely the one from the same top left location, became the projectiles that caused the fatal injuries.

Both employees were qualified, experienced carmen whose jobs at Baden Yard included work on locomotives as well as on cars; the foreman regularly worked on equipment in addition to supervising carmen.

Cause

This accident was caused by the improper use of fusees.

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