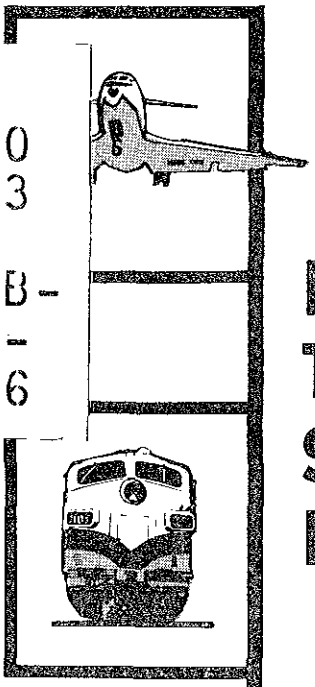

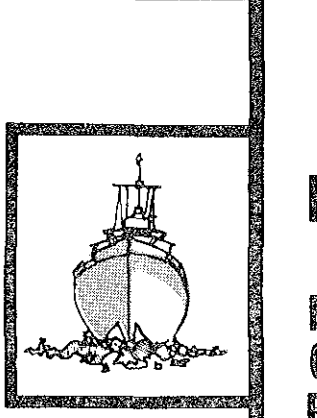

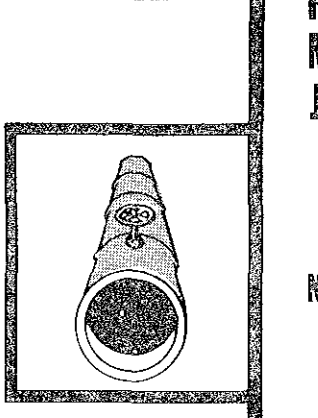

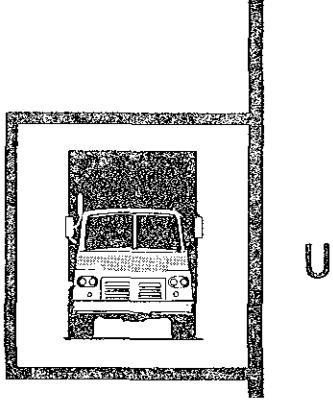

NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C. 20594

RAILROAD ACCIDENT REPORT

REAR-END COLLISION OF TWO
CONSOLIDATED RAIL CORPORATION
FREIGHT TRAINS
MUNCY, PENNSYLVANIA
JANUARY 31, 1979

NTSB-RAR-79-6

UNITED STATES GOVERNMENT

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15 Supplementary Notes

16 Abstract

About 5:08 a.m., e.s.t., on January 31, 1979, Consolidated Rail Corporation (Conrail) freight train CNEN-0 collided with the rear end of standing Conrail train SYEN-0 at Muncy, Pennsylvania. The lead locomotive unit of train CNEN-0 was destroyed and the second unit was heavily damaged; 14 cars were damaged. Four cars of train SYEN-0 were destroyed, and one was heavily damaged. Two crewmembers were killed and three were injured. Total property damage was estimated to be $1,304,200.

The National Transportation Safety Board determines that the probable cause of the accident was the failure of the engineer and the front brakeman of train CNEN-O to operate the train at a speed required by signal indication that would have allowed the engineer to stop the train short of standing train SYEN-0. Contributing to the collision was the failure of the operating rules to require the conductor to be located in a position to properly supervise the safe operation of the train.

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NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C. 20594

RAILROAD ACCIDENT REPORT

Adopted: August 2, 1979

REAR-END COLLISION OF TWO CONSOLIDATED RAIL CORPORATION FREIGHT TRAINS, MUNCY, PENNSYLVANIA JANUARY 31, 1979

SYNOPSIS

About 5:08 a.m., e.s.t., on January 31, 1979, Consolidated Rail Corporation (Conrail) freight train CNEN-0 collided with the rear end of standing Conrail train SYEN-0 at Muncy, Pennsylvania. The lead locomotive unit of train CNEN-0 was destroyed and the second unit was heavily damaged; 14 cars were damaged. Four cars of train SYEN-0 were destroyed, and one was heavily damaged. Two crewmembers were killed and three were injured. Total property damage was estimated to be $1,304,200.

The National Transportation Safety Board determines that the probable cause of the accident was the failure of the engineer and the front brakeman of train CNEN-O to operate the train at a speed required by signal indication that would have allowed the engineer to stop the train short of standing train SYEN-O. Contributing to the collision was the failure of the operating rules to require the conductor to be located in a position to properly supervise the safe operation of the train.

INVESTIGATION

The Accident

On January 31, 1979, eastbound Conrail train SYEN-0 departed Williamsport, Pennsylvania, at 3:25 a.m. The train consisted of 2 diesel electric locomotive units and 99 cars. The crewmembers took charge of the train on the Corning Connecting Track, near Williamsport, and received permission to proceed east to Enola, Pennsylvania. The crewmembers made a proper air test and took no exception to the train's condition before proceeding eastward. The radio on the lead locomotive unit functioned properly when used to communicate with the block operator at Lyco tower, Williamsport.

The engineer and front brakeman were in the lead locomotive and the conductor and flagman were in the caboose. The operator at Lyco told the engineer, by radio, that he should proceed to the east end of the Muncy siding to meet a westbound train (Conrail ENSY-0) which would use the siding. The train picked up a marker at the Arch Street Crossing to replace the marker lights on the caboose because the crew did not think that the original lamps were sufficiently bright.

Train SYEN-0 then passed the west end of Muncy siding at 4:53 a.m. It continued on the main track and was stopped west of the East Muncy signal, which displayed a "stop" aspect. The caboose was approximately 3,309 feet east of the west end of the siding. About 5 minutes after stopping, train SYEN-0 was struck in the rear by eastbound train CNEN-0. The brakes of train SYEN-0 applied in emergency. The engineer and front brakeman of train SYEN-0 then heard their conductor radio for assistance because of the collision. They stated that the emergency application of the brakes isolated their part of the train from impact forces of the collision.

Eastbound Conrail freight train CNEN-0 had departed Renovo, Pennsylvania at 2:10 a.m. on January 31, 1979. The train consisted of 2 diesel electric locomotive units and 95 cars. The crew made an airbrake test at Renovo and took no exception to the condition of the brakes. After departing, the train was stopped twice by the train's brakes with no difficulty. The block operator at Lyco Tower had told the engineer, by radio, that he would follow train SYEN-0 from Williamsport. After train SYEN-0 departed, train CNEN-0 proceeded at 4:29 a.m. from Linden near Williamsport. The engineer and the front brakeman were in the lead locomotive unit, and the conductor and the flagman were in the caboose. En route to Muncy the crew took no exceptions to the condition of the train and stated that the speed of the train was between 30 and 40 mph.

About 28 minutes before the accident, train CNEN-0 approached the east end of Allens siding, west of Williamsport, where the engineer questioned the operator at Lyco about stopping and he was informed to proceed east and that they would not be held at East Allen. Train CNEN-0 passed the east end of Allens siding at 4:48 a.m.; passed automatic signal No. 2566, located about 2 miles west of the west end of Muncy siding, which displayed an "approach" aspect 1/; passed the controlled signal at the west end of Muncy siding which displayed a "restricting" aspect 2/, and while moving at an estimated speed of 30 mph, collided with the rear end of train SYEN-0 at about 5:08 a.m. There was no indication that a locomotive whistle warning was sounded from train CNEN-0 as it approached train SYEN-0. Postaccident investigation disclosed no locomotive sand on or about the rails up to the point of impact. Additionally, the equipment and track did not show signs of discoloration indicative of heavy, prolonged braking.

Westbound train ENSY-0 approached the distant signal to the east end of Muncy siding at 10 mph. The engineer could see the aspects displayed on both the approach signal and the controlled signal at East Muncy. They displayed aspects for train ENSY-0 to proceed west and to enter the siding to permit the eastbound trains to pass. The engineer observed the distant signal change from an "approach medium" aspect to an "approach" aspect, and the home signal at East Muncy changed to a "stop" aspect. The engineer immediately took action to stop the train east of the siding and radioed the operator at Lyco of the signal change. Shortly thereafter, the engineer was informed of the collision.

1/ This aspect meant that the train must be operated at a speed not exceeding 30 mph, and be prepared to stop at the next signal. (See "Method of Operation" on page 6.)

2/ This aspect meant that the train must be operated at a speed that would enable the train to stop short of a standing train, but not exceeding 15 mph. (See "Method of Operation" on page 6.)

At Muncy, a siding parallels the single main track for 2.3 miles on the south. The distant signal is located 2.2 miles west of the controlled signal at the west end. There are no intervening signals on either the main track or siding between the opposing home signals at the ends of the siding. Muncy siding is located about 65 miles east of Renovo, and the home signals at the east and west ends are about 2.3 miles apart.

Approaching the controlled signal at the west end of Muncy from the west there is a 1°30', a 1°11', a 0°56', a 0°37', and a 1°11' right-hand compound curve for 4,710 feet, straight for about 185 feet to the signal and for 1,596 feet eastward, followed by a 2°08' right-hand curve for 1,623.3 feet and 250 feet of straight track to the point of collision. (See figure 1.) The grade is practically level west of the collision point.

Injuries to Persons

The front brakeman of train CNEN-0 and the rear brakeman of train SYEN-0 were killed. The engineer and the conductor of train CNEN-0 and the conductor of train SYEN-0 were injured. The other crewmembers were not injured.

	Crewmembers Train CNEN-0	Crewmembers Train SYEN-0
Fatal	1	1
Nonfatal	2	1
None	1	2

Damage

The lead locomotive unit of train CNEN-0 was destroyed and the second unit was heavily damaged. (See figure 2.) Fourteen cars in the train were damaged. Four cars of train SYEN-0 were destroyed, and one car was heavily damaged. The total estimated damage was:

Train Equipment	$ 1,217,000
Track	35,000
Signals	2,200
Lading	50,000
Total	$ 1,304,200

Crewmember Information

Each train involved in the accident had a conductor, engineer, flagman, and a front brakeman. The crewmembers were qualified for the physical characteristics of the territory, special instructions, and operating practices. All had passed physical examinations, and none were restricted from performing their duties. (See appendix A.)

The crewmembers of train CNEN-0 had previously worked west from Enola and had been relieved from duty at 4:00 a.m. on January 30, 1979, at Renovo. The crewmembers were in bed when called at 12:30 p.m. for duty at 1:30 p.m. on

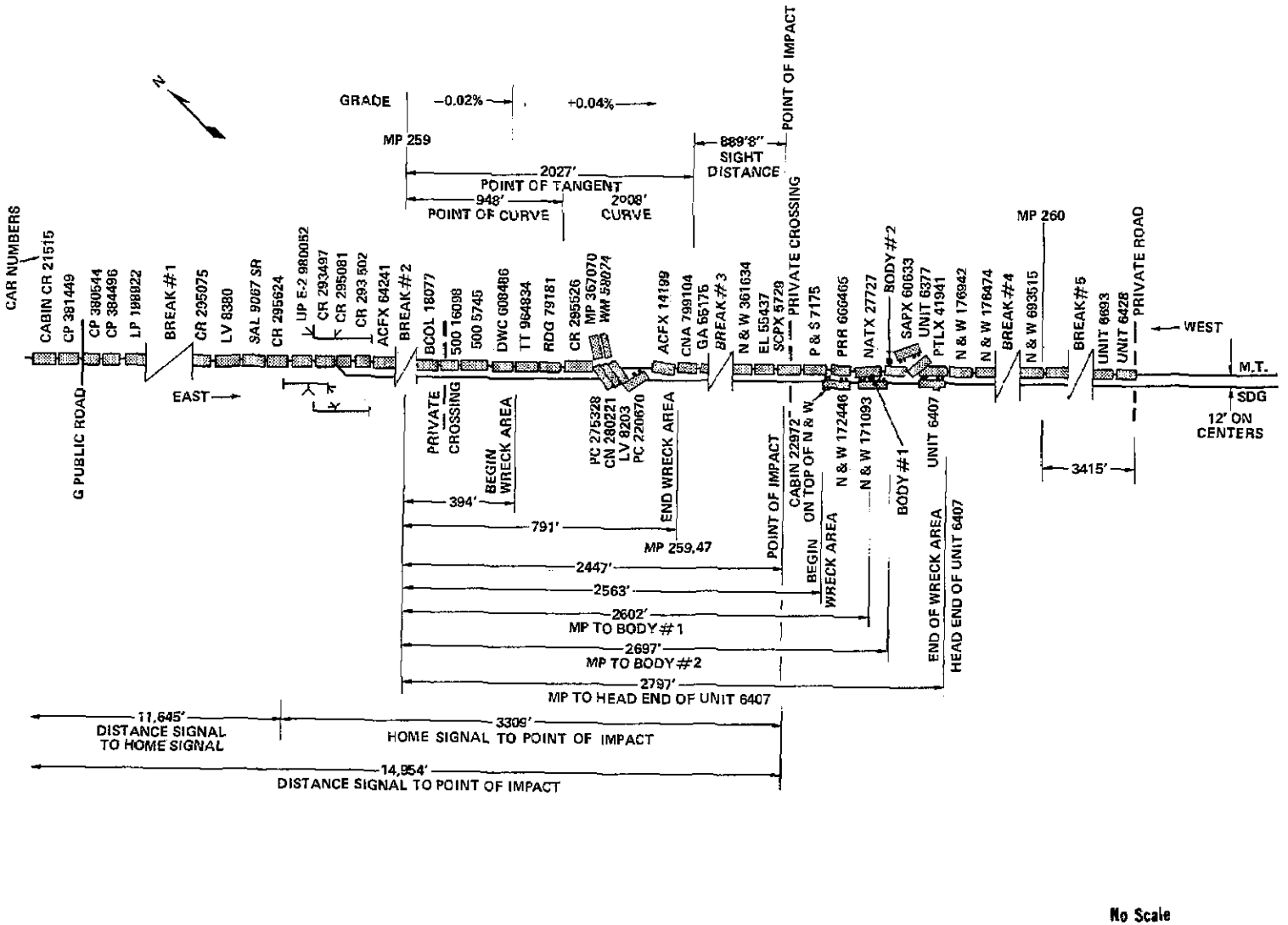

Figure 1. Plan of Accident site.

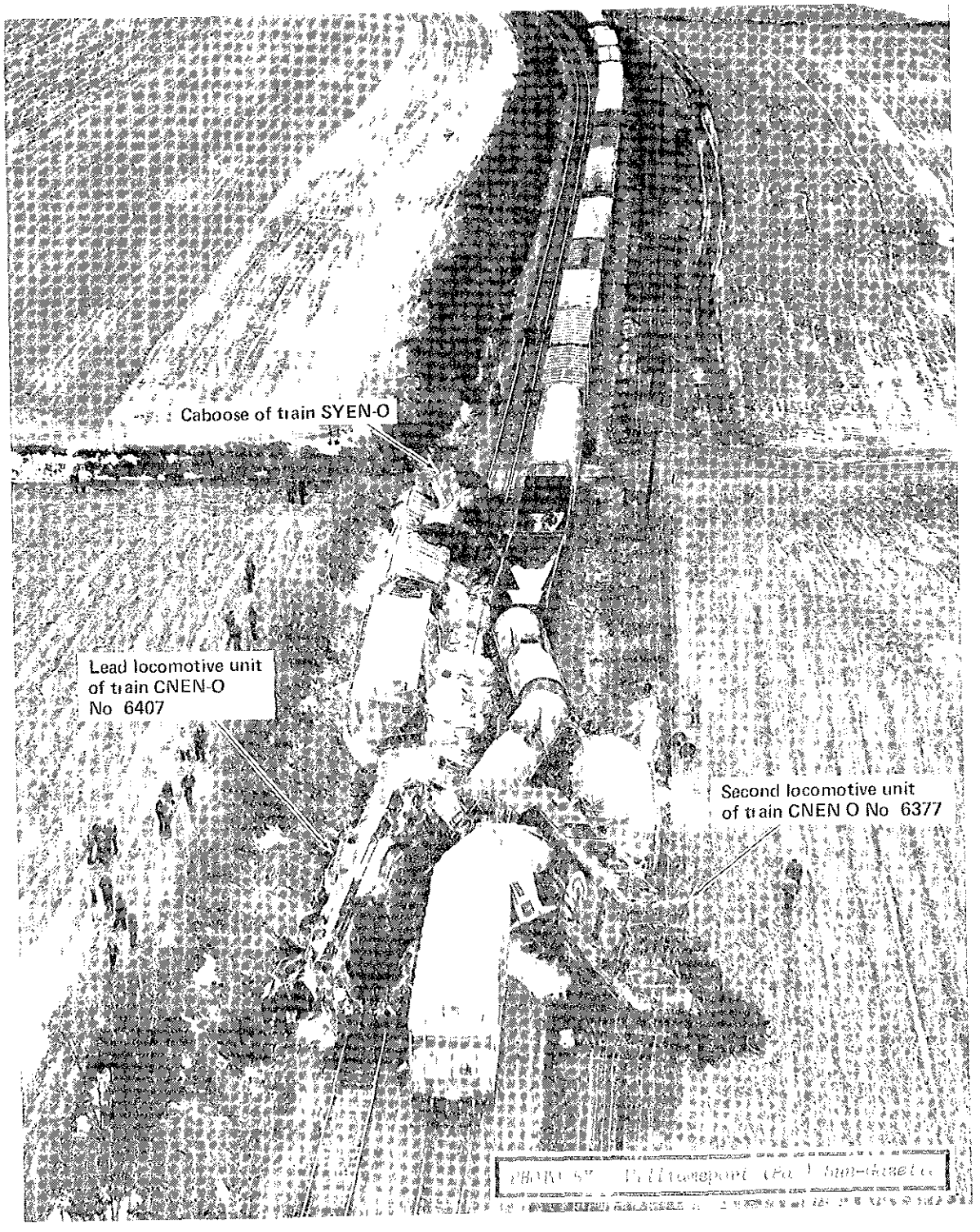

Figure 2. View of Accident site.

January 30. The crewmembers ate and then reported for duty. After repeated airbrake problems with the train, they were relieved from duty at 4:45 p.m.

They were again called to report at 12:45 a.m., on January 31, for train CNEN-0. The conductor and flagman had gone to bed, while the engineer and front brakeman remained awake after being relieved from the first train at 4:45 p.m. The men signed the register for the assignment and got their instructions from the yardmaster. No exception was taken to the crewmembers appearance or physical condition. During the month of January all of these men had worked between Enola and Renovo.

The crewmembers for train SYEN-0 were ordered for 2:00 a.m., January 31, to operate from Williamsport to Enola. This was the home terminal for all crewmembers for this assignment. The flagman, conductor, and engineer were regularly assigned, and the head brakeman was called from the extra list to complete the crew.

Train Information

Train CNEN-0 consisted of 2 diesel electric locomotive units, both Model SD 40-2 manufactured by General Motors (EMD); 94 cars; and a caboose. The lead unit had the short end forward. The locomotive was equipped with dynamic brake, 26-L automatic brake valve, radio, speedometer, and a safety device (dead-man control). The train had originated at Frontier Yard, Buffalo, New York. The train brakes were used several times en route and functioned properly at all times. On all descending grades the dynamic brake with a minimum automatic airbrake application maintained the required speed.

Method of Operation

Trains are operated in the accident area by signals of a traffic control system. (See appendix B.) The single main track is signaled for operation in either direction. The maximum authorized speed was 40 mph. There were no Bulletin Orders in effect that restricted speed in the accident area. The carrier's radio rules did not require crewmembers of one train to notify crewmembers of other trains of their location.

The operator at Lyco can display a "proceed" aspect on any of the controlled semiautomatic home signals by operating a lever on his control panel. If the lever is so operated and if the block beyond the signal is clear, but the signal at the east end of the siding is in the "stop" position, the signal will display the following aspect:

Aspect	Name	Indication
Three diagonal yellow lights to the right	Approach	Proceed prepared to stop at the next signal. Train exceeding Medium speed must at once reduce to that speed.

If the block beyond the signal is occupied, the signal will display the following aspect (see figure 3):

Aspect	Name	Indication
Two horizontal red lights over three diagonal yellow lights to the left	Restricting	Proceed at Restricted speed

If the lever is not positioned to proceed, the signal will display the following aspect regardless of the occupancy of the block:

Aspect	Name	Indication
Two horizontal red	Stop signal	Stop

If the home signal at West Muncy displays a "clear" or an "approach" aspect, signal 2566, the approach signal, will display the following aspect:

Aspect	Name	Indication
Three vertical yellow lights	Clear	Proceed

If the controlled home signal is clear but the operator displays a "restricting" or "stop" aspect, signal 2566 will display the following aspect:

Aspect	Name	Indication
Three diagonal yellow lights to the right	Approach	Proceed prepared to stop at the next signal. Train exceeding Medium speed must at once reduce to that speed.

"Medium" speed is defined as "not exceeding 30 mph," and "restricted" speed is defined as "proceed prepared to stop short of train, obstruction, or switch not properly lined, looking out for broken rail, not exceeding 15 mph." (See appendix B.)

Meteorological Information

At the time of the accident it was clear, dark, and dry. The temperature was 30° and the winds were light. Ground visibility was 7 miles.

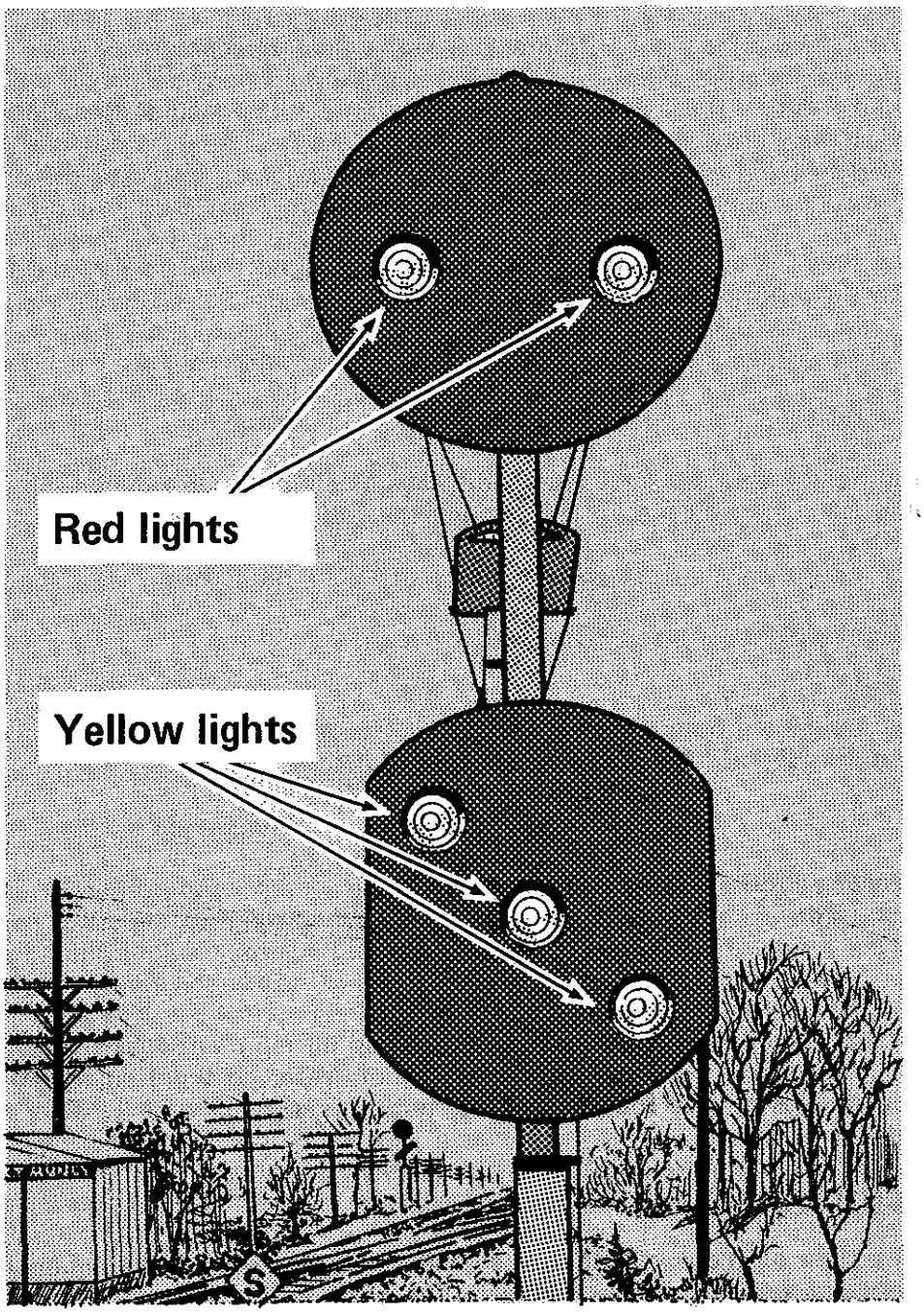

Figure 3. "Restricting" aspect shown on controlled signal at West End of Muncy siding viewed from the west.

Survival Aspects

The operating compartment and most of the structure above the frame of the lead locomotive unit of train CNEN-0 was completely destroyed. The front brakeman was ejected from the cab and landed to the left of the main track about 250 feet east of the point of collision. The engineer was found in the debris of the cab, on the right side of the controlled siding. The locomotive unit stopped on its side against a bank adjacent to the siding.

The caboose of train SYEN-0 was destroyed and only the cupola compartment which the conductor occupied was intact. The rear brakeman was ejected from the caboose and was found about 155 feet east of the collision point. The conductor survived the collision and radioed for assistance.

At about the same time that the conductor of train SYEN-0 was requesting assistance, the crewmembers on the rear of train CNEN-0 also asked for assistance. Emergency vehicles were dispatched and responded quickly, and the injured were removed and taken to local hospitals.

Tests and Research

The signal system involved was tested and disclosed that the system worked as intended with no defective conditions.

The brake system of train CNEN-0 was tested on February 1, 1979. The tests were made with both service and emergency applications. In the service test, five cars did not operate. In the emergency test, three cars did not operate. There were 79 cars capable of being tested.

A train similar to CNEN-0 was used to make stopping distance tests. The tests were performed with the same signals as those displayed for train CNEN-O. At maximum speeds authorized by applicable signals and at a point where an occupant of the lead locomotive cab could first see a standing train, the train brakes were applied in full service with the engine brake in release. This resulted in the train stopping 140 feet short of the collision point. The second test was made with the train operating at 27.5 mph and the brakes were applied as in test one, but allowing the engine brakes to apply. The train passed the collision point at 22 mph and went an additional 488 feet east before stopping.

The sight distance was predetermined from observations made at the accident site, from the locomotive cab of the test train to the point of impact. The caboose first became visible to the engineer of the approaching train at a distance of 890 feet.

ANALYSIS

The train brake system of train CNEN-0 had been tested properly and had functioned as intended several times en route. The crew that delivered the train to Renovo and the crew involved in the accident both had used the automatic brake system to stop or reduce the speed when required. The brake system tested properly after the accident.

The crewmembers were apparently well qualified. The engineer had 3 years service and had been through the training school for engineers. Although the conductor had received no other training, his extensive experience in train service should have qualified him well for this position.

Since the locomotive crewmembers of train CNEN-0 elected to remain awake after being released from an earlier assignment, they had been without significant rest for about 16 hours when the accident occurred. They had arrived at Renovo about 4:00 a.m. on the same day that they were ordered for train CNEN-0. The crew had less than 8 hours off duty in Renova after having been on duty about 12 hours. The records indicated that the locomotive crewmembers were not absent from their regular assignments during the previous week.

The environment of the locomotive control compartment with its constant noise of the diesel engines, the rocking motion imparted from movement over the track, fumes from the diesel fuel, and heat supplied by the cab heaters is conducive to lulling a crewmember to sleep or at least to making him less attentive to his duties than required. 3/ Operating the train in darkness of the early morning hours would compound the problem of inattentiveness.

The last radio communication that the engineer of CNEN-0 had was with the operator at Lyco about 28 minutes before the accident. Since the speed of the train remained between 30 and 40 mph after departing Linden and since there was no apparent reduction in speed or an application of the brakes as the locomotive approached the signal at West Muncy there would have been little activity on the part of the locomotive crew. That signal was displaying a "restricting" aspect which would have required the engineer to reduce the speed of the train to 15 mph or less. If the brakes of this train had failed and the engineer had been unable to control the speed or if he had received an improper signal at the west end of the Muncy siding, he probably would have blown the whistle to warn the crewmembers of the standing train when it came into his view. Because the speed was not reduced in compliance with the signal, the brakes were not applied, and an audible warning was not given, the Safety Board concludes that neither the engineer nor the head brakeman took any action in this regard. It is apparent from the training and experience of these employees that had they observed the signal they would have taken immediate action to control the train. Therefore, the Safety Board must conclude that the engineer and head brakeman were not alert as train CNEN-0 passed the signal and approached standing train SYEN-0.

Because the locomotive of train CNEN-0 was equipped with an air-operated safety device which only requires depressing a pedal on the floor to prevent it from being actuated, the engineer could have become incapacitated without the device being actuated. Instances have been found where the pedal has been kept depressed by some mechanical means or by the engineer's foot if he remained in the seat, even though he is incapacitated. A more dependable device is necessary

3/ "Railroad Accident Report—Rear-end Collision of Two Southern Pacific Transportation Company Freight Trains, Indio, California, June 25, 1973" (NTSB-RAR-74-1). "Railroad Accident Report—Head-on Collision of Two Penn Central Transportation Company Freight Trains, Herndon, Pennsylvania, March 12, 1972" (NTSB-RAR-73-3).

if adequate protection is to be provided in the event that the engineer becomes incapacitated. In 1973, following its investigation of an accident in Herndon, Pennsylvania, the Safety Board recommended that the Federal Railroad Administration (FRA) take action to develop such a device. 4/

If the railroad were provided with an absolute signal block system which would permit only one train in the signal block at a time, the signal at the entrance to the block would have indicated a "stop and stay" aspect. In this case, the "restricted" aspect displayed required the speed of the train to be reduced below 15 mph. However, because the engineer failed to comply with this signal, there is no reason to assume that he would have complied with the "stop and stay" aspect. In addition to the safety device to keep an engineer alert, a system should be provided which will increase the probability that the train will be operated in accordance with signal indications. This could be a form of automatic train control or could be adequate procedures to ensure proper operation. In 1976, the Safety Board recommended that the FRA take action to develop such a system. 5/

The conductor is in charge of the train. However, Conrail's operating rules make the engineer along with the conductor responsible for the train's safe operation. The conductor riding in the caboose has no positive means of knowing what aspect the signals are displaying and consequently cannot supervise the train's operation. If the conductor is to excercise his responsibility, then he should either be placed in a position to properly perform these duties or be provided means of executing them. If the engineer is to be responsible for the train's operation, then he is supervising himself.

There is no assurance that if the conductor had been in the cab of the locomotive instead of the front brakeman or in addition to the front brakeman that he would not have been affected in the same manner as the locomotive crewmembers on train CNEN-0. However, if he had been charged with the full responsibility for the train's operation, it is reasonable to assume that he would have taken action had he observed any inattention on the part of the other crewmembers. The conductor and engineer are equal in position, but the front brakeman reports to the conductor, which makes the front brakeman's position of less importance than the engineer's. Even though part of the front brakeman's duties are to monitor the engineer and the operation of the train, he may be reluctant, due to his position, to override the decisions of the engineer or to even criticize him. The radio is located at the engineer's position in the cab of the locomotive, and the front brakeman has no other means of communication with the conductor in the caboose. Therefore, any decision that he is required to make is entirely his own. The front brakeman in this accident, as well as those on most trains, had not been instructed in the operation of the locomotive, which makes it difficult for him to criticize

4/ "Railroad Accident Report—Head-on Collision of Two Penn Central Transportation Company Freight Trains, Herndon, Pennsylvania, March 12, 1973" (NTSB-RAR-73-3).

5/ "Railroad Accident Report—Rear-end Collision of Two Texas and Pacific Railway Company Freight Trains, Meeker, Louisiana, May 30, 1975" (NTSB-RAR-75-9).

its operation by a qualified engineer. In most cases, any action taken by the front brakeman has been too late to alter the course of an accident. In this accident, the front brakeman was killed, making it impossible to determine what action, if any, he may have contemplated.

In 1973, also as a result of its investigation of the Herndon, Pennsylvania, accident, the Safety Board made this recommendation to the FRA:

> "In the promulgation of regulations governing railroad operating rules, where responsibility for safe operation of the train is assigned jointly to the engineer and the conductor, require that they be located and informed so that they can make quick effective decisions. (R-73-11)"

The FRA informed the Safety Board that the adoption of FRA's proposed radio rules (49 CFR 220) would provide the conductor with the required information. The Safety Board did not agree and closed out the recommendation after notifying the FRA that its action was considered unacceptable. The Muncy accident again shows the need for the employee who is in charge of the train's operation to be located and informed so that he can properly supervise the safe operation of the train.

Both trains were provided with operable radios on the locomotive and on the caboose. This should have enabled the crewmembers of the trains to exchange information to keep each other informed of the intended moves and operating conditions. Additional use of the radios would have provided checks on the alertness of the crewmembers. This additional use was possible, since during the investigation of this accident, it was disclosed that there was no unusual amount of radio conversation immediately before the accident. The carrier has no rules or requirements relating to the use of radios for this purpose.

CONCLUSIONS

Findings

1. The train brakes of train CNEN-0 had performed properly prior to the accident.

2. The engineer of train CNEN-0 was qualified under Conrail rules to operate the train.

3. The radios on train CNEN-0 were not used during the 28 minutes before the accident.

4. The engineer of train CNEN-0 was operating his train at a speed in excess of that permitted by the signal indication.

5. The engineer did not take emergency action when he was able to see the standing train.

6. The head brakeman of train CNEN-0 did not assist the engineer.

7. The engineer and head brakeman of CNEN-0 were not alert as the train passed the signal at the west end of the Muncy siding and approached the rear of the standing train.

8. If the signal system had been provided with an automatic train control system, the accident would have been prevented.

9. Conrail does not require the crewmembers to keep each other informed by radio of train movements.

Probable Cause

The National Transportation Safety Board determines that the probable cause of the accident was the failure of the engineer and the front brakeman of train CNEN-0 to operate the train at a speed required by signal indication that would have allowed the engineer to stop the train short of standing train SYEN-0. Contributing to the collision was the failure of the operating rules to require the conductor to be located in a position to properly supervise the safe operation of the train.

RECOMMENDATIONS

As a result of its investigation of this accident, the National Transportation Safety Board recommended that the Consolidated Rail Corporation:

> "Insure that its train operations are conducted in accordance with its operating rules. (Class II, Priority Action) (R-79-56)"

--to the Federal Railroad Administration:

> "Promulgate regulations to require that the conductor or other employee in charge of the train's operation be located and informed so that he can properly supervise the safe operation of the train. (Class II, Priority Action) (R-79-61)

In addition to these recommendations, the Safety Board reiterates the following recommendations which were made to the FRA as a result of other accident investigations:

> "In cooperation with the Association of American Railroads, develop a fail-safe device to stop a train in the event that the engineer becomes incapacitated by sickness or death, or falls asleep. Regulations should be promulgated to require installation, use, and maintenance of such a device. (R-73-8)" (Issued May 3, 1973) (Open-Acceptable)

The FRA has informed the Safety Board that action to comply with this recommendation, made following the Herndon, Pennsylvania, accident, is still being studied.

> "Include in its present investigation of the safety of locomotive-control compartments a study of environmental conditions that could distract crews from their duties or cause them to fall asleep at the controls. Regulations should be promulgated to correct any undesirable conditions disclosed. (R-73-9)" (Issued May 3, 1973) (Open-Acceptable)

This recommendation, also made following the Herndon, Pennsylvania, accident, is to be included in the FRA's locomotive cab crashworthiness and improvement study.

> "Promulgate regulations to require an adequate backup system for mainline freight trains that will insure that a train is controlled as required by the signal system in the event the engineer fails to do so. (R-76-3)" (Issued January 25, 1976) (Open-Unacceptable)

This recommendation was made following the Meeker, Louisiana, accident. The FRA replied that "the immediate answer" to the problem "lies with training given to employees on the operating rules, and through an effective testing program, rather than installation of additional mechanical and electrical devices.

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

/s/ JAMES B. KING
Chairman

/s/ FRANCIS H. McADAMS
Member

/s/ PATRICIA A. GOLDMAN
Member

/s/ G. H. PATRICK BURSLEY
Member

ELWOOD T. DRIVER, Vice Chairman, did not participate.

August 2, 1979

APPENDIX A

TRAIN CREWMEMBER INFORMATION

TRAIN CNEN-0

Conductor Melvin G. Pope

Conductor Pope, 55, was employed as a brakeman by a predecessor of Conrail on October 10, 1950. He was promoted to conductor on March 18, 1953. Since 1964, Mr. Pope had been assigned to work between Renovo and Enola. During that period he had served as head brakeman, flagman, and conductor. Since the prior conductor's retirement in December 1978, he had been the regular assigned conductor of this crew. His home terminal was Enola. Pope's last physical examination was on September 22, 1977; there were no negative findings or restrictions.

Since hiring, Mr. Pope had incurred only four instances of discipline with a maximum suspension of 2 days.

Engineer Joseph A. Barrett

Engineer Barrett, 22, was employed as a fireman by Conrail on October 8, 1976. He was placed in the Training School For Engineers at Conway, Pennsylvania, in May 1978. He completed the school successfully and was promoted to engineer in October 1978. Mr. Barrett had a physical examination on February 10, 1978, and was found to be qualified with no restrictions.

Since promotion Mr. Barrett had received two efficiency checks; one on November 22, 1978, and the other on January 22, 1979.

Since entering service Mr. Barrett had had no discipline imposed.

Flagman Ronald W. Keller

Flagman Keller, 25, was hired by Conrail as a trainman on August 20, 1976. He was not a qualified conductor, but had served on trains between Enola and Renova for approximately 9 months before the accident. He passed his last physical examination on June 22, 1977, with no restrictions. There was no record of his having been examined on airbrakes or on the Rules for Conducting Transportation. No discipline had been imposed on Mr. Keller.

Head Brakeman Robert E. VanHorn, Jr.

Brakeman VanHorn, 29, was employed as a trainman on September 7, 1976, by Conrail. He was qualified physically with no restrictions on December 26, 1978. He had been promoted to conductor on March 27, 1978. Mr. VanHorn had had no discipline imposed.

APPENDIX B

Excerpts from Operating Rules of the Consolidated Rail Corporation

DEFINITIONS

* * * * *

BLOCK SIGNAL SYSTEMS

* * * * *

TRAFFIC CONTROL SYSTEM (TCS)—A block signal system under which train movements are authorized by block signals, cab signals, or both whose indications supersede the superiority of trains for both opposing and following movements on the same track

* * * * *

INTERLOCKING

INTERLOCKING—An arrangement of signals and signal appliances so interconnected that their movements must succeed each other in proper sequence and for which interlocking rules are in effect It may be operated manually or automatically.

INTERLOCKING LIMITS—The tracks between the extreme opposing home signals of an interlocking

* * * * *

SIGNALS

FIXED SIGNAL—A signal of fixed location indicating a condition affecting the movement of a train or engine

NOTE—The definition of a "Fixed Signal" covers such signals as switch target, train order, block, approach block limit, block limit, interlocking, speed signs, stop signs, yard limit signs, or other means for indicating a condition affecting the movement of a train or engine.

ASPECT—The appearance of a fixed signal conveying an indication as viewed from the direction of an approaching train; the appearance of a cab signal conveying an indication as viewed by an observer in the cab

INDICATION—The information conveyed by the aspect of a signal

BLOCK SIGNAL—A fixed signal, or hand signal in the absence of a fixed signal, at the entrance of a block to govern trains and engines in entering and using that block

BLOCK LIMIT SIGNAL—A fixed signal indicating the limit of a block the use of which by trains or engines is prescribed by manual block signal system rules

CAB SIGNAL—A signal located in the engine control compartment or cab indicating a condition affecting the movement of a train and used in conjunction with interlocking signals and in conjunction with or in lieu of block signals

APPROACH SIGNAL—A fixed signal used in connection with one or more signals to govern the approach thereto

HOME SIGNAL—A fixed signal at the entrance to a route or block to govern trains or engines entering and using that route or block

INTERLOCKING SIGNALS—The fixed signals of an interlocking

* * * * *

SPEEDS

NORMAL SPEED—The maximum authorized speed.

LIMITED SPEED—Not exceeding 45 miles per hour

MEDIUM SPEED—Not exceeding 30 miles per hour.

REDUCED SPEED—Prepared to stop short of train or obstruction.

SLOW SPEED—Not exceeding 15 miles per hour.

RESTRICTED SPEED—Proceed prepared to stop short of train, obstruction, or switch not properly lined looking out for broken rail, not exceeding 15 miles per hour.

NOTE—*Speed applies to entire movement.*

Appendix B

* * * * *

SPEED CONTROL SYSTEM

SPEED CONTROL—A device which will automatically apply the brakes on the train or engine, unless the speed conforms to the signal indication

* * * * *

STATIONS

STATION—A place designated in the timetable by name

BLOCK STATION—A place provided for the blocking of trains by block signals or other means

BLOCK-LIMIT STATION—A place at which a block-limit signal is displayed

INTERLOCKING STATION—A place from which an interlocking is operated

CONTROL STATION—A place from which remote control signal appliances or switches are operated

CONTROLLED POINT (CP)—A location where signal and/or other functions of a traffic-control system are controlled from the control machine.

* * * * *

TRACKS

MAIN TRACK—A designated track upon which trains are operated by timetable, train order, or both, or the use of which is governed by block signals

SINGLE TRACK—A main track upon which trains are operated in both directions

* * * * *

CONTROLLED SIDING—A siding the use of which is governed by signals under the control of a train dispatcher or operator

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OPERATING RULES

34. Employes located in the operating compartment of an engine must communicate to each other in an audible and clear manner the indication by name of each signal affecting movement of their train or engine, as soon as the signal is clearly visible or audible It is the responsibility of the engineman to have each employee comply with these requirements, including himself

It is the engineman's responsibility to have each employee located in the operating compartment maintain a vigilant lookout for signals and conditions along the track which affect the movement of the engine or train

If a crew member becomes aware that the engineman has become incapacitated or should the engineman fail to operate or control the engine or train in accordance with the signal indications or other conditions requiring speed to be reduced, other members of the crew must communicate with the crew member controlling the movement at once, and if he fails to properly control the speed of the train or engine, other members of the crew must take action necessary to ensure safety including operating the emergency valve

An employee controlling the movement of a train from a location other than the operating cab of an engine must, when practicable, communicate to other employes involved the indication by name of each signal affecting the movement

After the name of a signal has been communicated to other employes involved, it must continue to be observed until passed and any change of indication communicated in the required manner (Revised 7-1-75)

* * * * *

106. The conductor, enginemen, and pilot are responsible for the safety of the train and the observance of the rules, and under conditions not provided for by the rules, must take every precaution for protection.

This does not relieve other employes of their responsibility under the rules

* * * * *

Rule 285

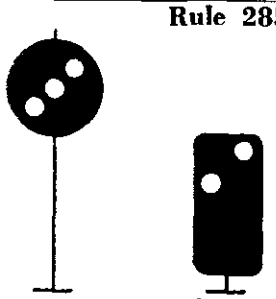

FIG. A FIG. A-1

* * * * *

IN CAB SIGNAL TERRITORY
CAB SIGNAL WILL DISPLAY

INDICATION—Proceed prepared to stop at next signal. Train exceeding Medium speed must at once reduce to that speed.

NAME: Approach.

Appendix B

* * * * *

Rule 290

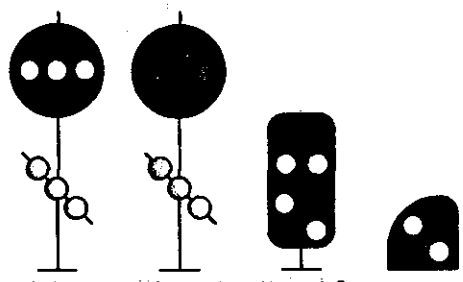

FIG. A FIG. AA FIG. A-1 FIG. A-2

* * * * *

IN CAB SIGNAL TERRITORY
CAB SIGNAL WILL DISPLAY

INDICATION—Proceed at Restricted speed.

NAME: Restricting.

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TRAFFIC CONTROL SYSTEM RULES

NOTE—Rules 450 to 462 inclusive will not be effective except by special instructions.

450. Trains will be governed by block signals whose indications will supersede the superiority of trains and will take the place of train orders for both opposing and following movements on the same track Automatic Block Signal System Rules, Interlocking Rules and Operating Rules, except as modified by Rules 450 to 462 remain in effect

451. The movement of trains will be controlled by the Train Dispatcher who will issue instructions to operator or others when required.

* * * * *

INTERLOCKING RULES

605. Interlocking signals govern the use of the routes of an interlocking, and as to movements within interlocking limits, their indications supersede the superiority of trains, but do not dispense with the use or the observance of other signals whenever and wherever they may be required.

Rules 99 and 152 do not apply within interlocking limits

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MISCELLANEOUS RULES

* * * * *

Conductors

400N-1. Report to and receive their instructions from the Superintendent or other designated officer They must obey the instructions of train master, station masters, station agents, yard masters, and operators within their jurisdiction, and from officers of other departments on matters pertaining to those departments.

Conductors have general charge of the train to which assigned and all persons employed thereon are subject to their instructions. They are responsible for the prompt movement, safety and care of their respective trains and the passengers and commodities carried, for the vigilance and conduct of the men employed thereon and for the prompt reporting to the Superintendent of conditions that interfere with the prompt and safe movement of trains

They must know that members of crew providing protection as required by Rule 99 are familiar with their duties and that their trains are properly equipped and inspected; also that Air Brake Rules have been complied with and that the prescribed signals are displayed.

* * * * *

Trainmen and Brakemen

400N-2. Report to and receive their instructions from the Superintendent or other designated officer. They must obey the instructions of their conductor and of officers of other departments on matters pertaining to those departments

They are responsible for the display of train signals, the proper protection of trains, the handling of

switches, the coupling and uncoupling of cars and engines, the manipulation of brakes and for assisting the conductor or engineman in all things requisite for the prompt and safe movement of their train

* * * * *

ENGINEMEN

400N-3. Report to and receive instructions from the Superintendent or other designated officer They will be governed by current mechanical, electrical and air brake instructions pertaining to the safety, inspection, preparation, and operation of trains and engines They must comply with the orders of the Road Foreman of Engines, Trainmaster or other designated officer within their jurisdiction

They must obey the instructions of Station Masters, Station Agents, Yard Masters, and Operators within their jurisdiction; and the conductor in charge of their train as to general management of their train, unless by so doing they endanger its safety or commit a violation of the rules

They must be qualified on type of engine to which assigned including any devices or auxiliaries attached thereto At a point where no mechanical forces are on duty and except on through trains, they will check the prescribed form in the cab to be sure that the unit or units of the engine consist have been inspected within the previous 24 hour period for road service or within one calendar day in yard service

If the engine unit or units are not within date they will make an inspection After making inspection, they will then record date, time and location on the prescribed form in the cab and prepare and sign regular work report

At points where mechanical forces are employed and on duty, they will accept the inspection of the mechanical forces, except air brake test, as to the condition of the engine

They will at the end of the trip make written report on the prescribed forms

They will be responsible for the observance of all signals controlling movements accordingly and the regularity of speed between stations, exercise discretion, care, and vigilance in moving the engine with or without cars to prevent injury to persons, damage to property, and lading, avoiding collisions and derailments While acting as pilot they will operate the engine unless otherwise instructed and when in charge of the engine to which no qualified conductor is assigned or is disabled they must perform the duties of and conform to the rules relating to conductors They will require the assistance of crew members in any duties relative to the prompt and safe movement of their trains, engine and cars, promptly reporting irregularities or failures

They must not allow any member of the crew to operate the engine except under their personal supervision They will be responsible for the proper operation of the engine and must not leave it while on duty except in case of necessity in which case the engine must be secured

They must, if anything withdraws attention from constant lookout ahead, or weather conditions make observation of signals or warnings in any way doubtful, at once so regulate speed as to make train progress entirely safe

When a train has more than one engine the rules apply alike to the engineman of each engine, but the use of the engine bell, whistle and air brake except in emergency must be limited to the leading engine

The engineman is responsible for the vigilance and conduct of other employes on the engine He will see that they are familiar with their duties and instruct them if necessary

* * * * *