RAILROAD ACCIDENT INVESTIGATION

REPORT NO. 4108

ERIE-LACKAWANNA RAILROAD COMPANY

DOVER, N.J.

NOVEMBER 1, 1966

DEPARTMENT OF TRANSPORTATION

FEDERAL RAILROAD ADMINISTRATION

WASHINGTON

SUMMARY

DATE	November 1, 1966	
RAILROAD:	Erie-Lackawanna	
LOCATION	Dover, N. J.	
KIND OF ACCIDENT:	Head-end collision	
EQUIPMENT INVOLVED:	Passenger train	Locomotive
TRAIN NUMBER:	615	
LOCOMOTIVE NUMBERS:		Diesel-electric units 902, 1407
CONSIST.	4 electrically-propelled passenger units	
ESTIMATED SPEEDS.	25 m.p.h.	60 m.p.h.
OPERATION	Signal indications	
TRACK:	Double; 3°00' curve; 0.84 percent descending grade eastward	
WEATHER:	Clear	
TIME	12:44 p.m.	
CASUALTIES:	1 killed; 6 injured	
CAUSE:	Unattended locomotive moving on a descending grade, due to not being properly secured and the controls being improperly positioned when it was left standing on a main track	
RECOMMENDATION:	That the Erie-Lackawanna Railroad Company immediately take the appropriate action necessary to enforce its rules governing the securement of unattended locomotives and to ensure proper maintenance of locomotive brake equipment, including hand brakes	

DEPARTMENT OF TRANSPORTATION

FEDERAL RAILROAD ADMINISTRATION

RAILROAD SAFETY BOARD

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SYNOPSIS

On November 1, 1966, a head-end collision occurred between an Erie-Lackawanna Railroad passenger train and a locomotive at Dover, N.J. One train-service employee was killed. Two train-service employees and four passengers were injured.

The accident was caused by an unattended locomotive moving on a descending grade, due to not being properly secured and the controls being improperly positioned when it was left standing on a main track.

LOCATION AND METHOD OF OPERATION

The accident occurred on that part of the New York Division extending between Port Morris Jct. and Hoboken, N.J., a distance of 45.7 miles. In the accident area this is a double-track line over which trains operate in either direction on both main tracks by signal indications of a traffic control system. From the north, the main tracks are designated as No. 1 and No. 2.

The collision occurred on track No. 1, 37.6 miles west of Hoboken and 2,706 feet east of the station at Dover.

Automatic signal 375 and semi-automatic signal R-18, governing westbound movements on track No. 1, are 1,267 feet east and 1,316 feet west of the collision point, respectively.

A highway bridge spans the main tracks at the accident point. Because of the south abutment of the bridge, vegetation and buildings on the south side of the railroad, and track curvature, the view between opposing trains approaching the accident point is considerably restricted.

An interlocking is at Port Morris Jct. A single-track line diverges to the south from the double-track line within the interlocking and extends 34.5 miles to Phillipsburg, N. J. The interlocking is controlled by the operator from a tower on the north side of the main tracks. A small yard parallels the main tracks on the south. The station at Lake Hopatcong is 0.3 miles east of Port Morris Jct. Due to track curvature, and vegetation and a hill adjacent to the south side of the main tracks, the Port Morris Jct. interlocking operator's view of the main tracks in the Lake Hopatcong station area is obstructed.

The grade at Lake Hopatcong is 1.30 percent descending eastward. From Lake Hopatcong to the collision point, the grade averages 0.84 percent descending eastward, and is 0.84 percent descending eastward at the collision point.

Details concerning the tracks, signals, carrier's operating rules, timetable special instructions, train involved, damages, and other factors are set forth in the appendix.

DESCRIPTION AND DISCUSSION

No. 615, a westbound first-class passenger train consisting of 4 electrically-propelled passenger units, left Hoboken at 11:30 a.m., on time. The train left Denville, 33.9 miles west of Hoboken, at 12:39 p.m., 1 minute late, and proceeded westward on track No. 1.

According to the conductor, the speed of No. 615 after departing from Denville was normal until reaching signal 375, where the speed was reduced to about 25 miles per hour. He thought that the signal displayed an Approach aspect because of the speed reduction, but he did not observe the signal aspect. A short time later, while moving westward on track No. 1 at an estimated speed of 25 miles per hour, No. 615 collided with an unattended locomotive consisting of diesel-electric units 902 and 1407. The conductor

was seated at the rear of the first unit of the train. He stated that after passing signal 375 and prior to the collision he noticed no indication of a brake application, heard no whistle signals, and observed no actions of the engineer.

The engineer of No. 615 was killed. The conductor, ticket collector and four passengers on that train were injured.

Extra 902 East, an eastbound freight train consisting of road-switcher type diesel-electric units 902 and 1407, coupled in multiple-unit control, 48 cars and caboose, left Phillipsburg at 8:50 a.m. on the day of the accident and arrived at Port Morris Jct. at 11:25 a.m. According to the crew members, the brakes were tested before leaving Phillipsburg. The engineer stated that both the automatic brake and independent locomotive brake functioned properly when used en route.

About 12:07 p.m., after the train had been yarded at Port Morris Jct., the conductor received permission from the interlocking operator to go to lunch at Lake Hopatcong. An eastbound freight train, designated as N.Y. 98, was expected momentarily and was to pick up 20 cars from the yard. To expedite the movement of N.Y. 98, the operator routed locomotive units 902 and 1407 from the yard to track No. 1, and eastward to the station at Lake Hopatcong.

According to the engineer, he stopped the two units on track No. 1 at the station with the independent brake, put the independent brake valve handle of unit 902 in full application position, made an automatic brake pipe reduction of 25 pounds, removed the automatic brake valve handle after moving it to lap position, put the reverser lever in neutral and removed it. He then left the control compartment, applied the hand brake at the east end of unit 902, and placed the double-heading cock in "TRAIL" position. As he alighted from this unit, he checked the chain on the hand brake and found it tight on the side from which he alighted. He was the last crew member to leave the locomotive for lunch.

The front brakeman alighted from the west end of unit 1407 just before the locomotive stopped at the Lake Hopatcong station. He proceeded up the south bank to the street level above the tracks, and to a nearby restaurant.

Upon stopping at the station, the conductor left the fireman's seat in unit 902. As he walked out of the cab he noticed the engineer working at the controls and making a brake pipe reduction. The flagman, who had been riding with the front brakeman on the west end of unit 1407, proceeded to the east end of unit 902.

As he alighted from the east end of this unit, he noticed the engineer was standing near the hand brake. Both the conductor and flagman waited on the station platform for the engineer, and then proceeded up a ramp and to the restaurant for lunch. As they reached the top of the ramp, the conductor noticed the time was 12:14 p.m.

At 12:38 p.m., train N.Y. 98 stopped at Port Morris Jct. The locomotive was uncoupled from the train, and as it started eastward to pick up cars from the Port Morris Jct. yard, the engineer heard a garbled radio communication from the Port Morris Jct. interlocking operator about a locomotive at Lake Hopatcong. The engineer replied by radio that there was no locomotive at the Lake Hopatcong station. Shortly afterward, about 12:42 p.m., the operator notified the dispatcher by telephone that units 902 and 1407 had disappeared from his westbound track occupancy indicator circuit, which extends 4.0 miles east of Lake Hopatcong. The dispatcher immediately started to call the operator at Dover, just as this operator shouted on the dispatcher's phone line that a run-away locomotive had just passed Dover at 60 miles per hour. A few moments later, at 12:44 p.m., locomotive units 902 and 1407 collided with No. 615.

No. 615 and all other westbound electrically-propelled passenger trains terminate at Dover. They are routed via the crossovers east of the station from track No. 1 to track No. 2 and to the "Wall" track, which parallels track No. 2 on the south. These crossovers are part of the Dover interlocking and are controlled by the operator from a tower on the south side of the "Wall" track, about opposite the east end of the station on the north side of the tracks.

About 12:42 p.m., No. 615 entered the track occupancy circuit for track No. 1, about 2.4 miles east of Dover. The operator immediately moved to the east end of his model board and started to line the route for this train to crossover to the "Wall" track. At this position, he could not see the model board track occupancy light, which was actuated by units 902 and 1407 when they reached a point on track No. 1 0.9 miles west of Dover. He was not aware of the movement of units 902 and 1407 until they were passing the station, and then there was no opportunity to take any action to prevent the collision.

Examination after the accident disclosed that the geared hand brake of unit 902 had 8 links of a total of 14 links wound up on the pocket wheel, indicating that the hand brake may not have been fully applied. However, the degree of application could not be

determined. Several links of the geared hand brake chain remained attached to the equalizing pulley, and the equalizing chain was still through the pulley. Although the pulley assembly was damaged, it was obvious that the pulley wheel was rusted and immovable.

Later examination of similar diesel-electric units of this carrier revealed lack of minimum maintenance of geared hand brakes and a resulting questionable efficiency.

Examination of the wheels and brake shoes of units 902 and 1407 disclosed no evidence of heavy or prolonged braking action.

After the accident, a brake pipe leak was discovered on unit 1407. This leak resulted from a loose union pipe fitting at the brake pipe connection under the brake valve stand. This condition was such that it could not have resulted from the accident and was clearly pre-existing. In later tests simulating this condition, with leakage introduced at the air hose gaskets in the equalizing pipe between the two units and all controls left in the positions described by the engineer just before going to lunch at Lake Hopatcong, a complete release of the air brake occurred in six minutes. This release would not occur when the double-heading cock was left in "LEAD" position, as the independent brake valve would provide a constant brake maintaining function directly from the main reservoir.

Apparently the engineer did not realize he was nullifying the functions of the independent brake valve when he changed the double-heading cock from "LEAD" to "TRAIL" position just before leaving the locomotive for lunch. He stated that the locomotive was not equipped with a chain or block and therefore he could not comply with that part of Rule 1902A of the timetable instructions for diesel locomotives left unattended that requires placing chain or block at wheels.

Calculations, based on the speed-recording tape of unit 1407 and adjusted for wheel wear, indicate that units 902 and 1407 started to move from the station at Lake Hopatcong at 12:33 p.m., about 20 minutes after the crew left the locomotive unattended. This unattended locomotive cleared the track occupancy indicator circuit, 4 miles east of the Lake Hopatcong station, at 12:40 p.m., passed Dover about 12:43 p.m., and while moving at a speed of 60 miles per hour struck No. 615 at 12:44 p.m.

Computations indicate that No. 615 passed signal 375 displaying an Approach aspect before units 902 and 1407 passed westward signal R-18 and entered the block of signal 375, the block in which the accident occurred. All westbound electrically-propelled trains

approaching Dover on track No. 1 receive an Approach indication at signal 375, when this block is unoccupied, as westward signal R-18 displays a STOP aspect or a RESTRICTING aspect for movement to the "Wall" track.

FINDINGS

It is evident that the hand brake of unit 902 was poorly maintained, because of the rusty and immovable condition of the pulley wheel. Whether the hand brake was inefficient, or was not sufficiently applied, could not be established. An efficient hand brake properly applied would have prevented this accident. Apparently the train crew gave no consideration to blocking the wheels of the locomotive before leaving for lunch. The engineer stated that the locomotive was not equipped with chain or blocks and that he did not attempt to use other material to block the wheels, which, according to the carrier's timetable special instructions, should be blocked when a locomotive is left unattended.

Results of tests made with diesel-electric units similar to units 902 and 1407 indicate that units left with controls and air brake valves positioned in accordance with carrier's instructions would maintain an air brake application indefinitely. Other tests confirmed that failure to comply with these instructions created conditions under which brake leak-off could be expected to result from leakage possible from various sources.

It is evident that when the engineer positioned the double-heading cock of unit 902 in "TRAIL" position with the automatic brake applied at Lake Hopatcong, this nullified the independent brake application. Consequently, as a result of brake cylinder pressure not being maintained by the self-lapping type independent brake valve, the brakes released due to existing leaks.

CAUSE

This accident was caused by an unattended locomotive moving on a descending grade, due to not being properly secured and the controls being improperly positioned when it was left standing on a main track.

RECOMMENDATION

It is recommended that the Erie-Lackawanna Railroad Company immediately take the appropriate action necessary to enforce its rules governing the securement of unattended locomotives and to ensure proper maintenance of locomotive brake equipment, including hand brakes.

Dated at Washington, D.C., this 2nd *day of* June 1967.
By the Federal Railroad Administration,
Railroad Safety Board.

(SEAL)

Bette E. Holt
Acting Executive Secretary
Federal Railroad Administration

APPENDIX

Track

From the east on track No. 1 there are, successively, a tangent 1,800 feet long, and a compound curve to the left having a maximum curvature of 3°00', 1,927 feet to the collision point and 70 feet westward. From the west there is a tangent 3,623 feet to the curve where the collision occurred.

Signals

Semi-automatic signal R-18 and automatic signal 375 are of the color-light type and are continuously lighted. Signal R-18 is the westward home signal for track No. 1 at the Dover interlocking and is controlled by the interlocking operator. The aspects applicable to this investigation and the corresponding indications and names are as follows:

Signal	*Aspect*	*Indication*	*Name*
375	Yellow	Prepare to stop at next signal. Train exceeding medium speed must at once reduce to that speed.	Approach
R-18	Red	Stop	Stop

The controlling circuits are so arranged that when the block of signal 375 is unoccupied, and signal R-18 displays a STOP aspect or a restricting aspect as a result of the route having been established for a westbound train on track No. 1 to cross over to the "Wall" track at the Dover interlocking, signal 375 displays an APPROACH aspect.

Carrier's Operating Rules

Medium Speed. - One half maximum authorized speed at point involved, but not to exceed thirty miles per hour, unless otherwise provided.

Timetable Special Instructions

1902A. Diesel Locomotive Left Unattended

When diesel locomotive is to be left unattended for layover on service track or similar designated location, with or without engine running, the generator field switch must be open, throttle in idle position, transition lever in OFF position and the reverser lever removed from controller.

The independent brakes must be fully applied, the automatic brake valve handle in lap position, hand brakes applied and chain or block placed at wheels.

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Train Involved

No. 615 consisted of electrically-propelled passenger units 2346, 2531, 3319 and 3589, coupled in multiple-unit control. The first and third units were trailer units and the other two were power units. Each unit was about 70 feet long and was of all-steel construction. Each trailer unit was equipped with seats for 78 passengers and each power unit with seats for 84 passengers.

As No. 615 approached the collision point, the engineer occupied the control compartment at the front of the first unit. The conductor was in the first unit and the flagman was in the fourth unit. The train brakes had been tested and had functioned properly when used en route.

Damages

No. 615 was moved backward by the impact and stopped with the front end 15 feet east of the collision point. All wheels of the 1st and 2nd units and of the front truck of the 3rd unit were derailed.

A separation occurred between the 1st and 2nd units. The first unit overturned and stopped on its south side on and in line with the track structure of track No. 2. The second unit stopped with the front end on track No. 2 and the rear end on track No. 1, and in a 40-degree leaning position to the south. The first two units were destroyed. The third unit was heavily damaged, and the fourth unit was slightly damaged.

The unattended locomotive stopped with the front end 125 feet east of the collision point and against the north side of the second unit of No. 615. Diesel-electric unit 902 was derailed but remained up-right and in line with the track structure and coupled to unit 1407. The east truck of unit 1407 was derailed. Unit 902 was destroyed and unit 1407 was heavily damaged.

Other Factors

The collision occurred at 12:44 p.m., in clear weather.

The maximum authorized speed for passenger trains in the collision area is 55 miles per hour.

The engineer of diesel-electric units 902 and 1407 had been on duty 5 hours 54 minutes and the other crew members 5 hours 39 minutes when the accident occurred. The engineer had previously been off duty 10 hours 50 minutes and the other crew members 11 hours 5 minutes.

The engineer of No. 615 had been on duty 6 hours 19 minutes and the conductor and flagman 5 hours 49 minutes when the accident occurred. The engineer had previously been off duty 10 hours 55 minutes and the conductor and flagman 11 hours 26 minutes.

This accident was investigated in conjunction with representatives of the New Jersey Department of Public Utilities.

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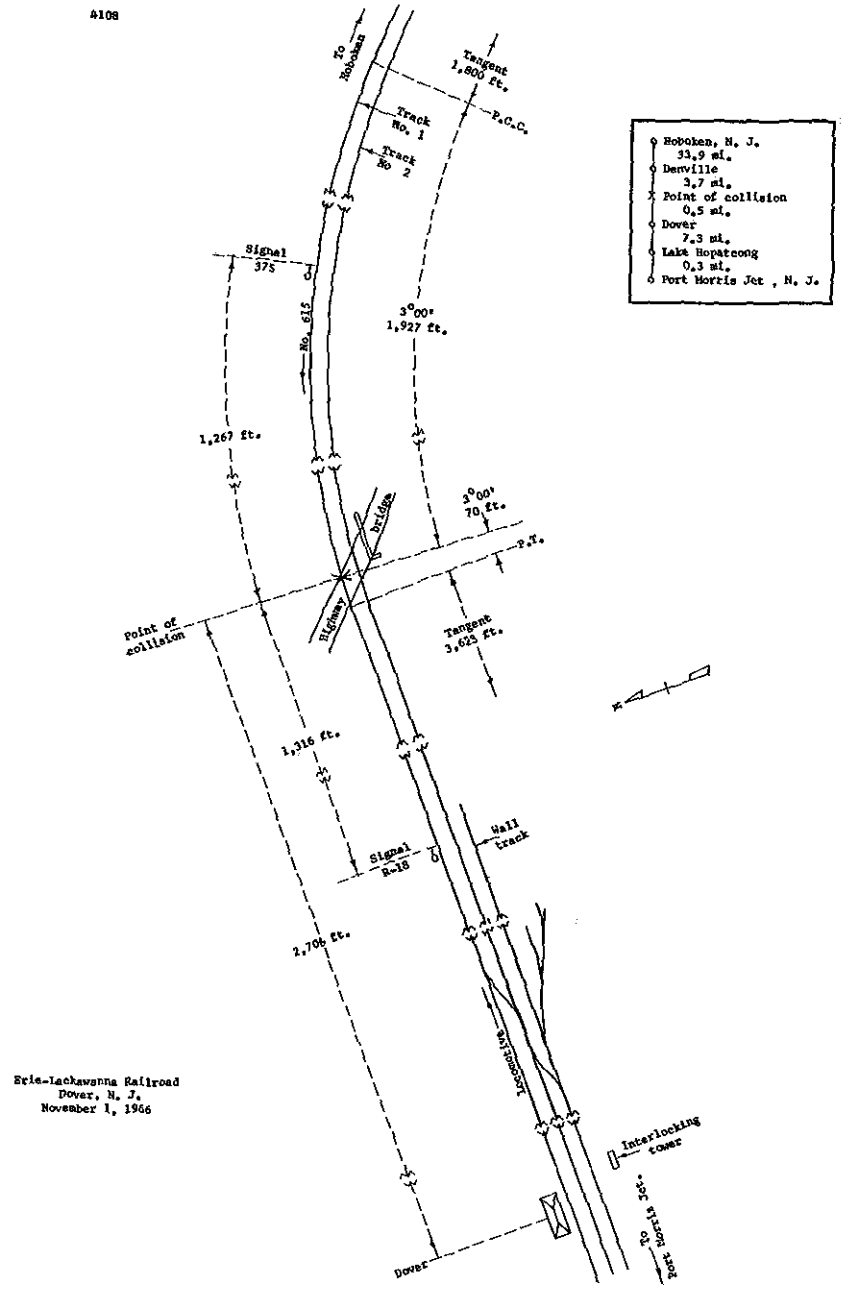

Erie-Lackawanna Railroad
Dover, N. J.
November 1, 1966