

## INTERSTATE COMMERCE COMMISSION

REPORT OF THE DIRECTOR OF THE BUREAU OF SAFETY IN RE  
INVESTIGATION OF AN ACCIDENT WHICH OCCURRED AT THE  
INTERSECTION OF THE TRACKS OF THE CENTRAL RAILROAD  
OF NEW JERSEY AND THE LEHIGH VALLEY RAILROAD AT  
BETHLEHEM, PA., ON SEPTEMBER 27, 1926.

October 25, 1926.

To the Commission:

On September 27, 1926, there was a side collision between two passenger trains at the intersection of the tracks of the Central Railroad of New Jersey and the Lehigh Valley Railroad at Bethlehem, Pa., which resulted in the death of 4 passengers and 4 persons traveling on free transportation, and the injury of 38 passengers and 2 employees. The investigation of this accident was made in conjunction with representatives of the Public Service Commission of Pennsylvania.

Location and method of operation

In the vicinity of the point of accident the tracks of the New Jersey and Lehigh Division of the Lehigh Valley Railroad are on the south bank of the Lehigh River, their general direction being east and west, and Bethlehem union station is located on the south side of these tracks. On the opposite bank of the river are the tracks of the Lehigh and Susquehanna Division of the Central Railroad of New Jersey, hereinafter referred to as the Jersey Central, and at a point known as Bethlehem Junction there is a single-track connection which leads off to the right from the Jersey Central main tracks, thence across a bridge over the Lehigh River and diagonally across the tracks of the Lehigh Valley Railroad to the Reading tracks on the south side of the union station. The Lehigh Valley Railroad at this point is a four-track line over which trains are operated by time-table, train orders and an automatic block-signal system. The tracks are numbered from south to north, 2, 1, 4 and 3, and the accident occurred at the intersection of the Jersey Central track with Lehigh Valley eastbound track 2. Approaching this point from the west on the Lehigh Valley's tracks there are 2,400 feet of tangent, a 30' curve to the right which is 350 feet in length, and then tangent track extending to the point of accident, 500 feet distant, and for some distance beyond; the grade is slightly descending. Approaching the point of accident on the Jersey Central connection there is a compound curve to the right 560 feet in length extending to

the northern end of bridge over the Lehigh River; the curvature varies from  $7^{\circ}$  to  $12^{\circ}$ . The track is then tangent across the bridge, a distance of 440 feet, while the point of accident was 123 feet beyond the leaving end of the bridge. The grade is slightly descending.

The interlocking signals governing movements over the crossing are electrically operated from Bethlehem tower, located in the southwest angle of the intersection. The interlocking signals governing eastbound movements on Lehigh Valley track 2 are semi-automatic signals 1 and 2, located on signal bridges 1,742 and 635 feet, respectively, west of the point of accident, both of these signals are of the two-position, lower-quadrant type. Automatic signal 892, a position-light signal, is located 5,544 feet west of the point of accident, while automatic signal 902 is located about 2 miles west of the point of accident. When an eastbound train passes signal 902 its approach is indicated to the towerman by means of an annunciator.

Trains of the Jersey Central en route to the Reading Railway by means of the single-track connection on which the accident occurred first encounter signal 47, located a short distance west of JU tower, immediately west of Bethlehem Junction. This signal governs their movement from the Jersey Central main track to the single-track connection and thence around the curve and across the bridge over the Lehigh River as far as semi-automatic signal 16. Signal 16 is located on the bridge 42 feet from its southern end and is mounted on the upper part of the framework on the engineer's side of the track, this signal is also of the two-position, lower-quadrant type, and is operated from Bethlehem tower. The center of the lens is about 21 feet above the rails and is 2 feet  $4\frac{3}{4}$  inches to the left of the inside edge of the framework. When in the stop position the end of the semaphore blade extends outward 13 inches beyond the outside edge of the bridge framework; this projecting end can be seen by the towerman in Bethlehem tower and also by the engineer of an approaching Jersey Central train as it comes around the curve north of the bridge, providing he is keeping a very careful lookout, otherwise his first view of the signal is not obtained until after his engine reaches the northern end of the bridge. There is no derail connected with the operation of this signal. The interlocking plant is so arranged that when a lever is reversed for the purpose of giving a proceed indication all conflicting levers are locked in normal position.

When a Jersey Central train is to be turned over to the Reading Railway the towerman at JU tower can only give it a signal authorizing its movement as far as signal 16; in the meantime the Reading yardmaster has been notified and when he is ready to receive the train he in turn notifies the Lehigh Valley towerman at Bethlehem tower and the latter clears signal 16; which allows the train to cross the four Lehigh Valley tracks; there is then another signal which governs the entrance of the train to the tracks of the Reading Railway.

It was daylight and the weather was clear at the time of the accident, which occurred at about 5.48 a.m.

#### Description

Eastbound Lehigh Valley passenger train No. 6 consisted of two coaches, one club car, and eight Pullman sleeping cars, hauled by engine 2092, and was in charge of Conductor Kroner and Engineer Donlin. It left Allentown, its last stopping point, at 5.40 a.m., on time, received clear automatic and interlocking signal indications as it approached Bethlehem, and was entering the station at a speed of about 15 miles per hour when it was struck by Jersey Central train No. 306.

Eastbound Jersey Central passenger train No. 306 consisted of two baggage cars, one mail car, one coach, four Pullman sleeping cars and a combination car, in the order named, hauled by Engine 825, and was in charge of Conductor Terry and Engineer Schmidt. This train also left Allentown, over the Jersey Central tracks, at 5.38 a.m., on time, passed JU tower, the last reporting station, at 5.47 a.m., although its time at Bethlehem Junction, just beyond JU tower, is 5.53 a.m., and collided with Lehigh Valley train No. 6 near the union station at Bethlehem while travelling at a speed estimated to have been from 12 to 15 miles per hour.

Engine 825 struck the side of train No. 6 near the rear end of the first car, that end of the car being derailed while the head end of the car broke away from the engine hauling the train. The second car was overturned while the third car came to rest in an upright position opposite the head end of the second car; none of the other equipment in this train was derailed or damaged. Engine 825 swerved to the left after colliding with the side of the Lehigh Valley train and turned over on its left side parallel with the Lehigh Valley tracks; neither the tender nor any of the cars in this train was derailed. All of the persons killed were riding in the second car of the Lehigh Valley train.

### Summary of evidence

Towerman Reilly said that when train No. 6 reached the annunciator circuit he cleared the interlocking signals for the purpose of allowing the train to pass through the interlocking plant and enter the station, signal 16, governing Jersey Central trains moving over the connection, being in the stop position, although he did not at that particular time look at the position of the semaphore blade; train No. 306 was not then in sight, although he had been notified by the Reading yardmaster that it was on time and let it come through the interlocking plant to the Reading tracks when it arrived. By the time the Lehigh Valley train came within his range of vision he could also see the Jersey Central train on the other side of the river. He did not, however, pay any particular attention to that train until he saw it coming across the last span of the bridge. He then looked at signal 16, saw that it was in the stop position, this being when the engine was within 10 feet of the signal, and remarked to Car Inspector Confer, who was in the tower, that the Jersey Central train was not going to stop. He did not see the engineer until the engine had passed the signal and had practically cleared the end of the bridge, at which time Engineer Schmidt appeared to be looking up the track toward the approaching Lehigh Valley train, the speed of his train, however, did not seem to decrease until the collision occurred. Towerman Reilly estimated the speed of the Jersey Central train to have been from 12 to 15 miles per hour and that of the Lehigh Valley train to have been 15 or 20 miles per hour. Towerman Reilly further stated that signal 16 had not been cleared for the passage of a train over the Jersey Central connection since the passage of an eastbound paper train at about 3.45 or 3.50 a.m. Such evidence as Car Inspector Confer was able to give practically corroborated the statements of Towerman Reilly, the car inspector did not see the position of signal 16 but said he did notice that the signals governing the approach of the Lehigh Valley train were in the clear position. He also said that the towerman had not been manipulating the levers prior to the time he cleared the signals for the passage of the Lehigh Valley train.

Engineer Donlin, of train No. 6, said he received a clear indication at signal 892, indicating that the route through the interlocking plant was lined for his train, and that when passing the signal location he could see the clear indications displayed by interlocking signals 1 and 2. After calling the indications of these signals the fireman went back into the tender and Engineer Donlin said he did not know anything about the approach of the Jersey Central train on the fireman's side of the track until the accident occurred, at which time the speed of his train was

about 15 miles per hour. Fireman Morlan said there was a lump of coal in the stoker and that this caused him to go back into the tender when the engine was about 300 feet west of signal 2, which was displaying a clear indication at that time. On returning to the engine he went to the left side and saw the engine of the Jersey Central train just leaving the bridge, at which time his own engine was about on the crossing. At first it did not seem possible to him that there was going to be a collision but he continued to watch the Jersey Central engine and saw it collide with the side of his train. He did not observe the Jersey Central engineman prior to the accident.

Engineman Schmidt, of train No. 306, said he received the proper signal indication at JU tower indicating that the route was lined for the movement of his train to the single-track connection, and that he reduced the speed of his train to about 15 or 18 miles per hour<sup>so</sup> as to round the curve prepared to stop at signal 16 if necessary. As his train approached the northern end of the bridge, with the brakes applied lightly, he looked for the end of the semaphore blade which is visible when the signal is in the stop position, but did not see it, thus being led to believe that the signal was in the clear position. As soon as the engine entered on the bridge he saw the signal itself, displaying a green or proceed indication, and after proceeding a short distance further and coming into full view of the semaphore blade he saw that it was down, then glanced around at the water glass, noticed the fireman with his back turned apparently engaged in gathering together his personal belongings preparatory to leaving the engine at the station, and then looked ahead again. He said signal 16 was still in the proceed position, at which time his engine was within 30 feet of the signal, and he then looked across the Lehigh Valley tracks to the signal governing the approach of his train to the Reading tracks; that signal was also displaying an indication authorizing his train to proceed into the station. By this time his engine had reached signal 16 and he again looked at the signal and saw that it was in stop position, apparently due to the fact that his engine was on the track circuit. He then heard the noise of an approaching train, looked westward, and saw Lehigh Valley train No. 3 passing under the signal bridge located 633 feet from the point of accident, moving at a speed he estimated to have been at least 40 miles an hour. At first he thought it was Lehigh Valley train No. 4 going into the station on one of the Reading tracks parallel to his own track, but on again looking at it he realized that it was entering the station on the Lehigh Valley tracks and he said that at the speed the Lehigh Valley train was running he felt he had a better chance to stop his own train, which was moving at a speed of 8 or 10 miles per hour. He at once applied the air brakes in emergency, at which time his engine was starting across the first of the Lehigh Valley tracks, this applica-

tion of the brakes brought his train practically to a stop with the engine just touching the side of the Lehigh Valley train as it crossed in front of him. There was then a surge from the rear of his train which pushed his engine ahead into the side of the Lehigh Valley train, causing the derailment of the cars in that train and the subsequent derailment of his engine. Engineman Schmidt further stated that the fireman did not call the indication of signal 16 and was positive that he himself did not misread its indication.

Jersey Central time-table No. 56 took effect at 12.01 a.m. September 26, the day before the accident. Under the time-table previously in effect train No. 306 was scheduled to leave Bethlehem Junction at 5.48 a.m., while under the new time-table its time was 5.53 a.m., only one time being shown. Engineman Schmidt said his train passed Bethlehem Junction on the morning of the accident at 5.48 a.m., and he considered that he had a right to the track between Bethlehem Junction and signal 16 at that time. When asked the direct question as to whether he thought he had a right to leave Bethlehem Junction before 5.53 a.m. he answered, "I believe that my time will permit me to come into the P&R station at that time, going through yard limits." After further questioning, however, accompanied by a discussion of the rules, he admitted that clear signal indications did not supersede the time-table schedule and that his train should not have left Bethlehem Junction prior to 5.53 a.m. He stated, however, that he had not confused the time shown in the old time-table with the time shown in the time-table in effect on the date of the accident.

Fireman Engler, of train No. 306, said the speed of his train was about 20 miles per hour when passing through the crossover to the single-track connection, that the speed was reduced at the bridge over the Lehigh River, and that the train was traveling at about 15 miles per hour when Engineman Schmidt applied the air brakes in emergency, about the time the engine passed signal 16. Fireman Engler had finished cleaning up the deck of the engine preparatory to turning it over to the Reading crew for the continuation of the run to Philadelphia and was putting on some clothing at the time the emergency application was made; he did not see the indication of the signal nor did he observe the approach of the Lehigh Valley train. It further appeared from his statements that Engineman Schmidt would always call the indication of a signal when it was displaying a stop indication and would never call its indication when it was displaying a proceed indication, and in this particular case the engineman did not say anything about the indication of signal 16 thus causing him to think that it must have been in the clear position. Immediately after

the accident the first thing the engineman said to him was that the signal had been displaying a proceed indication and that the tower had changed its position just as the engine reached it.

Conductor Terry, of train No. 306, said he had walked ahead through the first Pullman sleeping car and opened the trap doors of the coach, this being at the time the train reached the northern end of the bridge, moving at a speed of about 12 miles per hour. The brakes were again applied, still further reducing the speed, and suddenly they were applied in emergency, bringing the train to a stop. Previous to reaching the bridge he had noticed the Lehigh Valley train but had not paid any particular attention to it, and when crossing the bridge he again noticed the Lehigh Valley train but supposed it was Lehigh Valley train No. 4 entering the station on the Reading tracks, paralleling his own train. After the accident he helped the engineman and fireman and while so engaged the engineman told him that signal 16 had been in the clear position. Conductor Terry further stated that since only one time was shown for his train at Bethlehem Junction, 5.53 a.m., that it was the leaving time at that point whereas the accident actually occurred at 5.48 a.m. He also stated, however, that since his train was shown as leaving the preceding station, VW tower, at 5.44 a.m., then under the rules it was due at Bethlehem Junction, the next station where time was shown, at any time after 5.44 a.m. and he considered that his train was within its rights in leaving Bethlehem Junction at about 5.47 a.m. for the reason that the Jersey Central time-table was not in effect on the single-track connection on which the accident occurred. The statements of Baggage-master Smith, Assistant Baggage-master Glancey and Brake man Weaver, all of Jersey Central train No. 306, brought out no additional facts of importance.

Lehigh Valley train No. 4 had arrived at Bethlehem prior to the time of the accident and Conductor Welch, Baggage-master Mann, Brakeman Folleran and Flagman Kane, all of the crew of train No. 4, stated that they saw the signals displaying clear indications for the approach of train No. 6 but that they could not see the indication displayed for Jersey Central train No. 306. Assistant Baggage Agent Osmun said it was the custom before going into the waiting room to announce the arrival of a train to look at the signals governing the train's approach and that he had followed the usual custom in this instance, noting that clear indications were displayed for the approach of train No. 6; he did not see the indication of signal 16. Janitor Cunningham said that when making his rounds inside of the general office building of the Lehigh

Valley Railroad at Bethlehem he passed through one of the offices and noticed that the signals were clear for train No. 6 while at about the same time he heard the Jersey Central train whistling for the signal at Bethlehem Junction on the opposite side of the river. On passing into another of the offices he saw that signal 16 was in the stop position, saying that he could see the black semaphore arm in the horizontal position; this arm is painted yellow on the side toward the approaching engineer and black on the reverse side.

Road Foreman of Engines Mason, of the Jersey Central, said he qualified Engineer Schmidt for passenger service, that he had ridden with him on many occasions, and that he considered him to be a first-class engineer. When questioned regarding the schedule of train No. 306 under the present time-table he said that that train should not depart from Bethlehem Junction before 5.53 a.m., which statement was concurred in by Jersey Central Superintendent Reamer.

Assistant Superintendent Sweeney, of the Jersey Central, said with reference to the time of train No. 306 at Bethlehem Junction that so far as the Jersey Central is concerned this train lost all time-table authority after reaching Bethlehem Junction and being diverted to the single-track connection leading to the Reading Railway, and that its operation beyond Bethlehem Junction was only as a yard movement.

### Conclusions

This accident was caused by the failure of Engineer Schmidt, of Jersey Central train No. 306, properly to observe and to obey signal indications.

Engineer Schmidt said signal 16 was displaying a clear indication as his train approached the bridge and that it was still displaying a clear indication when his engine was within 30 feet of it, not going to the stop position until the engine passed the signal, thus causing it to assume the stop position. His statements, however, were not supported by those of any other witnesses, Tower van Reilly, as well as the janitor in the office building, saw signal 16 displaying a stop indication, while there were 10 witnesses who saw clear indications displayed for the movement of Lehigh Valley train No. 6. Tests showed that the interlocking plant was so arranged that clear signal indications could not possibly have been displayed for both trains at the same time, and in view of this fact it seems apparent that signal 16 was displaying a stop indication when train No. 306 approached and that for some reason this indication was not properly observed and obeyed by Engineer Schmidt.

A change in the time of train No. 306 at Bethlehem Junction had been made in the time-table which took effect on the day prior to the accident, and under the new schedule it should not have left that point until 5.53 a.m., instead of 5.48 a.m., as had previously been the case. While the failure of the crew of train No. 306 to hold their train at Bethlehem Junction until 5.53 a.m. did not cause the accident, the fact remains that had the time-table schedule been observed the accident would not have occurred.

There was no derail installed in connection with the operation of signal 16, and the investigation developed that originally there had been a derail at this point but that on account of the existing physical conditions it was considered to be a menace rather than a safeguard and for that reason was removed on October 30, 1922. It is not believed that a recommendation for the restoration of this derail is in any way warranted. On the other hand although signal 16 is not well located, from the standpoint of visibility, yet if it were located at or west of the entrance to the bridge it is probable that the rear end of a train stopped at the signal would foul the Jersey Central main tracks, resulting in delay to traffic in the event the train were held at that point for any great length of time. It does not appear, however, that the arrangement as now in effect is one which provides the greatest degree of safety consistent with the operating difficulties presented, and it is recommended that all movements over this single-track connection be required to come to a full stop before passing over the Lehigh Valley tracks. If it is not desired to stop at this particular point, then the present signal layout should be so rearranged as to insure that a signal could not be given to authorize a movement from the Jersey Central main tracks to the Reading tracks, or vice versa, until the entire route from one end of the connection to the other end had been lined for the movement in question, with the signals governing conflicting routes displaying the proper indications. The general idea of these recommendations was discussed with representatives of the Public Service Commission of Pennsylvania and met with their approval.

Engineer Schmidt was first employed as a brakeman in 1902, began firing in 1903 and was promoted to engineer in 1907; in June 1925, he was qualified for passenger service and had run over the territory in which the accident occurred since September, 1925. All the other employees were also experienced men and none of them had been on duty in violation of any of the provisions of the hours of service law.

Respectfully submitted,

W. P. BOPLAND

Director.