

BUREAU OF SAFETY

---

REPORT 1966

Railroad: Florida East Coast  
Date: February 12, 1935.  
Location: Jupiter, Fla.  
Kind of accident: Derailment  
Train involved: Passenger  
Casualties: 47 passengers and 26 employees injured  
Summary of facts: Train derailed at open drawbridge.  
Cause: Failure of train to be operated in accordance with signal indications.

1966

INTERSTATE COMMERCE COMMISSION

REPORT OF THE DIRECTOR OF THE BUREAU OF SAFETY CONCERNING AN  
ACCIDENT ON THE FLORIDA EAST COAST RAILWAY NEAR JUPITER,  
FLA., ON FEBRUARY 12, 1935.

March 29, 1935.

To the Commission:

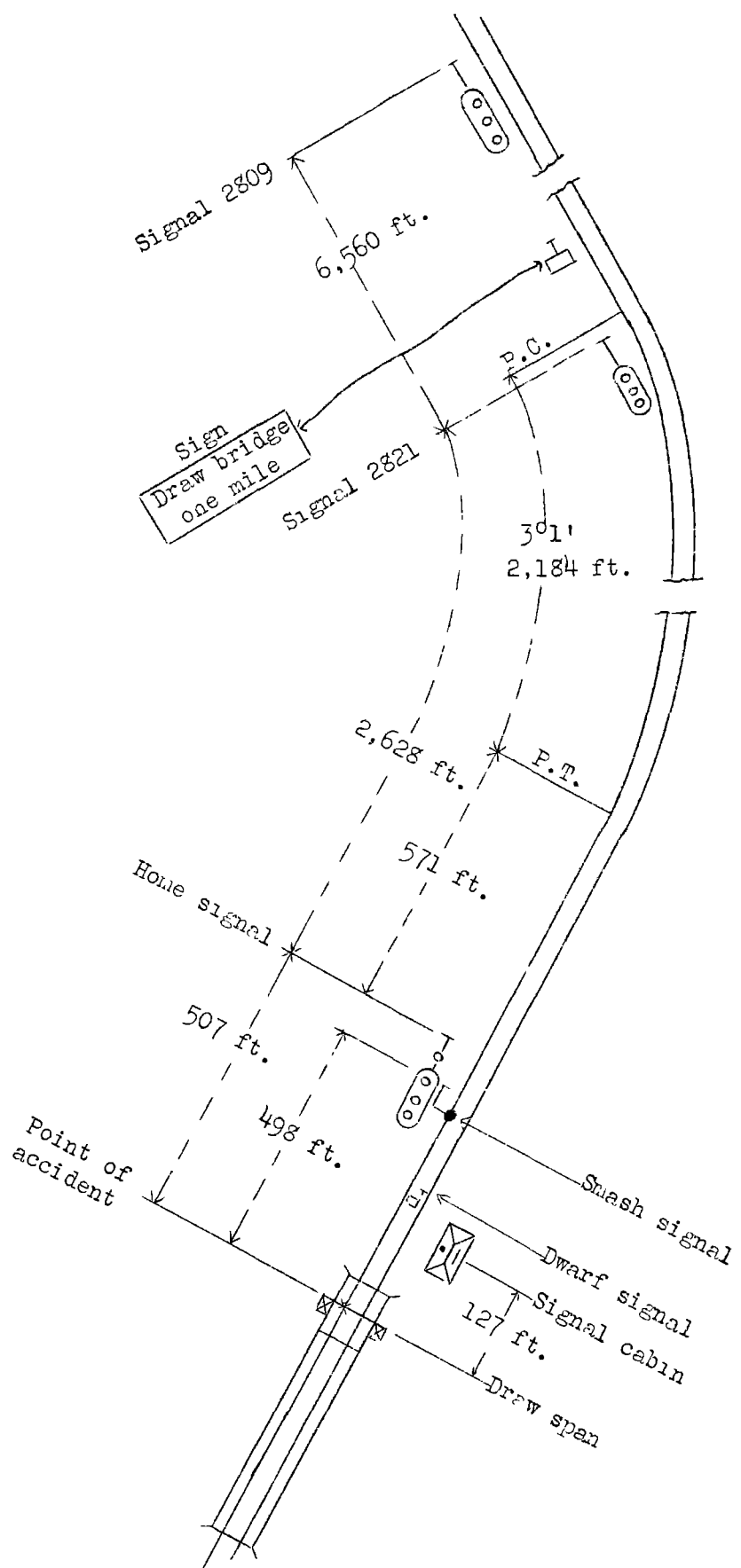
On February 12, 1935, there was a derailment of a passenger train on the Florida East Coast Railway near Jupiter, Fla., which resulted in the injury of 47 passengers, 9 Pullman employees, 12 dining-car employees, 1 news agent, and 4 employees of the railway.

Location and method of operation

This accident occurred on the Fourth District, which extends between Fort Pierce and Miami, Fla., a distance of 124 miles, and is a double-track line over which trains are operated by time table, train orders, and an automatic block-signal system. The point of accident was on the south-bound track at the north end of the draw span of the bridge over Jupiter River, about 1 mile north of the station; approaching this point from the north, the track is tangent for approximately 2 miles, followed by a  $3^{\circ}01'$  curve to the right 2,184 feet in length and then tangent track for a distance of 1,078 feet to the point of accident, the tangent extending for a considerable distance beyond that point. The grade for south-bound trains is descending for approximately 5,000 feet, varying from 0.26 to 0.06 percent; it is then 0.10 percent ascending for 900 feet, followed by 400 feet of level track to the point of accident.

The bridge is a 9-span, steel-girder drawbridge about 585 feet in length. The draw, of the bascule, single leaf type, is 55 feet in length, and extends between the first and second piers from the north end of the bridge; it is pivoted on the first pier and lifts from the second pier. It is operated by a gasoline motor located in a room built into pier 1 under the north end of the draw span, and the machinery is interlocked so that it is impossible to operate it until signals in both directions have been set at stop.

The signals involved are of the color-light type, continuously lighted. Automatic signal 2809 is located at the entrance



• Fort Pierce, Fla.
40.7 miles
* Point of accident
1.0 mile
Jupiter
82.3 miles
• Miami, Fla.

Inv. No. 1966  
 Florida East Coast Ry.  
 Jupiter, Fla.  
 Feb. 12, 1935

of the approach-locking circuit, 9,695 feet north of the point of accident; distant signal 2821 and the home signal are located 3,135 feet and 507 feet, respectively, north of the point of accident, and a smash-board signal is located 9 feet south of the home signal; the home signal displays a fixed red light below the other indications, showing that it is a stop-and-stay signal. When the draw is open, the smash board is in horizontal position and the home signal displays red or stop, the distant signal 2821 displays yellow or approach, and automatic signal 2809 displays green or proceed. When the draw is closed all signals operate automatically. Under the rules, an approach indication requires an engineman to approach next signal prepared to stop and a train exceeding half its maximum authorized speed at the point involved must at once reduce to not exceeding that speed. In addition to the signals above mentioned, there is a sign reading "Draw bridge one mile", located on the west side of the tracks at a point 5,235 feet north of the point of accident.

An interlocking cabin is located on the east side of the tracks, 127 feet north of pier 1, within which are housed desk circuit controllers which are set normally in clear position thus permitting the automatic operation of the signals. When the draw is to be raised the bridge tender must first place the north and south-bound signals in stop position. If no train is in the approach-locking sections he can then operate the electric control which releases the mechanical lock on the lift machinery. He then has to walk to the bridge and go under the deck, via a ladder on pier 1, raise the mechanical lock, and make nine revolutions of a large wheel which disengages the wedges locking the draw span; the gasoline motor is then operated to raise the draw. The entire procedure requires not less than 5 minutes. The circuits are so arranged, however, that if a train has passed signal 2809 it is impossible to open the draw without operating a time-release, which requires 2 minutes to function for south-bound trains and 1 minute 40 seconds for north-bound trains.

Special time-table instructions restrict the speed for passenger trains to 65 miles per hour on tangent track, 55 miles per hour on curves, and 45 miles per hour over Jupiter drawbridge.

The weather was clear at the time of the accident, which occurred about 4:08 p.m.

#### Description

Train Second No. 87, a south-bound passenger train, known as the Florida Special, consisted of 1 baggage car, 4 Pullman sleeping cars, 1 dining car, 3 Pullman sleeping cars, 1 Pullman recreation car and 1 Pullman observation car, all of steel

construction and in the order named, hauled by engine 427, and was in charge of Conductor Kerr and Engineman Turnipseed. This train departed from Fort Pierce, 41.7 miles north of Jupiter, at 3:21 p.m., according to the train sheet, 12 minutes late, passed Hobe Sound, the last open telegraph office, 7.6 miles north of the point of accident, at 3:59 p.m., 13 minutes late, passed signal 2821 displaying an approach indication and the home signal displaying a stop indication, struck and broke the smash-board signal, and then struck the lifted draw span while traveling at a speed estimated to have been from 10 to 25 miles per hour.

The draw span was torn from its pivots and landed with its north end in the river and the south end held suspended by pier 2. The engine stopped with its forward end partly in the river on top of the damaged draw span and about 12 feet below the level of the track, with its rear end on pier 1, and was leaning at an angle to the right of about 30°. The tender remained coupled to the engine and was supported by pier 1; it was headed downward toward the water with its rear end holding the front end of the first car about 3 feet above the rails. The rear trucks of this car remained on the track and none of the other equipment was derailed, although damage was sustained by some of the cars. The railway employees injured were the engineman, fireman, baggageman, and flagman.

#### Summary of evidence

Engineman Turnipseed stated that on approaching signal 2809 an approach indication was displayed but the indication changed to proceed before he reached it, indicating to him that the first section was just ahead, as he had seen two other signals en route change from approach to proceed. His train was traveling at a speed of about 60 miles per hour and after passing signal 2809 he saw the approach indication of signal 2821. The engineman's statements as to subsequent events were somewhat conflicting, but apparently the fireman called the indication of signal 2821 and shortly after passing the drawbridge sign and before reaching the curve, the engineman made brake-pipe reductions which totaled 15 pounds, reducing the speed to 40 or 45 miles per hour on passing signal 2821, and then released the brakes when part way around the curve, at which time the speed was down to 30 or 35 miles per hour. Shortly after releasing the brakes he saw the home signal at stop and applied the brakes in emergency, closed the throttle and opened the sanders. After striking the smash board he warned the fireman and jumped off, at which time the train was traveling about 15 miles per hour, and he thought its speed was about 10 miles per hour when it struck the open draw

span. The engineman saw the open drawbridge after seeing the home signal, and he thought the bridge had been raised only 6 or 8 feet and that it was just being raised. Engineman Turnipseed also stated that he thought there was more distance between the distant signal and the home signal than actually was the case, and that he expected to find the home signal displaying an approach indication; his statements indicated that he thought an approach indication required him to reduce speed and be prepared to stop at the next signal, although on a written examination when re-employed in February, 1934, he answered a question as to the indication of a yellow color-light signal in the following words: "Proceed with caution." It was only after the wording of the rule had been suggested to him by the officers that he said he also was required to reduce speed at once to not exceeding one-half his maximum authorized speed; in fact, repeated questions indicated that his own reason for failing to stop was because he thought he was closing up on the first section, and his further thought that after passing the approach signal he had more distance in which to stop than actually was the case, also that under the rules the only requirement was to approach the home signal prepared to stop. Engineman Turnipseed further stated that before leaving Fort Pierce he received a signal from the rear end that the air brakes were working throughout the train, that he made a running test on leaving that point, and that the brakes worked properly en route, including the service application which he said he made after passing the drawbridge sign. Engineman Turnipseed also stated that he had been an engineman since 1907 and was employed by this railway in 1928, but since that time had been out of service at intervals; that he had had about 2 years' service in all on this district, which extends between Fort Pierce and Key West, but that since being re-employed he had made only 8 or 10 trips in passenger service totaling 1,800 or 2,000 miles, principally when he was double-heading on the second engine, and this was only his second trip on this district in control of a train. He had last been examined on the rules in February, 1934, and his statements indicated that he considered himself able to handle trains safely over any part of the railroad.

Fireman Barton stated that when he first saw signal 2809, about 2,500 feet distant, it was displaying green and at no time did he or the engineman call its indication, it not being the practice to call indications unless they were restrictive. After passing that signal he saw the yellow or approach indication of distant signal 2831 and called it to the engineman, who acknowledged it by raising his hand and making a brake-pipe reduction, first making a 5-pound reduction on approaching the drawbridge sign and then a 10-pound reduction when about 100 feet from the signal, having reduced the speed from 65 miles per hour on passing signal 2809 to 55 miles per hour on passing signal 2831. He did not see

the engineman release the brakes nor did he hear them being released, although he was watching the engineman to see whether the latter would call the indication of the home signal. The engineman did not call the home signal however, but when they were at the south or leaving end of the curve the brakes were applied in emergency, at which time the fireman estimated the speed to have been close to 50 miles per hour. He then saw the drawbridge, but did not see the home signal or smash board, stating that the speed was too great and the distance too short. The fireman jumped off after the engine struck the smash board, at which time the speed was about 30 miles per hour and he thought it was about 25 miles per hour when the train struck the draw span. Fireman Barton further stated that on leaving Fort Pierce he informed the engineman that the air-brake superintendent was on the train and to observe the speed restrictions on the curves; he also called his attention to a point where there was a speed restriction. Fireman Barton was familiar with this district and had worked with Engineman Turnipseed double-headed in passenger service on one trip the previous winter and on one trip during the present winter.

Conductor Kerr stated that he was in the second car of the train, making out his reports, and thought the speed was about 50 miles per hour when there was a service application of the air brakes, followed almost immediately by an emergency application; the train then was well around the curve and he thought it traveled about its own length, which was 975 feet, before it struck the bridge, at which time the speed was 10 or 15 miles per hour. This was the first time he had worked with Engineman Turnipseed and he had noticed nothing unusual in the operation of the train.

Baggageman Helton noticed only one application of the air brakes approaching the drawbridge, at which time he went to the side door to look out and he then was passing the bridge tender's residence, which is located about 930 feet north of the bridge.

The statements of Flagman Morgan were not definite as to just when he felt an application of the air brakes, although he thought it was made in the vicinity of the distant signal, and he said it did not feel like an emergency application on the rear end of the train. In making the air-brake test at Fort Pierce, Flagman Morgan stated that the main engineman applied the brakes; the flagman then walked the length of the train to see that the brakes were applied and on reaching the engine he crossed over to the other side, asked the same engineman to release the brakes, and then walked to the rear of the train observing whether the brakes had released. Engineman Turnipseed was oiling the engine and he did not say anything to the engineman as to the

condition of the brakes, stating that if he finds that the brakes are not functioning properly he reports that fact to the conductor. On leaving Fort Pierce a running test was made and the brakes functioned properly.

Superintendent of Air Brakes Love was on Train Second No. 87 when it left Fort Pierce and particularly noticed the running test of the brakes on leaving that point. He noted that speed was reduced at several points as required, and while sitting in the observation car he checked the speed with his stop watch for 2 miles north of Hobe Sound, which is 8.6 miles north of Jupiter, and found it to be 65 miles per hour. On passing Hobe Sound an application of the brakes was made and he then started to walk forward and on the curve north of Mars, 2.5 miles north of Jupiter, the train was being operated at a high rate of speed, about 63 miles per hour. On going to the front vestibule of the fourth car in the train, which was equipped with doors the top half of which could be opened separately, he looked out and saw distant signal 2821 displaying yellow. The speed still was higher than 60 miles per hour and the train continued without any reduction in speed until its rear end passed the signal, when a service application of the brakes was started and shortly thereafter the brakes were applied in emergency, at which time he was looking out ahead and saw the home signal and the train was then leaving the curve. He thought that at the time the service reduction was made the engine was about 1,000 feet south of the distant signal, and that the speed had been reduced to about 50 miles per hour when the emergency application was made, at the leaving end of the curve. The brakes took hold, the speed was reduced rapidly, and he estimated it to have been 10 miles per hour at the time of accident, saying that he thought the train would have stopped within an additional distance of 100 or 150 feet; he did not notice a release of the brakes after the service application was made. Soon after the accident Superintendent of Air Brakes Love made a check on both sides of the train and found that the brake cylinder pistons were out on each car and all angle cocks open, and on the following day a test was made and nothing wrong with the piston travel was found; 10 of the cars were equipped with UC equipment and one with LN equipment. Superintendent of Air Brakes Love also stated that he had examined Engineman Turnipseed when he was re-employed and that he passed a satisfactory test; the engineman had been out of service for a few years, however, and he found the engineman was "lame" on handling both passenger and freight trains and the testing of equipment, and recommended that he put in 2 or 3 days of study. He had never had any complaint about Engineman Turnipseed not handling trains satisfactorily. Superintendent of Air Brakes Love further stated that he observed the flagman make the air-brake test on this train before it left



Fort Pierce and that it was done in the usual manner. This, however, was not in accordance with Bulletin No. 101, issued January 1, 1935; this bulletin quotes air-brake rule 42, which requires that train brakes be examined to determine if they are applied in service application on each car and that when this examination has been completed the proper release signal must be given and each brake examined to see that it releases properly, and the bulletin provides that this rule must be complied with in the handling of trains from or through Fort Pierce Yard and applies to both passenger and freight trains.

Bridge Tender Cook stated that he was sitting on the porch of his residence, located about 930 feet north of the bridge, when the first section of Train No. 87 passed. He had opened the bridge that morning for a boat to pass and as he expected the boat to return that afternoon he started to go to the bridge in order to see if it was coming, and when about half way there he heard the boat signal for the draw. He hurried to the cabin, placed the signals at stop, there being no indication that a train was on the approach circuits, operated the electric lock, and then proceeded to the bridge, where he descended the ladder, unlocked the door to the engine room, operated the revolving wheel which disengaged the wedges, cranked the gasoline motor, the battery having run down, and raised the bridge to an angle of 30°, which was ample to permit the passage of the boat; he stated that this entire operation from the time he left his home could not be done in less than 10 minutes. Bridge Tender Cook then left the engine room and saw the approaching train when it passed the home signal and struck the smash board and he saw the engineman jump off, he realized that the train was not going to stop before striking the bridge and at once jumped into the river. When he went to the signal cabin preparatory to opening the bridge he made a record of the time and noted that it was exactly 4 p.m. Bridge Tender Cook also stated that he opens this drawbridge on an average of once a day and that it seldom has been necessary to stop a train; under the requirements of the War Department, boats have right of way.

Signal Inspector Cargile arrived at the scene of the accident about 7:30 p.m. and as soon as the train was pulled away he inspected and tested the signals and also the equipment that operates the draw span, and found that they had been working properly.

Other tests made subsequent to the accident under clear weather conditions showed that from the engineman's side of the cab of a south-bound engine, distant signal 2821 displaying an approach indication could be seen plainly for a distance of 5,958 feet and that the indication of the home signal could be seen for a distance of 1,583 feet.

### Discussion

Engineman Turnipseed said signal 2809 was displaying an approach indication which cleared before his train reached it and that he thought he was closing up on the first section; signal 2821, the distant signal for the drawbridge, also displayed an approach indication. According to Engineman Turnipseed's statement, he made a service application of the brakes before reaching the curve which reduced speed from 60 to 40 or 45 miles per hour on passing the distant signal, and then released the brakes when part way around the curve, by which time the speed was down to 30 or 35 miles per hour; after traveling a few car lengths farther, however, he saw the home signal at stop and applied the brakes in emergency, too late to avert the accident. The engineman's statements further indicated that he thought there was a greater distance between the distant signal and the home signal and drawbridge than was actually the case, and that under the rules the only requirement of an approach signal indication was that he should approach the next signal prepared to stop.

The record in this case does not support the engineman's statements as to the indication of signal 2809 or the manner in which he handled the air brakes. The preceding section of Train No. 87 was so far ahead of him that it could not have caused signal 2809 to display an approach indication for the second section; this is established by the fact that after the passage of the first section the bridge tender was able to open the draw prior to the arrival of the second section, and this operation takes so long that it necessarily was started several minutes before the second section reached signal 2809, at which point the approach-locking circuit begins; furthermore, the fireman said signal 2809 was displaying a proceed indication, and in view of the fact that subsequent examination and test showed the signals to be operating as intended it is apparent that Engineman Turnipseed was in error in thinking an approach indication was displayed for his train by signal 2809. No question has been raised as to the operation of the distant and home signals; the evidence clearly establishes the fact that they were displaying approach and stop indications, respectively.

Concerning the method of operation of the brakes, the fireman said the engineman made a 5-pound reduction when approaching the drawbridge 1-mile sign and a 10-pound reduction when close to the distant signal. The statements of other members of the crew were at variance as to just when the engineman started to reduce speed but they indicated that on

leaving the curve, the southern end of which is only 571 feet from the home signal, the speed still was close to 50 miles per hour and that the engine had nearly reached the end of the curve when an emergency application of the brakes was made. These latter statements were supported by those of Superintendent of Air Brakes Love, who had been checking the speed with a stop watch and who said no reduction in speed was made until after the rear end of the train had passed the distant signal, at which time a service application was started but was followed shortly afterwards by an emergency application; according to his statement, the head end of the train then was leaving the curve and the train was traveling at a speed of 55 miles per hour. Evidence in support of this statement is afforded by the distance the train traveled after the emergency application was made, the distance between the end of the curve and the point of accident being 1,078 feet. The air brakes had been examined at Fort Pierce, they had operated properly en route, and after the accident tests indicated that they were in good condition; under these circumstances it is believed that had Engineman Turnipseed started to apply the brakes before reaching the distant signal as he claimed he did, and then continued to reduce speed as required by the rules and the approach signal indication, he would have been able to stop in time to avoid the accident.

Examination of the service record of Engineman Turnipseed showed that he was employed as an engineman in September, 1925, was cut off in June, 1926, was used twice in September of that year, and finally was cut off the seniority list in May, 1930; during this period none of his service was performed between Fort Pierce and Jupiter, within which territory this accident occurred. Engineman Turnipseed was re-employed in February, 1934, and subsequent to that time he made trips as follows:

	<u>Passenger</u>	<u>Freight</u>
March, 1934	3	2
April, 1934	1	3
January, 1935	2	1
February, 1935	5(a)	1
	<u>11</u>	<u>7</u>

(a) Including trip on which accident occurred.

Analysis of the records covering these trips shows that there had only been three occasions when Engineman Turnipseed handled a train south-bound in the territory in which this accident occurred, these trips consisting of one trip with

dead-head equipment in April, 1934, and one trip in passenger service in February, 1935, followed by the trip on which the accident occurred. During the investigation Engineman Turnipseed stated frequently that he thought the home signal and the drawbridge were farther away from the distant signal than actually was the case, and it is believed that the fact he was not well acquainted with the road, together with his failure to begin braking at the distant signal location, were the principal factors leading to the occurrence of this accident. Responsibility rests upon operating officers of this carrier for placing a man in charge of a fast passenger train who was not thoroughly acquainted with the road and who apparently had not been properly qualified concerning action required to be taken under the rules in connection with signal indications governing the movement of his train.

The signals involved in this accident were installed in 1926. At that time the maximum speed limit was 50 miles per hour, but in 1930 the speed limit was increased to 65 miles per hour, with no change at this point in signal spacing or signal indications. The distance between signals 2809 and 2821 was 6,560 feet, whereas the distance between signal 2821 and the home signal protecting the drawbridge was only 2,628 feet.

Under the rules of the Florida East Coast Railway, the approach signal indication is as follows:

"Approach next signal prepared to stop.  
A train exceeding one-half its maximum  
authorized speed at point involved must  
at once reduce to not exceeding that speed."

During the investigation of this accident it appeared that General Superintendent Beals and Road Foreman of Engines Norwood interpreted this indication as requiring the speed of a train to be reduced to half its authorized rate before the engine passed the signal displaying the approach indication. This interpretation was not clearly set forth in the printed rules or instructions, but in questioning Engineman Turnipseed, General Superintendent Beals read rule 161, which is shown in the rule book under the heading "Slow speed rules". Rule 161, together with rule 160 and the first two paragraphs of rule 162, which latter rules throw some light on the intended application of rule 161, read as follows:

- 160 Slow order requests should name in multiples of five a speed that is safe and instructions will be issued accordingly. Speed indicated must not be exceeded.
- 161 Where reduced speed is required the entire train must pass over the designated territory at the reduced speed. Flagmen will give proceed signal as rear of train passes designated point, which will be answered by signal 14(g).
- 162 Track protected by caution signal indicates track over which slow orders have been placed.

A caution signal, yellow flag by day and yellow light by night, will be placed about 3,000 feet, and farther if necessary, from the point where the slow track begins and on the side of the engineman as seen from a train approaching track to be protected.

Under the interpretation of the approach indication apparently adopted by General Superintendent Beals, in view of the 55-miles-per-hour limit on the curve, Train Second No. 87 should not have passed the distant signal at a speed greater than  $27\frac{1}{2}$  miles per hour. Engineman Turnipseed, however, did not have this understanding of the rule, and even after he had been prompted to a considerable extent, when questioned subsequently on the same subject he reiterated his original position, which was in substance that he was required only to be prepared to stop at the home signal. It is also noted that when Engineman Turnipseed passed a written examination in February, 1934, prior to being re-employed, in answer to a question concerning this signal indication his written reply stated that he was required to "proceed with caution", nothing being said by him about having the speed of his train reduced at the distant signal, or any other point, to half authorized speed.

The increase in the maximum authorized speed, in 1930, from 50 to 65 miles per hour, materially reduced any margin of safety which formerly was provided by the spacing of the signals protecting the approach to this drawbridge. If it is the purpose of this railway company to interpret the approach signal indication to require the specified speed reduction to be made before the train reaches the signal location, that interpretation should be clearly set forth in the rules and instructions, and steps should be taken to insure that it is

thoroughly understood by all operating officers and enginemen. However, it is seriously questioned whether reliance can properly be placed upon any interpretation of the approach signal indication which renders it necessary, to insure safety of operation, for an engineman to act upon that indication a considerable distance before he reaches the signal. The sighting distance of a signal is variable, and under adverse weather conditions when the view is materially restricted it would be difficult if not impracticable to conform to this interpretation. To insure adequate protection at this point some other alternative should be adopted, such as respacing of signals, the display of an approach-restricting indication by signal 2809 when the drawbridge home signal is at stop, or a restriction of maximum speed for a sufficient distance approaching this drawbridge to insure adequate stopping distance between signal 2821 and the drawbridge home signal. It is a matter of common knowledge that on many railroads maximum authorized speeds have been increased and faster train schedules adopted. Before such changes are made, however, in order to insure an adequate margin of safety, the spacing and location of signals should be thoroughly checked, and necessary revisions made to provide adequate stopping distances under all circumstances.

#### Conclusions

This accident was caused by the failure of Train Second No. 87 to be operated in accordance with signal indications,

#### Recommendations

It is recommended that appropriate action be taken by the carrier:

1. To provide additional protection for trains approaching this drawbridge.
2. To insure that all officers and employees concerned have a uniform understanding of the requirements and interpretations of rules.
3. To insure that enginemen are thoroughly qualified on the physical characteristics of that portion of the road to which they are assigned.

Respectfully submitted,

W. J. PATTERSON,

Director.