INTERSTATE COMMERCE COMMISSION

WASHINGTON

INVESTIGATION NO. 3256

CHICAGO GREAT WESTERN RAILWAY COMPANY
AND
ILLINOIS CENTRAL RAILROAD COMPANY

REPORT IN RE ACCIDENT

AT WAVERLY, IOWA, ON

MAY 26, 1949

SUMMARY

Date:	May 26, 1949	
Railroads:	Chicago Great Western	Illinois Central
Location:	Waverly, Iowa	
Kind of accident:	Side collision	
Trains involved:	Freight	Freight
Train numbers:	82	Extra 1586 East
Engine numbers:	Diesel-electric unit 111A	1586
Consists:	43 cars, caboose	35 cars, caboose
Estimated speeds:	33 m. p. h.	5 m. p. h.
Operation:	Interlocking	
Tracks:	Single; tangent; 0.64 percent descending grade eastward	Single; tangent; 0.63 percent descending grade eastward
Weather:	Clear	
Time:	1:05 p. m.	
Casualties:	1 killed; 2 injured	
Cause:	Insufficient stopping distance between approach signal and home signal for speed at which I.C. train was being operated	

INTERSTATE COMMERCE COMMISSION

INVESTIGATION NO. 3256

IN THE MATTER OF MAKING ACCIDENT INVESTIGATION REPORTS
UNDER THE ACCIDENT REPORTS ACT OF MAY 6, 1910.

CHICAGO GREAT WESTERN RAILWAY COMPANY
AND
ILLINOIS CENTRAL RAILROAD COMPANY

September 2, 1949

Accident at Waverly, Iowa, on May 26, 1949, caused by insufficient stopping distance between the approach signal and the home signal for the speed at which the I.C. train was being operated.

REPORT OF THE COMMISSION[1]

PATTERSON, Commissioner:

On May 26, 1949, there was a side collision between a freight train on the Chicago Great Western Railway and a freight train on the Illinois Central Railroad at Waverly, Iowa, which resulted in the death of one train-service employee, and the injury of two train-service employees. This accident was investigated in conjunction with representatives of the Iowa State Commerce Commission.

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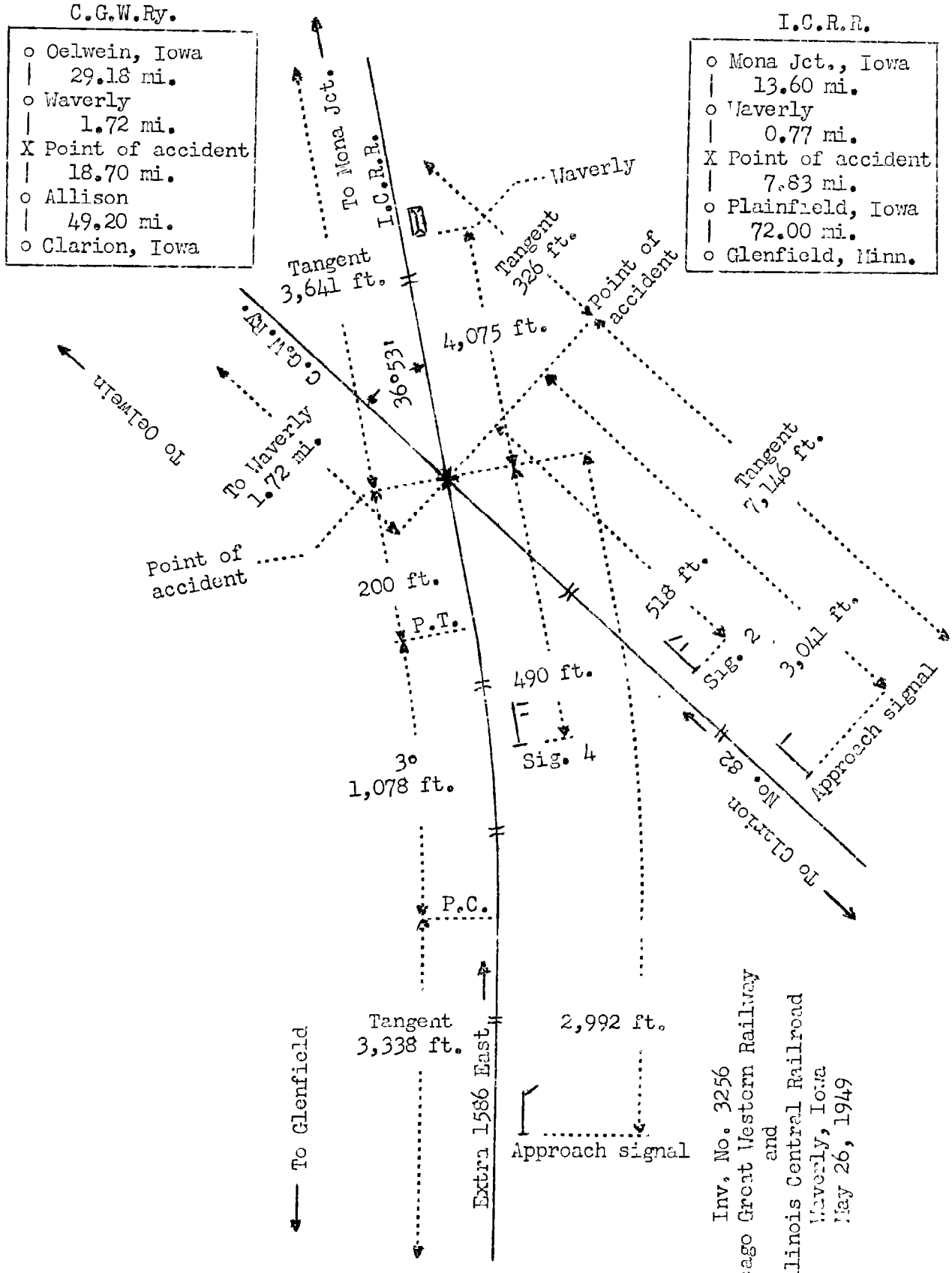
[1] Under authority of section 17 (2) of the Interstate Commerce Act the above-entitled proceeding was referred by the Commission to Commissioner Patterson for consideration and disposition.



Inv. No. 3256
Chicago Great Western Railway
and
Illinois Central Railroad
Waverly, Iowa
May 26, 1949

Location of Accident and Method of Operation

This accident occurred at the intersection of the Chicago Great Western Railway and the Illinois Central Railroad at Waverly, Iowa. The crossing is located on that part of the Minnesota Division of the C.G.W. extending between Clarion and Oelwein, Iowa, 98.8 miles, and on that part of the Iowa Division of the I.C. extending between Glenville, Minn., and Mona Jct., Iowa, 94.2 miles. The crossing is 67.9 miles east of Clarion and 1.72 miles west of the C.G.W. station at Waverly, and 79.83 miles east of Glenville and 4,075 feet west of the I.C. station at Waverly. In the vicinity of the point of accident both are single-track lines, over which trains are operated by timetable and train orders. There is no block system in use on either line. The C.G.W. track extends east and west. The I.C. track extends southeast and northwest, and intersects the C.G.W. track at an angle of 36°53'. Timetable directions on both roads are eastward and westward, and are used in this report. The C.G.W. track is tangent a distance of 7,146 feet west of the point of accident, and 326 feet eastward. Throughout a distance of 5,535 feet immediately west of the point of accident the grade for east-bound trains varies between 0.08 percent and 0.64 percent descending, and is 0.64 percent descending at the point of accident. From the west on the I.C. there are, in succession, a tangent 3,338 feet in length, a 3° curve to the left 1,078 feet, and a tangent 200 feet to the point of accident and 3,641 feet eastward. Throughout a distance of 6,010 feet immediately west of the point of accident the grade for east-bound trains varies between 0.14 percent and 1.06 percent descending, and averages 0.74 percent. It is 0.63 percent descending at the point of accident.

Movements over the crossing are governed by an automatic interlocking. East-bound movements on the C.G.W. are governed by an inoperative approach signal and home signal 2, located, respectively, 3,041 feet and 518 feet west of the crossing. The approach signal is of the one-arm semaphore type, fixed in the horizontal position to indicate Caution. It is continuously lighted. Home signal 2 is of the two-arm, semaphore type. The top arm operates in two positions in the lower quadrant and the bottom arm is fixed in the horizontal position. It is approach lighted. The involved aspects and corresponding indications of these signals are as follows:

Signal	Aspect	Indication	Name
Approach	Horizontal	Approach Home Signal with Caution.	Caution Signal.
2	Diagonal-over-horizontal	Proceed.	Clear Signal.

The eastward approach clearing circuit on the C.G.W. extends westward to the approach signal. East-bound movements on the I.C. are governed by an inoperative approach signal and home signal 4, located, respectively, 2,992 feet and 490 feet west of the crossing. The approach signal is of the one-arm semaphore type, fixed at 45° in the upper-quadrant to indicate Approach. It is continuously lighted. Home signal 4 is of the two-arm, semaphore type. The top arm operates in two positions in the upper quadrant and the bottom arm is fixed in the horizontal position. It is approach lighted. The involved aspects and corresponding indications of these signals are as follows:

Signal	Aspect	Indication	Name
Approach	Diagonal	PROCEED, PREPARING TO STOP AT NEXT SIGNAL.	APPROACH-DISTANT SIGNAL.
4	Horizontal-over-horizontal	STOP.	STOP.

The eastward approach clearing circuit on the I.C. extends westward to the approach signal. Each home signal normally indicates Stop. The controlling circuits are so arranged that the train first to enter its approach circuit automatically actuates the governing home signal to indicate Proceed. This prevents either home signal on the conflicting route from displaying an aspect to proceed until the first train either has completed its movement through the interlocking or until a predetermined time interval has elapsed after the first signal has been caused to indicate Stop by the manual operation of a time release.

Operating rules of the C.G.W. read in part as follows:

34. All members of train and engine crews must, when practicable, communicate to each other by its name the indication of every signal affecting the movement of their train or engine.

98. Trains must approach * * * railroad crossings at grade * * * prepared to stop, unless the * * * signals are right and the track is clear. * * *

* * *

Timetable special instructions read in part as follows:

(11). SPEED RESTRICTIONS--GENERAL.

ALL TRAINS, 20 MILES PER HOUR APPROACHING AND PASSING OVER RAILROAD CROSSINGS PROTECTED BY AUTOMATIC SIGNALS. * * *

* * *

Operating rules of the I.C. read in part as follows:

34. All members of engine and train crews must, when practicable, communicate to each other by its name, the indication of each signal affecting the movement of their train or engine.

* * *

98. Trains and engines must approach * * * railroad crossings at grade * * * prepared to stop, unless * * * signals indicate proceed, and track is clear. * * *

Timetable special instructions read in part as follows:

672. Trains or engines must not exceed speed of twenty miles per hour until engine or leading car has passed crossing. * * *

* * *

Waverly--C.G.W. Ry.

* * *

In the vicinity of the point of accident, except over the crossing involved, the maximum authorized speeds were 25 miles per hour for the C.G.W. train, and 40 miles per hour for the I.C. train.

Description of Accident

No. 82, an east-bound second-class C.G.W. freight train, consisted of Diesel-electric unit 111A, 43 cars and a caboose. This train passed Allison, the last open office, 18.7 miles west of the point of accident, at 12:18 p. m., 2 hours 36 minutes late, passed the approach signal west of Waverly, which indicated Approach, passed signal 2, which indicated Proceed, and while it was moving over the crossing at a speed of 33 miles per hour, according to the tape of the speed recorder with which the Diesel-electric unit was equipped, the twenty-ninth car was struck by Extra 1586 East.

Extra 1586 East, an east-bound I.C. freight train, consisted of engine 1586, 35 cars and a caboose. This train passed Plainfield, the last open office, 7.83 miles west of the point of accident, at 12:51 p. m., passed the approach signal west of Waverly, which indicated Approach, passed signal 4, which indicated Stop, and while moving at an estimated speed of 5 miles per hour it struck No. 82.

The engine of Extra 1586 East was derailed to the left, and stopped with the rear end approximately at the crossing and the front end north of the north rail of the C.G.W. track. It leaned to the left at an angle of about 30°. The cab was demolished, and the engine was otherwise badly damaged. The tender, which was not separated from the engine, stopped on its left side and parallel to the I.C. track, and was badly damaged. The first car overturned to the left, stopped on its side and parallel to the track, and was somewhat damaged. The rear truck of the twenty-ninth car of No. 82 was derailed. This car remained coupled to the front portion of the train and stopped at a point 1,240 feet east of the crossing. The thirtieth to the thirty-eighth cars, inclusive, were derailed. Separations occurred between each of these units, and they stopped in various positions on or near the crossing. The twenty-ninth, thirty-second, thirty-fourth, and thirty-sixth cars were so extensively damaged that they were listed for destruction. The thirtieth, thirty-first, thirty-third, and thirty-fifth cars were badly damaged. The thirty-seventh and thirty-eighth cars were somewhat damaged.

The engineer of the I.C. train was killed, and the fireman and the flagman of that train were injured.

The weather was clear at the time of the accident, which occurred about 1:05 p. m.

From the engine to the rear of the I.C. train there were, in order, eight AB brakes, one K, eight AB, one K, seven AB, one K, six AB, two K, one AB, and one K. The brake-cylinder piston travel was 10 inches on four of the cars, 9-1/2 inches on one, and 9 inches on five. The engine was equipped with type LT brake equipment and the brake-pipe feed valve was adjusted to supply 70 pounds brake-pipe pressure. It was not equipped with a speedometer or a speed-recording device.

Discussion

No. 82 passed the C G.W. eastward approach signal at a speed of 17 miles per hour. The enginemen and the front brakeman were maintaining a lookout ahead from their respective positions in the control compartment of the Diesel-electric unit, and the conductor and the flagman were in the caboose. The brakes of this train had been tested and had functioned properly when used en route. When the train occupied the approach clearing circuit at the inoperative approach signal, the enginemen and the front brakeman observed that the aspect of signal 2 changed to indicate Proceed. The speed of the train then was increased, and the engine passed signal 2 at a speed of 28 miles per hour. When the Diesel-electric unit was in the immediate vicinity of the crossing, these employees observed that signal 4 on the I.C. was indicating Stop, and that an east-bound I.C. train was approaching the signal. They could not determine the exact location or the speed of the I.C. train. When the Diesel-electric unit was a considerable distance east of the crossing, the fireman and the front brakeman observed that the engine of the I.C. train had passed signal 4. The speed of No. 82 had been increased to 33 miles per hour when the twenty-ninth car was struck on the crossing. The conductor and the flagman of No. 82 did not observe the approach of Extra 1586 East until immediately prior to the collision.

As Extra 1586 East was approaching the interlocking the enginemen were maintaining a lookout ahead from their respective positions on the engine, the front brakeman was on the deck of the engine, and the conductor and the flagman were in the caboose. The brakes of this train had been tested and had functioned properly when used en route.

The fireman was seated on the left side of the engine when the engine was approaching the approach signal. He said the first brake-pipe reduction was initiated when the engine was about 200 feet west of the approach signal, and at this point the speed of the train was about 30 miles per

hour. When the engine was about 400 feet east of the approach signal, where the speed had been reduced to about 20 miles per hour, a second brake-pipe reduction was made and the throttle was placed in the drifting position. During this time he was maintaining a lookout ahead to call the aspect displayed by the home signal. Because of track curvature, the view of signal 4 from the right side of the cab of an east-bound engine is restricted to a distance of 300 feet. The fireman did not observe the air-pressure gauge to determine the amount of brake-pipe reduction. When he first observed the home signal, at a distance of about 2,000 feet, it was indicating Stop, and he called the indication to both the engineer and the front brakeman. He said the speed of the train then was about 15 miles per hour. The speed had been reduced to about 7 miles per hour when the engine was about 500 feet west of signal 4, where the engineer moved the brake valve to the emergency position. The engine passed signal 4 at a speed of about 5 miles per hour. The engineer placed the reverse gear in position for backward motion and opened the throttle when the engine was about 100 feet east of signal 4. The fireman said he jumped from the left cab window immediately afterward.

The front brakeman was standing on the deck of the engine to the left of the engineer. He said the engineer closed the throttle soon after the train entered the descending grade west of the approach signal, where the speed was about 30 miles per hour. He said the first brake-pipe reduction was made about 900 feet west of the approach signal, and the speed of the train was reduced to about 20 miles per hour. He did not at any time observe the gauge to determine the amount of the brake-pipe reduction. He said the fireman called the Stop indication about 500 feet east of the approach signal. He said he and the engineer observed the C.G.W. train when his engine was about 1,200 feet west of signal 4, and the engineer moved the brake valve to the emergency position and opened the sander valve. The speed was reduced to about 5 miles per hour when the engine passed signal 4. The front brakeman said the engineer placed the reverse gear in position for backward motion and opened the throttle when the engine was about 100 feet east of signal 4.

The conductor said the speed was about 25 miles per hour as the train approached the approach signal. He first observed the air pressure gauge when the caboose was about 200 feet west of the approach signal, and a 5 or 6-pound reduction had been made, which reduced the speed to about 20 miles per hour when the caboose passed

the approach signal. A short time later he observed that the gauge indicated a brake-pipe reduction of 10 or 11 pounds. He said the emergency application was made when the caboose was about 1,200 feet east of the approach signal and the speed was still about 18 miles per hour. The engine would be within less than 200 feet of the crossing when the caboose was 1,200 feet east of the approach signal. He said the speed was about 5 miles per hour when the collision occurred.

The flagman also was riding in the cupola of the caboose and said that the speed was about 30 miles per hour as the train was approaching the approach signal. He first observed the caboose gauge when the caboose was about 300 feet west of the approach signal, and it indicated that a brake-pipe reduction of 12 pounds had been made. He did not know where the reduction was initiated. He said that the speed was about 15 miles per hour when the brakes were applied in emergency, and that the train moved about 1,000 feet after the emergency application, and was moving at a speed of about 5 miles per hour when the collision occurred.

After the accident occurred, the reverse lever of the engine was found to be in position for backward motion, the sander valve was open, the automatic brake valve was in emergency position, and the independent brake valve was in application position. The throttle assembly was damaged, and the position of the throttle at the time of the accident could not be determined. The air-brake equipment of the engine and of the first car were damaged to the extent that tests could not be made. The conductor said that when he inspected the remainder of the train immediately after the accident occurred he observed that the air brake on each car was applied. The air brakes on this portion of the train were tested after the accident occurred, and they functioned properly.

The Illinois Central chart for the braking of freight trains and passenger trains shows that a distance of 5,350 feet is required for spacing approach and home signals on level tangent track for freight trains moving at a speed of 40 miles per hour, the maximum authorized speed for freight trains in this territory. The estimates of the speed of the I.C. train, when the engine passed the approach signal, varied from 20 to 30 miles per hour. According to the braking chart, after considering the effect of the gradient and track curvature, the stopping distances for this train moving at either 20, 25, 30 or 40 miles per hour are, respectively, about 2,500, 3,300, 4,200 and 6,400 feet. Therefore, the

carrier did not provide in accordance with its chart sufficient stopping distance between the two signals for any freight-train speed above 20 miles per hour, as the distance between these signals is 2,492 feet. The estimates of speed vary widely. If the estimate of 20 miles per hour for the train when the caboose passed the approach signal is correct, obviously the speed was higher than 20 miles per hour when the engine passed the signal. However, the statements concerning the speed and the action taken to control the speed are so varied that they cannot be reconciled. If parts of certain statements of witnesses are used as a basis of determination, it would appear that the engine passed the approach signal at a speed not less than 30 miles per hour. To use as a basis of consideration any certain speed when the engine was passing the approach signal would be purely speculative, but in any event the preponderance of evidence indicates that the speed of the train was more than 20 miles per hour when the engine passed the approach signal.

The Commission's order of April 13, 1939, which prescribes, among other things, rules, standards and instructions for the installation, inspection, maintenance and repair of interlockings, requires that approach and home signals shall be spaced at least stopping distance apart, or, where not so spaced, an equivalent stopping distance shall be provided by two or more signals arranged to display restrictive indications in approach to the home signal, the indication of which requires such restrictive indications. If the train in question was moving at more than 20 miles per hour when the engine passed the approach signal, the stopping distance, according to the carrier's chart, was not sufficient to comply with the requirements of the order. Five days after the accident occurred, a braking test was made on the I.C. with an east-bound freight train. The weather was clear and the rail was dry. Engine 1556, of the same class as engine 1586, was used in this test. The train consisted of 37 loaded cars and a caboose, 33 of the cars were equipped with AB brakes, 1 with LN-type and 3 with K-type, and the gross weight was 2,921 tons, or 91.5 percent of the maximum tonnage rating. On the day of the accident, Extra 1586 East consisted of 33 loaded cars, 2 empty cars and a caboose, 30 of the cars were equipped with AB brakes and 6 with K-type, and the gross weight was 2,167 tons, or 68 percent of the maximum tonnage rating. The test train passed the eastward approach signal at a speed of 38 miles per hour, at which point a full-service reduction was initiated. This application was not released. The train overran the home signal a distance of 501 feet, and stopped with the front of the engine 11 feet east of the

crossing. According to the carrier's braking chart, for a speed of 38 miles per hour the signals in question should be spaced not less than 6,000 feet apart, or 3,500 feet more than was provided. The approach signal is inoperative, and therefore gives no information as to actual conditions in the interlocking. The interlocking is so arranged that the engine of an east-bound I.C. train moving at a speed of 40 miles per hour is within about 2,300 feet of the home signal before this signal changes to indicate Proceed, provided there is no train on the other route. This distance is not sufficient for freight trains moving at the maximum authorized speed to stop short of the home signal. After the accident, the carrier reduced the maximum authorized speed between the approach signals to 20 miles per hour. However, according to its braking chart a speed of 20 miles per hour for east-bound freight trains at the eastward approach signal is on the borderline, and the carrier should immediately make any further changes necessary to provide adequate stopping distance for movements through the interlocking.

Cause

It is found that this accident was caused by insufficient stopping distance between the approach signal and the home signal for the speed at which the I.C. train was being operated.

Dated at Washington, D. C., this second day of September, 1949.

By the Commission, Commissioner Patterson.

(SEAL)

W. P. BARTEL,

Secretary.