

## S U M M A R Y

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DATE	January 9, 1962	
RAILROAD	Chicago and North Western	
LOCATION	Agnew, Ill	
KIND OF ACCIDENT	Rear-end collision	
TRAINS INVOLVED	Freight	Freight
TRAIN NUMBERS	Extra 1632 East	124
LOCOMOTIVE NUMBERS	Diesel-electric unit 1632	Diesel-electric units 1747, 1756, 1759
CONSISTS	7 cars, caboose	29 cars, caboose
SPEEDS	Standing	40 m p h
OPERATION	Timetable, train orders, automatic train-control system	
TRACKS	Double, 0°45' curve, 0 35 percent ascending grade eastward	
WEATHER	Clear	
TIME	11 00 a m	
CASUALTIES	1 killed, 3 injured	
CAUSE	Failure to provide protection for the preceding train, and failure to operate the following train in accordance with signal indications	
RECOMMENDATION	That the Chicago and North Western Railway Company immediately take such action as may be necessary to obtain compliance with its operating rules and Commission regulations	

## INTERSTATE COMMERCE COMMISSION

REPORT NO 3941

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

CHICAGO AND NORTH WESTERN RAILWAY COMPANY

July 27, 1962

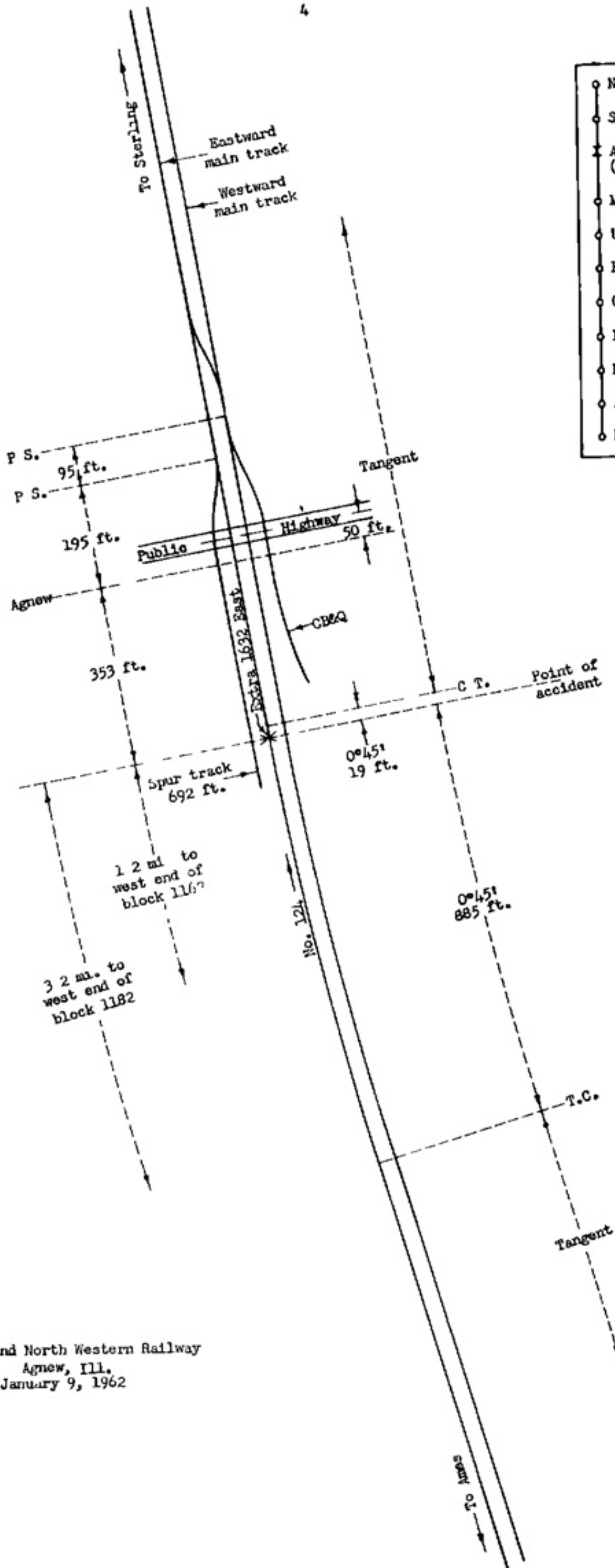
Accident at Agnew, Ill , on January 9, 1962, caused by failure to provide protection for the preceding train, and failure to operate the following train in accordance with signal indications

REPORT OF THE COMMISSION<sup>1</sup>*SAFETY AND SERVICE BOARD NO 1*

On January 9, 1962, at Agnew, Ill , there was a rear-end collision between two freight trains on the Chicago and North Western Railway, which resulted in the death of 1 train-service employee and the injury of 3 train-service employees

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<sup>1</sup>Under authority of section 17 (2) of the *Interstate Commerce Act* the above-entitled proceeding was referred by the Commission to Safety and Service Board No 1 for consideration and disposition



○	Nelson, Ill.	5.2 mi.
○	Sterling	5.3 mi.
+	Agnew	(Point of accident)
		9.0 mi.
○	Morrison	3.8 mi.
○	Union Grove, Ill.	8.9 mi.
○	East Clinton Tower, Iowa	1.6 mi.
○	Clinton	112.6 mi.
○	Belle Plaine	34.9 mi.
○	Marshalltown	37.8 mi.
○	Ames	33.8 mi.
○	Des Moines, Iowa	

Chicago and North Western Railway  
 Agnew, Ill.  
 January 9, 1962

### Location of Accident and Method of Operation

This accident occurred on that part of the railroad extending between Ames, Iowa, and Sterling, Ill., 213.9 miles, a double-track line over which trains moving with the current of traffic, which is to the left, are operated by timetable, train orders, and an automatic train-control system. A crew-change point is located at West Yard, Clinton, Iowa, 183.5 miles east of Ames. At Agnew, Ill., 208.6 miles east of Ames, a spur track, 692 feet in length, parallels the eastward main track on the north. The east end of this spur track is connected to the eastward main track by a switch located 195 feet east of the station sign. A single-track line of the Chicago, Burlington and Quincy Railroad Company (CB&Q) diverges southwestward from the westward main track at Agnew as shown in the sketch. The switch connecting this single-track line to the westward main track is located 95 feet east of the spur-track switch. A public highway crosses the main tracks, the spur track and the CB&Q single-track line at grade approximately 50 feet east of the station sign.

The accident occurred on the eastward main track 29 miles east of West Yard, Clinton, and 353 feet west of the station sign at Agnew. From the west on both main tracks there are, in succession, a tangent of considerable length, a  $0^{\circ}45'$  curve to the right 885 feet to the point of accident and 19 feet beyond, and a tangent throughout a considerable distance eastward. From the west the grade is, successively, 0.72 percent descending 3,650 feet, 0.30 percent descending 200 feet, level 160 feet, and an average of 0.35 percent ascending 845 feet to the point of accident and 250 feet eastward.

The automatic train control (A T C) system is of the continuous-inductive type, and the control compartment of a locomotive unit equipped with A T C apparatus is provided with a 2-aspect cab signal and audible indicators. There are no wayside signals, except at interlockings. The track is divided into blocks in the same manner as where wayside automatic signals are used. The A T C system is so arranged that when a block is occupied there is a restricted zone extending from the point of obstruction to a point at least stopping distance in approach of the entrance to the occupied block. When a locomotive unit having A T C apparatus in operation enters a restricted zone the aspect of the cab signal changes from green to red-over-yellow. If the speed is in excess of 40 miles per hour at this time an over-speed warning whistle immediately starts sounding and an A T C brake application occurs 6 seconds later, stopping the train. The engineman, however, may suppress the A T C brake application by moving the handle of the brake valve to service position within the 6-second delay period and by leaving it in that position until the acknowledging horn sounds, indicating that the speed has been reduced to less than 40 miles per hour. An A T C brake application occurs within a period of about 6 seconds after the acknowledging horn starts sounding, unless the engineman operates the acknowledging lever within this 6-second period and takes action to reduce the speed to 23 miles per hour within the following 75-second period. The over-speed warning whistle stops sounding when the speed is reduced to less than 23 miles per hour, at which time the engineman may release the brake application. The acknowledging horn again begins to sound at the expiration of the 75-second period in which the speed is required to be reduced to less than 23 miles per hour, and it sounds thereafter at 100-second intervals. To avoid an A T C brake application while moving in the restricted zone after the speed has been reduced to less than 23 miles per hour, the speed must not be increased to more than 23 miles per hour and the acknowledging lever must be operated within a period of 6 seconds after the acknowledging horn begins sounding at the expiration of each 100-second interval.

If a locomotive unit equipped with A T C apparatus in operation exceeds a speed of 70 miles per hour in A T C territory while the cab signal is displaying a green aspect, the over-speed whistle signal begins sounding and an A T C brake application occurs 6 seconds later, unless the engineman takes action within this interval to suppress the A T C brake application and reduce the speed to less than 70 miles per hour.

An A T C brake application is effected by means of an electro-pneumatic valve, and a brake-valve actuator super-imposed upon the brake valve housing. The electro-pneumatic valve controls the supply of air to the brake-valve actuator, which operates the brake valve automatically to the service position in the same manner as the engineman when he manually initiates a service application of the brakes. The brake-valve actuator is provided with a cutout cock, which is required to be locked in cut-in position while the locomotive is operating in A T C territory. Two keys are provided for the lock of the cutout cock. Both keys and the lock are stamped with the same identifying numbers. Each key is provided with a metal tag showing the number of the locomotive unit to which the key and the corresponding lock are assigned. One key is a spare key and is sealed within a metal box having a sealed glass lid. This box is located in the control compartment of the locomotive unit. The other key, or token, is used to lock the cutout cock of the brake-valve actuator in cut-in position as required when the locomotive unit is operating in A T C territory, and it cannot be removed from the lock unless the cutout cock is in cut-in position. According to rules and instructions of the carrier, after the cutout cock of the brake-valve actuator is locked in cut-in position the key, or token, which is attached to a short chain and a metal ring having a diameter of about 7 inches, is required to be removed from the lock. The ring to which the key is attached is then required to be sealed to an electrical conduit inside the control compartment in such manner that the key cannot be re-inserted in the lock of the cutout cock of the brake-valve actuator without breaking the seal.

When the cutout cock of the brake-valve actuator is in cutout position, the cab signal and the over-speed warning whistle of the A T C apparatus on a locomotive unit moving in A T C territory function in the same manner as when this cock is in cut-in position.

The entrance to block 1162, the block of the eastward main track in which the accident occurred, is located 1.2 miles west of the point of accident. Block 1182 of the eastward main track is located immediately west of block 1162 and its entrance is located 3.2 miles west of the point of accident. The track circuits of the A T C system are so arranged that when block 1162 is occupied at the point of accident, an A T C restricted zone is imposed on the eastward main track between this point and the entrance to block 1182.

This carrier's operating rules read in part as follows:

#### DEFINITIONS

\* \* \*

RESTRICTED SPEED -Proceed prepared to stop short of train, \* \* \* but not exceeding twenty miles per hour.

\* \* \*

TOKEN -The key, with tag attached, by means of which automatic train control \* \* \* apparatus on the engine is locked in Cut-In position.

\* \* \*

#### OPERATING RULES

35 The following signals will be used by flagmen:

Day signals -A red flag  
Torpedoes  
Fusees

99 When a train stops under circumstances in which it may be overtaken by another train, the flagman must go back immediately with flagman's signals a sufficient distance to insure full protection, placing two torpedoes and when necessary, in addition, displaying lighted fuseses. When recalled and safety to the train will permit, he may return.

#### AUTOMATIC TRAIN SPEED CONTROL RULES

523 In train control territory when a train or engine is being operated under low speed restrictions, the engineman must operate at restricted speed.

\* \* \*

#### ENGINEMEN AND FIREMEN

1042 They must keep a vigilant lookout at all times \* \* \*

This carriers instructions and rules governing A T C apparatus on locomotives read in part as follows

\* \* \*

1 Locomotives equipped with train control, must have same "Cut In" before entering train control territory

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\* \* \*

a The train control device, or any part of it must not be cut out unless it is unworkable. When through failure of the device it becomes necessary to cut out the train control brake applying apparatus, the engineman must immediately notify the conductor. After cut out is completed, the train will then proceed to first point where communication can be had with, and facts reported to the train dispatcher, being governed as follows, and in accordance with timetable special rules

b If the cab signals are operating properly after the brake applying apparatus is CUT OUT, train will be governed by the indication displayed, except when the indication displayed is green train must not exceed 40 MPH until the train dispatcher is notified and his instructions are received

\* \* \*

Box car type seals with special A T C lettering will be used to seal the A T C token in thru freight service while operating in train control territory \* \* \*

\* \* \*

The seals must be looped between the large token ring and a section of the electrical conduit and sealed in such a position that it will not reach the lock or create a safety hazard for those riding the locomotive. A T C seals must not be broken except when absolutely necessary, to obtain token for the purpose of cutting train control apparatus out of service

Engineers will be responsible for knowing that train control token for leading unit is properly sealed prior to entering automatic train control territory. If necessary to break seal while operating in automatic train control territory the engineer must make report to train dispatcher furnishing the number of the broken seal and advising reason for breaking same \* \* \*

Rules, Standards and Instructions for Signal Systems, INTERSTATE COMMERCE COMMISSION, Ex Parte No 171, read in part as follows

\* \* \*

Rules and instructions, locomotives

\* \* \*

§ 136 553 Seal or lock, where required —Seal or lock shall be maintained on any device, other than the double-heading cock, by means of which operation of the pneumatic portion of the apparatus can be cut out

\* \* \*

§ 136 567 Restrictions imposed when device fails or cut out enroute —Where an automatic train-stop, train-control, or cab-signal device fails and/or is cut out enroute, train may proceed at restricted speed or if an automatic block-signal system is in operation according to signal indication but not to exceed medium speed, to the next available point of communication where report must be made to a designated officer. Where no automatic block-signal system is in use train shall be permitted to proceed at restricted speed or where automatic block-signal system is in operation according to signal indication but not to exceed medium speed to a point where absolute block can be established \* \* \*

DEFINITIONS

\* \* \*

§ 136 811 Speed, medium —A speed not exceeding 40 miles per hour

§ 136 812 Speed, restricted —A speed that will permit stopping short of another train or obstruction, but not exceeding 20 miles per hour

The maximum authorized speed for freight trains in the vicinity of the point of accident is 60 miles per hour

The locomotive of No 124 was equipped with a speed-recording device. On the day of the accident, however, this device was not provided with tape

**Description of Accident**

Extra 1632 East, an eastbound freight train, departed from Union Grove, Ill, 12.3 miles east of West Yard, Clinton, about 9.30 a.m., and stopped at Morrison, Ill, 16.1 miles east of West Yard, Clinton. After picking up 4 cars at Morrison this train, consisting of diesel-electric unit 1632, 6 cars and a caboose, proceeded eastward, entered block 1182, entered block 1162, and about 10.35 a.m., stopped on the eastward main track with the front end a short distance west of the rail-highway grade crossing at Agnew, after which the locomotive with the 1st car was detached for switching operations on the spur track. During these operations 2 cars were added to the front end of that portion of the train standing on the eastward main track. About 11.00 a.m., while the locomotive with one car was in the vicinity of the switch of the spur track, the rear end of that portion of the train standing on the eastward main track west of the rail-highway crossing was struck by No 124 at a point 353 feet west of the station sign.

No 124, an eastbound second-class freight train, departed from Des Moines, Iowa, at 3.45 a.m., 6 hours 45 minutes late, proceeded eastward on a single-track line in non-A.T.C. territory, and stopped at Ames, 33.8 miles east of Des Moines, where the cutout cock of the brake-valve actuator of the A.T.C. apparatus on the locomotive was moved to cut-in position, and where the train entered the eastward main track of the double-track line in A.T.C. territory. This train, consisting of road-switcher type diesel-electric units 1747, 1756 and 1759, coupled in multiple-unit control, 81 cars and a caboose, departed eastward from Ames about 5.50 a.m., 4 hours 50 minutes late, stopped at Marshalltown, Iowa, 37.8 miles east of Ames, where 46 cars were set out,

and stopped at Belle Plaine, Iowa, 72.7 miles east of Ames, where the remaining 35 cars were set out and a cut of 29 cars was picked up. At 8:20 a.m., the train proceeded eastward from Belle Plaine without the brakes having been tested as prescribed by the Power Brake Law of 1958 and, at 10:15 a.m., it stopped at West Yard, Clinton, where the inbound crew was relieved by the outbound crew. This train departed from West Yard, Clinton, at 10:30 a.m., 1 hour late, without any change of equipment, and as it was moving in the vicinity of East Clinton Tower, 3.4 miles east of West Yard, the engineer moved the cutout cock of the brake-valve actuator of the A T C apparatus to cut-out position, preventing any A T C brake application while moving with the cutout cock in this position. The train then passed Union Grove, passed Morrison, entered block 1182, entered block 1162, and soon thereafter, while moving on the eastward main track at an estimated speed of 40 miles per hour, it struck the rear end of Extra 1632 East.

No. 124 stopped with the front end 309 feet east of the point of accident. All units of the locomotive, and the 1st to the 18th cars, inclusive, were derailed and stopped in various positions on or near the structure of both main tracks. The 1st and 2nd diesel-electric units were heavily damaged, and the 3rd unit was somewhat damaged. Of the 18 derailed cars, 4 were heavily damaged, 12 were somewhat damaged, 1 was slightly damaged and 1 was undamaged. The caboose of Extra 1632 East was demolished and the 4 cars immediately ahead of the caboose were heavily damaged.

The conductor of Extra 1632 East was killed. The swing brakeman of Extra 1632 East, and the conductor and the fireman of No. 124, were injured.

The weather was clear and the temperature was below zero at the time of the accident, which occurred about 11:00 a.m.

The caboose and the locomotive of No. 124 were provided with radio-telephone equipment.

### Discussion

A local freight train is regularly operated from Nelson, Ill., 35.6 miles east of West Yard, Clinton. On the day of the accident this train was operated as Extra 1632 West from Nelson to Union Grove, and as Extra 1632 East from Union Grove to Nelson. No. 124, the eastbound second-class freight train involved in this accident, is scheduled to depart eastward from Clinton at 9:30 a.m.

Extra 1632 West departed westward from Nelson at 1:50 a.m. on the day of the accident and as it was departing the conductor received a copy of a line-up of train movements. This train stopped for switching operations at Morrison and, at the completion of these operations, the conductor entered the station at Morrison and read the station agent's copy of a later line-up issued by the train dispatcher. The station agent said that after communicating with the train dispatcher in response to a request made by the conductor for a verification of the time shown for No. 124 at Clinton in the later line-up, he informed the conductor that this line-up was revised to indicate that No. 124 would depart eastward from Clinton about 10:00 a.m. Upon receipt of this information the conductor left the station and, about 9:05 a.m., the train departed westward from Morrison and proceeded against the current of traffic on the eastward main track to Union Grove without any train order and block authority for such movement as required by the operating rules. It arrived at Union Grove about 9:10 a.m. and after further switching operations at this point, a train was assembled for eastward movement to Nelson as Extra 1632 East.

Extra 1632 East, consisting of the locomotive, 2 cars and a caboose, departed eastward from Union Grove about 9:30 a.m., and after stopping to pick up four cars at Morrison, it proceeded on the eastward main track toward Agnew. As the train was approaching this point the engineer and the front brakeman were in the control compartment of the locomotive. The fireman a



qualified engineer, was at the controls. The conductor, the flagman and the swing brakeman were in the caboose. Both the flagman and the swing brakeman said that the conductor instructed them to assist the front brakeman in the switching operations required at Agnew and informed them that he would provide protection against following trains while their train was stopped on the eastward main track for these operations. The swing brakeman said the conductor also informed them that there was sufficient time for their train to complete the work at Agnew and proceed to Sterling, 5.3 miles eastward, indicating that the conductor intended to have Extra 1632 East clear the eastward main track for No. 124 at Sterling. Both the flagman and the swing brakeman, and the other members of the crew, said the conductor did not provide them with any specific information on the day of the accident as to the times shown for No. 124 or other trains listed in the line-ups issued by the train dispatcher. About 10:35 a.m., Extra 1632 East stopped on the eastward main track at Agnew with the front end a short distance west of the rail-highway grade crossing located about 50 feet east of the station sign. The flagman and the swing brakeman immediately alighted from the caboose and proceeded toward the front of the train to assist the front brakeman in the necessary switching operations. Meanwhile, the front brakeman uncoupled the 1st car from the 2nd car and proceeded eastward with the locomotive and the 1st car to the switch of the spur track. About 25 minutes later, after removing two cars from the spur track and attaching them to the front end of that portion of the train standing on the eastward main track west of the rail-highway crossing, the locomotive with one car proceeded on the eastward main track and stopped east of the spur-track switch, and the front brakeman lined the switch for movement to the spur track. At this time the swing brakeman was at a point between the switch and the rail-highway crossing, and the flagman was standing near the spur track about 100 feet west of the crossing. Immediately after operating the spur-track switch the front brakeman observed No. 124 approaching on the eastward main track at a distance of about 1-1/2 miles. He said this train was moving at a high rate of speed when he first observed it, and that he immediately called a warning to the swing brakeman. When the swing brakeman heard this warning he looked westward and observed that his conductor was not providing flag protection against the approaching train. He said that he immediately lighted a fusee and ran westward toward the approaching train while simultaneously giving stop signals with the fusee, and that the collision occurred about the time he reached the rail-highway crossing. The conductor apparently was in the caboose at this time, and was killed in the accident.

No. 124 departed from Des Moines at 3:45 a.m. on the day of the accident and before its departure from this point the engineer was provided with A.T.C. seal No. 1671, which was of the type commonly used to seal doors of box cars. This train proceeded eastward on a single-track line in non-A.T.C. territory and stopped short of the wye at Ames. The 3-unit locomotive was then detached and operated over the wye to place unit 1747, which was equipped with A.T.C. apparatus, at the front of the train. After the locomotive was recoupled to the train, the engineer arranged the controls for operation from the control compartment near the front of unit 1747. The engineer then moved the cutout cock of the brake-valve actuator on unit 1747 to cut-in position and tested the A.T.C. apparatus as required. He said that this test disclosed the A.T.C. apparatus was functioning properly, and that upon its completion he removed the key, or token, from the lock of the cutout cock and used seal No. 1671 to seal the ring, to which the key was attached by a chain, onto an electrical conduit located near the ceiling of the control compartment.

No. 124 moved over the east leg of the wye at Ames, entered the eastward main track of the double-track line in A.T.C. territory, and departed eastward from Ames about 5:50 a.m. It then stopped at Marshalltown and set out 46 cars, after which it proceeded to Belle Plaine, 112.6 miles west of Clinton, where the remaining 35 cars were set out and a cut of 29 cars was picked up. This train departed from Belle Plaine at 8:20 a.m., without the brakes having been tested as prescribed by the Power Brake Law, and soon thereafter the fireman exchanged places with the engineer and operated the locomotive. He said that on three occasions while en route eastward from Belle Plaine the over-speed warning whistle of the A.T.C. apparatus sounded, indicating the train had attained a speed of 70 miles per hour, 10 miles per hour in excess of the maximum authorized speed, and that on each of these occasions he suppressed an A.T.C. brake application by

taking action within six seconds to reduce the speed as required. He also said that as the train was approaching West Yard, Clinton, the air horn of the 1st diesel-electric unit failed to sound properly, apparently as a result of condensation freezing in the air pipes associated with the horn. About 10 12 a m, the train stopped on a non-A T C portion of the eastward main track at West Yard, Clinton, and the members of the inbound crew were relieved by the members of the outbound crew. The independent brake was applied while the crew was being changed, and during this time the train remained intact without any change in its equipment or 29-car consist. After boarding diesel-electric unit 1747, the first unit of the locomotive of No 124, the engineer of the outbound crew tested the A T C apparatus pneumatically, and took no exceptions. Soon afterward he tested the air horn of the first diesel-electric unit and found that it was not sounding properly because of condensation frozen in the horn piping. Both outbound enginemen then used lighted fuses to thaw horn piping located on top and inside the short-hood compartment located in front of the control compartment, after which the engineer considered the condition of the horn to be satisfactory.

No 124 departed eastward from West Yard, Clinton, at 10 30 a m. The engineer said that while the train was moving in the vicinity of East Clinton he left his seat and twisted open a link in the chain to which the A T C key was attached and, without breaking the seal, removed the key. He said that he then used the key to unlock the cutout cock and moved it to cut-out position, leaving the key in the lock. This action cut out the pneumatic feature of the A T C apparatus on the locomotive and prevented automatic actuation of the brake valve if cab signal indications and audible warning signals were not complied with while moving in a restricted zone or in case train speed exceeded 70 miles per hour. Neither enginemen provided any explanation as to why the cutout cock was moved to cut-out position, and nothing was disclosed during the investigation to indicate that any portion of the A T C apparatus involved was defective.

As No 124 proceeded eastward from East Clinton Tower the enginemen were in the control compartment near the front of the 1st diesel-electric unit. The front brakeman was in the control compartment of the 2nd diesel-electric unit with instructions from the engineer to sound the air horn of that unit when necessary, if the air horn of the first unit again failed to sound properly. The conductor and the flagman were in the caboose. The train passed Union Grove and Morrison and as it was proceeding at a speed of about 60 miles per hour in approach to a rail-highway grade crossing located a short distance east of Morrison, the engineer found that the horn of the 1st diesel-electric unit again failed to sound properly, apparently as a result of frozen condensation in the horn piping. He signalled the front brakeman to sound the horn of the 2nd unit, and after making an unsuccessful attempt to do so the front brakeman gave the engineer a signal indicating that the horn of the 2nd diesel-electric unit was inoperative, apparently as a result of ice forming in the associated piping. About this time the fireman left his position in the control compartment of the 1st diesel-electric unit and proceeded into the short-hood compartment located in front of the control compartment, where he began thawing pipes of the air horn by means of a lighted fusee. Soon afterward, as the train was approaching the point of accident at a distance of about four miles, the engineer left his position at the controls and also proceeded into the short-hood compartment, where he assisted the fireman. The door between the control and the short-hood compartments became closed after the engineer entered the latter compartment, and at this time the train was moving eastward on the eastward main track at a speed in excess of 60 miles per hour without anyone at the controls or occupying the control compartment, and without the pneumatic feature of the A T C apparatus cut in.

Soon after the engineer of No 124 proceeded into the short-hood compartment the train entered the A T C restricted zone, which extended 3 2 miles eastward from the entrance of block 1182 to the point where the rear end of Extra 1632 East occupied the eastward main track at Agnew, and at this time the aspect of the cab signal in the control compartment changed from green to red-over-yellow and the over-speed warning whistle began sounding. An A T C brake application, which normally would have occurred about 6 seconds later, was prevented because of the cutout cock of the brake-valve actuator being in cut-out position. Since both enginemen were in the short-hood compartment with the door closed behind them, they could not see the restrictive aspect of

the cab signal and could not hear the sound of the over-speed warning whistle. Apparently about the time that the train was moving in the vicinity of the entrance to block 1162, 1.2 miles west of the point of accident, the engineer opened the door between the short-hood and control compartments, and heard the sound of the over-speed warning whistle. He immediately re-entered the control compartment, observed that the speed indicator was indicating a speed of about 68 miles per hour and, without looking at the cab signal, assumed that the over-speed warning whistle was sounding only because the speed was about to exceed 70 miles per hour. He said that he then looked forward along the main tracks and initiated a service application of the brakes to reduce the speed somewhat below 70 miles per hour, and that at this time he observed freight cars standing in the vicinity of the station at Agnew, but thought they were on the CB&Q single-track line located adjacent to the westward main track. Soon afterward, the engineer noticed that the over-speed warning whistle had not stopped sounding and first observed that the cab signal was displaying a red-over-yellow aspect. About the same time he realized that the freight cars ahead were standing on the eastward main track, and he initiated an emergency application of the brakes and called a warning to the fireman. Immediately afterward, he attempted to restore the cutout cock of the brake-valve actuator to cut-in position. The fireman re-entered the control compartment at this time, observed that the engineer was experiencing difficulty in operating the cutout cock, and moved this cock to cut-in position for the engineer. He then removed the key, or token, from the lock of the cutout cock and gave it to the engineer, who threw it out of the window of the control compartment instead of retaining it in his possession or replacing it on the chain from which it had been removed. Both enginemen said that they did not hear any explosions of torpedoes in the approach to the point of accident, and that they did not observe anyone providing protection to the rear of Extra 1632 East. They took positions on the floor of the control compartment immediately before the accident occurred, and the engineer estimated that the speed of the train was reduced to about 40 miles per hour at the time of the collision. The other members of the crew said they did not know that the cutout cock of the brake-valve actuator had been moved to cut-out position, and were unaware of anything being wrong before the brakes of the train became applied in emergency.

Examination of the control compartment of diesel-electric unit 1747 after the accident occurred disclosed that the handle of the automatic brake valve was in emergency position, that the cutout cock of the brake-valve actuator was locked in cut-in position with the A T C key, or token, removed, and that the independent brake valve was in full application position. After damaged brake equipment of this unit was repaired and broken air pipe connections blanked off, tests disclosed that the brake equipment, including the A T C apparatus, functioned properly. Tests of the track circuits involved disclosed that this portion of the A T C system was functioning properly, and that prior to the accident a restricted zone had been imposed on the eastward main track between the point of accident and the entrance to block 1182, a distance of 3.2 miles.

The A T C token, or key, which the engineer of No. 124 threw out of a side window of the control compartment shortly before the accident occurred, was recovered.

The rules of this carrier require that when a train stops under circumstances in which it may be overtaken by another train, the flagman or some other member of the crew must go back immediately with flagman's signals a sufficient distance to insure full protection, placing two torpedoes and when necessary, in addition, displaying lighted fuses. Enginemen and firemen are required to keep a vigilant lookout at all times. Locomotives equipped with A T C apparatus must have same "Cut In" before entering train control territory, and such A T C apparatus, or any part of it, must not be cut out unless it is unworkable. A seal or lock shall be maintained on any device of the locomotive, other than the double-heading cock, by means of which operation of the pneumatic portion of the apparatus can be cut out. Where an automatic train control device is cut out en route, the train may proceed at restricted speed or according to signal indications but not to exceed medium speed, to the next available point of communication where report must be made.

to a designated officer. When a cab signal displays a red-over-yellow aspect, the train may proceed at restricted speed, not exceeding 20 miles per hour, and must be operated in such manner that it can be stopped short of another train.

In the instant case flag protection as prescribed by Rule 99 was not provided for the preceding train. As the conductor of this train was killed in the accident, it could not be determined why adequate protection was not provided. The engineer of No. 124 intentionally cut out the pneumatic feature of the automatic train control apparatus on the locomotive of the following train. The automatic train control apparatus previously had been tested and had functioned as intended and no defective condition existed at the time the pneumatic feature was cut out. It is apparent that this action was taken to circumvent the restrictions automatically imposed on train speed by the automatic train control apparatus and was in violation of this Commission's regulations relating to signal and train control apparatus. This apparatus was so arranged that it would automatically apply the brakes if the train were not operated in accordance with a restrictive cab signal indication, or if at any time train speed exceeded 70 miles per hour unless action was taken within 6 seconds to reduce the speed by initiating a service application of the brakes by manual operation of the brake valve. Later, after this protective feature had been nullified, when the locomotive horn failed to operate the fireman left the control compartment and entered the short hood compartment of the locomotive where he attempted to thaw frozen condensation which blocked an air pipe leading to the pneumatic horn. Although at this time the train was nearing an estimated speed of 60 miles per hour the engineer left his position at the controls and also entered the front compartment to assist the fireman. He estimated that the train at this time was approximately 3 miles west of the point where the accident occurred. It is evident that the engineer remained in the short hood compartment until No. 124 was closely approaching the point at which the preceding train was stopped. It is apparent that if either the engineer or the fireman had remained in the control compartment and maintained a lookout ahead, the restrictive indication of the cab signal when the locomotive entered the restricted zone to the rear of the preceding train and the audible warning which accompanied it, would have been observed in time to have stopped No. 124 short of the preceding train. It is further evident that if the automatic train control apparatus had been cut in as was required that it would have functioned automatically to apply the train brakes when the engineer failed to take proper action to control the speed of this train in accordance with the cab signal indication received at the entrance to the restricted zone and in sufficient time to have averted the accident.

The investigation disclosed laxity in the enforcement of the carrier's operating rules. The Commission has instituted appropriate action in those violations of the Power Brake Law and Rules, Standards, and Instructions applicable to train control and cab signal systems which were disclosed in the course of this investigation.

### **Cause**

This accident was caused by failure to provide protection for the preceding train, and failure to operate the following train in accordance with signal indications.