RAILROAD ACCIDENT INVESTIGATION

Report No 3811

THE ATCHISON, TOPEKA AND SANTA FE RAILWAY COMPANY
and
THE CHICAGO, ROCK ISLAND AND PACIFIC RAILROAD COMPANY

MARION, KANS

JULY 4, 1958

INTERSTATE COMMERCE COMMISSION

Washington

SUMMARY

§§§

DATE	July 4, 1958	
RAILROAD	Atchison, Topeka and Santa Fe	Chicago, Rock Island and Pacific
LOCATION	Marion, Kans	
KIND OF ACCIDENT	Side collision	
TRAINS INVOLVED	Freight	Freight
TRAIN NUMBERS	87	Extra 113 North
LOCOMOTIVE NUMBERS	Diesel-electric unit 2832	Diesel-electric units 113A, 70B, and 120B
CONSISTS	55 cars, caboose	86 cars, caboose
ESTIMATED SPEEDS	3 m p h	Undetermined
OPERATION	Interlocking, Special instructions	
TRACKS	Single, tangent, 0.03 percent descending grade westward	Single, tangent, level
WEATHER	Clear	
TIME	2 05 p m	
CASUALTIES	3 injured	
CAUSE	Failure to operate Atchison, Topeka and Santa Fe train in accordance with rules governing movements over automatic interlocking	

INTERSTATE COMMERCE COMMISSION

REPORT NO 3811

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

THE ATCHISON, TOPEKA AND SANTA FE RAILWAY COMPANY
and
THE CHICAGO, ROCK ISLAND AND PACIFIC RAILROAD COMPANY

October 28, 1958

Accident at Marion, Kans , on July 4, 1958, caused by failure to operate the Atchison, Topeka and Santa Fe train in accordance with rules governing movements over an automatic interlocking

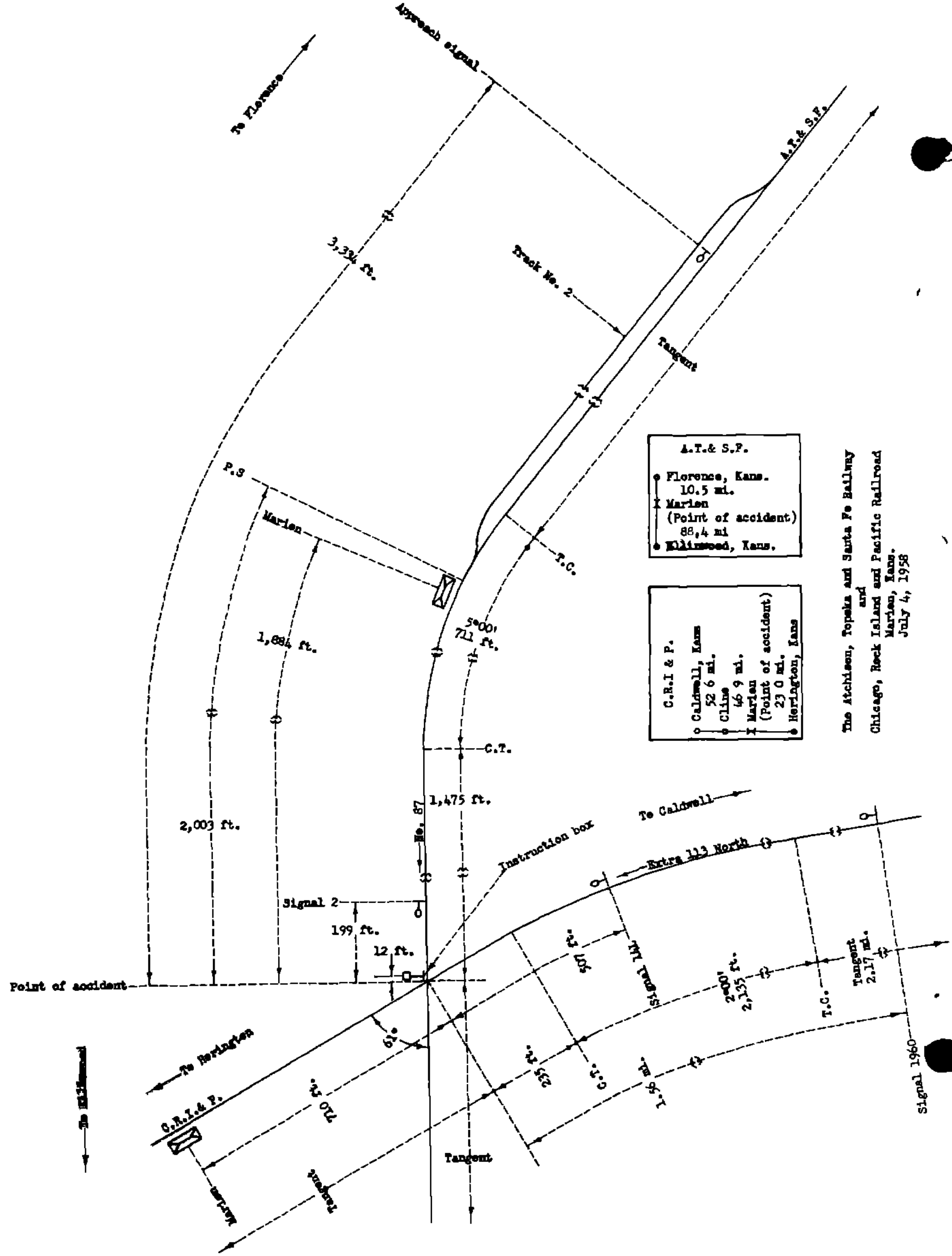
REPORT OF THE COMMISSION[1]

TUGGLE, Commissioner

On July 4, 1958, there was a side collision between a freight train on the Atchison, Topeka and Santa Fe Railway and a freight train on the Chicago, Rock Island and Pacific Railroad at Marion, Kans , which resulted in the injury of three train-service employees

---

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


The Atchison, Topeka and Santa Fe Railway
and
Chicago, Rock Island and Pacific Railroad
Marion, Kans.
July 4, 1958
A.T.& S.F.
Florence, Kans.
10.5 mi.
Marion
(Point of accident)
88.4 mi
Ellinwood, Kans.
C.R.I & P.
Caldwell, Kans
52 6 mi.
Cline
46 9 mi.
Marion
(Point of accident)
23 0 mi.
Herington, Kans
To Florence
Approach signal
A.T.& S.F.
3,334 ft.
Track No. 2
Tangent
P.S
Marion
T.C.
1,884 ft.
5°00'
711 ft.
C.T.
2,003 ft.
1,475 ft.
No. 87
To Caldwell
Instruction box
Extra 113 North
Signal 2
199 ft.
12 ft.
Point of accident
507 ft.
Signal 141
2°00'
2,135 ft.
T.C.
Tangent
2.17 mi.
61°
To Herington
C.R.I.& P.
710 ft.
235 ft.
C.T.
1.56 mi.
Signal 1960
Tangent
Marion
Tangent

Location of Accident and Method of Operation

This accident occurred at the intersection of the Atchison, Topeka and Santa Fe Railway and the Chicago, Rock Island and Pacific Railroad at Marion, Kans The accident occurred on that part of the Middle Division of the A T & S F extending between Florence and Ellinwood, Kans , 98 9 miles, and on that part of the Southern Division of the C R I & P extending between Caldwell and Herington, Kans , 122 5 miles The intersection is 10 8 miles west of Florence and 1,884 feet west of the A T & S F station at Marion, and 99 4 miles north of Caldwell and 710 feet south of the C R I & P station at Marion The lines intersect at an angle of 61° In the vicinity of the point of accident the A T & S F is a single-track line over which trains are operated by timetable and train orders There is no block system in use An auxiliary track, designated as track No 2, parallels the main track on the north The west switch of this track, which is trailing point for westbound movements on the main track, is located 2,003 feet east of the point of accident From the east there are, in succession, a tangent of considerable length, a 5°00′ curve to the left 711 feet, and a tangent 1,475 feet to the point of accident and a considerable distance westward The grade for westbound trains in the vicinity of the point of accident is 0 03 percent ascending In the vicinity of the point of accident the C R I & P is a single-track line over which trains are operated by signal indications From the south there are, in succession, a tangent 2 17 miles in length, a 2°00′ curve to the left 2,135 feet, and a tangent 235 feet to the point of accident and a considerable distance northward The grade is level at the intersection

Movements over the intersection are governed by the signals of an automatic interlocking A single-aspect approach signal and automatic interlocking signal 2, governing westbound movements on the A T & S F , are located, respectively, 3,334 feet and 199 feet east of the intersection Semi-automatic signal 1960 and semi-automatic interlocking signal 14L, governing northbound movements on the C R I & P , are located, respectively, 1 56 miles and 507 feet south of the intersection The single-aspect approach signal is of the one-arm semaphore type The arm is fixed at an angle of 45 degrees in the upper quadrant Signal 2 is of the one-arm semaphore upper-quadrant type Signals 1960 and 14L are of the searchlight type and are continuously lighted The aspects applicable to this investigation, and the corresponding indications and names are as follows

Signal	Aspect	Indication	Name
Single-aspect approach	Diagonal-yellow light	PROCEED PREPARING TO STOP AT NEXT SIGNAL, IF EXCEEDING MEDIUM SPEED, IMMEDIATELY REDUCE TO THAT SPEED	APPROACH
2	Horizontal-red light	STOP	STOP
1960	Green	CLEAR	Proceed
14L	Red-over-red	STOP	Stop

The east end of the approach-clearing circuit of signal 2 is located 3,035 feet east of that signal The south end of the approach-clearing circuit of signal 14L is located 2 58 miles south of that signal Signals 1960 and 14L also form part of a traffic-control system The control machine is located at El Reno, Okla , 108 1 miles south of Caldwell The control dispatcher can cause signal 14L to display a Stop aspect at any time but the display of a Proceed aspect by that signal depends not only on the positioning of the control lever but also on the condition of occupancy of the tracks of the interlocking and of the approach-clearing sections of the interlocking signals The controlling circuits are so arranged that when a westbound A T & S F train enters the approach-clearing section of signal 2, and the tracks of the interlocking and of the approach-clearing sections of the interlocking signals are otherwise unoccupied, signals 2, 1960, and 14L indicate, respectively, Proceed, Proceed-preparing-to-stop-at-next-signal, and Stop If the westbound train does not pass signal 2 within 6 minutes after the train occupies the approach-clearing section, the indication of signal 2 will change to Stop, and 2 minutes later the interlocking will be restored to normal Under those conditions, if the control dispatcher lines the route for a northbound C R I & P train over the interlocking, signal 1960 will indicate Proceed, and signal 14L will indicate Proceed after the train occupies the approach-clearing section of that signal, provided the blocks of signal 14L and the signal in advance are unoccupied Signal 2 is provided with a reclearing circuit which extends 97 feet east of the signal If the front end of the westbound train occupies the reclearing section after signal 2 has changed to indicate Stop because of the expiration of the 6-minute interval, the indication of signal 2 will change to indicate Proceed provided the tracks of the interlocking and of the approach-clearing sections of the interlocking signals are otherwise unoccupied However, if the control dispatcher positions the control lever for signal 14L to clear and the approach-clearing section of signal 14L becomes occupied before the reclearing section of signal 2 is occupied, signal 1960 and 14L will indicate Proceed and signal 2 will continue to indicate Stop after the reclearing section of signal 2 is occupied If the westbound train then passes signal 2 immediately after the northbound train enters the approach-clearing section of signal 14L, signal 1960 will indicate Proceed-preparing-to-stop-at-next-signal and signal 14L will indicate Stop

The control machine at El Reno is equipped with an automatic traingraph for the recording of train movements A pen is provided which operates to record the time when signal 2 indicates Proceed or to record the time when the block of signal 2 is occupied by a westbound train Another pen is provided which operates to record the time when the block of signal 14L is occupied by a northbound train

A key circuit controller mounted on signal 2 is provided to clear that signal in order to make a reverse movement over the interlocking after a forward movement An instruction box mounted on a mast north of the A T & S F main track and 12 feet east of the intersection contains special instructions for the movement of a train over the interlocking when signal 2 fails to clear, and for making a reverse movement over the interlocking after making a forward movement

These special instructions read in part as follows

> WHEN TRAINS OR ENGINES FIND HOME SIGNAL GOVERNING MOVEMENT OVER CROSSING DISPLAYING STOP INDICATION, AFTER STOPPING SHORT OF SIGNAL ON CLEARING SECTION AND A MEMBER OF CREW HAS PRECEDED TRAIN TO CROSSING, AND THERE IS NO TRAIN OR ENGINE MOVEMENT ON OPPOSING ROUTE, AT THE EXPIRATION OF FIVE MINUTES FROM THE TIME STOP IS MADE THERE IS STILL NO EVIDENCE OF TRAIN OR ENGINE MOVEMENT ON OPPOSING ROUTE, THE TRAIN OR ENGINE MAY BE HAND SIGNALLED OVER THE CROSSING

Operating rules of the A T & S F read in part as follows

606 Hand signals must not be given which conflict with interlocking signals, except

* * *

(c) At automatic interlocking, the governing signal ordinarily clears if conflicting routes are unoccupied When signal indicates "stop", a member of crew must precede move to crossing and follow instructions outlined in control box

If signal cannot be cleared after expiration of time stated in such instructions, may proceed protecting against conflicting movements

The maximum authorized speed within the interlocking limits for A T & S F freight trains and C R I & P freight trains are 15 miles per hour and 40 miles per hour, respectively

Description of Accident

No 87, a westbound A T & S F second-class freight train, consisted of road-switcher type diesel-electric unit 2832, 57 cars, and a caboose The control compartment of the diesel-electric unit was at the west end This train departed from Florence, the last open office, at 12 25 p m , 6 hours 25 minutes late, and stopped at Marion about 1 00 p m Two cars were set off on track No 2 About 1 50 p m this train proceeded westward and stopped at signal 2 which indicated Stop Shortly after and while signal 2 indicated Stop, the train proceeded westward and stopped with the front end of the locomotive about 10 feet west of the signal Immediately after, the train entered the intersection and while moving at an estimated speed of 3 miles per hour the second and third cars were struck by C R I & P Extra 113 North

Extra 113 North, a northbound C R I & P freight train departed from Caldwell at 9 50 a m and passed Cline, the last open office, 52 6 miles north of Caldwell, at 11 52 a m Switching operations were performed en route As the train was approaching Marion it consisted of road type diesel-electric units 113A, 70B, and 120B, coupled in multiple-unit control, 86 cars, and a caboose. It passed signal 1960, which indicated Proceed, passed signal 14L, which indicated Stop, and while moving at an undetermined speed it struck No 87

The locomotive of No 87 stopped with the front end approximately 165 feet west of the point of accident The second to the fourth cars, inclusive, were derailed and stopped in various positions north of the point of accident The locomotive of Extra 113 North stopped with the front end 1,120 feet north of the point of accident The locomotive, and the first to the seventh cars, inclusive, were derailed and stopped approximately in line on the track structure The derailed cars of No 87 were heavily damaged The diesel-electric units of Extra 113 North and five cars were somewhat damaged Four other cars were heavily damaged

The engineer, the fireman, and the front brakeman of Extra 113 North were injured

The weather was clear at the time of the accident, which occurred about 2 05 p m

Discussion

No 87 entered the approach-clearing section of signal 2 at 12 58 p m , as indicated by the traingraph, and stopped in the vicinity of the station at Marion about 1 00 p m The first and second

cars of the train were set off on track No 2 and, after the locomotive returned to the main track about 1 10 p m , the members of the crew went to lunch The trainigraph indicated that the indication of signal 2 changed from Proceed to Stop and that the interlocking was restored to normal at 1 06 p m When the members of the crew returned from lunch the locomotive was coupled to the train and the front brakeman proceeded to the intersection He said that as he approached signal 2 he observed that it indicated Stop and that he then unsuccessfully attempted to clear the signal by operating the key controller The enginemen and the flagman were in the control compartment of the diesel-electric unit, and the conductor was in the caboose The fireman, a qualified engineer, was operating the locomotive under the supervision of the engineer The members of the crew said that the train stopped on the reclearing section of signal 2 at 1 55 p m The fireman said that the front end of the locomotive was approximately 5 feet east of the signal when the train stopped The signal continued to indicate Stop Both the front brakeman and the flagman then proceeded to the instruction box and read the instructions pertaining to the movement of a train over the intersection when the governing interlocking signal indicates Stop The flagman said that after the expiration of a 5-minute period he returned to the locomotive to obtain fusees to protect the movement of the train over the intersection The fireman said that shortly after, about 2 01 p m , the train was moved westward and stopped with the front end of the locomotive approximately 10 feet west of signal 2 in order to shunt the track circuit of that signal The front brakeman said that he proceeded northward on the main track of the C R I & P and placed a lighted fusee on the track at a point approximately 150 feet north of the intersection The flagman said that he proceeded southward on the main track of the C R I & P and, after observing that there was no indication of a train approaching, he placed a lighted fusee on the track at a point approximately 150 feet south of the intersection He then gave a proceed signal to the enginemen of No 87 The members of the crew said that the train proceeded westward at 2 02 p m The flagman boarded the locomotive when it passed the intersection, and the front brakeman was about to board the locomotive when the collision occurred The first the members of the crew became aware of anything being wrong was when the collision occurred The enginemen and the conductor said that the collision occurred at 2 05 p m The conductor estimated that the speed of the train was about 3 miles per hour at that time

As Extra 113 North was approaching the point where the accident occurred the enginemen and the front brakeman were in their proper locations in the control compartment of the first 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 The headlight was lighted The members of the crew in the control compartment said that signal 1960 indicated Proceed and that they called the indication The flagman said he observed that signal 1960 indicated Proceed as the train was approaching the signal Both the conductor and the flagman said that the flagman called the indication The conductor said that he was unable to observe the signal from his location in the caboose The conductor and the flagman estimated that the speed of the train was between 45 miles per hour and 50 miles per hour at that time The engineer said that he initiated a light service-brake application to reduce the speed of the train in compliance with a speed-restriction sign located 2,738 feet south of the point of accident, and that after the brakes were released the speed of the train was 40 miles per hour as indicated by the speed-indicating device The members of the crew in the control compartment said that they observed signal 14L when it was about 1,700 feet distant as the train was moving on the curve south of the point of accident They said that it indicated Stop and that the engineer immediately initiated an emergency application of the brakes The fireman and the front brakeman said that the speed of the train was not materially reduced before the collision occurred They said that they did not observe a lighted fusee as the train was approaching the intersection The members of the crew in the control compartment alighted immediately before the collision occurred

A terminal box of the signal system located in the northwest angle of the intersection and the tracks in the vicinity of the intersection were damaged as a result of the accident The signals involved in the accident were tested on the day following the day of the accident after repairs were made to the terminal box and the tracks, and no defects were found which would cause the signal system to function other than as intended

Examination of the traingraph of the control machine disclosed that No 87 passed signal 2 about 2 04 p m and that Extra 113 North passed signal 14L about 2 05 p m

It is evident that Extra 113 North entered the approach-clearing section of signal 14L before No 87 entered the reclearing section of signal 2 since signal 1960 indicated Proceed when Extra 113 North passed it and signal 2 continued to indicate Stop when No 87 entered the reclearing section of that signal Based on an average speed of 40 miles per hour, Extra 113 North would proceed throughout the distance from the south end of the approach-clearing section of signal 14L to the point of accident, 2 68 miles, in 4 02 minutes It appears, therefore, that No 87 did not occupy the reclearing section of signal 2 for 5 minutes before passing that signal while it indicated Stop, as required by the rules

Cause

This accident was caused by failure to operate the Atchison, Topeka and Santa Fe train in accordance with rules governing movements over an automatic interlocking

Dated at Washington, D C , this
day of October, 1958

By the Commission, Commissioner Tuggle

Secretary