

INTERSTATE COMMERCE COMMISSION

WASHINGTON

REPORT OF THE DIRECTOR

BUREAU OF SAFETY

ACCIDENT ON THE

ATCHISON, TOPEKA & SANTA FE RAILWAY

BARSTOW, CALIF.

JUNE 29, 1937

INVESTIGATION NO. 2183

SUMMARY

Inv-2183

Railroad:	Atchison, Topeka & Santa Fe
Date:	June 29, 1937
Location:	Barstow, Calif.
Kind of accident:	Derailment
Train involved:	Passenger
Train number:	Second 19
Engine number:	3521
Speed:	30-45 m.p.h.
Track:	2 No. 10 turnouts
Weather:	Clear
Time:	11:03 a.m.
Casualties:	1 injured
Cause:	Excessive speed through short turnout.

Inv-2183

August 19, 1937.

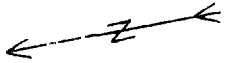
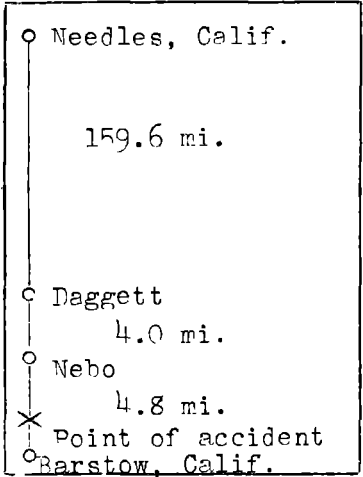
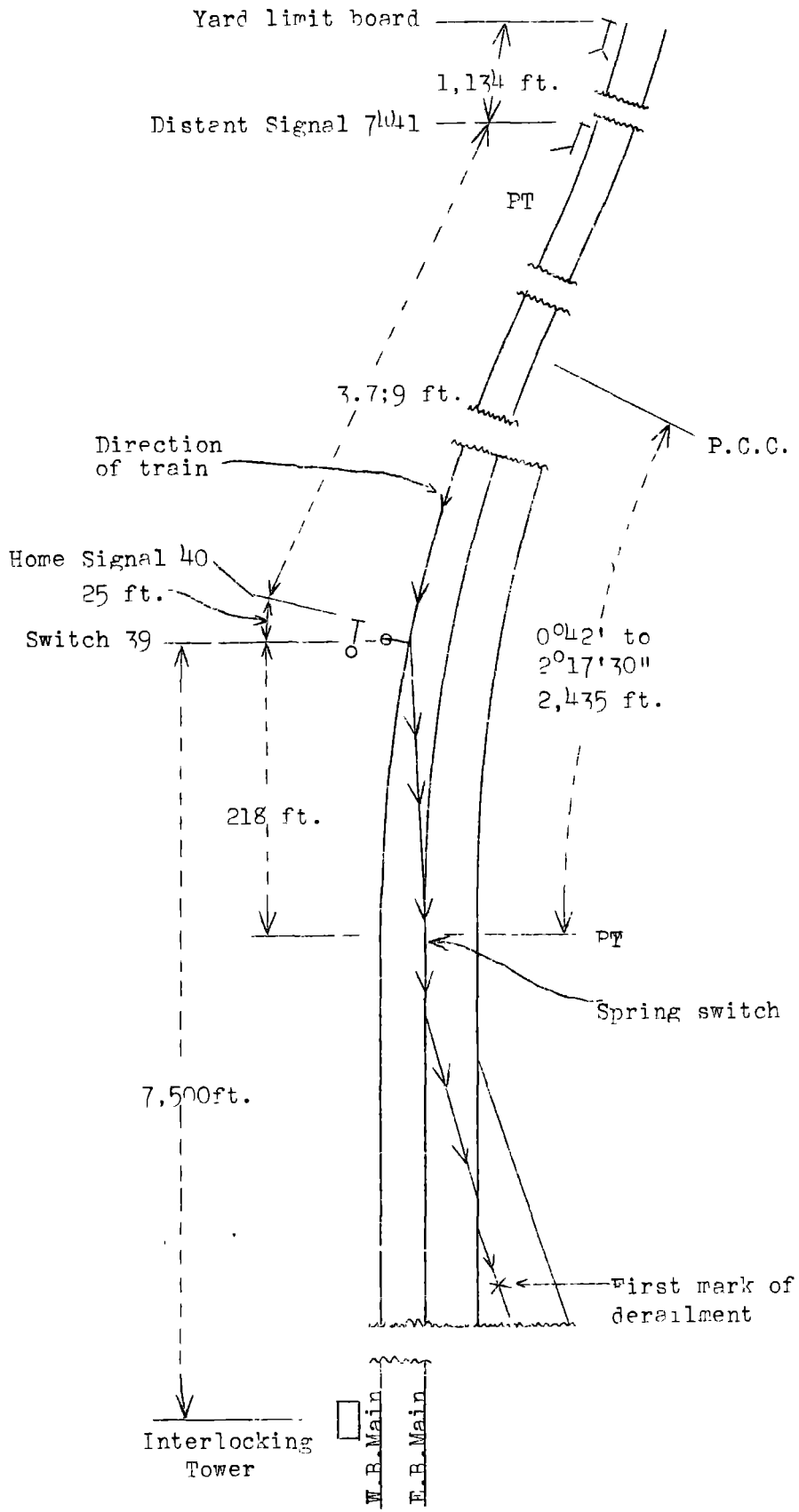
To the Commission:

On June 29, 1937, there was a derailment of a passenger train on the Atchison, Topeka & Santa Fe Railway at Barstow, Calif., which resulted in the injury of one employee. This accident was investigated in conjunction with the Railroad Commission of California.

Location and method of operation

This accident occurred on the Second District of the Arizona Division, extending between Needles and Barstow, Calif., a distance of 168.4 miles; in the vicinity of the point of accident this is a double-track line over which trains are operated by timetable, train orders and an automatic block-signal system.

At Barstow the freight yard is located to the south of the main tracks; the switches which afford connection between east end of the yard and the main tracks are interlocked and are operated from a tower located north of the main tracks about 7,500 feet west of Signal 40, the westward home signal. The switches consist of a #10 turnout crossover from the westward to the eastward main tracks, and a facing-point switch leading westward from the eastward main track, through a No. 10 turnout, to the yard lead which parallels the main track. The facing-point switch of the cross-over between the main tracks, designated Switch 39, is at its east end, and the switch at the west end is of the spring type. Home signal 40, located 25 feet east of switch 39, is a semi-automatic interlocked signal of the color-light type having two indications, yellow for "restricted speed" and red for "stop". The stop indication is displayed when the controlling lever in the tower is in normal (stop) position; or, when there is track occupancy west of the signal; or, when the spring switch at the west end of the cross-over is not in normal position. The "restricted speed" indication is displayed when the controlling lever is in "restricted speed" position regardless of the routing for which switch 39 is set, provided the spring switch at the west end of the cross-over is in normal position; with switch 39 lined for a movement into the yard a yellow target and a yellow light are displayed at the switch, and with switch 39 lined for a main line movement a green light is displayed at the switch.



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Automatic signals 7441 and 7431, located respectively 3,719 and 9,150 feet east of signal 40, are of the 3-position, upper-quadrant, semaphore type, displaying green for proceed, yellow for restricted speed, and red for stop. When signal 40 is in "restricted speed" position, approach locking prevents changing the position of switch 39 after a westward train has passed signal 7431 unless a 2 minute time release is operated. After a train has passed signal 40, detector locking prevents the changing of the position of switch 39 until the train has passed through the plant, and even then switch 39 cannot be moved unless the spring switch at the west end of the crossover has returned to normal position. Indication locking prevents the return to normal position of the lever controlling the indication of signal 40 unless the signal indication actually changes to stop and the red light is lit. Unless the controlling lever of signal 40 is in normal position, (stop), switch 39 cannot be moved. The target on switch 39 is an 18 inch disk located 42 inches above the head block, and the switch light is mounted above the target. A microphone track circuit, extending 14,000 feet east of signal 40, informs the tower-man of the approach of west-bound trains. Under the above signal arrangement trains en route to the passenger station receive a "proceed" indication at signal 7441, a "restricted speed" indication at signal 40, and a green light indication at switch 39. Trains en route to the freight yard receive a "restricted speed" indication at signal 7441, a "restricted speed" indication at signal 40 and a yellow target and yellow light indication at switch 39.

Due to curvature, and to the fact that in this vicinity the track is laid in a deep cut, the view of signal 7441 is restricted to 1,540 feet for an engineman on a west-bound train, and to 300 feet for the fireman; also, the view of signal 40 and switch 39 is restricted to 1,003 feet for the fireman of a west-bound train, and to 453 feet for the engineman.

The maximum authorized speed for passenger trains approaching Barstow is 50 miles per hour.

The first marks of derailment appeared on yard track No. 10 at a point 471 feet west of switch 39. Approaching this point from the east there is a compound curve to the left 2,435 feet long, which ranges in curvature from $0^{\circ}42'$ to $2^{\circ}17'30''$, upon which switch 39 is located at a point 218 feet from its western end; then two No. 10 turnouts, each 90 feet long, extending from the westward main track to the yard lead and track 10.

The weather was clear at the time of the accident which occurred about 11:03 a.m.

Description

Extra 3940 West, (Symbol 1/33-X), consisted of 69 freight cars and a caboose, hauled by engines 3940 and 3910, and was in charge of Conductor Carr and Enginemen Poole and Frazier. This train passed Daggett, 8.8 miles east of Barstow and the last open office, at 10.37 a.m., according to the train sheet, passed distant signal 7441 and home signal 40, then headed through the crossover at switch 39, yellow indications being properly displayed by both signals and the switch target, thence onto the eastward main track and into Barstow freight yard, no stop having been required or made while making the cross-over movement.

Westbound Train Second No. 19, consisted of one baggage car, one standard Pullman car, one Pullman tourist car and one chair car, in the order named, all of all-steel construction except the baggage car, which had a steel-underframe and wooden superstructure, hauled by engine 3521, and was in charge of Conductor Hettig and Engineman Devlin. This train passed Daggett, 8.8 miles east of Barstow, at 10:53 a.m., 2½ hours late, and 16 minutes behind the preceding freight train, according to the train sheet, passed signals 7441 and 40, the indications of which are in dispute, and headed through the crossover at switch 39, which was displaying a yellow target and a yellow light, to the eastward main track, and thence into track 10 in the freight yard, where it was derailed while traveling at a speed estimated to have been from 30 to 45 miles per hour.

Engine 3521 stopped on its right side on yard track 11, with its forward end 881 feet west of switch 39; the tender was also on its side, south of and opposite the engine, across yard tracks 9 and 10. All four cars were derailed, but remained practically upright across yard tracks 9 and 10. The employee injured was the engineman.

Summary of evidence

Engineman Devlin, of Train Second No. 19, stated that before leaving Needles the air brakes were tested and he had no trouble controlling the speed of the train en route. Approaching Barstow he found signal 7441 displaying a clear indication and when he called the indication to the fireman and also indicated its vertical position with his arm, the fireman acknowledged his signal. At that time the speed of his train was about 65 miles per hour; about 10 or 12 car

lengths east of signal 7441 he made a brake application which had reduced the speed to about 35 miles per hour when the fireman, who because of the curve, was first to see signal 40 and switch 39, called an indication which Engineman Devlin understood to be "clear switch, yellow block", the indication for a through movement on the westward main track. He then released the brakes and this action apparently caused the fireman to realize that the information regarding the signal indication had been misunderstood for he immediately called out that the switch was yellow. Engineman Devlin then placed the brake valve in emergency position, closed the throttle and opened the sanders, but there was not sufficient distance in which to stop before the derailment occurred. Engineman Devlin was positive that signal 7441 was displaying a green indication, and signal 40 a yellow indication when he passed them. Between Daggett and Barstow there was ample distance between his train and the preceding one and clear signal indications were received. The weather was clear and visibility was good; he placed the time of the accident at about 11:03 a.m. Engineman Devlin said that he passed a satisfactory examination on eyesight about January 12, 1937.

Fireman Treanor, of Train Second No. 19, corroborated the statement of Engineman Devlin regarding air brake tests made at Needles, and the operation of the train brakes en route; he stated further that he was unable to see the indication displayed by signal 7441 from his side of the cab but the engineman called a clear signal. The speed was about 55 to 65 miles per hour and an air brake application was made soon after passing the distant signal. As soon as signal 40 and switch 39 came into view across the inside of the curve he noted the indication and called "yellow block and yellow switch". The engineman nodded his head to show that he had received the signal, but when he did not reach for the brake valve immediately the fireman repeated the call, the second call following the first after about two seconds. The engineman responded by immediately applying the brakes in emergency; at that time they were about 100 feet from switch 39, and the speed of the train was between 30 and 35 miles per hour. Fireman Treanor was positive that the indication of signal 40 was yellow and stated that the engineman appeared to be normal in every respect and was awake approaching Barstow. He did not think it possible to mistake a red indication for a yellow indication.

Conductor Hettig compared time and conversed with Engineman Devlin prior to departure from Needles and found

him apparently normal. The speed was about 60 to 65 miles per hour after leaving Daggett, but approaching Barstow an air brake application was made which reduced the speed to about 30 to 35 miles per hour. After the brakes were released, the train traveled less than a train length, when the brakes were again applied, this time in emergency.

Head Brakeman Claypool, of Train Second No. 19, stated that approaching the distant signal at Barstow he had the door open in the head vestibule of the fourth car and made an attempt to observe the indication of that signal but was unable to do so because of the dust in the air.

Flagman Mildren, of Train Second No. 19, stated that when his train passed the distant signal at Barstow he was on the rear platform but could not determine the position of the signal because of dust. Immediately after the accident he went back to flag and at that time switch 39 was lined to cross-over and signal 40 was displaying a red indication; he did not notice the indication displayed by signal 7441.

Operator-Towerman Springer, at Barstow tower, stated that while the freight train which preceded Second No. 19 was moving through the crossover into the yard he operated the lever to place signal 40 in stop position and he did not again clear that signal. After the freight train had cleared the plant he was unable to operate crossover switch 39 and while he was awaiting the arrival of repairmen he was notified that Second No. 19 had been derailed. He stated that it was impossible for the distant signal to show a green indication or the home signal a yellow indication while the circuit controlling the operation of the crossover switches was dead.

Signal Maintainer Dockery stated that when Operator-Towerman Springer told him of the trouble in the plant he checked the levers and in addition to noting the location of the trouble, he noted that the lever for signal 40 was in stop position. He and Supervisor Green, then took a track motor car and started for the crossover involved but while they were en route the derailment occurred. On arrival at the point of accident the injured engineman was placed on the track motor car and Dockery took him back to Barstow, after which he returned to the crossover where Supervisor Green pointed out to him that the points of the spring crossover switch were being held open by sand which had

either been deposited by engines or blown in by the wind. After this sand was cleaned out the plant operated normally. Before the sand was removed from the switch points he noted that home signal 40 was displaying a stop indication.

The statement of Signal Supervisor Green corroborated that of Signal Maintainer Dockery. He stated, too, that before making an inspection of the plant he noted that signal 40 was displaying a stop indication. He stated that in case of failure the signals are designed to display their most restrictive indications, and that he has never received a report of a false clear indication at this plant. He also stated that in order to change the route after a west-bound train has entered the approach circuit it is necessary first to operate a two minute time release.

Signal Engineer Winans stated that on the day after the accident, accompanied by General Signal Supervisor Stoliker, Signal Supervisor Green and Signal Maintainer Dockery, he conducted tests on all relays, slots, lever locks, circuit controllers and other circuits that could possibly have any connection with the accident. Everything was found to be in proper working order in all respects, and a complete test made of all circuits for grounds showed them to be clear. He stated that the fact that the lever operating the home signal was placed in normal position by the towerman is proof that the signal light was burning red. The spring switch is fitted with a controller which shorts the track circuit and is the equivalent of track occupancy in that circuit, and with that condition signal 40 can display only red, and signal 7441 yellow. He expressed the opinion that it would be impossible to mistake a red signal indication for a yellow one.

General Signal Supervisor Stoliker stated that in making the test described by Signal Engineer Winans, it was found impossible to get a false clear indication of either signal 7441 or signal 40 with a condition similar to that which existed at the time of the derailment. He also expressed the opinion that it would be impossible to mistake a red indication for a yellow one.

Discussion

The investigation disclosed that after the passage of a freight train into the yard the towerman attempted to line switch 39 for a movement on the main track which would permit Train Second No. 19 to proceed to the passenger station at Barstow; however, he was unable to do so because of the fact that sand had accumulated between the switch points of the west switch of the crossover and the main track rail. The

effect of this condition upon the control circuits is equivalent to track occupancy west of signal 40 and that signal should have shown a "stop" indication and signal 7441 a "restricted speed" indication. However, Engineman Devlin of Train Second No. 19 stated that signal 7441 was displaying a "proceed" indication when he passed it; this statement is not corroborated except by the statement of Fireman Treanor that while he himself could not see the indication of the signal because of track curvature, the engineman called a clear signal at that location. Fireman Treanor stated that the indications of both signal 40 and switch 39 were yellow as his train approached them and this statement was corroborated by Engineman Devlin. The arrangement of the circuits in this plant is such that these statements cannot be reconciled with the "restricted speed" and "stop" indications which should have been displayed unless the towerman changed the route during the time Train Second No. 19 was between signals 7441 and 40. Since the distance between these two signals is 3,719.5 feet and the speed ranged between 30 and 60 miles per hour, and the time release requires a minimum of two minutes to unlock the route, it appears that it would have been impossible for him to do so and there is no evidence that he made any effort to do so. The lever controlling signal 40 cannot be placed in stop position unless a stop indication is actually being displayed, and there is evidence that this lever was returned to stop position before the arrival of Train Second No. 19, and that signal 40 was displaying a "stop" indication immediately after the derailment; in tests subsequent to the derailment it was impossible to establish any condition which would result in the display of a "proceed" indication of signal 7441, a "restricted speed" indication of signal 40, and a "yellow" indication of switch 39. The most favorable indication that can be given by signal 40 is "Restricted Speed", which is defined in the book of rules as "Proceed prepared to stop short of train, obstruction, or anything that may require the speed of a train to be reduced". Regardless of what indication was displayed by signal 7441, "restricted speed" was the most favorable indication displayed by signal 40 and this was the indication which both the engineman and the fireman stated was displayed by that signal, although all other evidence indicates that this signal displayed a stop indication. Had the speed of this train been reduced as required by a "restricted speed" signal indication at this point this accident would not have occurred.

Conclusions

This accident was caused by failure to control the speed of a train as required by signal indications, resulting in the train entering a short turnout at excessive speed, the route not having been properly lined for a main-track movement due to obstruction of a spring switch.

Respectfully submitted,

W. J. PATTERSON,

Director.