INTERSTATE COMMERCE COMMISSION

WASHINGTON

REPORT NO. 3530

SOUTHERN PACIFIC COMPANY

IN RE ACCIDENT

AT CHILOQUIN, OREG., ON

JULY 25, 1953

SUMMARY

Date:	July 25, 1953
Railroad:	Southern Pacific
Location:	Chiloquin, Oreg.
Kind of accident:	Derailment
Train involved:	Passenger equipment
Train number:	Second 20
Engine number:	4462
Consist:	20 cars
Speed:	50 m. p. h.
Operation:	Timetable, train orders, and automatic block-signal
Track:	Single; tangent; 0.25 percent ascending grade eastward
Weather:	Clear
Time:	12:55 p. m.
Casualties:	1 killed; 1 injured
Cause:	Movement of train over dual-control switch, the points of which were unlocked and not in proper position

INTERSTATE COMMERCE COMMISSION

REPORT NO. 3530

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

SOUTHERN PACIFIC COMPANY

September 3, 1953

Accident at Chiloquin, Oreg., on July 25, 1953, caused by the movement of a train over a dual-control switch, the points of which were unlocked and not in proper position.

REPORT OF THE COMMISSION[1]

CLARKE, Commissioner:

On July 25, 1953, there was a derailment of a passenger-equipment train on the line of the Southern Pacific Company at Chiloquin, Oreg., which resulted in the death of one train-service employee, and the injury of one train-service employee. This accident was investigated in conjunction with a representative of the Public Utilities Commissioner of Oregon.

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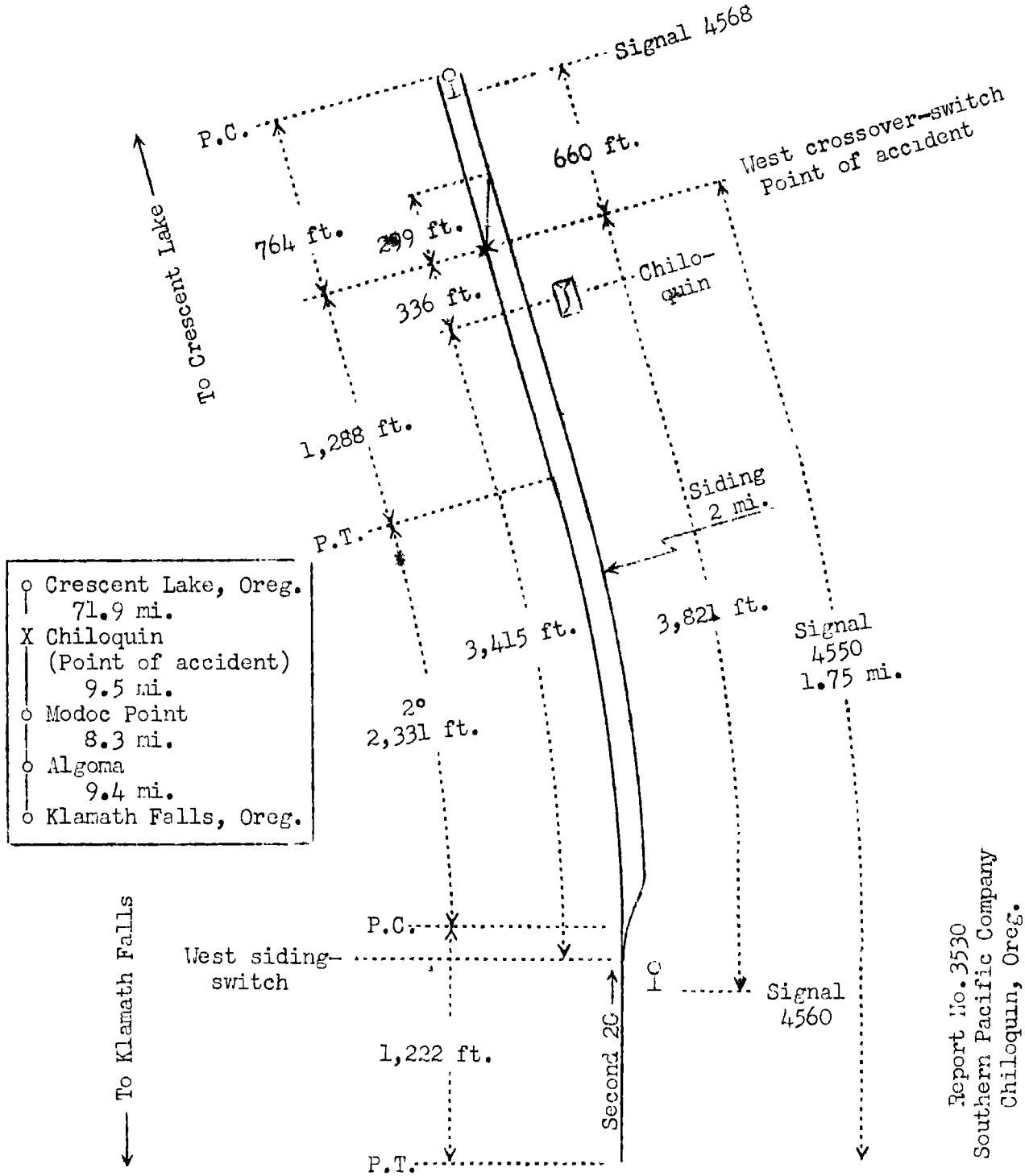
[1] Under authority of section 17 (2) of the Interstate Commerce Act the above-entitled proceeding was referred by the Commission to Commissioner Clarke for consideration and disposition.



Report No. 3530
Southern Pacific Company
Chiloquin, Oreg.
July 25, 1953

Location of Accident and Method of Operation

This accident occurred on that part of the Shasta Division extending between Klamath Falls and Crescent Lake, Oreg., 99.1 miles. This is a single-track line. At the time of the accident trains were operated by signal indications between Klamath Falls and Modoc Point, 17.7 miles east of Klamath Falls, and by timetable, train orders, and an automatic block-signal system between Modoc Point and Crescent Lake. At Chiloquin, 27.2 miles east of Klamath Falls, a siding 2 miles in length parallels the main track on the south. The west siding-switch is 3,415 feet west of the station. East of the station a crossover 299 feet in length connects the main track and the siding. The west crossover-switch, which is facing-point for east-bound movements on the main track, is 336 feet east of the station. The accident occurred on the main track at the west crossover-switch. From the west there are, in succession, a tangent 1,222 feet in length, a 2° curve to the left 2,331 feet, and a tangent 1,288 feet to the point of accident and 764 feet eastward. The grade is 0.25 percent ascending eastward at the point of accident.

In the vicinity of the point of accident the structure of the main track consists of 132-pound rail, 39 feet in length, laid new in May and June, 1953, on an average of 24 ties to the rail length. It is fully tieplated with double-shoulder tieplates, single-spiked, and is provided with four-hole joint bars and an average of 12 rail anchors per rail. It is ballasted with cinders to a depth of 8 inches below the bottoms of the ties. The turnout at the west end of the crossover is constructed with 24-foot reinforced switch rails, 132-pound rails, adjustable rail braces, and a No. 14 railbound manganese steel frog. The switch points are secured by a front rod and five switch rods. The switch is operated by a dual-control switch machine.

At the time the accident occurred the traffic-control system in service between Klamath Falls and Modoc Point was being extended eastward. Dual-control switch machines had been installed at each crossover switch at Chiloquin. The wiring for power operation of the switches had not been completed, and the switches were in service for manual operation only. Each switch machine is equipped with a selector lever and a hand-throw lever. With the selector lever in motor position the switch is operated electrically. With this lever in hand position the switch can be operated manually by use of the hand-throw lever. At the time of the accident a switch stand from which the hand-throw lever had been removed was located opposite the west crossover-switch and 9

feet 9 inches north of the center-line of the track. This switch stand was used only to indicate the position of the switch. When the switch was lined for entry to the crossover a circular red banner 18 inches in diameter was displayed at right angles to the track. When the switch was in normal position the banner was parallel to the track. The center of the banner was 5 feet 3 inches above the level of the tops of the ties.

At the time of the accident automatic signals 4550, 4560, and 4568, governing east-bound movements on the main track, were located, respectively, 1.75 miles west, 3,821 feet west, and 660 feet east of the point of accident. These signals were of the three-indication searchlight type and were approach-lighted. The aspects of these signals and the corresponding indications were as follows:

Aspect	Indication
Green	PROCEED
Yellow	PROCEED NOT EXCEEDING MEDIUM SPEED, PREPARED TO STOP SHORT OF NEXT HOME SIGNAL
Red	STOP

The controlling circuits were so arranged that when either switch of the crossover at Chiloquin was not in normal position, signal 4550 indicated Approach and signal 4560 indicated Stop. The approach-lighting circuit of signal 4568 was so arranged that the signal was lighted when the route was lined for an east-bound movement from Modoc Point to Chiloquin, when the track was occupied between Modoc Point and Chiloquin, or when either switch of the crossover at Chiloquin was not in normal position. While construction work was in progress switch-circuit controllers were connected to the switch points of each crossover switch. These controllers were adjusted to shunt the track circuit if the switch points were moved 1/4 inch from normal position. Except for these controllers, the operation of the automatic block-signal system was not affected by the operation of the switch machines.

This carrier's rules for the maintenance-of-way and structures read in part as follows:

1692. Main track switches, not interlocked, must be kept locked in normal position at all times except when in actual use, or when being inspected. * * *

2102. The normal functioning of any device shall not be interfered with in testing or otherwise without first taking measures for insuring safety of train operation which depends on normal functioning of such device.

The maximum authorized speed for the train involved was 70 miles per hour, but it was restricted to 50 miles per hour in the vicinity of the point of accident.

Description of Accident

Second 20, an east-bound first-class passenger-equipment train, consisted of engine 4462 and 20 sleeping cars. All cars were of all-steel construction. This train passed Algoma, 17.8 miles west of Chiloquin and the last open office, at 12:36 p. m., 2 hours late, passed signals 4450 and 4460, each of which indiccated Proceed, and while moving at a speed of 50 miles per hour the engine and tender and the first six cars were derailed at the west crossover-switch at Chiloquin.

Separations occurred between the tender and the first car and between the first and second cars. The engine and tender stopped on their right sides, between the main track and the siding and parallel to them, with the front end of the engine 609 feet east of the crossover switch. None of the cars overturned. The first car stopped with the front end against the rear end of the tender and the rear end 22-1/2 feet north of the center-line of the main track. The second car stopped with the front end against the rear end of the first car and the rear end between the main track and the siding. The other derailed cars stopped approximately in line with the main track. The engine and tender and the first five cars were considerably damaged, and the sixth car was slightly damaged.

The engineer was killed, and the fireman was injured.

The weather was clear at the time of the accident, which occurred at 12:55 p. m.

Engine 4462 is of the 4-8-4 type. The total weight in working order is 468,400 pounds, distributed as follows: engine truck, 79,500 pounds; driving wheels, 270,300 pounds; and trailing truck, 118,600 pounds. The specified diameters of the engine-truck wheels, the driving wheels, and the trailing-truck wheels are, respectively, 36 inches, 73 inches, and 45 inches. The driving wheelbase is 20 feet long, and the total wheelbase is 45 feet 10 inches long. The total length of the engine and tender, coupled, is 108 feet 4-1/4 inches. The tender is rectangular in shape and is provided with two six-wheel trucks. Its capacity is 23,300 gallons of water and 6,275 gallons of oil. Its weight when fully loaded is 399,100 pounds.

Discussion

As Second 20 was approaching the point where the accident occurred the speed was 50 miles per hour, as indicated by the tape of the speed recording device. The enginemen were maintaining a lookout ahead from their positions in the cab of the engine. The members of the train crew were in the cars of the train. The fireman said that signal 4560 indicated Proceed and that he and the engineer called the indication. This signal is located a short distance west of a curve to the right, and the conductor, who was in the ninth car, also observed that the signal indicated Proceed. The fireman said that he did not observe any irregularity in the position of the switch target at the west crossover-switch. He was not aware that anything was wrong until the front end of the engine lurched to the right and the engine became derailed.

When Second 20 stopped, the seventh car was standing with the front end 21 feet east of the switch points of the west crossover-switch. The left wheels of the front truck were on the stock rail of the main track, and the right wheels were on the stock rail of the crossover. The switch points were in approximately mid-position between the stock rails. Examination of the track structure throughout a considerable distance immediately west of the switch disclosed no indication of dragging equipment or defective condition of the track. Examination of the engine and the cars disclosed no condition which could have caused or contributed to the cause of the derailment.

Examination of the switch after the accident occurred disclosed that the selector lever was in motor position and the hand-throw lever was in normal position. The switch lock, which was not locked, was hooked through the keeper. The switch target was at an angle of approximately 45 degrees to the track. The lock rod was out of engagement with the locking bar. These parts were undamaged. Neither the switch rods nor the mechanism of the switch machine bore indications that the switch points had been forced in either direction while the mechanism was locked in either normal or reverse position. The front rod and the No. 1 switch rod were undamaged. The centers of switch rods Nos. 2 to 5, inclusive, were bent downward as a result of pressure from the outside of the switch rails. The degree of bend increased progressively from rod No. 2 to rod No. 5.

From the marks on the track structure and the fact that the front of the engine lurched to the right as it became derailed, it appears that when the front end of the engine passed the switch the south switch point was open sufficiently to permit the flanges of the right wheels to pass between the switch point and the stock rail. There were no flange or wheel marks on either switch point, but both switch rails bore marks indicating that flanges had passed between each switch rail and the adjacent stock rail. Marks on the rails and track fastenings indicated that a wheel had dropped between the south switch rail and the stock rail at a point approximately 15 feet east of the switch point and that a second wheel had dropped inside the north rail at a point approximately 15 feet farther east. The bolts in the joint at the heel of the south switch rail and the next joint to the east were sheared. Derailed equipment had moved to the south and displaced the north rail of the siding at the east crossover-switch. The left guard rail, the north rail of the crossover between the frog and the east crossover-switch, and the south rail of the main track between the frog and the point at which the first car stopped were torn out.

On the day of the accident a signal inspector and two signal foremen were engaged in testing the wiring and equipment which had been installed at Chiloquin in connection with the extension of the traffic-control system. While the tests were being made the positive side of the switch machine motor circuit was disconnected from the normal energy supply at the WR switch control relay in the instrument case at the west crossover-switch. At no time during the tests was this portion of the motor circuit completed. During the forenoon various tests were made with the selector lever of the switch machine in hand

position. The switch was operated several times by use of the hand-throw lever. Other tests were made with the selector lever in motor position. During one of the latter tests the inspector, who was at an instrument house 286 feet east of the switch, connected a battery wire to its terminal on a 16-volt battery in series with his ammeter. He noted that there was a current flow of eight amperes, although with the normal energy supply disconnected from the switch control relay there should have been no current flow through the meter. After obtaining the meter reading, the inspector disconnected the battery. A short time later the selector lever was locked in hand position and these employees took their lunch period. One westbound train passed Chiloquin while they were at lunch. After they returned, at 12:30 p. m., one of the signal foreman placed the selector lever in motor position so that they could make further tests to ascertain the cause of the current flow which the inspector had observed before lunch. While the foreman was at the switch he observed that signal 4568 was lighted. This indicated the approach of an eastbound train. After ascertaining from the operator that Second 20 should pass Chiloquin about 12:55 p. m., he returned and gave this information to the inspector. The inspector decided to wait until after Second 20 had passed before beginning the tests. As Second 20 approached the crossover the inspector and both foremen were at the instrument house east of the west crossover-switch. They said that the switch target at the west switch appeared to be in normal position before the accident occurred.

After the accident occurred two jumper wires were found to be applied to an overload relay in a factory-wired instrument case near the west crossover-switch which were not in accordance with the circuit plans submitted to the manufacturer by the carrier. At the time the accident occurred the testing of the equipment had not progressed to the point at which these improperly applied jumper wires would be found. With the jumper wires so arranged and with the battery wire connected to the battery through the inspector's ammeter a circuit would be established which would permit current to flow to the motor of the switch machine and cause the motor to rotate. The switch could have become unlocked at any time during the testing, and the operation of the automatic block-signal system would not have been affected provided the switch points were not moved. However, if the switch points were moved more than 7/32 inch, signal 4560 should have displayed its most restrictive aspect. Since the signal indicated Proceed for the movement of Second 20, it appears that a connection was made which caused current to flow to the motor of the switch machine and resulted in a movement of the switch points after Second 20 passed the signal.

The rules of this carrier provide that the normal functioning of any device which affects the safety of train operation shall not be interfered with in testing without first taking measures for insuring safety. If the switch points had been secured by being spiked, clamped, or blocked in proper position before a train was permitted to move over the switch, this accident would have been averted.

Cause

It is found that this accident was caused by the movement of a train over a dual-control switch, the points of which were unlocked and not in proper position.

Dated at Washington, D. C., this third day of September, 1953.

By the Commission, Commissioner Clarke.

(SEAL)

GEORGE W. LAIRD,

Acting Secretary.