

INTERSTATE COMMERCE COMMISSION
WASHINGTON

INVESTIGATION NO. 2543
THE SOUTHERN PACIFIC COMPANY
REPORT IN RE ACCIDENT
NEAR HASSON, CALIF., ON
NOVEMBER 19, 1941

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SUMMARY

Railroad: Southern Pacific
Date: November 19, 1941
Location: Hasson, Calif.
Kind of accident: Fire, smoke and gas in tunnel
Train involved: Freight
Train number: Extra 4193 West
Engine number: 4193
Consist: 96 cars and caboose
Speed: Standing
Operation: Timetable, train orders and
automatic block-signal system
Track: Single; tangent; 1.00 percent
ascending grade westward
Weather: Clear
Time: About 12:45 a. m.
Casualties: 5 killed; 4 injured
Cause: Accident caused by train stalling
in tunnel, and fire and excessive
smoke and gas as result of failure
to shut off oil feed

INTERSTATE COMMERCE COMMISSION

INVESTIGATION NO. 2543

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

THE SOUTHERN PACIFIC COMPANY

January 20, 1942.

Accident near Hasson, Calif., on November 19, 1941, caused
by train stalling in tunnel, and fire and excessive
smoke and gas as result of failure to shut off oil feed.

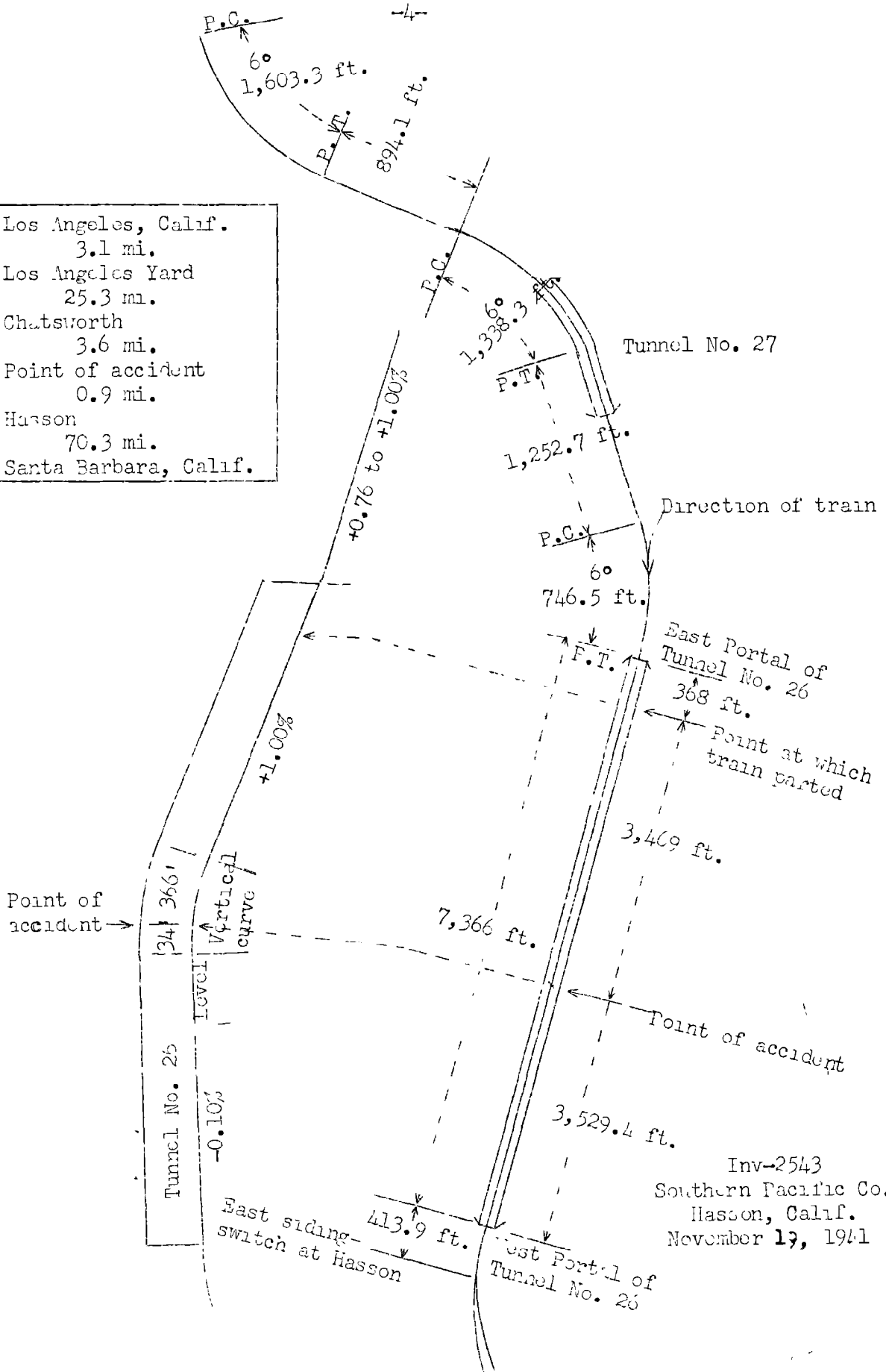
REPORT OF THE COMMISSION¹

PATTERSON, Commissioner:

On November 19, 1941, a freight train stalled in a tunnel on the line of the Southern Pacific Company near Hasson, Calif., escaping fuel oil became ignited, and excessive smoke and gas resulted in the death of two trespassers and three employees and the injury of four employees. This accident was investigated in conjunction with representatives of the Railroad Commission of California.

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

- o Los Angeles, Calif. 3.1 mi.
- o Los Angeles Yard 25.3 mi.
- o Chatsworth 3.6 mi.
- X Point of accident 0.9 mi.
- o Hasson 70.3 mi.
- o Santa Barbara, Calif.



Inv-2543
 Southern Pacific Co.
 Hasson, Calif.
 November 17, 1941

Location of Accident and Method of Operation

This accident occurred on that part of the Los Angeles Division designated as the Ventura Subdivision, which extends between Los Angeles and Santa Barbara, Calif., a distance of 103.2 miles. In the vicinity of the point of accident this is a single-track line over which trains are operated by timetable, train orders and an automatic block-signal system. At Hasson a siding 3,946.4 feet in length parallels the main track on the north. Tunnel No. 26 is 7,366 feet in length and its west portal is 413.9 feet east of the east siding-switch at Hasson. The accident occurred in this tunnel at a point 3,529.4 feet east of the west portal. As the point of accident is approached from the east there are, in succession, a 6° curve to the left 1,603.3 feet in length, a tangent 804.1 feet, a 6° curve to the right 1,338.3 feet, a tangent 1,252.7 feet, a 6° curve to the right 746.5 feet and a tangent 3,823 feet to the point of accident and 3,564.9 feet beyond. Throughout a distance of 6.4 miles east of the east portal of tunnel No. 26 the grade for west-bound trains varies between 0.76 and 1.00 percent ascending. From the east portal westward the grade is 1.0 percent ascending a distance of 3,470.7 feet, and then there is a vertical curve 366 feet to the point of accident and 34 feet beyond.

Tunnel No. 26 is 16 feet 1/2 inch in width and the distance from the top of the rail to the top of the tunnel is 20 feet 6 inches. The roof is arched on a radius of 8 feet. The height of the vertical walls is 12 feet 6 inches above the level of the rail. The overhead clearance above the top of the cab of the engine involved is 4 feet 4 inches, and above the top of the smokestack, 4 feet 1/2 inch. The side clearance between the wall of the cab and the wall of the tunnel is 2 feet 6-1/2 inches. The tunnel is lined with concrete, is entirely on a tangent and the compass direction is North 80°01' West. No ventilating system is provided. The prevailing direction of wind through the tunnel is westerly during morning hours and easterly during afternoon hours. The average velocity of wind is 4 or 5 miles per hour.

In the vicinity of the point of accident the maximum authorized speed for freight trains is 30 miles per hour.

Description of Accident

Extra 4193 West, a west-bound freight train, consisted of engine 4193, of the 4-8-8-2 type, 51 loaded and 45 empty cars and a caboose. This train departed from Los Angeles Yard, 29.8 miles east of Hasson, at 11:15 p. m., November 18, according to the dispatcher's record of movement of trains, and passed Chatsworth, 4.5 miles east of Hasson and the last open

office, at 12:25 a. m., November 19. When the engine was at a point about 5,000 feet east of the east portal of tunnel No. 26 the engine slipped and the train stalled. After the slack was taken twice the train proceeded and when the engine entered the tunnel the speed was between 10 and 12 miles per hour. At a point 3,899 feet west of the east portal, or approximately half way through the tunnel, the engine again slipped and the train stalled. Because of slack action the train drifted backward. A knuckle on the front end of the seventy-fifth car was broken, and the train separated at that point. The brakes were applied in emergency and the train stopped, with the front end of the engine standing 3,837 feet west of the east portal.

Because of an excessive supply of fuel oil flowing to the firebox of the engine, excessive smoke and gas filled the tunnel. Fuel oil dripping from the modified dampers beneath the firebox became ignited, flames enveloped the cab, and the fire resulted in considerable damage. The cab was badly distorted and all appurtenances in the cab were badly damaged. The No. 2 axle of the engine truck was bent and the engine-truck spring rigging was badly damaged. The wheel centers of the No. 1 pair of driving wheels were loose and the brasses, shoes, and wedges were melted. The brasses and the liners in the journals of the No. 2 pair of driving wheels were melted, the axle was sprung, and the main engine-frame was out of line. An inspection of engine 4193 after the accident disclosed that the throttle was closed, the automatic brake valve in running position, the independent brake valve in application position, the sender valve open, the injector wide open, and the reverse lever in position for 30 percent cut-off in forward motion. The oil-regulating firing-valve handle was latched open 1/4 inch from the drifting stop-pin. The emergency drop-valve on the fuel feed line was open and the spring was under compression. The emergency drop-cable was intact. The firebox door was closed, and the eccentric locks were in place. No defect was found which could have contributed to the cause of the accident.

Investigation disclosed that there were 4 slipping burns on the north and the south rails at points, respectively, 25 feet, 30 feet 7 inches, 36 feet 3 inches, and 41 feet 11 inches east of the front of the engine. These slipping burns averaged 7 inches in length and were from 1/8 inch to 3/16 inch in depth. The metal was badly frayed, and there was no indication that any equipment had moved over them. At a point about 4 feet west of the front of the engine the center-line of the roof of the tunnel was scoured to a depth of 3-1/2 to 4 inches throughout an area of 22 inches by 30 inches. At a point 22-1/2 feet east of the front end of the engine the center-line of the roof of the tunnel was scoured to a depth of 3-1/2 to 4 inches throughout an area of 14 inches by 27 inches.

The weather was clear at the time of the accident, which occurred about 12:45 a. m.

The employees killed were the engineer, the fireman and the second brakeman, and the employees injured were a student fireman, the front brakeman, the third brakeman and the conductor.

Mechanical Data

Engine 4193 is of the articulated single-expansion 4-8-8-2 type, is equipped to burn oil as fuel, and the cab is at the front end. The working steam pressure is 250 pounds per square inch and the rated tractive effort is 124,300 pounds. In the territory involved the tonnage rating of engine 4193 is 3,650 tons. Extra 4193 West consisted of 3,550.5 tons. The tender is rectangular in shape, has two 6-wheel trucks, and its capacity is 21,900 gallons of water and 6,400 gallons of oil. The length of the engine is 79 feet 2-1/2 inches and the total length of the engine and tender is 125 feet 5 inches. The distance from the front of the cab to the center of the smokestack is 66 feet 11 inches. The engine has two sand boxes, and sander pipes are provided in front of each driving wheel. The cab is 10 feet in width and its top is 16 feet 2 inches above the top of the rail. Fuel is supplied by a 2-inch fuel line between the tender and the engine. At the front of the tender there is an emergency drop-valve located in the 2-inch feed supply pipe. When this valve is open a spring is compressed. A trigger device is provided so that this valve may be tripped shut if an emergency arises. A cable attached to the tripping device leads to the cab of the engine and is readily accessible. Near the fireman's station in the cab a regulating stop-cock is located in the fuel supply line. The regulating handle is provided with a notched quadrant so that the valve will stay in any position in which it is set. A stop-pin is provided, and when the regulating handle is closed against the pin sufficient fuel will flow to maintain the fire while the engine is drifting. This stop-pin may be set at any desired location on the quadrant. After the accident the regulating handle was 1/4 inch from the stop-pin. The valve opening was 5/32 inch by 41/64 inch in area. Dampers are located beneath the firepan. The cab of engine 4193 is provided with a roof ventilator. From the main reservoir a pipe with regulating cocks and filters is provided for attaching respirators. Respirators are issued to engine crews if requested by them.

Investigation disclosed that the level of the sand in the front sandbox was 4-5/8 inches below the top, and in the rear sandbox the sand was 2-1/2 inches below the top. The amount of oil remaining in the tender was 1,834 gallons.

The seventy-fifth car in the train was a gondola of steel construction and loaded with steel. The coupler involved was of the A. A. R. type "D" and had a type "D" knuckle. This knuckle was broken vertically near the knuckle-pin hole. There was no indication of prior fracture or of defective metal.

Discussion

Extra 4193 West had been moving at average speed for a tonnage train on an ascending grade varying between 0.76 and 1.00 percent until, at a point about 5,000 feet east of the east portal of tunnel No. 26, the engine slipped and the train stalled. After slack was taken several times, the train proceeded. According to the statement of the conductor, the caboose did not move backward more than 10 feet each time slack was taken. The speed was about 10 miles per hour when the engine entered the tunnel. Throughout a distance of 3,470 feet west of the east portal of the tunnel, the grade is 1.00 percent ascending for west-bound trains. When the engine reached a point about midway of the tunnel the engine again slipped and the train stalled.

According to the statement of the front brakeman, the left cylinder cock of the No. 1 engine was blowing continuously between Los Angeles Yard and tunnel No. 26. When the train stalled east of the tunnel, the brakeman suggested to the engineer that the cylinder cock be repaired before the train proceeded; however, the engineer was of the opinion it was not serious enough to warrant the delay that would result from repairing it. When the engine started to slip in the tunnel, the engineer experienced difficulty in closing the throttle and the engine slipped a considerable time before the throttle was closed. Immediately afterward, a large quantity of steam escaped from the boiler, and the cab was filled with steam. Because of the escaping steam, the brakeman could not move past the cab to uncouple the engine from the train. According to the statement of a student fireman who was on the engine, the engineer experienced difficulty with the throttle throughout the trip. Because of dense smoke and steam in the tunnel, both the student fireman and the front brakeman were forced to proceed to the west portal for fresh air and they did not observe any further action on the part of the engine crew. Since the engineer and the fireman lost their lives in the accident, it could not be determined what action was taken by them.

The tonnage for the class of engine involved was 3,650 tons and the tonnage of the train involved was 3,550 tons. Since the speed of the train had increased to approximately 10 miles per hour in a distance of about 5,000 feet, the train should have proceeded through the tunnel without difficulty if

the engine had not slipped. Steam blowing from the cylinder cock of the No. 1 engine would be deflected from the wall of the tunnel and undoubtedly this resulted in lessening the adhesion of the driving wheels to the rails. When this engine departed from the enginehouse at Los Angeles, sand flowed from all sandpipes and was deposited on the rail. After the accident, investigation disclosed that each sandbox was about two-thirds full. The slipping marks on the rail and the most westerly hole in the roof of the tunnel were spaced about the same distance apart as the No. 1 driving-wheel assembly and the smoke stack; therefore, it is reasonable to assume that the No. 1 engine slipped and the hole in the roof was made by the intense velocity of the exhaust during the slipping period. When the engine slipped, the conductor, the flagman and the third brakeman felt the slack run in at the rear of the train, and then it ran out about 25 feet and the brakes became applied in emergency. The conductor said that it is usual for the slack to run in then run out whenever an engine slips on an ascending grade. During the trip involved no severe slack action was felt, except just before each time the train stalled. Undoubtedly, after the engine slipped, the momentum of the 96 cars in the train caused the slack to bunch proportionate to the weight and speed, then, after the engine stopped, the compression of the draft gears resulted in the slack running out on the 1.00 percent grade. The run-out of slack moved the engine backward about 62 feet, as indicated by another hole in the roof of the tunnel at the location of the safety valves. Since the independent brake valve was found in application position, it follows that the run-out of slack would begin at the rear of the engine and progress toward the caboose. The force of the slack action increased from car to car on the descending grade until it caused a jerk or a whip-lash effect, which resulted in the breaking of the knuckle at the front end of the seventy-fifth car and in the separation of the train between the seventy-fourth and the seventy-fifth cars.

After the train stopped, the conductor closed the angle cock at the rear of the seventy-fourth car, which was standing at a point 368 feet west of the east portal, replaced the knuckle in the front end of the seventy-fifth car, and then instructed the second brakeman to proceed to the engine and to tell the engineer to proceed to Hasson with the front portion of the train. Soon afterward the conductor and the third brakeman were almost overcome by smoke and gas and were forced to leave the tunnel at the east end. The body of the second brakeman was found at a point 500 feet west of the east portal.

Before this train departed from Los Angeles Yard the tender was supplied with 5,788 gallons of oil. Ordinarily not more than 1,000 gallons is consumed between Los Angeles Yard and the point where the accident occurred. After the engine

was removed from the tunnel 1,834 gallons of oil remained in the tender. Apparently, about 2,900 gallons of oil were burned after the engine stalled. After the accident the fuel regulating valve was found in position to supply sufficient oil for hauling heavy tonnage. When the throttle was closed, the draft necessary to produce complete combustion was lacking, and the excessive fuel oil dripped through the dampers, became ignited and produced great quantities of smoke and gas. The walls of the tunnel opposite the dampers and the firebox sheets as well as the inside of the smokebox were covered with thick deposits of soot.

The investigation disclosed that the fireman involved had had but little experience. He was hired August 29, 1941. If the fuel regulating valve had been closed against the stop-pin when the engine stopped in the tunnel, the flow of oil would have been sufficient to maintain steam on a standing engine. The emergency drop-valve was in good condition and operated properly after the accident occurred. If either the regulating valve or the emergency valve had been closed, there would not have been excessive smoke and gas, and this accident would not have occurred.

On the line involved, respirators are provided on all conventional type engines but are not provided on the type involved unless requested by the engine crew. When the engine involved departed from the enginehouse at Los Angeles at 10 p. m., November 18, there were six respirators in stock but the engine crew did not request that any be supplied. Had respirators been used on this engine it is probable the engine crew could have closed the oil feed and would not have been overcome by smoke and gas.

Cause

It is found that this accident was caused by a train stalling in a tunnel, and fire and excessive smoke and gas as a result of failure to shut off oil feed.

Dated at Washington, D. C., this twentieth day of January, 1942.

By the Commission, Commissioner Patterson.

(SEAL)

W. P. BARTEL,

Secretary.