RAILROAD ACCIDENT INVESTIGATION

Report No 4007

THE ATCHISON, TOPEKA AND SANTA FE RAILWAY COMPANY

Doublea, Arizona

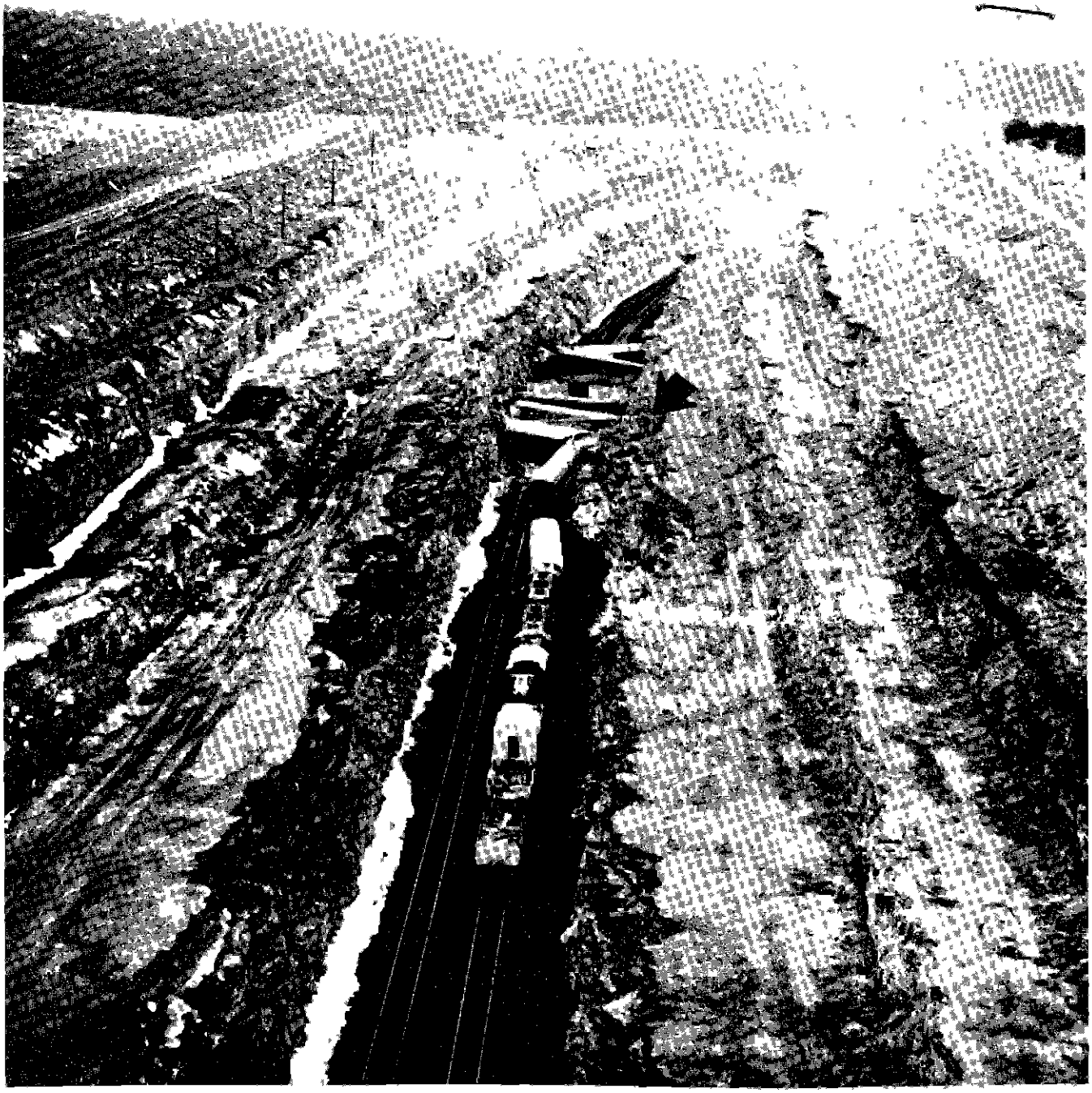
April 5, 1964

INTERSTATE COMMERCE COMMISSION

Washington

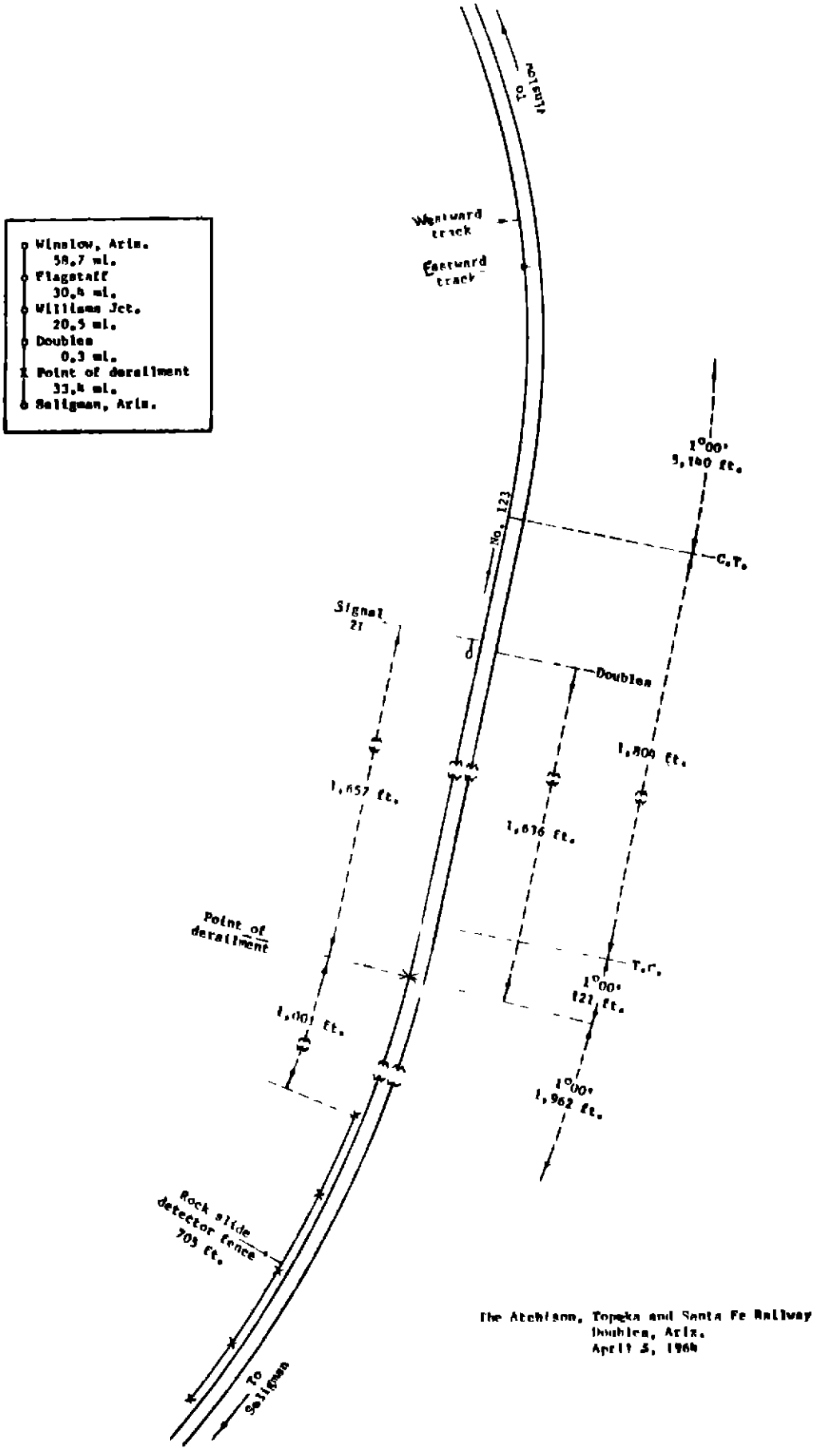
SUMMARY

DATE	April 5, 1964
RAILROAD	Atchison, Topeka and Santa Fe
LOCATION	Doublea, Arizona
KIND OF ACCIDENT	Derailment
TRAIN INVOLVED	Passenger
TRAIN NUMBER	123
LOCOMOTIVE NUMBERS	Diesel-electric units 42L, 37B, 304A, 36B, 37L
CONSIST	16 cars
SPEED	81 m p h.
OPERATION	Signal indications
TRACKS	Double, 1°00' curve, 1 00 percent descending grade westward
WEATHER	Cloudy
TIME	2 18 a m
CASUALTIES	3 Killed, 33 Injured



Westward view Wrecking train in center foreground. Arrow shows point where rock slide occurred.

View eastward Arrow at top right-hand corner points to cavity left by rock slide



The Atchison, Topeka and Santa Fe Railway
Doublee, Ariz.
April 5, 1960

INTERSTATE COMMERCE COMMISSION

Safety and Service Board No 1

RAILROAD ACCIDENT INVESTIGATION

Report No 4007

THE ATCHISON, TOPEKA AND SANTA FE RAILWAY COMPANY

April 5, 1964

SYNOPSIS

About 2 18 a m , April 5, 1964, No 123, a westbound passenger train of the Atchison, Topeka and Santa Fe Railway Company, struck a rock slide while moving at a speed of 81 m p h in a cut a short distance west of Doublea, Arizona All five locomotive units and the first 12 cars were derailed The engineer, the fireman, and a railway-express messenger were killed The flagman, 4 Pullman Company employees, 1 railway-express messenger, 1 news agent, 3 train attendants, and 23 passengers were injured

Location and Method of Operation

This accident occurred on that part of the Albuquerque Division extending between Winslow and Seligman, Ariz , 143 3 miles In the vicinity of the accident point this is a double-track line over which trains are operated in both directions on either main track by signal indications of a traffic control system supplemented by an automatic train-stop system From the north, the main tracks are designated as the westward track and the eastward track

The accident occurred on the westward track 109 9 miles west of Winslow and 1,636 feet west of Doublea

Details of the track structure, the cut, and the train equipment involved are described in the appendix

Description and Discussion

No 123, a westbound first-class passenger train, consisted of five diesel-electric units and sixteen cars This train departed from Winslow at 11 50 p m and stopped at Flagstaff and Williams

Jct , respectively, 58 7 and 89 1 miles west of Winslow It departed from Williams Jct at 2 12 a m , 1 hour 32 minutes late According to the graph of the traffic control machine, No 123 passed controlled signal 2L, which indicated proceed, at Doublea at 2 18 a m A few moments later, while moving through a rock cut on the westward track at a speed of 81 miles per hour, as indicated by the speed-recording tape, the train struck a rock slide that obstructed both main tracks about 1,636 feet west of Doublea The diesel-electric units and first 12 cars derailed

The train stopped with the front end 590 feet west of the point of derailment and several separations occurred The derailed equipment stopped in various positions on the track structure between the walls of the cut as shown in the photographs at the front of this report The five diesel-electric units and the first 11 cars were heavily damaged or destroyed The 12th car was somewhat damaged and the 13th car, which was not derailed, was slightly damaged.

Both enginemen and a railway-express messenger were killed The flagman and 32 other persons on the train were injured

The surviving crew members were at various locations in the cars as the train approached the point of derailment They were unaware of anything wrong until they felt a series of jolts resulting from the derailment

Examination of the track structure disclosed the train had been derailed by a rock slide from the north wall of the cut The track structure was destroyed or heavily damaged throughout a considerable distance

Examination of the north wall of the cut revealed a large, fresh, V-shaped cavity opposite the point of derailment Beginning near the base of the wall, the cavity extended upward about 40 feet to a bench in the cut At the top of the bench, the cavity was approximately 100 feet long and 14 feet wide Rocks and earth from this area fell on the structure of the tracks and caused the derailment

Three days prior to the derailment, a track supervisor inspected the rock cut and took no exceptions

Extra 803 West, a westbound freight train, moved through the cut about 1 hour 30 minutes prior to the accident The crew members noticed no unusual condition at this time

According to weather records maintained at Williams, Ariz , near Doublea, there was a total precipitation of 2 49 inches in this area during March, 1964, and 2 01 inches during the first four days of April During March and the first four days of April, the maximum and minimum daily temperatures averaged 46° and 22°

In 1960, when this part of the carrier's line was constructed and placed in service, a rock slide detector fence was installed along a portion of the base of the north wall of the cut This fence is 705 feet long and is connected to circuits of signals governing movements on the westward track only Its east end is 1,001 feet west of the point of accident

It is apparent the rock slide was caused by the precipitation followed by alternate freezing and thawing that occurred during the 35-day period preceding the day of the accident The slide occurred within a period of about 1 hour 39 minutes before No 123 passed Doublea and did not affect the circuits of the wayside signal system Signal 2L displayed a proceed aspect as the train locomotive approached and passed it at a speed of 81 miles per hour It is evident the engineer was unable to see the rock slide obstructing the westward track in sufficient time to materially reduce the speed prior to the derailment Unless the slide occurred immediately in front of the approaching train, a rock slide detector fence installed along the base of the north wall probably would have averted this derailment

Cause

This accident was caused by the track being obstructed by a rock slide

Recommendation

It is recommended that rock slide detector fences be installed along both sides of the track structure throughout the length of the cut

Dated at Washington, D C , this thirty-first day of August, 1964

By the Commission, Safety and Service Board No 1

(SEAL)

HAROLD D McCOY,

Secretary

Appendix

Details Concerning the Track Structure

In the vicinity of the accident, the main tracks are 14 feet between centers From the east there are, in succession, a 1°00'curve to the right 5,140 feet in length, a tangent 1,804 feet, and a 1°00' curve to the right 121 feet to the point of derailment, and 1,962 feet westward The grade is 1 00 percent descending westward in the vicinity of the derailment

The structure of the main tracks consists of 136-pound welded rail laid new in 1960 in 1,440-foot sections on 24 treated ties per 39 feet It is fully tie-plated with double-shoulder tie plates, spiked with two rail-holding spikes and two plate-holding studs per tie plate, and is provided with 6-hole 36-inch joint bars and an average of 24 rail anchors per 39 ee It is ballasted with volcanic cinders to 10 inches below the bottoms of the ties

The maximum authorized speed for passenger trains in this territory is 90 miles per hour

Controlled signal 2L, governing westbound movements on the westward track, is located 1,657 feet east of the point of accident

Details Concerning the Rock Cut

This cut is approximately 7,200 feet in length with a maximum depth of 115 feet In the vicinity of the derailment, its width at subgrade is 46 feet Its height is 79 feet The walls slope upward at a ratio of about ¼ 1, and are characterized by two 30-foot wide benches on each side, one at 40 feet and the other at 57 feet above the subgrade

The geological section in the vicinity of the derailment consists of two major rock formations Permian-Kaibab limestone overlying Permian-Coconino sandstone Soil covers the limestone formation to a depth of two or three feet Both formations are generally horizontal The underlying sandstone, however, is characterized by extensive crossbedding The dips of the crossbedding are highly variable and are generally southerly, at low angles, in the area of the rock slide

During August 1963, several hundred cubic yards of rock were removed from the north wall of the cut about 500 feet west of where the rock slide occurred Later in the same year, cracks on top of the lowest bench of this wall were sealed with tar

Details Concerning the Train Equipment Involved

No 123 consisted of car-body type diesel-electric units 42L, 37B, 304A, 36B and 37L, coupled in multiple-unit control, 1 baggage car, 1 refrigerator-express car, 3 box-express cars, 1 baggage car, 1 refrigerator-express car, 3 baggage cars, 4 chair cars and 2 sleeping cars, in that order The cars were of all-steel construction, and the last two cars were equipped with tightlock couplers

The brakes of the train had been tested prior to the accident and no exceptions had been taken