INTERSTATE COMMERCE COMMISSION

WASHINGTON

REPORT OF THE DIRECTOR

BUREAU OF SAFETY

ACCIDENT ON THE

LOUISVILLE & NASHVILLE RAILROAD

SINKS, KY.

JULY 3, 1939

INVESTIGATION NO. 2368

SUMMARY

Inv-2368

Railroad:	Louisville & Nashville
Date:	July 3, 1939
Location:	Sinks, Ky.
Kind of accident:	Derailment
Train involved:	Freight
Train number:	46
Engine number:	1844
Consist:	53 cars and caboose
Speed:	30 miles per hour
Operation:	Timetable, train orders, and automatic block-signal system
Track:	Double; 4° 30' curve; grade 0.47 to 0.50 percent ascending northward.
Weather:	Foggy
Time:	1:25 a. m.
Casualties:	3 killed
Cause:	Striking rocks which had fallen upon track

Inv-2368

September 15, 1939.

To the Commission:

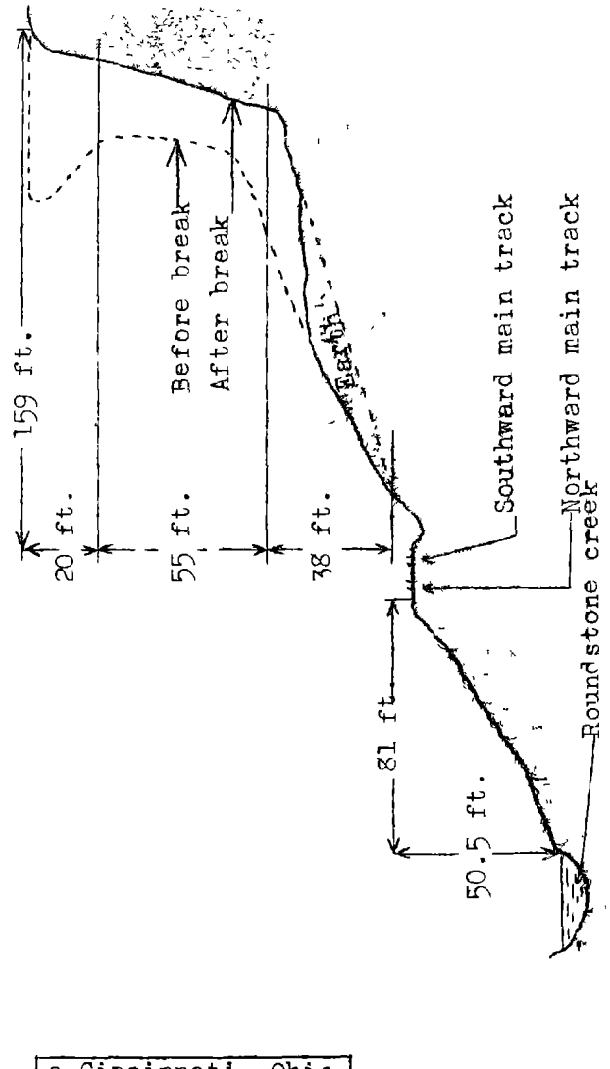
On July 3, 1939, there was a derailment of a freight train on the Louisville & Nashville Railroad near Sinks, Ky., which resulted in the death of three employees.

Location and Method of Operation

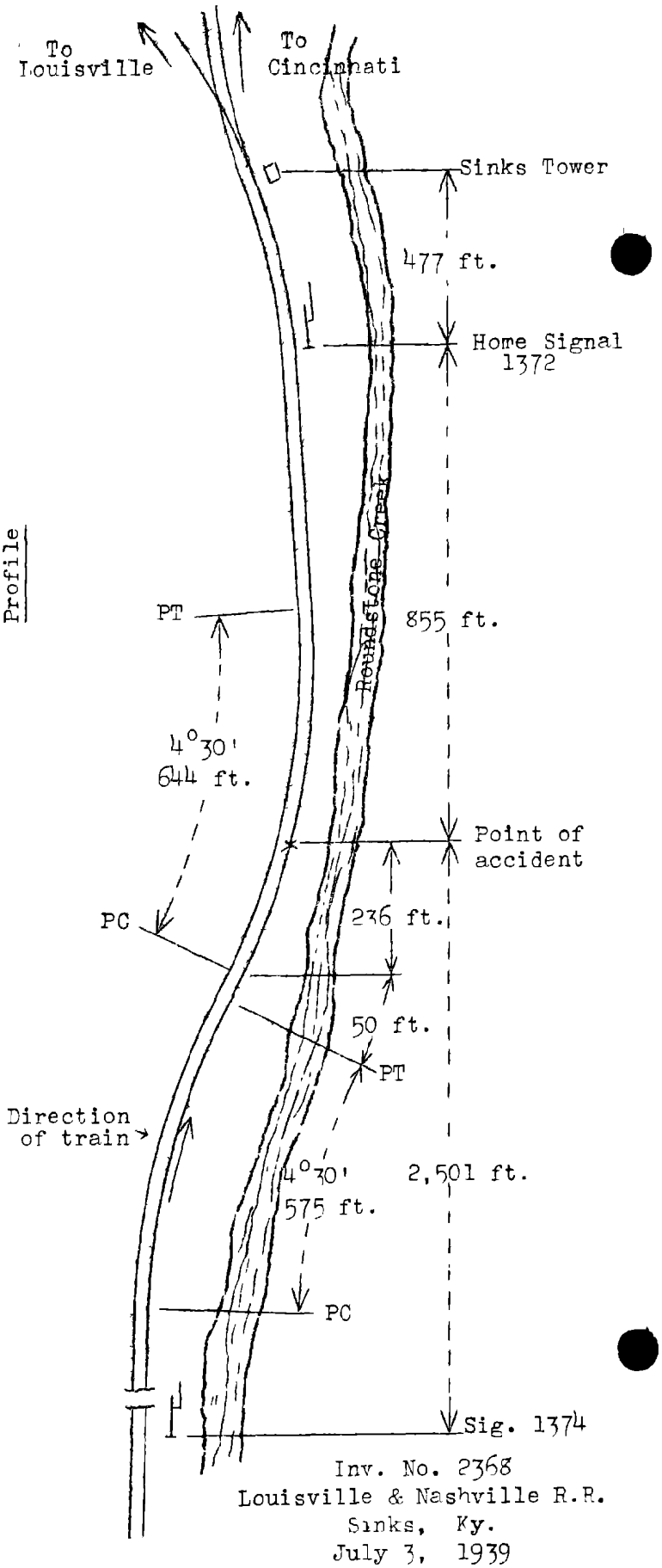
This accident occurred on that part of the Cincinnati Division which extends between Corbin and Spring Lake, Ky., a distance of 178.47 miles. In the vicinity of the point of accident this is a double-track line over which trains are operated by timetable, train orders, and an automatic block-signal system. The derailment occurred on the northward track at a point 1,302 feet south of Sinks interlocking. Approaching from the south there is a series of short curves and tangents followed by a 4°30' curve to the left extending 236 feet to the point of accident and 408 feet beyond. The grade for north-bound trains is 0.50 percent ascending a distance of 400 feet, then 0.47 percent ascending 1,118 feet to the point of accident. Because of track curvature and vegetation on the inside of the curve involved, the view had by an engineman of a north-bound train was restricted to a distance of 300 feet.

The track structure consists of 100-pound rail, 39 feet in length, laid on 24 treated oak ties to the rail length; it is single-spiked, fully tieplated, provided with 4 gage rods and 6 rail anchors to the rail length, ballasted with crushed rock to a depth of 8 feet, and is well maintained.

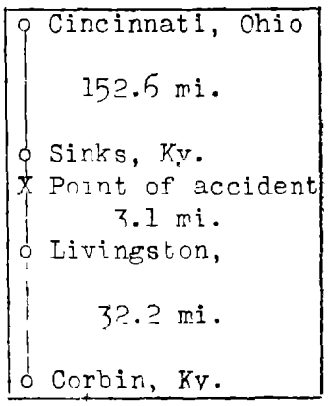
In the vicinity of the point of accident the tracks are laid along a hillside paralleling and about 50 feet above the west bank of Roundstone Creek. The distance between track centers is 13 feet. The distance from the northward track-center to the ditch line on the west side of the southward track is 22 feet. The hill-slope rises westward at a gradient of about one to three a distance of 145 feet to a height of 52 feet above the track. This slope is composed of material that has fallen from the cliff above and become covered with a thin overburden of soil on which there is a growth of trees and vegetation. From the top of this slope a perpendicular wall of conglomerate sandstone, lying on a soft sandstone base, rises 48 feet; above this there is a ledge of soft sandstone 20 feet thick which extends beyond the face of the cliff a depth of 18 feet. The crest of this



Profile



Inv. No. 2368
Louisville & Nashville R.R.
Sinks, Ky.
July 3, 1939



ledge rises to a height of 120 feet above the track and parallels it northward a distance of 300 feet. Immediately south of the point of accident the pit of an abandoned rock quarry extends westward into the cliff a distance of 300 feet. The north wall of this pit is adjacent to the point from which rock fell upon the track shortly before the accident occurred.

The northward route through Sinks interlocking is governed by home signal 1372, located 477 feet south of the tower and 855 feet north of the point of accident. Automatic signal 1374, located approximately 3,356 feet south of signal 1372 and 2,501 feet south of the point of accident, governs the approach to signal 1372 and is of the one-arm, three-position, upper-quadrant, semaphore type, approach lighted.

Night aspects and indications of signal 1374 are as follows:

Green	Proceed, Name - Clear.
Yellow	Prepare to stop at next signal. Train exceeding medium speed must at once reduce to that speed. Name - Approach.
Red	Stop; then proceed in accordance with Rule 509(B). Name - Stop and proceed.

When signal 1372 displays a stop indication, signal 1374 displays an approach indication except that it displays a stop-and-proceed indication when there is a train, obstruction, or broken rail in the block ahead.

Signal 1374 is controlled by a polarized line relay with 4 front and 2 back neutral contacts and 2 normal and 2 reverse polar contacts. This relay is identified as 1374HD and is energized by a control wire designated as wire 1374HD. Signal control is affected by a three line-wire polarized system having two control wires and a common wire. Of these, wire 1374HD controls the indication of signal 1374, and wire 1513HD5 controls the indication of southward home signal 1513; the common wire is used to carry energy to both circuits. These three wires extend from signal 1374 to the northward home signal at Sinks interlocking. Paralleling these three wires and located on the same cross-arms are four other signal wires, one of which is a track repeater wire, normally energized, and which causes a light to burn and an annunciating buzzer to sound in the tower when a train is approaching on the northward track a distance of over two miles.

The current from this wire returns to negative battery through the common wire that is used in connection with wires 1374HD and 1513HD5, making three circuits using this common wire. A cross between wires 1374HD and 1513HD5 or between 1374HD and the track repeater wire may energize relay 1374HD which would result in a false-proceed indication being displayed by signal 1374, should there be a train, obstruction, or broken rail in the block.

The pole line carrying the signal wires, all of which are non-insulated, parallels the track on the west side at a distance of 25 or 30 feet.

The transportation rules of this carrier provide in part as follows:

> Rule 27 - "A signal imperfectly displayed, *** must be regarded as the most restrictive indication that can be given by that signal, except that when the day indication is plainly seen, it will govern."
>
> Rule 509(B)-"When a train is stopped by a Stop and Proceed signal it may proceed at once at restricted speed."
>
> Definition of restricted speed - "Proceed prepared to stop short of train, obstruction, or anything that may require the speed of a train to be reduced."

The maximum authorized speed for freight trains is 45 miles per hour.

It was moonlight and the weather was foggy at the time of the accident, which occurred at 1:25 a. m.; there had been intermittent rains for some weeks prior to the accident.

Description

No. 46, a north-bound second-class freight train, consisted of 53 cars and a caboose, hauled by engine 1844, and was in charge of Conductor Day and Engineman Wever. This train left Corbin, 35.3 miles south of Sinks, at 11:50 p. m. according to the train sheet, 10 hours 15 minutes late, left Livingston, 3.2 miles south of Sinks, at 1:25 a. m., 10 hours 15 minutes late, and, after entering the curve involved a distance of 236 feet, it struck a large rock and was derailed while moving at a speed estimated to have been about 30 miles per hour.

The engine and tender, coupled, stopped upright at right angles to the track, with the front end down the embankment and the rear end on the road-bed. The first, second, fifth, eighth, and ninth cars stopped down the embankment; the third and fourth cars stopped on top of large boulders on the northward track and the sixth and seventh cars leaned against the engine. All the derailed equipment stopped within a distance of 100 feet. Three of the derailed cars were demolished; the remainder of the derailed cars and the engine and tender were badly damaged. About 200 feet of the northward track and 150 feet of the southward track were destroyed.

The employees killed were the engineman, the fireman, and the head brakeman.

Summary of Evidence

Conductor Day stated that before departure from Corbin the usual terminal brake test was made, and the brakes functioned properly en route. Approaching the point of accident he felt an emergency application of the brakes, at which time the speed was about 30 miles per hour; he thought the train moved about a car length before stopping. He said that the accident occurred at 1:25 a. m., at which time he thought the visibility was restricted by haze or fog, to about 300 feet. It had been raining for some days prior to the accident but in 36 years of experience as brakeman and conductor on this division, he had never seen indications of land or rock slides at this point.

Flagman Newman stated that the speed approaching the point of accident was about 30 miles per hour and that the train did not move more than a car length after the emergency application of the brakes was made. He thought that, on account of fog, visibility was limited to about 10 car lengths. Going back to flag after the accident occurred, he observed that signal 1374, about 15 car lengths south of the caboose, and signal 1382, about a half mile farther south, both displayed clear indications during the period of more than an hour that he remained there.

Operator Branaman, who was on duty at Sinks interlocking, stated that about 12:55 a. m. he heard a low rumbling sound and felt a vibration, which he thought were caused by night blasting in a stone quarry about a mile distant. Simultaneously with this the wires and the office lights failed; the indicator light bulbs for both northward and southward tracks were illuminated and the annunciator rang continuously, which would indicate that the circuits were occupied. Thinking that No. 46 was approaching, he went down to the platform to deliver their orders,

and while waiting he observed the headlight of No. 46 approaching throughout a distance of about 1,500 feet, and then heard the crash as it struck the slide. He said that because of the fog his vision by lantern light was restricted to about 100 feet. There had been no rain during the night but it had rained considerably for some days previously. When going to the point of accident a few minutes after the crash, he observed that the northward home signal displayed a clear indication.

Engineman McCarthy, of No. 43, a south-bound freight train, stated that about 12:47 a. m. he passed over the curve on which the accident occurred. He estimated that visibility was restricted because of fog to about 8 or 10 car lengths. He was on the embankment side but saw no indication of danger from falling rocks.

Signal Maintainer White stated that he arrived at the scene of the accident at 3 a. m. The section men were already clearing away the tangled signal wires and when he observed signal 1374, about 3:30 a. m., the light was extinguished but the arm was at stop.

Signal Supervisor Petty stated that the signals involved were constructed and maintained in accordance with recommended practices. He inspected them at 11 a. m. the day following the accident, at which time normal operation had been effected through temporary repairs and the mechanism was in good repair and the signals operated as intended. He said that foreign current if introduced on the HD control wire would cause signal 1374 to display a false-clear indication but when the wires were cleared of one another and the foreign current eliminated this condition would be relieved and a broken wire would cause the signal to assume its most restrictive position.

Section Foreman Owens stated that on the morning of July 1 he walked over the curve involved and saw no indication of falling rock.

Track Supervisor McHargue stated that when he arrived at the point of accident about 3:15 a. m. it was moonlight but quite foggy. Approaching from the south on a motor-car, he observed that all signals displayed clear indications and that signal 1374, on which the light was extinguished, could be seen a distance of 3 or 4 car lengths. He said that on July 1 he passed over the curve involved on a motor-car but saw no indication of danger. After the accident he examined the face of the cliff and found that the break extended southward to the rock wall in the quarry. About six months prior to the accident he had been in the quarry but observed no indication of a break or fissure in the wall. He never had known of any rock falling from this cliff previous to this instance.

Division Engineer Nickerson stated that he arrived at the point of accident about 5:30 a. m. and on the southward track found a stone approximately 60 by 30 by 25 feet with an estimated weight of 5,400 tons and on the northward track another stone about 75 by 20 by 15 feet with an estimated weight of 1,500 tons. Numerous smaller stones were scattered over both tracks. A strip 35 feet thick at the top, with a vertical depth of 75 feet, had apparently first broken from the cliff, and then had broken horizontally from its base at the lower surface of the conglomerate sandstone and fell and then slid to the tracks. He said that he found a slight fissure extending downward 30 or 40 feet from the apex near the south edge and another small concealed fissure about 70 feet from the top of the north side, both of which extended almost across the face and comprised approximately 15 percent of the entire break. The sandstone ledge overhanging the top of the cliff showed an old break over about 35 percent of its surface although this was not apparent until after the accident because the surface of the cliff was covered with a thin layer of soil. He had been in the abandoned quarry on three different occasions since April, 1939, and had seen no indications of a break in the wall at that point. An unusual amount of rainfall during the past five months had caused the break in the cliff. He thought that because of track curvature and the view around the curve being obscured somewhat by vegetation the range of vision from an engine on a north-bound train was limited to a distance of about 300 feet.

Observations of Commission's Inspectors

Observation of the cliff by the Commission's inspectors disclosed that the mass of rock which fell extended approximately 150 feet in length, 80 feet in height, and from 18 to 35 feet in depth; these measurements included the overhanging sandstone ledge at the summit.

Inspection of the signal apparatus disclosed that it was in good order and well maintained. While a train occupied the block, a cross was made intentionally between the track repeater wire and wire 1374HD to determine if it would cause signal 1374 to display a false-proceed indication; this signal immediately assumed the proceed position although the track relay was deenergized. A similar test was made with wires 1513HD5 and 1374HD, and the result was the same.

Discussion

According to the evidence, the train involved was approaching the point where the accident occurred at a speed of about 30 miles per hour when the brakes became applied in emergency, following which the train stopped within about one car length. After the accident it was found that a mass of rock approximately 150 feet long, 80 feet wide, and from 18 to 35 feet thick, had fallen from the cliff to the tracks.

As the engineman, the fireman, and the head brakeman were killed in the accident, it was not known at what time the slide was first observed by them. It was moonlight but foggy at the time of the accident. The headlight was burning as the train approached. Because of track curvature and trees and other vegetation on the inside of the curve involved, the view from an engine of a north-bound train of the track ahead was restricted to a distance of about 300 feet. This distance of visibility was further restricted by the prevailing fog. The last train prior to the one involved passed the point of accident about 38 minutes before the accident occurred and no indication of a rock-fall was observed at that time. About 30 minutes prior to the time of the accident the operator at Sinks heard a low rumbling sound and felt a vibration, at which time the wires and the office lights failed. Subsequently, the wires at the point of accident were found to be entangled because of the rock-fall.

No slides or falling rocks had previously disturbed the tracks at this point. Subsequent examination disclosed that fissures in the cliff had weakened the formation and caused a portion of the wall to break away, and no doubt this condition was accentuated by recent rains.

After the accident, while the rear of the train was occupying the block north of signal 1374, this signal displayed a proceed indication. Tests made subsequent to the accident established the fact that a false-clear indication could be displayed by this signal if the signal line wires were crossed. No doubt the wires became crossed when they were entangled by the rock-fall. Since a section of about 200 feet of the northward track was destroyed, it follows that if the wires had not become crossed signal 1374 no doubt would have displayed a stop-and-proceed indication, which in turn would have given the crew a warning of danger in time to avert the accident.

Conclusion

This accident was caused by the train striking large rocks which had fallen upon the track.

Respectfully submitted,

S. R. WHITE

Assistant Director.