Inv-2241

INTERSTATE COMMERCE COMMISSION

WASHINGTON

REPORT OF THE DIRECTOR

BUREAU OF SAFETY

ACCIDENT ON THE

GREAT NORTHERN RAILWAY

MONROE, WASH.

DECEMBER 28, 1937.

INVESTIGATION NO. 2241

SUMMARY

Inv-2241

Railroad:	Great Northern
Date:	December 28, 1937.
Location:	Monroe, Wash.
Kind of accident:	Derailment
Train involved:	Passenger
Train number:	27
Engine number:	1713
Consist:	10 cars
Speed:	40-45 m.p.h.
Track:	4° curve; level.
Weather:	Rain
Time:	4:40 a.m.
Casualties:	1 killed and 10 injured
Cause:	Landslide

February 2, 1938.

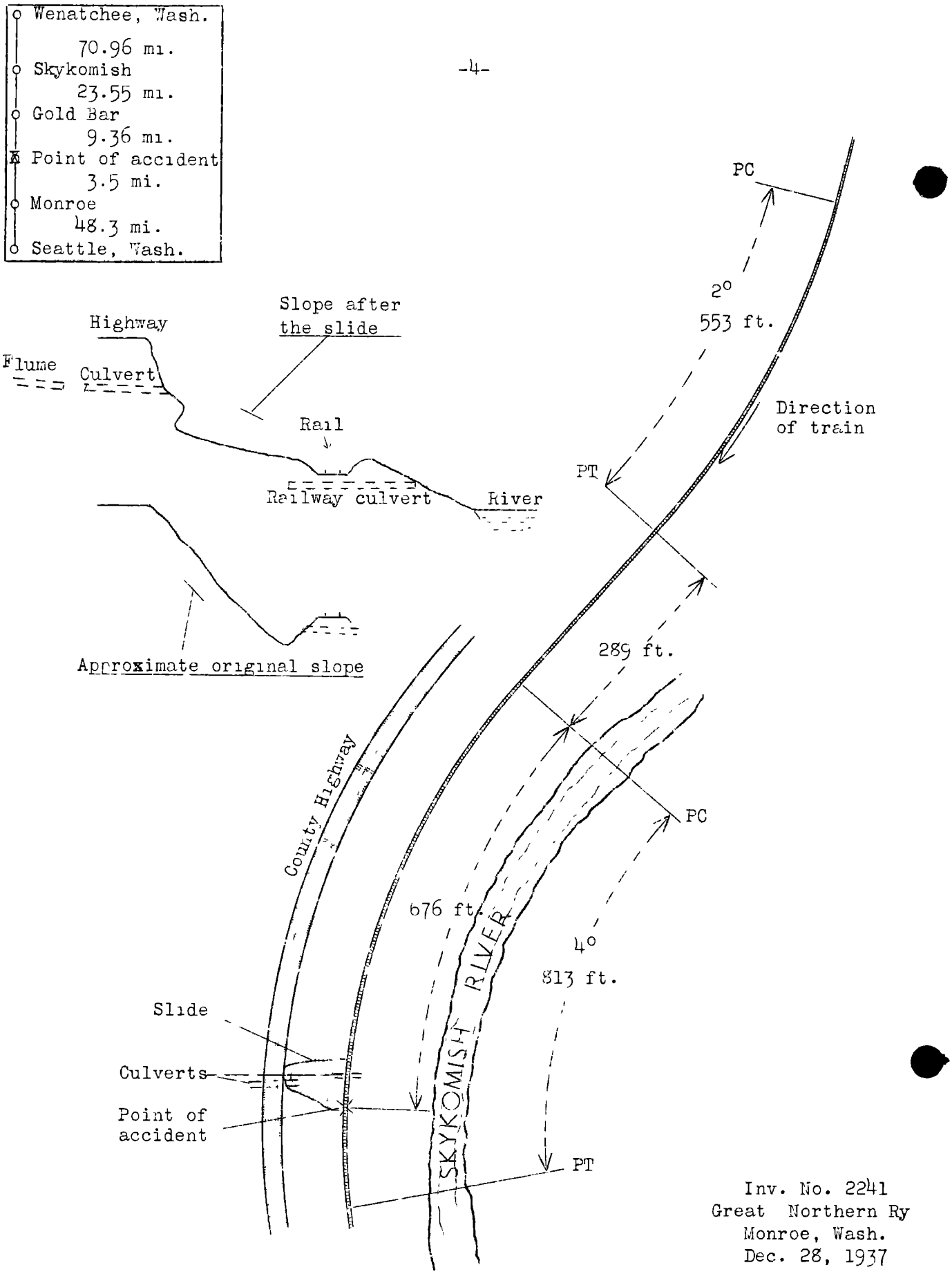
To the Commission:

On December 28, 1937, there was a derailment of a passenger train on the Great Northern Railway near Monroe, Wash., which resulted in the death of one employee and the injury of eight mail clerks and two employees. The investigation of this accident was made in conjunction with a representative of the Department of Labor and Industries of the State of Washington.

Location and method of operation

This accident occurred on the Second Subdivision of the Spokane Division which extends between Wenatchee and Seattle, Wash., a distance of 155.67 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. The accident occurred at what is known as Fern Bluff, located 3½ miles east of Monroe. Approaching this point from the east the track is tangent for a distance of 2,684 feet, followed by a 2° curve to the right 553 feet in length, tangent track for a distance of 289 feet, and then a 4° curve to the left 813 feet in length, the accident occurring on this latter-mentioned curve at a point 676 feet from its eastern end. The grade was level at the point of accident.

The track is laid with 110-pound rails, 39 feet in length, with 24 ties to the rail length, tieplated, with 8 rail anchors to the rail length, and is ballasted with crushed rock. The track is well maintained and the maximum authorized speed for passenger trains is 55 miles per hour. In the immediate vicinity the track is laid on a side hill cut with a bluff on the north and the Skykomish River on the south. At the time of the accident the water line of the river was about 19 feet below the level of the track. A ditch along the north side of the track varies in depth from 1½ to 3½ feet, and from a line ranging from 15 to 21 feet from the center of the track the bluff rises northward to a height of about 45 feet in a distance of approximately 70 feet, having a 1 to 1 slope. The bluff is of clay and gravel formation and is covered with woods, grass and brush. A county highway, which parallels the railway for miles is laid along the top of this bluff. Drainage water from approximately 200 acres of land lying north of the highway is directed to a 12 by 12 inch wooden flume 50 feet long which delivers to a 12-inch concrete pipe laid transversely under the highway with a drop of 2.2 feet toward the south. The concrete pipe is laid 15 feet below the highway and



Inv. No. 2241
Great Northern Ry
Monroe, Wash.
Dec. 28, 1937

consists of 2-foot sections with bell and spigot joints which are not cemented; it is 45 feet in length, and the outlet, which is 29½ feet above the top of the rail, delivers to a wooden flume that runs down the bank and connects with a 24-inch pipe culvert under the track.

It was raining at the time of the accident, which occurred at 4:40 a.m.

Description

No. 27, a west-bound passenger train, consisted of one express car, one refrigerator car, two baggage cars, one mail car, two baggage cars, one dining car, one smoking car, and one Pullman sleeping car, in the order named, hauled by engine 1713, and was in charge of Conductor Boozer and Engineman McLean. This train departed from Skykomish, Wash., 36.41 miles from Monroe, at 3:43 a.m. according to the train sheet, 1 hour 53 minutes late, passed Gold Bar, the last open office, 12.86 miles from Monroe, at 4:25 a.m., 1 hour 50 minutes late, and was derailed on approaching Monroe while traveling at a speed estimated to have been between 40 and 45 miles per hour.

The engine was derailed to the left and plunged into the river, being entirely submerged. The tender became uncoupled and also plunged into the river at a point about 465 feet beyond the point of derailment. The first five cars and the front trucks of the sixth car were derailed, the first two cars being destroyed, while the third, fourth and fifth cars stopped on the roadbed leaning toward the river. The fireman was missing, and the employee injured was the engineman.

Summary of evidence

Engineman McLean stated that a terminal air brake test was made before leaving Skykomish and a running test was also made on leaving that point; the headlight was burning properly. It was raining hard, and due to bad weather conditions he operated the train at a lower rate of speed than usual between Skykomish and Gold Bar. After passing Gold Bar, however, he increased the speed as the track west of that point is considered good track and there was no probability of slides. Approaching the curve on which the accident occurred the speed was about 45 miles per hour; he made a light brake application, reducing the speed to about 40 miles per hour rounding the curve, and the first indication he had of anything wrong was when the engine dropped off

the track. It did not appear to have struck anything. He immediately applied the air brakes in emergency and the next thing he knew he was in the water. He did not see any obstruction on the track and had never known of a slide occurring in that vicinity. Both he and the fireman were looking ahead at the time.

Conductor Boozer stated that earlier in the night it had been raining hard; at the time of the accident there was a strong wind with only a light rain falling. The train was travelling at a speed of about 40 or 45 miles per hour when he felt a jar. After the train stopped he stepped down from the rear end of the rear car and saw that there was about 10 inches of rock and debris piled up under the car, and the debris continued to be washed down after the train stopped, indicating that the slide was in progress when the train struck it. Rock and mud were scattered along the track for a distance of approximately 8 or 10 feet ahead of the rear car. There was no indication of a washout under the track.

Section Foreman Clancy stated that he had been in charge of the section on which the accident occurred for thirty years and there was no record of a slide over having occurred previously in that vicinity. The track and drainage were good. He had last inspected the track on the afternoon of December 23, at which time everything was in good condition. The flume leading down from the highway culvert to the track culvert was in good condition and taking care of the water, and he had never seen any water in the ditch. He did not examine the culvert under the highway as he had no occasion to do so. On his arrival at the scene of accident about 6 a.m. he found mud, rock and debris on the track and water was washing along the track as well as over it.

Track Inspector Holm stated that he had been over the track on a motor car on the morning of December 27 and he noted nothing unusual; the water was flowing down into the flume and no water was in the ditches. His territory extends between Skykomish and Interbay, a distance of 80 miles, and he covers it daily except Saturday.

District Roadmaster Torkelson stated that he was over the section of track on which the accident occurred on December 26 and there was no indication of a slide. This section consists of 11½ miles of main track, in charge of a section foreman and two men, the force having been reduced on November 1, in accordance with the regular policy during the winter months. The section foreman inspects the track on Saturdays.

Division Engineer Burr stated that on his arrival at the scene about 8 a.m. water averaging about 30 inches deep was standing on the flat north of the highway culvert covering an area 20 feet in width and 50 feet in length. A channel drained the meadow and adjacent hills to the north and at the time of his observations a stream having cross sectional area of 4 or 5 square feet was flowing to the highway culvert, and the culvert was not large enough to accommodate this flow. The water in the channel was probably not more than 12 or 18 inches deep, but it was building up pressure against the pipe, and not being able to go through the pipe it went into the fill. On the south side of the highway the concrete pipe was exposed and a full stream of water was being discharged from it, and in addition there was considerable discharge of water from the full face of the bluff where the slide had occurred, coming out on top of the gravel stratum. The whole area of the fill itself was very heavily saturated and had been under considerable pressure. The slide consisted of between 80 and 90 cubic yards, and a section of concrete pipe was lying on top of the slide. At the spigot end of this pipe there was a crescent-shaped old break, measuring from 6 to 8 inches, nearly half the diameter of the pipe. The edges of this break were weather-worn and washed. A piece of 12-inch corrugated pipe, 8 feet in length, was also lying on the slide; these two pieces of pipe had come from the end of the highway culvert. Division Engineer Burr stated that he thought the corrugated pipe had been an extension of the concrete pipe. He further stated that the sections of pipe under the highway were in 24-inch lengths with bell and spigot joints and apparently there had not been any attempt to cement the ends together.

Superintendent Close stated that on the morning of December 27 he rode on the observation platform of a passenger train eastbound over the territory on which the accident occurred, and returned westbound in the afternoon for the purpose of making observations as to the condition of the streams, the embankments and the snow, there having been severe snowstorms in the mountains. Between Skykomish and Lowell there was no water standing in the ditches, and the drains were properly taking care of the water. When he arrived at the scene of accident approximately 1 hour after its occurrence a full stream of water was running in the culvert pipe under the highway but there was no evidence of water having run over the highway. From his experience and from observation of the slide he was of the opinion that the embankment between highway and railroad after becoming saturated with water had settled slightly and in so doing had either parted the corrugated iron pipe from the concrete pipe or had disjointed the first two sections of the concrete pipe, and this had resulted in diverting the water flowing through the 12-inch pipe into the embankment, with the result that about 100 yards of material

slipped out upon the track. The rear car was standing over the slide, with rock and debris piled up to the floor of the car. The next three rear cars were on the track and free of any debris, which led him to believe that a considerable amount of debris had washed down after the train had stopped as it would have been impossible for these cars to pass through the accumulation on the track without becoming derailed. After the debris had been cleared away the track was found in good condition, with the ties in place, and the rail in good surface and alinement; the track was good for a speed of 70 miles per hour. Very little damage was done to the track from the point of derailment for a distance of 4½ car lengths; from that point westward the track was destroyed for a distance of 300 feet. Superintendent Close further stated that during the month of December, 1937, the records of the U.S. Weather Bureau at Seattle, showed 8.49 inches of rainfall, as compared with an average of 5.6 inches covering a number of years.

Observations of the Commission's Inspectors

The debris from the slide extended along the track for a distance of about 57 feet, and the first flange marks were found near the west edge of the debris.

Discussion

The slide consisted of between 80 and 90 cubic yards of debris, consisting of boulders, sand and mud, which became dislodged from a bluff on the north side of the track. The indications are that No. 27 arrived just after the slide started; at that time it was of sufficient depth on the track to derail the engine and first six cars, but the following three cars passed through it without being derailed. It was apparent that after the train stopped the slide material continued to come down as it finally reached to the floor of the rear car. The first mark of derailment was at the western end of the slide.

The slide area was directly under a highway culvert located above, and to the north of, the tracks. The culvert consisted of sections of 12-inch concrete pipe with bell and spigot joints which were not cemented together. One section of this pipe was found lying on top of the slide material as was also a 12-inch corrugated pipe 8 feet in length. At the spigot end of the concrete pipe there was a crescent shaped old break, measuring from 6 to 8 inches. Rainfall during the month of December had been considerably above the average and it was raining at the time of the accident. Because of this weather condition, and the fact that the 12 inch culvert was inadequate to handle the water draining toward it and consequently permitted water to accumulate north

of the highway, it is believed that the embankment between the highway and railroad had become saturated with water and had settled slightly, thus separating either the corrugated pipe from the concrete pipe or the concrete sections at the first joint. The resulting diversion of water into the ground washed out the already heavily water-soaked dirt on the face of the bluff. Heretofore no trouble resulting from water conditions has been experienced in this location.

Conclusion

This accident was caused by a landslide.

Respectfully submitted,

W. J. PATTERSON,

Director.