

INTERSTATE COMMERCE COMMISSION

WASHINGTON

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INVESTIGATION NO. 2507

THE NORTHERN PACIFIC RAILWAY COMPANY

REPORT IN RE ACCIDENT

NEAR ATHOL, IDAHO, ON

JUNE 13, 1941

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SUMMARY

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Railroad: Northern Pacific  
Date: June 13, 1941  
Location: Athol, Idaho  
Kind of accident: Derailment  
Train involved: Express  
Train number: Third 2  
Engine number: 2239  
Consist: 10 cars  
Speed: 40 to 60 m. p. h.  
Operation: Timetable, train orders and  
automatic block system  
Track: Single; 6°02' compound right  
curve, 0.3 percent descending  
grade eastward  
Weather: Clear  
Time: About 10:31 a. m.  
Casualties: 2 killed; 2 injured  
Cause: Accident caused by excessive  
speed on sharp curve

INTERSTATE COMMERCE COMMISSION

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INVESTIGATION NO. 2507

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

THE NORTHERN PACIFIC RAILWAY COMPANY

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August 5, 1941

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Accident near Athol, Idaho, on June 13, 1941, caused by  
excessive speed on sharp curve.

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REPORT OF THE COMMISSION<sup>1</sup>

PATTERSON, Commissioner:

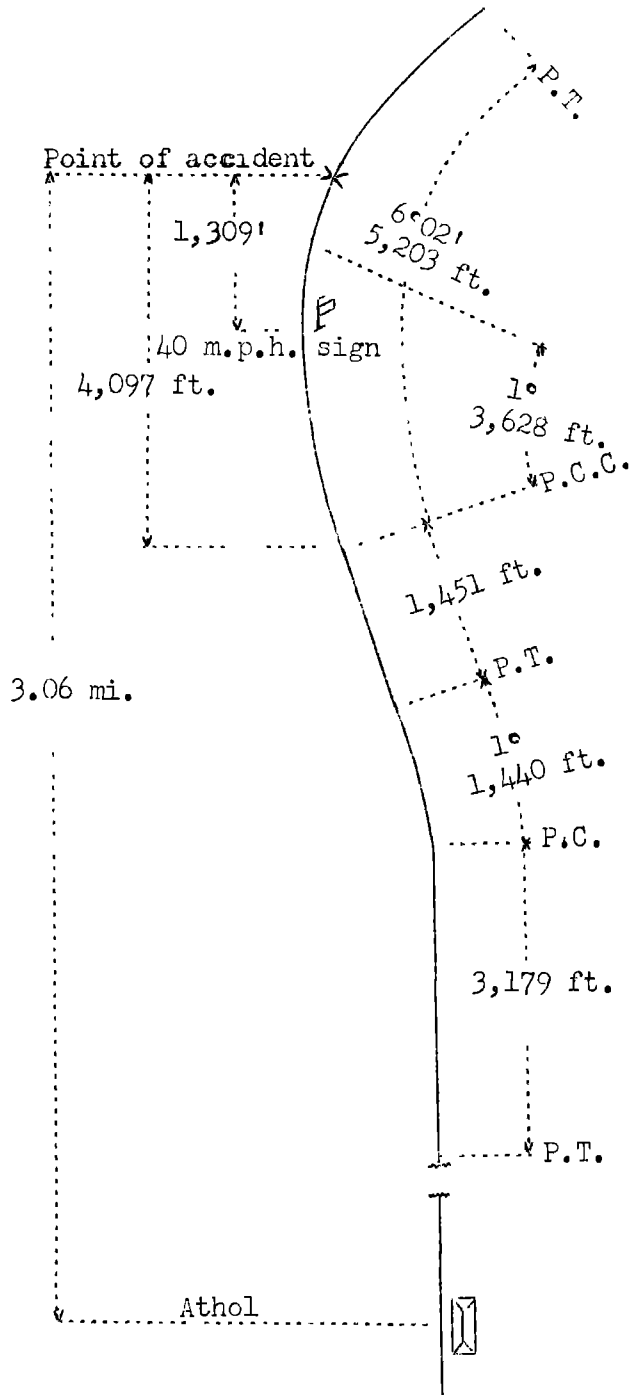
On June 13, 1941, there was a derailment of an express train on the Northern Pacific Railway near Athol, Idaho, which resulted in the death of two employees and the injury of two employees.

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Under 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 Paradise, Mont.  
144.34 mi.
- X Point of accident  
3.06 mi.
- o Athol, Idaho  
13.0 mi.
- o Rathdrum, Idaho  
23.5 mi.
- o Yardley, Wash.



Inv-2507  
Northern Pacific Railway  
Athol, Idaho  
June 13, 1941

## Location and Method of Operation

This accident occurred on that part of the Idaho Division designated as the First Sub-Division, which extends between Yardley, Wash., and Paradise, Mont., a distance of 183.9 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 a point 3.06 miles east of Athol. As the point of accident is approached from the west there are, in succession, a tangent 3,179 feet in length, a  $1^{\circ}$  curve to the left 1,440 feet, a tangent 1,451 feet, and a compound curve to the right 5,203 feet, having a maximum curvature of  $6^{\circ}02'$ . The accident occurred on this latter curve at a point 4,097 feet east of its western end where the curvature is  $6^{\circ}02'$ . The grade for east-bound trains varies between 0.5 and 0.3 percent ascending a distance of 3.06 miles and is 0.3 percent at the point of accident.

On the curve involved the track structure consists of 131-pound rails on the high side and 130-pound rails on the low side. The 131-pound rails were laid new in 1939 and the 130-pound rails were transferred from the high side to the low side in the same year. The rails are 39 feet in length and laid on an average of 22 or 23 treated hardwood ties to the rail length. The track is fully tieplated, double-spiked on the outside of the rail and single-spiked on the inside, equipped with an average of 10 or 11 rail anchors per rail, is ballasted with gravel, sand and cinders to a depth of 14 inches, and is well maintained. The maximum superelevation on the curve involved was  $4-5/8$  inches and the gage varied between 4 feet  $3-3/8$  inches and 4 feet  $8-9/16$  inches. At the point of derailment the superelevation was  $4-7/16$  inches and the gage was 4 feet  $8-1/2$  inches.

The maximum authorized speed on this curve is 40 miles per hour. A speed-limit sign bearing the numerals "40" is located 1,509 feet west of the point of derailment and 12.9 feet south of the center-line of the track. The maximum authorized speed at other points in this vicinity is 60 miles per hour.

The weather was clear at the time of the accident, which occurred about 10:31 a. m.

## Description

Third 2, an east-bound first-class express train, with Conductor Tompkins and Enginemen Reeves in charge, consisted of engine 2239, of the 4-6-2 type, nine express-refrigerator cars and one passenger-baggage car, in the order named; all cars were of steel-underframe construction. This train departed from Yardley, Wash., 36.5 miles west of Athol, at 9:40 a. m., accord-

ing to the train sheet, 1 hour 11 minutes late, passed Rathdrum, Idaho, 13 miles west of Athol and the last open office, at 10:16 a. m., 1 hour 19 minutes late, and while moving at a speed variously estimated as from 40 to 60 miles per hour was derailed at a point 3.06 miles east of Athol.

Engine 2239 was derailed to the left and, at a point 102 feet beyond, turned over on its left side, slid 208 feet and stopped, badly damaged, practically parallel to the track; its front end was 310 feet east of the point of derailment and 57 feet north of the center of the track. The cab was demolished and the steam turret and related piping were broken off. The engine truck was detached and stopped 97 feet beyond the engine and about 38 feet north of the center of the track. The tender was torn loose from the engine and was derailed to the left. The tender cistern stopped upright, badly damaged, 56 feet north of the center of the track and about 10 feet to the rear of the engine and at right angles to it; both trucks were detached and the frame was torn loose. The first car was derailed to the left and stopped 438 feet east of the point of derailment, at right angles to the track and 25 feet north of it; this car was demolished. The second car was derailed to the left and stopped with its front end 436 feet beyond the point of derailment and 84 feet north of the center of the track. The third, fourth, fifth and ninth cars were derailed to the left and stopped, in the order named, behind the second car and practically in line with it; these cars were badly damaged. The sixth car was derailed to the left and stopped on the roadbed, badly damaged, with its front end 104 feet east of the point of derailment. The seventh car stopped in front of the sixth car and was demolished. The eighth car was derailed to the right and stopped on the roadbed and leaned toward the south. The front truck of the tenth car was derailed. All trucks of the first five cars were detached and bunched together at a point about 210 feet east of the point of derailment and north of the track.

The employees killed were the engineman and the fireman, and the employees injured were the conductor and the flagman.

#### Summary of Evidence

Conductor Tompkins stated that at Yardley a terminal air-brake test was made and the brakes functioned properly en route. Just west of Rathdrum he began to trace the cords in the rear car to determine which one was attached to the conductor's emergency valve. As his train was approaching the point where the accident occurred, the speed was about 70 miles per hour. He was in the rear car, seated on the left side and facing toward the rear. When the engine was a short distance west of the 40-mile-per-hour speed restriction sign he felt a heavy service

application of the brakes and thought the speed was reduced to about 40 miles per hour; however, he was not experienced in judging speed when riding in passenger equipment. When the engine was about 500 feet west of the point where the accident occurred he felt the brakes release. Immediately following the release of the brakes he felt a slight shock as though something had happened to a truck or a pair of wheels and he reached for the emergency cord, but just at that time there was a series of surges of the train, then the brakes applied in emergency and the train stopped abruptly. He proceeded toward the front end of the train and examined the track. The left wheels of the front truck of the tenth car were on an overturned rail. On three ties about 10 feet west of the front truck there were flange marks about 1 foot north of the north rail. The fact that there were no companion marks inside the south rails indicated that the marks of derailment were made as some unit of the train was overturning to the left. His examination of track and equipment failed to disclose any condition that could have contributed to the cause of the accident. Based on the action of the rear of the train, he thought the engine was derailed about 40 seconds before all units of the train stopped. The first three cars stopped ahead of the engine. The weather was clear at the time of the accident.

Brakeman Moore thought the speed of his train was about 60 miles per hour at the time of the accident. The first he knew of anything being wrong was when he felt a heavy run-in of slack, which was followed by several others, and then the derailment occurred.

Flagman MacKinnon stated that at Yardley a terminal air-brake test was made. At Rathdrum, from the rear car he inspected the train and observed no indication of defective equipment. As his train was approaching the point where the accident occurred the speed was between 60 and 70 miles per hour and a service application of the brakes reduced the speed before the train entered the 6° portion of the curve. The first he knew of anything being wrong was a sudden impact, which was followed by several others, then the train stopped.

District Engineer Tremaine stated that he arrived at the scene of the accident before any equipment was moved or any track repairs were made. The first mark of derailment was at a point 469 feet east of the west end of the spiral between the 1° and the 6°02' portions where the curvature was 6°02' and the superelevation was 4-7/16 inches. This mark was on the base of the north rail on the outside and on a tieplate; the corner of the tieplate was bent downward. Two marks appeared on the tie about halfway between the tieplate and the north end of the tie. Starting at a point 27-1/2 feet west of the first mark of derailment a slight bruise mark on the gage side of the head of the north

rail indicated that a flange climbed to the top of the rail, crossed diagonally to a point 27-1/2 feet farther east, and then dropped on the outside portion of the base of the rail. There was no corresponding mark on the south rail. Eastward from the first mark of derailment marks appeared on the north ends of the next 20 ties. These marks progressed diagonally outward from the first mark of derailment to the north end of the twentieth tie. The first marks that appeared between the rails were about 52 feet east of the first mark of derailment. He examined the track westward from the point of accident and there was no indication of defective track or dragging equipment, or of any obstruction having been on the track. No ties were shifted in the ballast. Throughout a distance of 819 feet immediately west of the point of derailment the gage, superelevation and curvature were as follows:

<u>Stations</u>	<u>Distance west of point of accident</u>	<u>Degree of Curve</u>	<u>Superelevation</u>	<u>Gage</u>
1	819 feet	1°00'	2-1/16"	4' 8-1/2"
2	780 "	1°00'	2-1/16"	4' 8-3/8"
3	741 "	1°00'	2-1/16"	4' 8-7/16"
4	762 "	1°00'	2"	4' 8-1/2"
5	663 "	1°00'	2"	4' 8-5/8"
6	624 "	1°00'	2"	4' 8-1/2"
7	585 "	1°00'	2"	4' 8-1/2"
8	546 "	1°00'	2-1/16"	4' 8-5/8"
9	507 "	1°00'	2-1/8"	4' 8-1/2"
10	468 "	1°00'	2-1/8"	4' 8-1/2"
11	429 "	1°21'	2-1/8"	4' 8-3/8"
12	390 "	2°16'	2-11/16"	4' 8-1/2"
13	351 "	3°10'	3-1/8"	4' 8-3/8"
14	312 "	4°04'	3-5/8"	4' 8-9/16"
15	273 "	4°58'	4-1/8"	4' 8-1/2"
16	234 "	6°02'	4-5/8"	4' 8-1/2"
17	196 "	6°02'	4-9/16"	4' 8-3/8"
18	157 "	6°02'	4-1/2"	4' 8-1/2"
19	118 "	6°02'	4-1/2"	4' 8-9/16"
20	79 "	6°02'	4-9/16"	4' 8-1/2"
21	40 "	6°02'	4-9/16"	4' 8-1/2"
P. of D.		6°02'	4-7/16"	4' 8-1/2"

He said that on the curve involved the equilibrium speed is 34 miles per hour, the comfortable speed is 43 miles per hour, the safe speed is 50 miles per hour, and the overturning speed is 77 miles per hour. He said that after the engine and the cars became derailed they continued in a tangential direction. Because of the direction taken by the derailed equipment, together with the absence of flange marks between the rails at the point of derailment, it was his opinion that the equipment was lifted and overturned by centrifugal force as a result of excessive speed on the curve.



Assistant District Engineer Young corroborated the statement of District Engineer Tremaine in all essential details.

Division Roadmaster Stotler stated that he arrived at the scene about 3 hours after the accident occurred. He observed the marks of derailment to be as described by District Engineer Tremaine. The general condition of the track was good. On June 11 he rode once in each direction over the track involved and at that time the track was in good condition. He said that the view of the 40-mile-per-hour speed sign is unrestricted from the right side of the cab of an east-bound engine throughout a distance of 1,905 feet immediately west of the sign.

District Roadmaster Zanger stated that he arrived at the scene of the accident about 4 p. m. He found the marks of derailment to be as previously described. The track was torn up throughout a distance of 195 feet east of the first mark of derailment. The rails were bent and twisted but none was broken. No rail or angle bar was disconnected. On June 9 low joints on the curve involved were raised. About 9:30 a. m., June 12, he rode over the track involved and it was in good condition. The track is inspected daily by the track supervisor.

Track Supervisor Jacks stated that he was present when the curve involved was surfaced on June 9. On June 12 he inspected the track involved from a track motor car and at that time he did not observe any abnormal condition.

Section Foreman Jerisevich stated that on June 9 he spot-surfaced the curve involved wherever there was a variation from the prescribed superelevation of more than 1/4 inch.

General Master Mechanic Ernstrom stated that he examined engine 2239 at the scene of the accident and after it was removed to the shop. The No. 1 pair of wheels of the engine truck were torn loose from the engine-truck pedestals, and the axle was bent and the left wheel was loosened; however, a pressure of 100 tons was required to press the wheel off the axle. The back-to-back measurements of all pairs of wheels of the engine disclosed the spacing to be within the prescribed limits. All flanges were practically of full contour, over 1 inch in thickness, and their heights were within the prescribed limits. All lateral motion was within the prescribed limits. The greatest tread wear was 1/16 inch. The engine-truck center casting was in good condition and there was no indication of binding. No condition of the engine was found that would contribute to the cause of the derailment. He examined all wheel treads and the rails and there was no indication that any object had been run over. Because there were no marks between the rails opposite the first mark of derailment, because some of the equipment moved 438 feet in soft earth after it was derailed, and because of the damage sustained by the equipment, it was his opinion that the train entered the 6°02' portion

of the curve at a speed of at least 60 miles per hour, that the engine truck was the first to become derailed and that the derailment was caused by excessive speed. He said that the recommended braking practice in a location of this nature is to start the initial brake-pipe reduction a sufficient distance from the curve to reduce to the desired speed, and then either to release or to graduate the brake-cylinder pressure downward before the curve is entered.

Master Mechanic Clark stated that he examined the track and the equipment. West of the point of derailment there was no indication of anything having been dragged or of any obstruction on the track. Since the first marks of derailment were on the north or outside rail of the curve for some distance, since the equipment moved in a tangential line a considerable distance after it was derailed, and since the equipment sustained considerable damage, it was his opinion that the engine overturned as a result of excessive speed on the curve. In his opinion the speed was 55 or 65 miles per hour. There was no condition found on the engine that could have contributed to the cause of the derailment. According to the records, the engineman involved was first employed as a fireman on June 24, 1910, and was promoted to engineman on August 27, 1936. Because of incomplete records the master mechanic was not certain but he expressed the opinion that the engineman involved was assigned to yard service during 1937, 1938, and 1939. During 1940 he made four round trips between Paradise and Yardley as engineman, and during 1941 he made two round trips over the division. The records do not disclose that between May, 1940, and June, 1941, he performed service as fireman over the territory involved.

Road Foreman of Engines Mudd stated that on June 12 he rode on engine 2359 between Paradise, Mont., and Kootenai, Idaho, a distance of 115.9 miles. The engine rode smoothly and there was no evidence of any defective condition. He had ridden with the engineman involved and, based on observation of his performance, considered the engineman competent.

Agent-Operator Owen, at Rathdrum, stated that Third 2 passed his station at 10:16 a. m. and the speed was about 40 miles per hour.

Wire Chief Adderley, at Spokane, stated that the wires failed at 10:31 a. m.

Assistant Car Foreman Petty, at Yardley, stated that, together with Car Inspectors Lund and Shank, he conducted a terminal air-brake test on Third 2. Each brake applied and released properly. The brake-cylinder piston-travel was within the prescribed limits. The train air-signal equipment was tested and it functioned properly.

Superintendent Brastrup stated that only enginemen who have demonstrated their capability are qualified to operate passenger trains; however, the train involved was classified as a freight train that was being operated on a first-class schedule and a qualified passenger engineman was not required.

According to data furnished by the carrier, the total weight of engine 2239 was 323,700 pounds, distributed as follows: Engine truck, 61,200 pounds; No. 1 pair of driving wheels, 66,700 pounds; No. 2 pair of driving wheels, 66,300 pounds; No. 3 pair of driving wheels, 66,700 pounds; and trailing truck, 62,800 pounds. The tender was rectangular in shape and had two four-wheel trucks. Its capacity was 9,300 gallons of water and 17 tons of coal. The weight of the tender was 199,400 pounds. The diameters of the engine-truck wheels, the driving wheels, and the trailing-truck wheels were, respectively, 33-1/2 inches, 73 inches, and 45-3/4 inches. The rigid wheelbase of the engine was 14 feet and the total length of the engine and tender was 84 feet 5-7/8 inches. The last Class 3 repairs were completed during March, 1939, and the last Class 5 repairs were completed during November, 1940. The accumulated mileage was 38,434 miles since the Class 5 repairs were made and 140,692 miles since the Class 3 repairs.

#### Observations of the Commission's Inspectors

The Commission's inspectors examined the track in the vicinity of the point of derailment and found no indication of any equipment having been dragged or of any obstruction having been on the track prior to the derailment. The marks on the north rail west of the point of derailment and the marks at the point of derailment were found to be as previously described. The first marks that appeared between the rails were 52 feet east of the first mark of derailment. Apparently no condition of the engine or equipment that could have contributed to the cause of the derailment existed prior to the time of the accident.

#### Discussion

According to the evidence, Third 2 was moving at a speed variously estimated as from 40 to 60 miles per hour on a 6°02' portion of a compound curve to the right when the engine was derailed to the left and overturned on its left side. The maximum authorized speed on the curve involved was 40 miles per hour. The rails were in good condition. The gage varied between 4 feet 8-3/8 inches and 4 feet 8-9/16 inches. The superelevation at the point of derailment was 4-7/16 inches. On the 6°02' portion of the curve the greatest variation between two adjacent stations 39 feet apart was 1/8 inch. There was no indication in the ballast of ties having been shifted, of any obstruction on the track, or of any dragging or defective equipment.

The equipment and the air brakes had been inspected 40 miles west of the point of accident and no defective condition was disclosed. The air brakes functioned properly en route. After the accident occurred inspection of the equipment failed to disclose any defective condition which might have existed prior to the occurrence of the accident and contributed to the cause of the derailment.

According to A. R. E. A. superelevation tables, the maximum safe speed at the point where the accident occurred is about 50 miles per hour and the overturning speed is about 77 miles per hour. The highest estimate of the speed at the time the train entered the 6°02' portion of the curve was 17 miles per hour less than the overturning speed but 10 miles per hour more than the maximum safe speed. Apparently the engine was rolling enough laterally to permit one or more wheels to climb the high rail, as marks on the gage side and on the head of this rail indicated that a flange had moved from the gage side diagonally and dropped to the outside in a distance of 27-1/2 feet. These marks indicate that the train was being operated at a speed in excess of the maximum safe speed, and this is also borne out by the positions in which the engine and cars stopped.

The conductor estimated the speed to be about 70 miles per hour when the engine was about 1,500 feet west of the point where the accident occurred and about 40 miles per hour at the time of the accident. Apparently the conductor was somewhat concerned about the speed a short time before the derailment occurred, as he began to take action to identify the cord connected to the conductor's emergency valve when the train was only a few miles west of the point where the accident occurred. The brakeman's estimate of the speed was considerably higher than that made by the conductor. From the flagman's estimate of the speed at the point where he thought the brakes were applied, it appears that the speed was higher at the time of the derailment than the estimate made by the conductor. The engineman and the fireman were employees of long service. The engineman had not had much experience as a road engineman but he was considered competent. It is not known why proper action was not taken on the engine to control the speed, as both the engineman and fireman were killed in the accident.

#### Cause

It is found that this accident was caused by excessive speed on a sharp curve.

Dated at Washington, D. C., this fifth day of August, 1941.

By the Commission, Commissioner Patterson.

(SEAL)

W. P. BARTEL,  
Secretary.