

1935

INTERSTATE COMMERCE COMMISSION

REPORT OF THE DIRECTOR OF THE BUREAU OF SAFETY CONCERNING AN
ACCIDENT ON THE PENNSYLVANIA RAILROAD AT CLY, PA., ON
SEPTEMBER 29, 1934.

November 21, 1934.

To the Commission:

On September 29, 1934, there was a derailment of a freight train on the Pennsylvania Railroad at Cly, Pa., and as a result an adjacent track was damaged and caused the derailment of another freight train, the wreckage of this second train striking a passing freight train on a third track, resulting in the death of 2 employees and the injury of 1 employee.

Location and method of operation

This accident occurred on that part of the Philadelphia Division known as the York Haven Line, which extends between Wago Junction and Dy Block Station, Enola, Pa., a distance of 19.1 miles; it is a 4-track line over which trains are operated by time table, train orders, and an automatic block-signal system, with tracks 1 and 2 equipped with a cab-signal system. The tracks are designated from south to north as follows: 1, eastward passenger; 2, westward passenger; 3, eastward freight; 4, westward freight. All three derailments occurred within interlocking limits; the first on track 3 at the west end of a facing-point cross-over connecting tracks 3 and 4; the second on track 4 at the east end of the cross-over, and the third on track 2 in the vicinity of the cross-over; this cross-over is located approximately 200 feet east of the interlocking tower at Cly. Approaching the cross-over from the west, the track is tangent for a distance of 2,500 feet and then there is a 1°40' curve to the left 1,700 feet in length, followed by tangent track for a distance of 1,700 feet, the cross-over being located on this tangent at its western end. The grade is level in the vicinity of Cly, followed by a slight descending grade for east-bound trains.

The signals governing movements at Cly interlocking are of the position-light type; the east-bound signals are mounted on a signal bridge about 800 feet west of the tower, while the signals governing west-bound movements on tracks 2 and 4 are located on masts 962 feet and 536 feet east of the tower, respectively.

To Enola

MP 74

460 ft.- Portion of journal box bolt with nut and nut lock.

Highway crossing

Highway crossing

GOLDSBORO
14,400 ft.

MP 73

Highway crossings

MP 72

- Track 4 - Westward freight
- Track 3 - Eastward freight
- Track 2 - Westward passenger
- Track 1 - Eastward passenger

MP 71

2°10'
1,600 ft.

Highway crossings

2,500 ft.

MP 70

Point of derailment, Extra 6753

CLY

1°40'
1,700 ft.

Train Second P-5

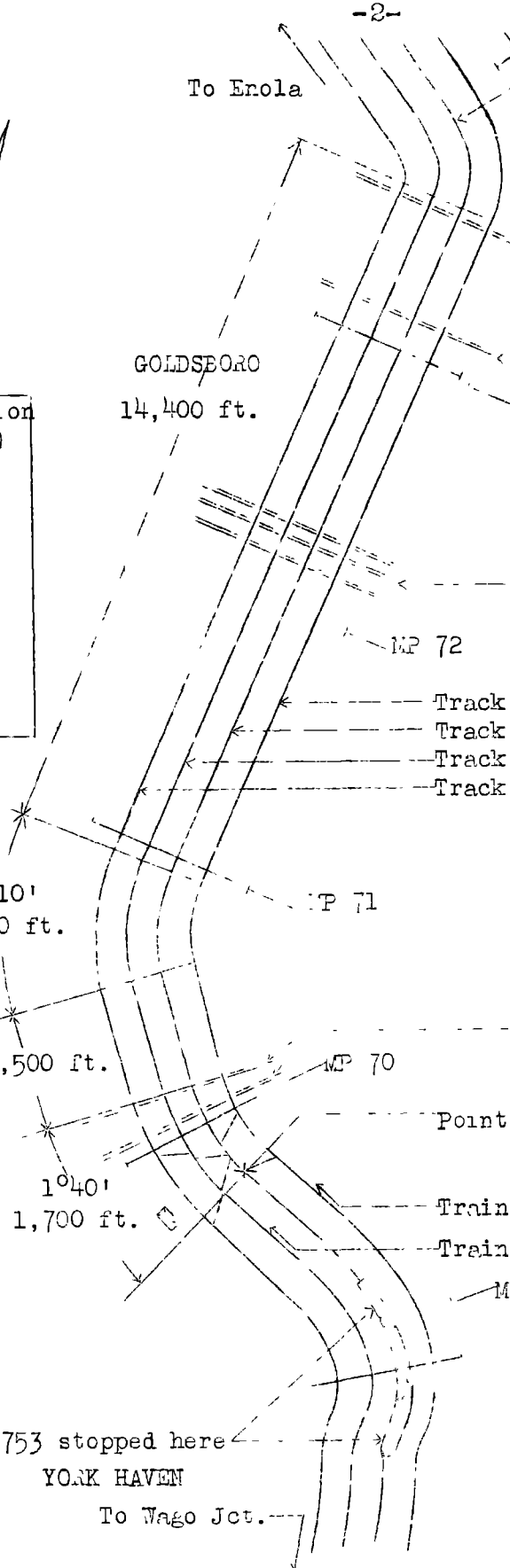
Train B-1

MP 69

Extra 6753 stopped here
YORK HAVEN
To Wago Jct.

Inv. No. 1935
Pennsylvania Railroad
Cly, Pa.
Sept. 29, 1934

CLY Block Station (Enola, Pa.)
13.4 mi.
Goldsboro
2.5 mi.
Cly
3.2 mi.
Wago Jct.



Track 3 is laid with 130-pound rails, 33 feet in length, with 18 treated ties to the rail length, fully tieplated, ballasted with trap rock, and is maintained in good condition. The maximum authorized speed for freight trains on all tracks is 40 miles per hour.

It was dark and cloudy at the time of the accident; the derailment of the first train occurred about 3:08 a.m., and the derailments of the other two trains occurred about 3:25 a.m.

Description

East-bound freight train Extra 6753 consisted of 66 cars and a caboose, hauled by engine 6753, and was in charge of Conductor Wagner and Engineman Fackenthal. This train left DY Block Station, Enola Yard, at 2:40 a.m., on track 3, passed Cly interlocking tower at 3:08 a.m., and was stopped with the front end at York Haven, 1.4 miles east of Cly, when fire was observed flying from one of the cars in the train which was found to be a result of a broken truck which had become derailed.

West-bound freight Train Second P-5 consisted of 107 cars and a caboose, hauled by engines 6759 and 6948, and was in charge of Conductor Bader and Enginemen Feasel and Baston. This train left LG-42 Block Station, 16.1 miles east of Cly, at 2:45 a.m., and was traveling on track 4 when it became derailed at the facing-point cross-over leading to track 3 at Cly while traveling at a speed estimated to have been from 30 to 35 miles per hour.

West-bound freight Train B-1 consisted of 57 cars and a caboose, hauled by engine 3586, and was in charge of Conductor Fisher and Engineman Ransom. This train was en route from Baltimore to Enola, and was passing through Cly on track 2 at a speed estimated to have been between 20 and 25 miles per hour when the seventeenth car was struck by the wreckage of Train Second P-5.

Extra 6753 had only one pair of wheels derailed, these being under the thirty-first car, and they caused only minor damage to the track except at Cly interlocking where they started to follow the lead rail of the cross-over and pulled track 4 out of line. Engine 6759, the lead engine of Train Second P-5, together with its tender, was derailed to the right on encountering the track which had been pulled out of line, and stopped on its right side over the embankment to the right of track 4. Engine 6948, the second engine, also was derailed and stopped between tracks 3 and 4 tipped to the right at an angle of about 45°, with the tender directly behind it and forced into the cab of the engine. The wreckage of this

train fouled track 2, and the first 14 cars, and also the twenty-first to the thirtieth cars, inclusive, in Train B-1, were derailed and badly damaged; these cars blocked all four tracks and were piled up in various positions within a distance of about 200 feet. The employees killed were the engineman and a head brakeman on the second engine of Train Second P-5 and the employee injured was the fireman of this engine.

Summary of evidence

Engineman Fackenthal, of Extra 6753, stated that after passing Cly and on rounding a curve to the right the brakeman called his attention to fire flying from one of the cars, and on looking back it appeared to him from the steady stream of flying sparks that a brake must be sticking. He stopped the train with a service application of the air brakes and the brakeman went back to ascertain the trouble, the engineman watching the brakeman and not paying particular attention to the two trains that passed by, having assumed a brake was sticking, he did not think it necessary to provide flag protection on the adjacent tracks. At Enola Yard a terminal air brake test had been made by the train crew and the brakes reported as operating properly, and on leaving that point he made a running test, not again applying the brakes until he stopped his train beyond Cly, and although the train had traveled a distance of 16 miles it did not occur to him that it was strange then to find a stuck brake. Fireman Rode was on his seatbox after passing Cly and did not see the flying fire; the engineman, however, told him it probably was due to a stuck brake and he did not give any thought to protecting the adjacent tracks, the stop being made in an ordinary manner and the engineman not instructing him to provide protection.

Head Brakeman Zimmerman of Extra 6753, stated that he rode on the box in the tender, looking back over the train from the time they left Enola to the point where he saw sparks flying. He immediately warned the engineman and as soon as the train was stopped he went back to ascertain the trouble and found one pair of wheels of the front truck of the thirty-first car derailed to the left. There were wheel marks on the ties on the inside of the south rail but he did not see any marks on the outside of the north rail; the conductor then joined him and they made an inspection together. There was ample time to provide flag protection but he did not think it necessary inasmuch as the car did not foul the adjacent tracks. Train B-1 passed while they were inspecting the car and train Second P-5 went by while they were en route to the telephone.

Conductor Wagner, of Extra 6753, stated that while he was working on his reports after leaving Enola the flagman frequently went to the rear end of the caboose to look over the train and on passing the interlocking tower at Cly the flagman exchanged signals with the operator, the flagman just having entered the caboose when they felt the air brakes being applied. After getting off the caboose Conductor Wagner saw wheel marks on the ties behind the caboose, and then started toward the head end of his train. He saw that the box bolts on the front end on the left side of the derailed truck were missing and part of the strap broken, but inasmuch as the car did not foul the adjacent tracks he did not think it necessary to flag those tracks and it did not occur to him that the switches at the interlocking at Cly might be damaged. Conductor Wagner was familiar with the rule which requires that all tracks must be protected when an equipment failure occurs that may obstruct adjoining tracks, but said that after examining the derailed car and finding that it did not obstruct any other track he did not think it proper to flag the trains.

Flagman Clouser, of Extra 6753, stated that as soon as the train stopped he went back to flag and saw marks on the track which he thought might have been made by a dragging spreader bar. He did not know whether these marks had been made by his own train or another train, and it did not occur to him that something might be wrong with his own train which could have affected the condition of the other tracks, his train having been stopped in an ordinary manner by a service application of the brakes.

Engineman Feasel, of the lead engine of Train Second P-5 stated that approaching York Haven he observed a train standing on track 3 and was on the lookout for a fusee or signal indicating that there was something wrong with the train, but he saw no signals of any description. He had been drifting, with steam shut off on his own engine and also on the helper engine, but on seeing clear indications displayed by the distant and home signals, he began to work steam and was traveling at a speed of between 30 and 35 miles per hour when after passing the home signal the engine lurched and became derailed; he then applied the brakes in emergency, the engine turned over immediately afterward. On inspecting the track after the accident he found that track 4 had been pulled over toward track 3 about 2 feet or more, and concluded that the cross-over had been pulled out of line, pulling track 4 with it, and that his engine became derailed when it struck the frog of the cross-over switch. The switch had not been damaged and the points were in good condition, fitting tightly.

Engineman Ransom, of Train B-1, stated that he watched Extra 6753 standing on track 3 as he passed it, and observed the flagman at the rear of that train. Approaching Cly the distant and home signals displayed clear indications and he was operating his train at a speed of between 20 and 25 miles per hour on passing through the interlocking plant. When his engine was opposite the tower he looked back and saw a train approaching on track 4, and he had previously noted that the home signal on that track also displayed a clear indication. On approaching the signal bridge west of the tower he felt the air brakes being applied and the cab signal on his engine went from clear to caution-slow-speed; he immediately placed his brake valve in lap position and on looking back he saw there had been an accident.

The statements of the crew of Train AP-19, which passed Cly at 3:05 a.m., traveling westward on track 4, were to the effect they noticed nothing unusual on passing through the interlocking, and on passing Extra 6753 in the vicinity of Goldsboro, 2.5 miles west of Cly, the fireman, head brakeman and flagman watched that train as it passed and nothing out of the ordinary was seen by them.

Block Operator Stoner, on duty at Cly, stated that during part of the time that Extra 6753 was passing the tower, which is on the south side of the tracks, he was talking with the dispatcher on the telephone, although he was able to observe the train at the same time and did not see any fire flying nor did he hear any unusual noise, and he said he signaled to the flagman with his flash light that everything was all right. The first intimation he had of anything wrong was when the front end of Train B-1 broke away as the train was passing the tower; he heard a crash and escaping steam, the indicators in the tower went out, and the power was off in the entire plant. He had had no occasion to operate the switches between tracks 3 and 4 after the passage of Extra 6753 and at no time was there any indication in his plant that the track had been disturbed in any way; the indicators were clear until the derailment of Trains B-1 and Second P-5.

Foreman of Car Inspectors Manahan stated that he inspected the derailed car in Extra 6753, BWC Co hopper car 2323. The lead pair of wheels of the front truck were derailed to the left and both journal box bolts were missing. This condition, together with the position of the top and bottom arch bars and the angle at which the free journal box stood, indicated that the truck had collapsed due to the box bolts losing out, and in all probability shearing off, as indicated by the bent condition of the two arch bars. In searching for the missing

material Foreman Manahan found first, at a point 460 feet east of mile post 74 along the north side of track 3, a portion of a journal box bolt 15 3/4 inches in length with nut and nut lock attached. In the vicinity of mile post 70, at a trailing-point cross-over between tracks 3 and 4, this cross-over being located just west of the cross-over at which Train Second P-5 became derailed, a portion of a 1 3/4-inch column bolt with nut attached was lying back of and west of the heel filler block of the frog in track 3; within 4 feet of this bolt and between the rails was a 1 3/4-inch nut lock, and at a point 1,136 feet east of the frog a section of the bottom stay iron, from between the column bolts, was found. At a point 68 feet eastward he found another box bolt 1 1/4 inches by 15 3/4 inches with box nut and nut lock attached; at a point 45 feet beyond, along track 4, there was a long section of the journal box end of a stay iron, and a small sliver of stay iron was found wedged in the top of the frog previously mentioned. The other box bolts in this truck were 17 inches in length and as the top arch bar was 1 1/4 inches thick, it was his opinion that the box bolts were sheared off between the two arch bars, but he was unable to state the cause of the shearing action. The holes in both the top and bottom bars were in good shape, and about 1/16th inch larger than the bolts passing through them; those in the stay iron were 1 3/8 inches. Both box bolts showed some wear at the points where they engaged the stay iron and there was some play on the threaded portion of the nut and bolt which he thought was the inside box bolt. All other parts and the brake rigging were in place, and it was his opinion that they were in good condition prior to the accident.

Division Engineer Hoopes found that track 4 had been pulled out of line to a maximum of 27 inches; at the time of his inspection the west end of the cross-over was covered by wreckage, and track 4 and the cross-over were torn out west of a point approximately 20 feet west of the heel of the switch. Later in the day he looked for marks through the interlocking and found the frog of the trailing-point cross-over between tracks 4 and 3 at the west end of the interlocking had been freshly scored. He then inspected the two highway crossings a short distance west of Cly, the three crossings near Goldsboro, and the two crossings west of Goldsboro, approximately 3 1/2 miles west of the wreckage. He was informed by the flagmen of the wreck trains stationed at one of the crossings a short distance west of Cly that trackmen had replaced the stone along one of the tracks during the day, as these crossings were practically impassable on account of having been torn out, and he found on examination that the stone had been torn out at the crossings at Goldsboro and also west of Goldsboro, and some of the stones showed unmistakable evidence of recent fracture.

While the crossing at the extreme west end showed a very faint mark compared with the crossings at Goldsboro, he nevertheless was convinced that it had been made by the damaged truck. The first marks of derailed wheels east of the wreck were near the center of track 3 a short distance west of the heel of the switch in track 4; these marks continued eastward to the point where the derailed car was stopped. Division Engineer Hoopes was of the opinion that the truck broke down on the curve west of Goldsboro, probably at the point where the first box bolt was found 460 feet east of mile post 74, and that the truck gradually settled as the train moved eastward. The nut of one of the column bolts was torn off in the frog in the trailing-point cross-over between tracks 4 and 3 and when this truck encountered the facing-point cross-over the lead wheels became derailed and followed the rail of track 3 until they encountered the frog, from which point they continued inside the cross-over rail, pulling track 4 out of line after they had passed over the long switch timbers until finally the strain caused these wheels to mount the rail of the cross-over, after which the truck was in such a position as to mark the ties between the rails until the train was stopped.

Car Inspectors Enders and Rodebaugh made an inspection of the first 40 cars of Extra 6753 when they arrived in the receiving yard at Enola on the morning of September 28; this inspection included BWC Co Hopper car 2323, and no defects were found on any of the cars.

Statements made by Rules Examiner Cunningham, Freight Trainmaster Peoples, and Superintendent Gerard were to the effect that all employees in train service are periodically instructed and examined with respect to their knowledge and familiarity with the operating rules, together with their meaning and how to execute them. Rules 101-B and 107 are old and long-established and in their opinion are thoroughly understood by every employee on the railroad, especially the train-service employees. Rule 101-B relates to protecting other tracks in case the brakes are applied suddenly or there is an equipment failure which may obstruct other tracks, and rule 107 relates to taking a safe course in case of doubt or uncertainty. Conductor Wagner of Extra 6753 had last been examined on the rules on January 2, 1934, and was said to have given evidence of having a thorough knowledge and understanding of them.

Inspection of the track by the Commission's inspectors from a point west of mile post 74 to a point east of mile post 69 disclosed the track to be in good condition and nothing was found that could have contributed in any way to the cause of

the accident. Inspection of the front truck of BWCM hopper car 2323 at the scene of the accident and also at later dates disclosed it to be in the condition previously described. It appeared that the left front journal box bolts on the forward truck, had been sheared off apparently between the top and bottom arch bars; the arch bars on this side of the truck appeared to have been in a generally good condition prior to the accident. BWCM car 2323 is a high side hopper car, equipped with diamond arch-bar trucks, built in February 1902, with a capacity of 100,000 pounds, and at the time of the accident was loaded with 108,900 pounds of bituminous coal.

Inspection of track 4 before any work had been done showed that it had been pulled southward toward track 3 a maximum of 27 inches; the switch points of the facing-point cross-over leading from track 4 to track 3 were intact and undamaged, and in position for a straight movement on track 4. From the cross-over to the point where Extra 6753 was stopped, flange marks appeared on the ties from 17 to 18 inches from the gauge side of the south rail of track 3. There were no marks on the outside of the left or north rail, due apparently to the spring plank riding this rail and the rear wheels of the truck remaining on the rails.

Subsequent to the investigation a report was furnished by the engineer of tests of the railroad company covering the examination and test of the broken bolts and portions of the arch bars. This report showed that no failure of the arch bars was involved, although they showed considerable wear on the contact faces and some elongation of the bolt holes. The column bolt was broken at the inside face of the nut, the fracture being a tear-shear and entirely secondary, while both journal box bolts showed straight shear fractures and were no doubt the primary cause of the truck failure; there was considerable wear on the threads of these bolts, one of which was of soft steel and the other of wrought iron, and both of which were of good quality material. The general examination also indicated, by the existing wear, that the truck assembly probably was somewhat loose, but that this condition could not have been detected without removing the sustained load or disassembling the truck. The journal box bolts did not show any indication of prior shear, and the opinion was expressed that the failure of these bolts by well-defined shear was due directly to some service shock in conjunction with the concealed wear existing on the truck assembly as a whole.

Conclusions

This accident was caused by the failure of an arch-bar truck.

The investigation disclosed that the front journal box bolts on the left or north side of the forward truck of the thirty-first car in Extra 6753 had been sheared off at a point between the top and bottom arch bars. The failure of this truck apparently started at a point approximately 4 miles west of the point of derailment, where a portion of one of the box bolts was found. Between this point and Cly there was evidence of the truck having been dragging sufficiently to encounter the stone ballast along the north side of track 3 at six road crossings. A further sagging of the truck is indicated by a portion of a column bolt, nut and nut lock found near the heel filler block of the frog at the trailing-point cross-over at Cly. As the truck encountered the facing-point cross-over the lead wheels apparently became derailed, the left wheel following the lead rail of this cross-over and pulling track 4 southward toward track 3 until the wheel finally passed over the rail; the truck then continued on track 3, causing the ties to be marked about 18 inches from the gauge side of the south rail until the train was stopped. Subsequent examination of this truck by the engineer of tests of the railroad indicated that the journal-box bolts had sheared off, probably as a result of some service shock in conjunction with looseness and considerable wear in the truck assembly, which in his opinion could not have been detected without removing the sustained load or disassembling the truck. The car had received a regular inspection at Enola, at which time nothing wrong was noted.

The evidence further indicated that track 4 had been pulled southward a maximum distance of 27 inches, thereby causing the derailment of Train Second P-5, the crew of which had not been given any indication that there was anything wrong; the wreckage from Train Second P-5 was responsible for the derailment of Train B-1, which was passing at the time.

Rule 101b provides that "when a sudden or severe application of the brakes takes place or an equipment failure occurs that may obstruct adjoining tracks, all tracks must be protected immediately." The crew of Extra 6753 made no attempt to provide flag protection on the adjacent tracks, stating that under the circumstances they did not consider it necessary; the engineman assumed that the fire flying from his train was due to a stuck brake, although he had not applied the brakes from the time his train left Enola, a distance of approximately 16 miles, while

the conductor saw marks on the ties behind the caboose as soon as he got off but on going forward he found that the derailed truck did not foul the adjacent tracks and consequently did not think it necessary to protect those tracks. These men were experienced employees, fully posted on the rules, and there was ample time available in which to take steps to safeguard other movements until it had been ascertained whether or not any damage had been done; the taking of such protective measures would have prevented the subsequent derailment of Trains Second P-5 and B-1.

Within the past 2 or 3 years investigation has been made of several serious accidents which were due to the failure of arch-bar trucks, and attention is called to the fact that in 1931 action was taken by the American Railway Association to bring about the elimination of trucks of this type, which are a menace to safe operation. The result of this action was the inclusion in the A.R.A. interchange rules of a rule providing that cars equipped with arch-bar trucks will not be accepted from owners after January 1, 1936. The close approach to the date beyond which cars with trucks of this type may not be received from the owners should give impetus to the work of making the changes necessary to comply with this rule within the time-limit specified.

Respectfully submitted,

W. J. PATTERSON,

Director.