Inv-2230

INTERSTATE COMMERCE COMMISSION

WASHINGTON

REPORT OF THE DIRECTOR

BUREAU OF SAFETY

ACCIDENT ON THE

BALTIMORE & OHIO RAILROAD

GREAT CACAPON, W. VA.

DECEMBER 1, 1937.

INVESTIGATION NO. 2230

SUMMARY

Inv-2230

Railroad:	Baltimore & Ohio		
Date:	December 1, 1937		
Location:	Great Cacapon, W. Va.		
Kind of accident:	Derailment; wreckage struck by opposing train on adjacent track.		
Trains involved:	Freight	:	Passenger
Train numbers:	Extra 6143	:	No. 7
Engine numbers:	6146	:	5003
Consist:	102 cars and caboose	:	10 cars
Speed:	20-25 m.p.h.	:	20-30 m.p.h.
Track:	Derailment occurred on $0^{\circ}20'$ curve; collision occurred on tangent; descending grade for east-bound trains, varying from 0.08 to 0.17 percent.		
Time:	2:13 a.m.		
Weather:	Cloudy		
Casualties:	11 injured		
Cause:	Arch bar truck failure		

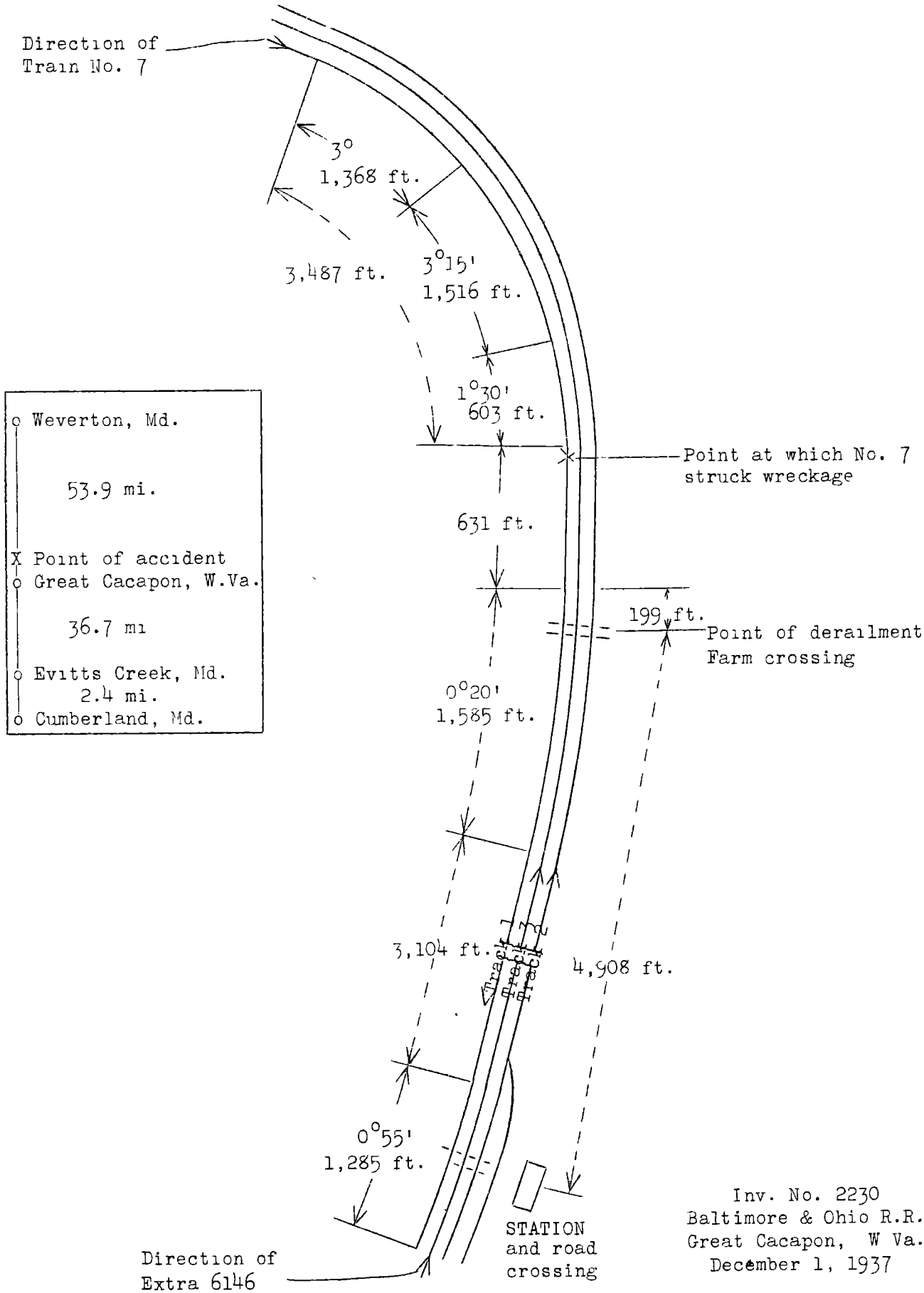
To the Commission:

On December 1, 1937, there was a derailment of a freight train on the Baltimore & Ohio Railroad near Great Cacapon, W.Va., the wreckage of which was struck by a passenger train traveling in the opposite direction on an adjacent track, resulting in the injury of 11 passengers.

Location and method of operation

This accident occurred on the East End Subdivision of the Cumberland Division which extends between Cumberland and Weverton, Md., a distance of 93.0 miles. In the vicinity of the point of accident this is a 3-track line over which trains are operated by timetable and train orders; movements on tracks 1 and 2 are governed by an automatic block-signal system, and on track 3 by manual block rules. The tracks numbered from north to south are: No. 1 westward high speed track, No. 3 eastward slow speed track, and No. 2 eastward high speed track. The freight train involved was traveling eastward on track 3, while the passenger train was traveling westward on track 1. The derailment occurred on track 3 at a farm crossing located 4,908 feet east of the station at Great Cacapon, and the wreckage was struck by the opposing train approximately 806 feet east of the point of derailment. Approaching from the west there is a $0^{\circ}55'$ curve to the left 1,285 feet in length, followed by tangent track for a distance of 3,104 feet, and then a $0^{\circ}20'$ curve to the left 1,585 feet in length; the derailment occurred on this latter curve 199 feet from its eastern end. Approaching from the east the track is tangent for a distance of 470 feet, followed by a compound curve to the right 3,487 feet in length, with a maximum curvature of $3^{\circ}15'$, and then tangent track for a distance of 631 feet; the collision occurred on the last mentioned tangent 24 feet from its eastern end. The grade for east-bound trains is 0.08 percent descending for more than 3,000 feet to the point of collision where it changes to 0.17 percent descending.

In the immediate vicinity of the point of accident the tracks are laid on a hill side with an embankment about 8 feet high on the north side. Tracks 1 and 2 are laid with 130-pound rails, 39 feet in length, with 22 ties to the rail length, double-spiked and fully tie-plated. Track 3 is laid with 100-pound rails, 39 feet in length, with 22 ties to the rail length, single-spiked and fully tie-plated. The tracks were ballasted with stone to a depth of more than 12 inches.



Inv. No. 2230
Baltimore & Ohio R.R.
Great Cacapon, W Va.
December 1, 1937

The last automatic signal governing westward movements on track 1 is located 2,662 feet east of the point of accident.

The weather was cloudy at the time of the accident, which occurred at 2:13 a.m.

Description

East-bound freight train Extra 6146 consisted of 102 loaded steel cars and a caboose, hauled by engine 6146, and was in charge of Conductor Keenan and Engineman Trussell. This train departed from Evitts Creek, Md., 36.7 miles from Great Cacapon, at 12 midnight, according to the train sheet, passed Orleans Road, 6.3 miles from Great Cacapon at 1:58 a.m., and was running on track 3 at a speed estimated to have been between 20 and 25 miles per hour when it became derailed at a farm crossing east of Great Cacapon.

West-bound passenger train No. 7 consisted of one mail car, one express car, one combination car, one coach, one lounge car, and five Pullman sleeping cars, in the order named, of all steel construction, hauled by engine 5003, and was in charge of Conductor Keyser and Engineman Myers. This train departed from Weverton, Md., 53.9 miles from Great Cacapon, at 12:57 a.m., according to the train sheet, 2 minutes ahead of time, passed Sir Johns Run, 4.1 miles from Great Cacapon, at 2:09 a.m., 4 minutes ahead of time, and was running on track 1 at a speed estimated to have been between 15 and 30 miles per hour when it collided with the wreckage of Extra 6146.

The engine and first six cars of the freight train were not uncoulped or derailed and stopped with the engine about 1,339 feet beyond the initial point of derailment. The seventh car, the first to be derailed, was thrown upon track 1 and stopped at a point 585 feet beyond the point of derailment. The following three cars ran by the seventh car and were sideswiped by it. They were stopped when they struck the head end of the train; the front truck of the eighth car was derailed. The eleventh to twenty-first cars, inclusive, were derailed; ten of these cars were jackknifed within a space of about 135 feet and stopped across all three tracks. The front truck of the twenty-second car was also derailed, and this car stopped opposite the seventh car. Engine 5003 of the passenger train was derailed to the north and stopped on its right side down the embankment with its front end 39 feet from the center line of track 1. The tender broke loose from the engine and stopped on its right side behind the engine, but remained coupled to the first car; none of the remaining equipment in this train was derailed or damaged.

Summary of evidence

Engineman Trussell, of Extra 6146, stated that a terminal air brake test was made before leaving Cumberland and the brakes functioned properly en route. He was working a very light throttle and the train was stretched and was rounding the curve east of Great Cacapon when the head brakeman called out that fire was flying in the train. He immediately closed the throttle and attempted to apply the air brakes in emergency, but before he was able to do so the brake pipe pressure went to zero. The brakeman grabbed his lantern and jumped off and the fireman was right behind him with a fusee. Engineman Trussell then looked out from the fireman's side, saw the fireman cross the tracks in front of No. 7, which was then only about 3 car lengths away. Fire flying from the wheels of No. 7 indicated that the brakes had been applied. Engineman Trussell stated that his own train had been traveling at a speed of between 20 and 25 miles per hour at the time of the accident, and that it moved a distance of about 12 car lengths after the brakeman's warning was given. His engine was stopped when No. 7 passed it.

Fireman Werking, of Extra 6146, stated that on rounding the curve approaching Great Cacapon he looked back over the train and did not see any indication of fire flying, but entering the curve east of Great Cacapon the brakeman called out that a car had broken down. Just prior to this he had seen the headlight of No. 7 approaching around the curve to the east. He immediately grabbed a fusee, lighted it and jumped off into the middle of track 1 just as his engine was coming to a stop. No. 7 was then about 3 car lengths east of his engine and he had to jump to get out of the way. He heard a blast of the whistle and when the engine passed him he saw fire flying from the brakes.

Head Brakeman Mason, of Extra 6146, stated that he also had seen the headlight of No. 7 before he saw the fire flying from one of the cars in his own train, and after giving the warning he immediately grabbed a lantern while the fireman was lighting a fusee. They both flagged No. 7 and ran across track 1 and down the bank to avoid being struck. He thought that No. 7 was not more than 15 or 20 car lengths distant when he jumped off his own engine.

Conductor Keenan, of Extra 6146, stated that he was on the left side in the cupola of the caboose when he felt the air brakes being applied in emergency; he saw No. 7 approaching and the lighted fusee near his engine. He then saw No. 7 strike the wreckage and turn over down the bank. He did not see any fire flying from under his train prior to the emergency brake application. He thought the rear portion of his train traveled a

distance of about 18 car lengths before it stopped. On inspecting the track after the accident he found the first marks of derailment to be at a farm crossing west of the wreckage.

Engineman Myers, of Train No. 7, stated that an air brake test was made at Washington, D. C., and the brakes functioned satisfactorily en route. The last automatic-block signal east of the point of accident displayed a clear indication and his first intimation of anything wrong was when he saw the red fusee. He saw the first flash of the fusee when the flagman lighted it, and he saw it flare; at that time the flagman was on the ground, and engine 5003 was about 100 feet from engine 6146. He answered the flagman, applied the air brakes in emergency, opened the sanders and closed the throttle, and just as he started to close the drifting valve the engine struck the wreckage. Approaching the point of accident the speed of his train had been 60 miles per hour and he thought the train ran about 400 feet after he applied the air brakes before it struck the wreckage; at that time the speed had been reduced to between 15 and 20 miles per hour.

Fireman Hughes estimated the speed of their train to have been reduced to between 25 and 30 miles per hour at the time it struck the wreckage.

Both Conductor Keyser, and Flagman Carter, of No. 7, stated that as they looked across the curve approaching the point of accident they saw stop signals being given their train with the red fusee and almost instantly the air brakes were applied in emergency. Flagman Carter stated that when he went back to flag after the accident he observed the automatic-block signal displaying a red indication.

Car Inspector Keller stated that he made a class "A" inspection of B. & S. car 9007, the first car to be derailed, on November 29 at Cumberland, prior to its departure in Extra 6146. This car was on the repair track due to a chipped rim on the west truck, but the wheel was not removed as it did not take the gauge. The inspection consisted of a general inspection of the car, including safety appliances, couplers, brakes, trucks, wheels, etc. He used a mirror in his inspection of the arch bars and also tapped them with a hammer, and there was no evidence of any flaw at the time of his inspection. This car had a capacity of 100,000 pounds, and was equipped with arch bar trucks, the arch bars measuring 1¼ by 5 inches which was the A.R.A. standard size at the time the car was built; larger sizes are now being used. After the accident he inspected the broken arch bar and found an old flaw, involving about 10 percent of the cross-sectional area, which extended outward from the inside of the column bolt hole. No part of the flaw extended to the

outside surface except on top at a point where it was covered by the column casting when the truck was assembled, and it could not have been seen at the time of inspection unless the truck had been dismantled.

Road Foreman of Engines Foster stated that the broken arch bar was the bottom bar of the lead truck of B.& S. car 9007, and he stated that the flaw at the break involved about 5 percent of the cross-sectional area, and was invisible unless the truck was dismantled. The truck was completely torn apart and the arch bars were badly bent and twisted in the derailment. The nuts of two box bolts and one column bolt were sheared off new flush with the tie bars.

Observations of Commission's Inspectors

Inspection of the track disclosed the first mark incident to the derailment at a road crossing at Great Cacapon Station. The crossing plank on the north side of the north rail of track 3 was found to have been broken and torn from its place as a result of having been struck and the splinters and fragments of this plank showed that it had been carried or dragged about 1½ rail lengths eastward from its location in the crossing. The plank was newly broken and plainly showed where something had struck it and scraped along its top surface about 8 inches outside of the north rail. The next marks on the track were found at a farm crossing 4,918 feet east of the road crossing at the station. At this crossing also the north plank was newly broken; marks indicated that it had been struck at its western end, and something of great weight had slid or scraped across it, leaving a rather glazed surface. The first mark of derailment was at the middle of the crossing plank on the inside of the south rail of track 3, indicating that a wheel flange had run on the plank; at its eastern end the marks showed that the wheel had dropped off the plank upon the ties, about 7½ inches inside the rail. These wheel marks continued from that point eastward, angling off gradually to the north for a distance of about 500 feet to the point where the track was torn up. The marks indicated that at first the wheel was rolling on the ties, but that later the derailed truck gradually slewed around to a position in which the wheels were dragging rather than rolling. The marks on the north side of the north rail beginning at the eastern end of the crossing plank were intermittent; in some places these marks were evidently flange marks while at other points the marks indicated that something of great weight had slid over the ties leaving a glazed appearance. These marks also angled off to the north until they were off the ends of the ties and thereafter the road bed had been plowed up and apparently the cars had been thrown upon track 1. The track west of the point of derailment was well maintained and there was no indication

that any track condition contributed to the cause of the accident.

The lead or east truck of the seventh car in the train, B.& S. 9007, was practically demolished. The arch bars on the north side, size 1¼ by 5 inches, were broken and badly twisted, and the tie bar, size 5/8 by 5 inches, which was badly twisted and doubled under, was polished and scraped, indicating that it had slid along on the track. An old flaw involving 8 to 10 percent of the cross sectional area was found at the point of failure of the bottom arch bar, which was at the forward column bolt hole. This flaw extended from the column bolt hole inward but reached the surface of the bar only on its top face, where it would be entirely concealed by the column casting when truck was assembled. One column bolt, size 1¾ by 24 inches, and the two journal box bolts, size 1¼ by 16½ inches, in the lead journal box were newly broken off just above the nut and these pieces were not found. Wheel marks were found on the slope sheet of the car, plainly indicating where the wheel had come into contact with it. These marks were on the north side of the slope sheet on the east end of the car, indicating that the body of the car had dropped down and permitted the slope sheet to come into contact with the top of the wheel.

B. & S. car 9007 was an all-steel hopper car, with 5½ by 10 inch journals, and arch-bar trucks, nominal capacity 100,000 pounds, type D couplers and friction gears, KD 1012 air brake schedule, cubic capacity 1,880 cubic feet; the stenciled capacity in pounds, load limit, and date built were not legible on the car, but the records show that this car was built in 1923. According to the way bill the load limit of this car was fixed at 120,000 pounds, and at the time of the accident it contained 113,600 pounds of coal.

Discussion

B. & S. car 9007 was given class "A" inspection at Cumberland on November 29, at which time a mirror was used for the purpose of detecting any cracks or flaws present in the arch bars; the bars were also tapped with a hammer, but at the time of this inspection no evidence of any flaw was apparent. This car then departed in Extra 6146, being the seventh car in the train, and had traveled a distance of approximately 39 miles when the head brakeman suddenly saw fire and sparks flying from under the train and before the engineman could apply the air brakes an emergency application occurred, indicating that the train had broken in two.

The car in question was an all steel hopper car, with a nominal capacity of 100,000 pounds, and a load limit of 120,000

pounds; at the time of the accident it contained 113,600 pounds of coal. The bottom arch bar of the lead truck broke at the forward column bolt hole. An old flaw involving 8 to 10 percent of the cross-sectional area was found; it extended inward but reached the surface of the bar only on its top face where it would be entirely concealed by the column casting when the truck was assembled. One column bolt and two journal box bolts in the lead journal box were newly broken off just above the nut.

No. 7 was seen approaching around the curve by the fireman and head brakeman just prior to the time the fire was seen flying under their train, and the quick action of these men in flagging this train and the immediate response of the engineman of No. 7 in making an emergency application of the air brakes resulted in a material reduction in the speed of the passenger train before it struck the derailed equipment.

This case is another illustration of the fact that arch bar trucks are inherently dangerous in present day service and serves further to emphasize the necessity for the elimination of this type of truck at the earliest possible date. The possibility of accidents involving trains on adjacent tracks, as mentioned in many previous reports concerning arch bar failures, is forcibly demonstrated in this case, and it is apparent that only the prompt action of the crew of Extra 6146 and of the engineman of No. 7 prevented a collision at a speed of about 60 miles per hour instead of at 20 or 30 miles per hour.

Conclusion

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

Respectfully submitted,

W. J. PATTERSON,

Director.