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DEPARTMENT OF
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REPORT NO. 4162

PENN CENTRAL TRANSPORTATION COMPANY

RIDGEWAY, OHIO

APRIL 18, 1969



FEDERAL RAILROAD ADMINISTRATION

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BUREAU OF RAILROAD SAFETY,
Washington, D C 20591

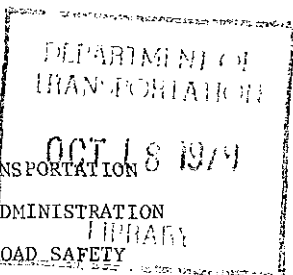
Summary

DATE:	April 18, 1969	
RAILROAD:	Penn Central Transportation Company	
LOCATION:	Ridgeway, Ohio	
KIND OF ACCIDENT:	Derailment and side collision	
TRAINS INVOLVED:	Freight	Freight
TRAIN NUMBERS:	Extra 2840 West	Extra 3171 East
LOCOMOTIVE NUMBERS:	2840, 2876	3171, 6148
CONSISTS:	97 cars, caboose	78 cars, caboose
ESTIMATED SPEEDS:	40 m p h	47 m p h
OPERATION:	Signal indications	
TRACKS:	Double; tangent; 0 30 percent ascending grade westward	
WEATHER:	Raining	
TIME:	9:05 p m	
CASUALTIES:	1 killed	
CAUSE:	Inadequately secured end door of a box car swinging open and striking the locomotive units of the train moving on the adjacent main track, resulting in the door dropping to the track structure and derailment of both trains	

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DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION
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RAILROAD ACCIDENT INVESTIGATION
REPORT NO. 4162

PENN CENTRAL TRANSPORTATION COMPANY
APRIL 18, 1969

Synopsis

On April 18, 1969, an open end-door protruding from a box car in a westbound freight train of the Penn Central Transportation Company struck the locomotive of a passing eastbound freight train near Ridgeway, Ohio, killing the front brakeman of the latter train. Several cars of the eastbound train derailed as a result of the end door dropping to the structure of the eastward main track, and derailed equipment struck the side of the westbound train, causing several cars of that train to derail also.

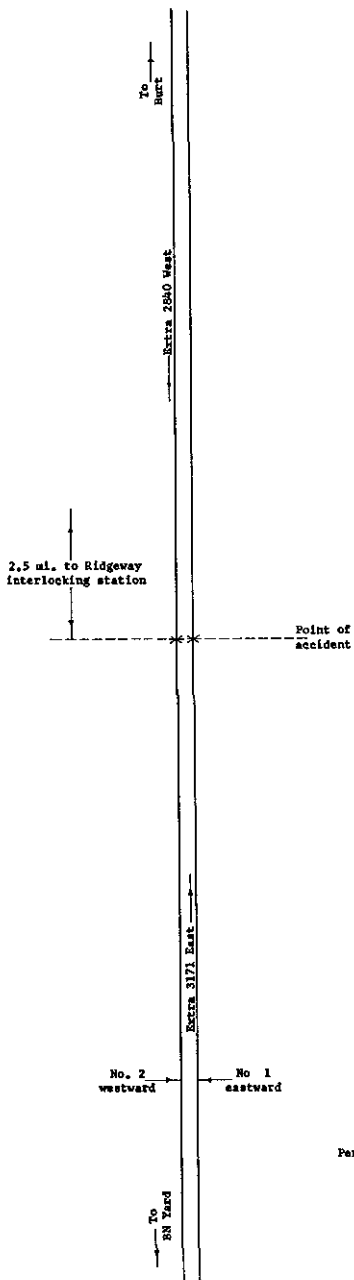
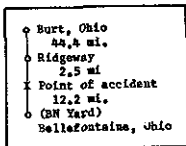
Location and Method of Operation

The accident occurred on that part of the Columbus Division extending westward from Burt to BN Yard, Bellefontaine, Ohio, a distance of 59.1 miles. In the accident area, the railroad is a double-track line over which trains moving with the current of traffic operate by signal indications of an automatic-block signal system. From the north, the main tracks are designated as No. 2 westward and No. 1 eastward.

The collision and derailment occurred on the main tracks, 46.9 miles west of Burt and 2.5 miles west of the Ridgeway interlocking station.

Time and Weather

The accident occurred at 9:05 p.m., in rainy weather.



Penn Central Transportation Company
 Ridgeway, Ohio
 April 18, 1969

Tracks

The main tracks are tangent a considerable distance east and west of the accident point. The grade in this area is 0 30 percent ascending westward

Authorized Speeds

The maximum authorized speed for freight trains in the territory involved is 50 m p h

Circumstances Prior to Accident

Extra 2840 West

Extra 2840 West (SLX-1a), a westbound freight train consisting of 2 road-switcher type diesel-electric units, 97 cars and a caboose, left Cleveland, Ohio, 80 3 miles east of Burt, at 5:39 p m the day of the accident. It passed Burt at 7:37 p m, and continued westward on track No 2 with the engineer, fireman and front brakeman in the control compartment near the front of the first diesel-electric unit. The conductor and flagman were in the caboose. At 8:50 p m, the train passed the Ridgeway interlocking station and approached the accident point. The station operator watched the train pass and noticed no unusual condition.

The crew members said they made frequent observations of the train while enroute to the accident point and noticed no unusual condition. Those observations, however, were hampered by rain and darkness.

Extra 3171 East

Extra 3171 East (MC-6a), an eastbound freight train consisting of 2 road-switcher type diesel-electric units, 78 cars and a caboose, left BN Yard, Bellefontaine, at 8:30 p m, the day of the accident. About 30 minutes later, it approached the accident area while moving eastward on track No 1. The engineer and fireman were in the control compartment near the front of the first locomotive unit. The front brakeman was in the control compartment near the rear of the second locomotive unit. The conductor and flagman were in the caboose.

The Accident

Extra 2840 West

Some time before or shortly after this train passed the Ridgeway interlocking station, an end door on the 64th car, a box car, swung open and protruded over the north side of track No 1. Soon after passing the Ridgeway interlocking station, while it was moving westward on track No 2 at 40 m p h, as indicated by the speed-recording tape, Extra 2840 West began to pass Extra 3171 East, which was moving eastward on track No 1. A few seconds later, the open door on the 64th car struck locomotive units of Extra 3171 East and dropped to the track structure causing several cars of that train to derail.

Derailed equipment then struck the south side of Extra 2840 West, causing 12 cars of that train to derail also, 2.5 miles west of the Ridgeway interlocking station. None of the crew members of Extra 2840 West was aware of anything being wrong before the brakes of that train applied in emergency as a result of the derailment.

Extra 3171 East

This train neared the accident point while moving eastward on track No. 1 at 47 m p h, as indicated by the speed-recording tape. At that time Extra 2840 West was approaching from the east on track No. 2. Soon after the locomotive passed, the engineer of Extra 3171 East saw the end door protruding from the south side of the 64th car of Extra 2840 West at a distance of about 400 feet and initiated an emergency application of the train brakes. Immediately thereafter, before Extra 3171 East reduced speed, the front left side of its first diesel-electric unit and the left side of the control compartment of its second unit, were struck by the protruding end door of the westbound train. Immediately afterward, the door dropped onto track No. 1, derailing the 5th through 24th cars of Extra 3171 East. Some of those derailed cars then struck Extra 2840 West, derailing 12 cars of that train.

Casualties

The front brakeman in the control compartment of the second diesel-electric unit of Extra 3171 East was killed.

Damages

Extra 2840 West

This train stopped with its front end 4440 feet west of the accident point. The 76th and 78th to 88th cars, inclusive, were derailed. They stopped in various positions on or near the track structures. Of the 12 derailed cars, 4 were lightly damaged, 1 was heavily damaged, and 7 were destroyed. Eight other cars were slightly damaged as a result of being scraped by derailed equipment of Extra 3171 East.

Extra 3171 East

This train stopped with its front end about 1680 feet east of the accident point. The 5th to 24th cars, inclusive, were derailed. They stopped in various positions on or near the track structures. Of the 20 derailed cars, 1 was slightly damaged, 3 heavily damaged, and 16 destroyed. Both diesel-electric units and the 1st to 4th cars, inclusive, were slightly damaged as a result of being struck by the protruding end door.

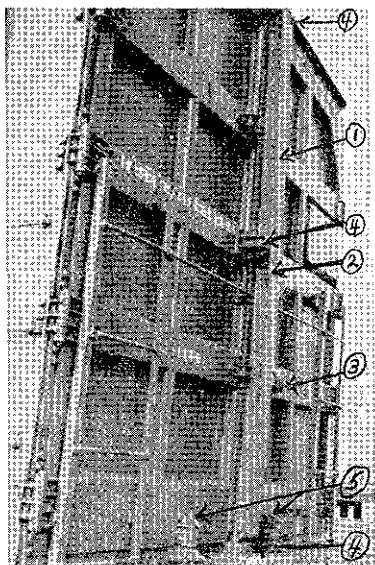
The structures of the main tracks were heavily damaged or destroyed throughout a distance of about 310 feet.

The total cost of damages to track and train equipment was \$144,710, as estimated by the carrier.

NP 4627

This car was the 64th car of Extra 2840 West. It was a box car of all-steel construction, built in February 1967. Its lightweight, nominal capacity and load limit were 60,400, 154,000, and 159,000 pounds, respectively. Its width was 10 feet 8 inches, and the length over strikers was 52 feet 11½ inches.

The front, or "A", end of the car had two end doors, each measuring 5 feet 2 inches by 10 feet 6 inches. Each door had four hinges. One door overlapped the other by 2-¾ inches. (See photo below for end doors similar to that on NP 4627)



1. Vertical locking bar
2. Bar pivot point
3. Bar locking arm
4. Bar stops
5. Auxiliary locks

End door arrangement similar to that of NP 4627. Overlapping door at left.

The overlapping door had a locking bar, which was mounted on a pivot bracket for movement of the bar on a vertical plane. The pivot bracket was attached to the overlapping door near its inner edge, about midway between the top and bottom of the door. When pivoted to vertical, or locking position, the locking bar extended from the top to the bottom of the door frame, over the inner edge of the overlapping door. Stops were at the top and bottom of the door frame, and near the inner edge of the overlapping door, to prevent the locking bar from pivoting beyond vertical position when the door was to be secured in closed position.

A locking assembly for securement of both doors in closed position, after moving the locking bar on the overlapping door to vertical position, was provided about 35 inches above the door bottoms. It consisted of a metal closing arm attached to the locking bar on the overlapping door, and a closing arm pivot bracket, or keeper, attached to the other door.

Each door was provided with an auxiliary lock assembly at its bottom. The assembly consisted of a bracket with a moveable vertical bolt attached to the door bottom, and a keeper attached to the bottom of the door frame. The keeper was so designed that the bolt of the bracket attached to the door would rise when the door was being closed and would drop into the keeper when the door closed.

Post-Accident Examination of Train Equipment

Examination of the equipment of Extra 2840 West disclosed that both end doors at the "A" or west end of NP 4627, the 64th car, were missing. The overlapping door with the vertical locking bar apparently had been missing for quite some time prior to the accident, as indicated by oxidization of surfaces where its four hinges were broken through at the straps remaining attached to the car. The upper portion of the bottom stop for the locking bar of the overlapping door had been cut off.

With the overlapping door missing, the other door could have been secured in closed position only by its auxiliary lock assembly. The latter door was found on the track structure with its four hinges broken. Information developed in the investigation indicates that two of the hinges had been broken through some time before the accident, and the other two broke as a result of the door striking the locomotive of Extra 3171 East.

WP 68121, the 63rd car of Extra 2840 West, was a box car having a cushion underframe with 20-inch travel. It was coupled to the "A" or west end of NP 4627. Examination of the cars while coupled together disclosed that when the cushion underframe assembly of WP 68121 was fully extended, a clearance of 7 feet 2 inches existed between the end sills of the cars. Such clearance was sufficient to permit the end door of NP 4627 to swing fully open and strike Extra 3171 East.

History of Movement of NP 4627

The car was last loaded by the C. A. Cruikshank Lumber Company, Arlington, Washington, on February 18, 1969. The lading consisted of fir and hemlock gutters, weighing 74,000 pounds, consigned to the Warren Trask Company, North Wilmington, Mass. The car moved eastward over several railroads and was delivered to the Warren Trask Company at North Wilmington on or about March 15th, by the Boston and Maine Railroad.

On March 17th, employees of the B&M mechanical department were dispatched to the Warren Trask Company to open the end doors of the car, which were inoperable due to the lock-

ing bar of the overlapping door being stuck in its bottom stop. To free the locking bar, the B&M employees used an acetylene torch to cut approximately one inch off the top of its bottom stop. They did not notice the condition of the door hinges before or after freeing the locking bar from its bottom stop.

On March 25th, the car was dispatched partially unloaded to West Stoughton, Mass., for final unloading by another facility of the Warren Trask Company. It was interchanged to the Penn Central and, on or about April 4th, placed on a track of the Cohenno Terminal Company at West Stoughton for final unloading.

The terminal company foreman said the car arrived with the two bottom hinges of each end door broken; the end doors bulging outward at the bottom as a result of shifted lading; the locking bar of the overlapping door in vertical position; the closing arm of the locking assembly for the locking bar broken off and hanging by a piece of wire, and with the bolt of the auxiliary locking assembly at the bottom of each door outside its keeper. He said it was necessary to force the doors inward with a fork-lift truck, then pry them upward and outward over the keepers for the auxiliary locking bolts, before they could be opened. After the car was unloaded, the fork-lift truck closed the doors by forcing them upward and inward over the auxiliary locking bolt keepers. When this was accomplished, the doors were secured in closed position by the auxiliary locking bolt assemblies and by the locking bar being moved to vertical position. The foreman said he further secured the end doors by fixing a steel band to end ladders on the car and tightening the band across the doors by use of a machine.

NP 4627 left West Stoughton on April 9th and proceeded empty to Boston via the Penn Central. At Boston, the side doors were seen to have seals applied, and the car was returned to West Stoughton under the assumption that it was still loaded. Upon its arrival there, the car was recognized by a Penn Central freight agent as having been unloaded a few days before. He said both end doors were on the car at that time, but did not notice their condition.

The car left West Stoughton, for the second time, on April 14th. At Boston, it was placed in a westbound Penn Central train destined for West Springfield, Mass. The train departed from Boston at 5:00 p m, April 15th, after an inspection by car inspectors, who took no exception to the condition of the car. At West Springfield, NP 4627 was placed in a Penn Central train destined for Selkirk, N. Y. It was again inspected by car inspectors after being placed in this train and no exceptions were taken prior to its departure on April 17th. When the train arrived at Selkirk, the cars were switched for movement to various destinations, and NP 4627 was placed in the consist of Extra 2840 West. Before this train left Selkirk on April 18th, the day of the accident, it was inspected by car inspectors. They discovered that the overlapping end door with the locking bar was missing from the "A" end of NP 4627 and that the remaining

end door was secured in closed position by its auxiliary locking bolt assembly. They notified their supervisor of the missing door and were instructed by him to permit NP 4627 to depart in the train, and to make a note of their discovery on the carrier's Train Inspection Form No. RS. 136, which they did.

Extra 2840 West was subsequently subjected to roll-by inspections at Buffalo and Cleveland on the day of the accident, and no exception was taken on either occasion to the condition of NP 4627.

A search for the missing door was made along the railroad between Boston and Selkirk. It was not found.

Train Crew Hours of Service

Extra 3171 East

At the time of the accident, the crew members of this train had been continuously on duty 2 hours 5 minutes, after having been off duty in excess of 19 hours.

Extra 2840 West

All the crew members of this train had been continuously on duty 4 hours 35 minutes at the time of the accident, after having been off duty in excess of 16 hours.

Analysis of Accident

On March 17th, B&M mechanical department employees cut approximately one inch away from the top of the bottom keeper for the stuck locking bar on the overlapping end door of NP 4627, so that the doors could be opened for partial unloading of the car at North Wilmington. In doing this, they may have inadvertently cut through the bottom of the bar.

On March 25th, when NP 4627 was delivered for final unloading at West Stoughton, both of its end doors were found to be bulging outward at their bottoms, due to shifted lading, and apparently also to the bottom of the locking bar moving outward over the cut-off portion of its bottom stop. The two bottom hinges of each door were also found to be broken through, apparently as a result of the doors being forced outward at their bottoms.

Both doors were still on the car when it left West Stoughton, for the second time, on April 14th. They apparently were secured in closed position at that time by the auxiliary locking bolt assembly at the bottom of each door; the locking bar being in vertical position, and by a steel band stretched across the doors and fastened to end ladders of the car. Inasmuch as the closing arm on the locking bar was broken, the locking assembly for securing the locking bar in vertical position evidently was ineffective.

Some time after NP 4627 left West Stoughton the unsecured locking bar on the overlapping door pivoted from

vertical position, resulting in that door being secured in closed position by its bottom auxiliary locking bolt assembly only

An undetermined sequence of events later caused the two upper hinges of the overlapping end door and the steel band across both doors to break, resulting in the overlapping door falling from the car. If this occurred while the car was moving in a train, the indications are that after the locking bar on the overlapping door pivoted from vertical position, the auxiliary bolt assembly at the bottom of that door and the steel band across the end of the car failed to keep the overlapping door secured in closed position. Since no derailment occurred when the overlapping door fell from the car, it appears that the door swung fully open, broke its two remaining hinges, and dropped to the ground clear of the track structure and following cars in the train.

The door was first found to be missing by Penn Central car inspectors after NP 4627 was placed in the consist of Extra 2840 West at Selkirk on April 17th. They notified their supervisor of this and were instructed to permit the car to depart in the train. That the supervisor should have ordered the car removed from the train for adequate securement and/or replacement of the door is obvious in view of what occurred near the Ridgeway Interlocking station the following day. However, it is noted here that the Penn Central has no regulation requiring a car to be removed from service when an end door is missing and that the Association of American Railroads has no recommendation relative to how a car with a missing end door should be handled. Thus, it was left to the aforesaid supervisor's discretion as to whether NP 4627 was safe to move in the consist of Extra 2840 West, after its overlapping end door was found to be missing.

After departure from Selkirk, Extra 2840 West received roll-by inspections by car inspectors at Buffalo and Cleveland. The inspectors took no exception, indicating that the remaining end door on NP 4627 was secured in closed position at those times by its auxiliary locking bolt assembly. Apparently some time before or shortly after the train passed the Ridgeway Interlocking station, rough vertical motion of the car caused the gravity type locking bolt at the bottom of the remaining door to move upward sufficiently to disengage from its keeper. This permitted the door to swing open over the north side of the adjacent main track structure and strike the locomotive of Extra 3171 East, resulting in fatal injury to the front brakeman of that train and the derailment of both trains.

The Association of American Railroad's current "Specifications for Design, Fabrication and Construction of Freight Cars" recommends that the ends of box cars of 70-ton nominal capacity be designed to withstand a minimum horizontal force induced by lading of 115,000 pounds. The door end of NP 4627, a 70-ton nominal capacity box car, met only 54% of the strength requirement prescribed by the above AAR recommendation in that its end-door configuration was designed to withstand a force induced by lading of only 62,000 pounds. After NP 4627 was

delivered to its consignee at North Wilmington, Mass , a portion of its 74,000 pound lading was unloaded without any unusual condition of the end doors being noted. However, after the car was delivered to the consignee's facility at West Stoughton for final unloading, its end doors were found bulging outward due to shifting of its lading. The inability of the end doors to withstand a force induced by lading of 74,000-pounds or less triggered off the series of events leading to the accident. Hence, it appears the accident might have been averted had the door end of the car been of sufficient strength to meet the strength requirement prescribed by the above-mentioned AAR recommendation.

Dated at Washington, D C , this 18th
day of January 1971
By the Federal Railroad Administration

Mac E Rogers, Director
Bureau of Railroad Safety