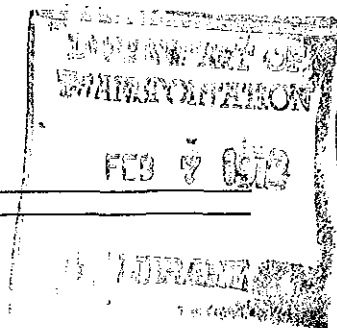


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RAILROAD ACCIDENT INVESTIGATION

REPORT NO. 4165



NORFOLK AND WESTERN RAILWAY COMPANY

COLBY, OHIO

SEPTEMBER 21, 1969



FEDERAL RAILROAD ADMINISTRATION

BUREAU OF RAILROAD SAFETY

Washington, D. C 20591

### Summary

DATE:	September 21, 1969		
RAILROAD:	Norfolk & Western		
LOCATION:	Colby, Ohio		
ACCIDENT TYPE:	Rear-end and side collisions		
TRAINS:	Freight	Freight	Freight
TRAIN NUMBERS:	Extra 1381 East	Extra 1305 East	Extra 217 West
LOCOMOTIVE NUMBERS:	1381, 1915, 1371	1305, 3906	217, 2525, 1348
CONSISTS:	129 cars, caboose	118 cars, caboose	145 cars, caboose
SPEEDS:	Standing	24 m.p.h	40 m.p h
OPERATION:	Timetable, train orders, automatic block-signal system		
TRACKS:	Double; tangent; 0 30% average ascending grade eastward		
WEATHER:	Clear		
TIME:	3:20 a.m.		
CASUALTIES:	1 killed; 3 injured		
CAUSE:	Crew members on locomotive of following eastbound train falling asleep, due to fatigue and consumption of alcoholic beverages		

DEPARTMENT OF TRANSPORTATION  
FEDERAL RAILROAD ADMINISTRATION  
BUREAU OF RAILROAD SAFETY

RAILROAD ACCIDENT INVESTIGATION,  
REPORT NO. 4165.

NORFOLK AND WESTERN RAILWAY COMPANY

SEPTEMBER 21, 1969

Synopsis

On September 21, 1969, a rear-end collision occurred between two eastbound freight trains on the Norfolk and Western Railway near Colby, Ohio, resulting in derailed equipment striking the side of a westbound train passing on the adjacent main track and derailling several cars of that train. The rear-end collision resulted in death to one and injury to three crew members of the eastbound trains.

Cause

The accident was caused by the crew members on the locomotive of the following eastbound train falling asleep, due to fatigue and the consumption of alcoholic beverages.

Location of Accident and Method of Operation

The accident occurred on that part of the railroad extending eastward from Lima to Bellevue Yard, Ohio, a distance of 81.0 miles. In the accident area, this is a double-track line over which trains operate by timetable, train orders and an automatic block-signal system.

The rear-end collision occurred on the eastward main track, 71.2 miles east of Lima, near the small community of Colby. The side collision occurred on the westward main track in the immediate vicinity of the rear-end collision.



### Time and Weather

The collisions took place at 3:20 a m , under clear visibility conditions

### Tracks

From the west on the eastward main track there are a 0°52' curve to the right 2205 feet long, and a tangent 1 5 miles to the rear-end collision point and a considerable distance eastward. The grade for eastbound trains in this area averages 0 30% ascending.

### Signals

Automatic signals 258 2 and 255 8, governing eastbound movements on the eastward main track, are 3 6 and 1 3 miles west of the rear-end collision point, respectively. They are of the color-light type and are approach lighted. Signal 255 8 is a grade signal. The applicable signal aspects, indications and names are as follows:

<u>Signal</u>	<u>Aspect</u>	<u>Indication</u>	<u>Name</u>
258.2	Yellow	Proceed preparing to stop at next signal If exceeding medium speed immediately take action to reduce to that speed	Approach
255 8	Red-over-Yellow plate showing letter "G"	Proceed at restricted speed	Restricting

The circuits are so arranged that when the block of signal 258 2 is unoccupied and the block of signal 255 8 is occupied, signals 258 2 and 255 8 display Approach and Restricting aspects for an approaching train, respectively

### Carrier's Operating Rules

Medium Speed - One-half the maximum authorized speed, but not exceeding 30 miles per hour

Restricted Speed - A speed that will permit stopping short of train, engine, obstruction \*\*\* but not exceeding 15 miles per hour

34 All members of the crew must, when practicable, observe and then communicate to each other by its name the indication of the next signal ahead affecting the movement of their train \*\*\* Should the engineman fail to comply with the signal indication displayed, other members of the crew will first remind him and if necessary take action to insure safety of the train

99 (a) When a train or engine, moving or standing in automatic block signal territory, is protected against following movements by automatic block signals, flag protection against following movements on the same track will not be required.

#### Authorized Speed

The maximum authorized speed for freight trains in the Colby area is 60 m.p h

#### Circumstances Prior to Accident

##### Extra 1381 East

This train consisted of 3 diesel-electric units, 129 cars and a caboose. At 2:30 a.m. the day of the accident, after passing signals 258 2 and 255 8, which displayed Approach and Restricting aspects, respectively, Extra 1381 East stopped on the eastward main track in the block of signal 255 8 with the rear end 1 3 miles east of that signal. The front end stopped short of a preceding train standing in the block of signal 255 8 because of congested rail-traffic conditions ahead. While waiting for their train to resume its trip eastward, the conductor and flagman remained in the cupola of the caboose. Neither was required to provide protection against following trains on the eastward main track, because of the provisions of the carrier's operating rule 99 (a).

##### Extra 1305 East

The crew members of this train operated a westbound train from Bellevue Yard to Lima the day before the accident, having gone on duty at 3:15 p.m. and off duty at 8:10 p.m., September 20. Not being certain when they would be called for another tour of duty, all the crew members registered in at a Lima hotel, about 8:30 p.m. Approximately one hour later they were called to report on duty at 10:30 p.m. for the operation of Extra 1305 East from Lima to Bellevue Yard.

After checking in at the hotel, the conductor and flagman spent their time, until called for Extra 1305 East, in the hotel lobby and at a restaurant. The engineer and front brakeman went to a cocktail lounge, where they were joined by the fireman soon afterward. About 9:30 p.m., the conductor notified them that they were called for Extra 1305 East. The engineer, fireman and front brakeman left the cocktail lounge about 30 minutes later, ate at a restaurant, then went by taxi with the conductor and flagman to the Lima yard office, where the entire crew reported for duty about 10:30 p.m. According to their statements, the engineer consumed "four beers" and the front brakeman "two beers" while at the cocktail lounge. The fireman stated he had no alcoholic beverages of any kind.

Extra 1305 East, an eastbound freight train, left Lima at 12:07 a m the day of the accident, after receiving the prescribed brake test. About 2:40 a m, the train, consisting of 2 road-switcher type diesel-electric units, 118 cars and a caboose, neared Green Springs, 5 0 miles west of the accident point, while moving on the eastward main track. The engineer, fireman, and front brakeman were in the control compartment at the front of the first diesel-electric unit. The fireman, a qualified engineer was at the controls. The conductor and flagman were in the caboose.

#### Extra 217 West

This train, a westbound freight train consisting of 3 diesel-electric units, 145 cars and a caboose, left Bellevue Yard at 2:50 a m the day of the accident. About 25 to 30 minutes later, while moving on the westward main track at an estimated speed of 40 m p h, it neared the point where Extra 1381 East was standing on the eastward main track. The engineer and fireman were in the control compartment of the first locomotive unit; the front and swing brakeman were in the control compartment of the second unit. The conductor and flagman were in the caboose.

#### The Accident

#### Extra 1381 East

Approximately 45 minutes after his train stopped on the eastward main track in the block of signal 255 8, the conductor of Extra 1381 East saw the headlight of Extra 217 West approaching on the westward main track and alighted from the caboose to inspect the westbound train when it passed. Shortly thereafter, while that train was passing, the conductor noticed the headlight of Extra 1305 East approaching his train from the rear on the eastward main track. Later, he grew concerned about the approaching train and gave it stop signals with a lantern. After neither seeing nor hearing any acknowledgement of his stop signals and realizing the approaching train was not going to stop short of a collision, the conductor shouted a warning to his flagman in the caboose and ran to safety. Moments later, Extra 1305 East struck the caboose of Extra 1381 East, fatally injuring the flagman, who apparently did not hear the conductor's warning because of noise from the passing westbound train.

#### Extra 217 West

Derailed equipment resulting from the rear-end collision on the eastward main track struck the north side of Extra 217 West while that train was passing the rear end of Extra 1381 East. As a result, 11 cars in the rear portion of Extra 217 West derailed.

# Derailed equipment of Extra 217 West

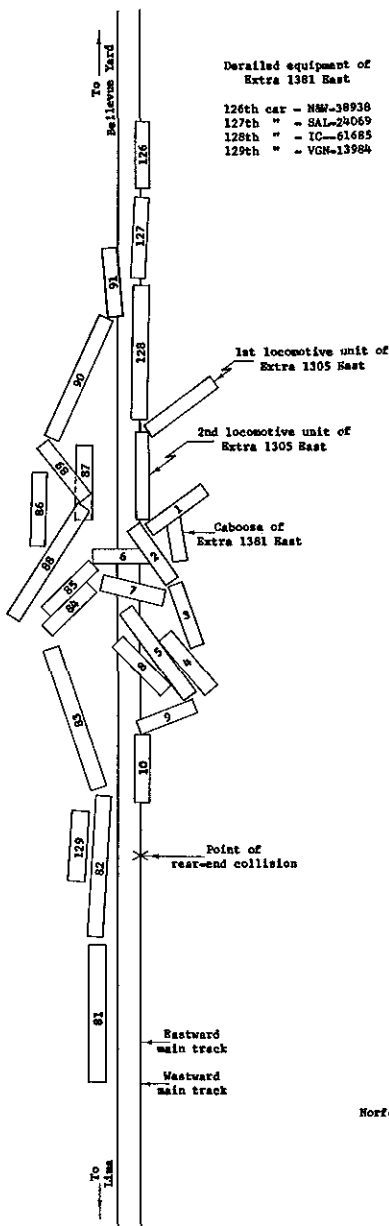
31st car - NWM--860478  
 32nd " - BL--91065  
 33rd " - SOO--42967  
 34th " - BL--92039  
 35th " - SOO--48306  
 36th " - NWM--319810  
 37th " - C&O--28827  
 38th " - OTW--306098  
 39th " - WCLX--2496  
 90th " - RTTX--501248  
 91st " - NWM--56737

# Derailed equipment of Extra 1381 East

126th car - NWM--38938  
 127th " - SAL--24069  
 128th " - IC--61685  
 129th " - VGN--13984

# Derailed equipment of Extra 1305 East

1st car - C&O--76227  
 2nd " - VGN--30394  
 3rd " - GATX--51603  
 4th " - GATX--21041  
 5th " - C&O--21957  
 6th " - NWM--38781  
 7th " - NWM--74058  
 8th " - NWM--7496  
 9th " - NWM--66673  
 10th " - NWM--278544



Norfolk and Western Railway  
 Colby, Ohio  
 September 21, 1969



Extra 1305 East

While approaching Green Springs, Extra 1305 East moved on a slightly ascending grade and decreased speed from 58 to 52 m p h , as indicated by the speed-recording tape. Nearing Green Springs, it entered the grade averaging 0 30% ascending eastward. It decelerated rapidly on this grade, to a speed of about 21 m p h in the immediate vicinity of Green Springs.

According to the crew members on the locomotive, they experienced some discomfort while moving on the ascending grades in approach to Green Springs because of fumes in the control compartment. The fireman stated that he opened his side window slightly to overcome this condition. The engineer and front brakeman said they kept the window on their side of the control compartment in closed position because of chilly weather conditions. According to their statements, all three crew members on the locomotive lapsed into unconsciousness as their train moved in the Green Springs area and remained in that state until after the accident. Their statements indicate they believe they lost consciousness as a result of being overcome by fumes in the control compartment.

After Extra 1305 East passed Green Springs, its speed increased gradually on the 0 30% ascending grade. The train was moving at 26 m p h when it passed signal 258 2, which displayed an Approach aspect, and was moving at 25 m p h when the front end passed signal 255 8, which displayed a Restricting aspect. The train then decreased speed on the ascending grade and tangent track, to 24 m p h at the time it struck the rear end of Extra 1381 East. The reduction in speed as Extra 1305 East approached the collision point was probably due not only to the ascending grade, but also to continual slipping of locomotive wheels, as indicated by the speed tape.

DamagesExtra 1381 East

The caboose and the 126th to 129th car, inc , (last four cars) of this train were derailed. The caboose separated from its trucks and stopped upright on the south side of the eastward main track, about 180 feet east of the rear-end collision point. The rear portion of the caboose, including the cupola area was telescoped by the locomotive and derailed equipment of the following train (see following photograph). The caboose and the 128th car were destroyed. The 129th, or last, car was heavily damaged, and the 126th and 127th cars were slightly damaged.



*Caboose of Extra 1381 East*

Extra 1305 East

Both locomotive units and the first 10 cars of this train derailed. The first locomotive unit stopped on its right side, and on the south side of the eastward main track, with the front end about 270 feet east of the rear-end collision point (see following photograph). The second unit stopped upright on and in line with the eastward main track structure immediately to the rear of the first unit. The 10 derailed cars stopped in various positions on or near the main track structure, as indicated in Plate No. 2. The two locomotive units were heavily damaged. Of the 10 derailed cars, 7 were destroyed, 2 heavily damaged, and 1 slightly damaged.



*First locomotive unit of Extra 1305 East*

Extra 217 West

The 81st to 91st cars, inclusive, of this train were derailed as a result of the south side of the train being struck by derailed equipment of Extras 1381 and 1305 East. The 11 derailed cars stopped along the north side of the westward main track in various positions as indicated in Plate No. 2. Three were destroyed, seven were heavily damaged, and one slightly damaged.

Cost of Damages

According to the carrier's estimate, the cost of damages to the track structures and train equipment was \$361,650.

CasualtiesExtra 1381 East

The flagman was found between the main tracks, alongside the second locomotive unit of Extra 1305 East and under lumber from the next-to-last car, a flat car, in his train. He sustained, among others, a severe head injury, and died while being transferred to a hospital at Elyria, Ohio, after being examined by a physician. The conductor was slightly injured when he fell at a fence while running to safety before the impending collision.

Extra 1305 East

The front brakeman was hospitalized, having sustained serious bruises and/or lacerations to his head, left lower rib cage, and left shoulder. The fireman was found in a dazed or amnesic condition after the accident. Medical examination revealed he sustained minor injury. He declined to be admitted to a hospital, against advice of the attending physician. The engineer was admitted to the hospital because of appearing to be in a dazed condition. Examination, however, revealed no evidence of physical injury.

Extra 217 West

None of the crew members was injured.

Post-Accident Examinations and TestsExtra 1305 East

Examination of the control compartment of the first locomotive unit found the automatic brake valve approximately midway between minimum and full service application. The independent brake valve was in release position; the fireman's emergency brake valve in closed position; the reverser in forward position; and the throttle in No. 8 position. All other controls, valves, cocks, etc. on both units were found in proper positions.

A test of the air brakes on the undamaged cars of the train revealed they were functioning properly.

The locomotive speed-recording device was calibrated and found to be accurate

The exhaust system of the first locomotive unit was examined by a locomotive inspector of the Federal Railroad Administration. The examination revealed no evidence of leakage of diesel-engine exhaust fumes into the control compartment, or of a defective condition which could have caused such leakage. The carrier's records indicate no engineman had reported trouble of this kind with the locomotive unit.

Signals 258 2 and 255 8 were tested and found to be functioning properly.

#### Train Crews' Hours of Service

##### Extra 1381 East

At the time of the accident, the engineer and fireman had been continuously on duty 8 hours 45 minutes, and the conductor and two brakemen had been continuously on duty 8 hours 25 minutes. All these crew members had been previously off duty 8 hours or more. The flagman had been on duty 15 hours 45 minutes in the aggregate at the time of the accident, after having been previously off duty 8 hours.

##### Extra 1305 East

It is questionable whether the crew of this train had a bonafide release, or off-duty, period at Lima. If the 2 hours 20 minutes release period was bonafide under the Hours of Service Act, all the crew members had been on duty 9 hours 45 minutes in the aggregate at the time of the accident. If the release period was not bonafide, they had been continuously on duty 12 hours 5 minutes at the time of the accident. All the crew members had previously been off duty over 24 hours.

##### Extra 217 West

All the crew members of this train had been continuously on duty 3 hours 25 minutes at the time of the accident, after having been off duty over 15 hours 30 minutes.

##### Crew on Locomotive of Extra 1305 East

The engineer, age 51, was first employed as a fireman in June 1941. He was promoted to engineer on August 15, 1947. His record shows disciplinary action taken against him in 1949 for failure to register total mileage at the end of a tour of duty, and in 1953 for responsibility in connection with an accident on a yard track at Bellevue, Ohio.

The fireman, age 35, was first employed by the carrier in January 1956, as a laborer. He was subsequently employed as a fireman, and was promoted to engineer on January 26, 1965. His record was clear, except for disciplinary action taken against him in 1964 for failure to protect an assignment.

The front brakeman, age 27, was first employed by the carrier as a brakeman in June 1960. His record was clear, except for a reprimand he received in 1967 for his responsibility in connection with failure of a train to stop at a Stop-and-Proceed signal.

#### Post-Accident Events

Shortly after the accident, various members of all the train crews involved converged at the scene of the rear-end collision, where they found the flagman of Extra 1381 East under lumber from one of the derailed cars, and were informed by the front brakeman of Extra 1305 East that the engineer and fireman of his train were seriously hurt and were on the other side of some wreckage. The conductor of Extra 217 West then went to a telephone at a nearby residence, where he called for ambulances and reported the accident to the railroad carrier. In the meantime, other crew members went to the assistance of the flagman of Extra 1381 East. About 4:10 p.m., an ambulance arrived at the scene and transported that flagman and the front brakeman of Extra 1305 East to the Firelands Clinic at Bellevue.

The engineer and fireman of Extra 1305 East alighted from their locomotive after the accident and subsequently wandered away from the wreckage, apparently without being observed by the crew members assisting the fatally injured flagman. Several railroad officials reached the collision area about 4:30 or 4:45 a.m. and instituted a search which found the engineer and fireman quite some time later at separate locations and in what appeared to be a dazed condition. The officials who were in proximity to the fireman said they detected a strong odor of alcohol on his breath. The fireman was taken by ambulance to the Firelands Clinic for treatment, arriving there about 5:00 a.m.

The engineer was found after the fireman and was taken to the clinic about 6:00 a.m.

With respect to other than physical injuries, the reports of the clinic physicians who attended the front brakeman, engineer and fireman of Extra 1305 East indicate that (a) the front brakeman displayed no outward symptoms of having consumed alcoholic beverages (b) the mental functions of the fireman were somewhat unclear and he had an alcoholic odor which was detectable at a distance of 8 to 10 feet, and (c) the engineer appeared to be in a somewhat dazed condition. The reports do not mention whether or not the engineer displayed any outward symptoms of having consumed alcoholic beverages.

Upon request, the engineer and front brakeman readily assented to blood alcohol tests. The fireman declined.

The engineer's and front brakeman's blood was drawn for the tests between 7:00 and 7:10 a.m. The tests revealed that the engineer had a blood alcohol content of 118.8 mg (milligrams) per 100 ml (milliliters) of blood, and that the front brakeman had a blood alcohol content of 73.0 mg per 100 ml of blood.

#### Analysis of Blood-Alcohol Test Results

According to authorities, blood alcohol concentration dissipates at the rate of about 15 mg per 100 ml hourly in the average person. Hence, it appears the engineer's blood alcohol concentration at the time of the accident was approximately 178 mg per 100 ml or 0.18% by weight, and the front brakeman's was about 133 mg per 100 ml or 0.13% by weight. Assuming they consumed no alcoholic beverages after leaving the cocktail lounge at Lima, it further appears that at 10:30 p.m., the time of reporting on duty for the accident trip, the engineer's blood alcohol concentration was about 253 mg per 100 ml or 0.25% by weight, and the front brakeman's was about 208 mg per 100 ml, or 0.21% by weight.

In connection with the above blood alcohol concentrations, many authorities, including some State authorities and the Department of Transportation, presume the driver of a highway vehicle is under influence of intoxicating liquor if his blood alcohol concentration exceeds 0.10% by weight. According to authoritative sources, the subject is markedly intoxicated if his blood alcohol concentration is 0.25% or above, and may feel sleepy when the concentration exceeds 0.20%. Applying the aforesaid standards, the engineer of Extra 1305 East apparently was quite intoxicated when he reported at the Lima yard office for the accident trip, and the front brakeman was somewhat less so. Further, both apparently were under the influence of liquor at the time of the accident. Although the fireman of Extra 1305 East denied having consumed any alcoholic beverage during his layover at Lima, the indications are that he drank a considerable quantity of such beverage while with the engineer and front brakeman in a cocktail lounge at Lima.

#### Analysis

At the time of the accident, Extra 1381 East was standing on the eastward main track in accordance with applicable rules of the carrier and under protection afforded by signals 258.2 and 255.8. Those signals had displayed Approach and Restricting aspects, respectively, for Extra 1305 East. Under the circumstances, Extra 1305 East had been authorized to proceed in the block of signal 258.2 at 30 m.p.h. or less; to pass signal 255.8 without stopping, and to proceed in the block of that signal at 15 m.p.h. or less, prepared to stop short of Extra 1381 East.

It is clear the accident was the result of failure to operate Extra 1305 East in accordance with the Restricting aspect displayed by signal 255 8. The reason for that failure, as stated by the engineer, fireman and front brakeman, was that they had lost consciousness as their train moved in the area of Green Springs, because of being overcome by diesel-engine fumes entering the control compartment of the first locomotive unit. The validity of their reason for not operating their train as required by signal 255 8, or stopping it short of Extra 1381 East, is highly questionable in view of (a) no findings of any condition in the engine exhaust system that would permit fumes to enter the control compartment (b) the absence of reports indicating other enginemen had experienced trouble with fumes entering that control compartment, and (c) the improbability of all three crew members on the locomotive being overcome by fumes about the same time, particularly if the fireman had a side window partially open as alleged.

On the other hand, the preponderance of evidence developed in the investigation strongly indicates that the failure to operate Extra 1305 East in accordance with the aspect displayed by signal 255.8 was due to the engineer, fireman and front brakeman falling asleep some time before their train neared signals 258 2 and 255 8.

Considering the early morning hour at which the accident occurred and the lengthy period they had been up and about since before going on duty for their trip from Bellevue to Lima, the engineer, fireman and front brakeman were undoubtedly somewhat fatigued as they returned to Bellevue on Extra 1305 East. In view of the results of blood tests made after the accident, the statements of physicians and/or railroad officials, and standards applicable to drivers of highway vehicles, it is reasonable to presume the aforesaid crew members were under the influence of intoxicating liquor at that time, because of having consumed alcoholic beverages during their layover at Lima. One may further presume that because of their fatigued condition and intake of alcoholic beverages at Lima, the engineer, fireman and front brakeman became drowsy sometime after reporting for service on Extra 1305 East and all three eventually fell asleep sometime before their train neared signals 258.2 and 255.8. Consequently, they did not see the aspects displayed by those signals or take any action to stop their train short of Extra 1381 East, resulting in the accident.

The circumstances involved in this accident illustrate the danger inherent in excessive consumption of alcoholic beverages by train-service employees under conditions whereby they may be called for duty before the effects of their alcoholic intake dissipate to an acceptable level. That such employees performing service under the influence of alcohol present not only danger to themselves, but to fellow employees as well, is also illustrated by the fatal injury to the flagman of Extra 1381 East.

Dated at Washington, D C., this 11th  
day of May 1971  
By the Federal Railroad Administration

Mac E Rogers, Director  
Bureau of Railroad Safety