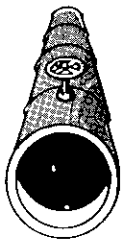
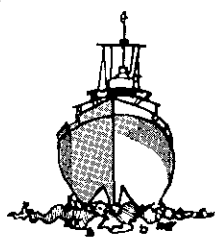
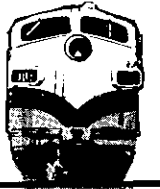
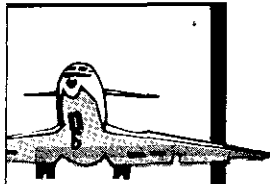


PL  
1780  
.A33  
no.  
NTSB-  
RAR-  
75-9



U.S.

# NATIONAL TRANSPORTATION SAFETY BOARD

Dept. Of Transportation

MAR 26 1976

Library

WASHINGTON, D.C. 20594

## RAILROAD ACCIDENT REPORT.

REAR END COLLISION OF  
TWO TEXAS AND PACIFIC  
RAILWAY COMPANY  
FREIGHT TRAINS,  
MEEKER, LOUISIANA,  
MAY 30, 1975.

REPORT NUMBER: NTSB-RAR-75-9.

UNITED STATES GOVERNMENT

PL  
1780  
A-3  
NO  
NTSB  
RAR-  
75-9

TECHNICAL REPORT DOCUMENTATION PAGE

1. Report No. NTSB-RAR-75-9		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle Railroad Accident Report--Rear End Collision of Two Texas and Pacific Railway Company Freight Trains, Meeker, Louisiana, May 30, 1975				5. Report Date December 30, 1975	
				6. Performing Organization Code	
7. Author(s)				8. Performing Organization Report No.	
9. Performing Organization Name and Address National Transportation Safety Board Bureau of Surface Transportation Safety Washington, D. C. 20594				10. Work Unit No. 1719-A	
				11. Contract or Grant No.	
12. Sponsoring Agency Name and Address  NATIONAL TRANSPORTATION SAFETY BOARD Washington, D. C. 20594				13. Type of Report and Period Covered  Railroad Accident Report May 30, 1975	
				14. Sponsoring Agency Code	
15. Supplementary Notes					
16. Abstract  About 8:52 a.m. on May 30, 1975, a Texas and Pacific Railway Company freight train, Extra 3311 West, passed an "approach" signal and a "low" signal and collided with the rear of train Extra 551 West, which had stopped on the main track in Meeker, Louisiana. The 4 locomotive units and the first 10 cars of Extra 3311 West and the last 5 cars and the caboose of the standing train were derailed and damaged. The engineer and the front brakeman of Extra 3311 West and the conductor of Extra 551 West were killed.  The National Transportation Safety Board determines that the probable cause of the collision was the failure of the engineer of Extra 3311 West, while operating the train in violation of a "low" signal indication, to perceive the train ahead in time to prevent a collision. A cause of the severity of the collision was the subnormal braking capability of a significant number of cars.  As a result of this investigation, five recommendations concerning use of radio, backup control system, "Stop and Proceed" procedure, and enforcement of braking system regulations have been addressed to the Federal Railroad Administration.					
17 Key Words  Railroad accident; rear-end collision; "low" signal; restrictive signal; train control system; crashworthiness of locomotive.				18. Distribution Statement  This document is available through the National Technical Information Service, Springfield, Va. 22151	
19. Security Classification (of this report) UNCLASSIFIED		20. Security Classification (of this page) UNCLASSIFIED		21 No. of Pages 23	22. Price

## FOREWORD

This report is based on an investigation by the National Transportation Safety Board under the authority of the Independent Safety Board Act of 1974. The conclusions, the determination of probable cause, and the recommendations are those of the Safety Board.

TABLE OF CONTENTS

	PAGE
SYNOPSIS . . . . .	1
FACTS . . . . .	1
The Accident . . . . .	1
Weather . . . . .	3
Method of Operation . . . . .	3
Crew Information . . . . .	5
Train Equipment . . . . .	6
Tests and Research . . . . .	6
ANALYSIS . . . . .	7
The Accident . . . . .	7
The Use of Radio . . . . .	8
The Engineer . . . . .	9
The Signal System. . . . .	9
The Reduced Braking Capability of Extra 3311 West . . . . .	10
Responsibility for Train's Operation . . . . .	10
CONCLUSIONS . . . . .	10
PROBABLE CAUSE . . . . .	11
RECOMMENDATIONS . . . . .	11
APPENDIXES	
Appendix A: Excerpts from the Uniform Code of Operating Rules . . . . .	13
Appendix B: Brake Tests Conducted on Extra 3311 West. . . . .	17
Appendix C: Safety Recommendations made to the Federal Railroad Administration. . . . .	18

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D. C. 20594

RAILROAD ACCIDENT REPORT

Adopted: December 30, 1975

---

Rear End Collision of Two  
Texas and Pacific Railway Company  
Freight Trains  
Meeker, Louisiana  
May 30, 1975

SYNOPSIS

About 8:52 a.m. on May 30, 1975, a Texas and Pacific Railway Company freight train, Extra 3311 West, passed an "approach" signal and a "low" signal and collided with the rear of train Extra 551 West, which had stopped on the main track in Meeker, Louisiana. The 4 locomotive units and the first 10 cars of Extra 3311 West and the last 5 cars and the caboose of the standing train were derailed and damaged. The engineer and the front brakeman of Extra 3311 West and the conductor of Extra 551 West were killed.

The National Transportation Safety Board determines that the probable cause of the collision was the failure of the engineer of Extra 3311 West, while operating the train in violation of a "low" signal indication, to perceive the train ahead in time to prevent a collision. A cause of the severity of the collision was the subnormal braking capability of a significant number of cars.

FACTS

The Accident

Extra 551 West, a Texas and Pacific Railway Company (T&P Rwy) freight train stopped on the main track at Meeker, Louisiana, on May 30, 1975. The rear of the train was 3,828 feet west of the east siding switch. The train consisted of 2 locomotive units, 44 loaded cars, 62 empty cars, a caboose, and an empty hopper car. The locomotive and one car were detached and moved through the siding to a spur track to perform switching in a sugar plant. The flagman and the front brakeman rode on the locomotive, while the conductor stayed on the caboose. The spur track switch from the siding was east of the caboose, which was standing on the main tracks. The crewmembers on the locomotive saw the conductor standing on the caboose's rear platform when the locomotive went into the spur track and again when it returned to the head of the train.

Extra 3311 West was also a T&P Rwy freight train bound for Meeker. The train consisted of 4 locomotive units, 69 loaded cars, 58 empty cars, and a caboose. The train's gross tonnage was 8,477 tons. After the brakes were tested the train departed from Avondale yard, located near New Orleans, Louisiana, at 12:40 a.m. A number of its cars were picked up en route. The crewmembers on the locomotive of Extra 551 West had heard the crewmembers of Extra 3311 conversing on the radio before Extra 551 stopped on the main track; therefore, they knew of that train's general location, although there was no direct radio contact between the trains.

Extra 3311 West passed signal 174.1, 2.55 miles east of the east switch at Meeker, which displayed an "approach" aspect. The speed of the train at that time was estimated by the crew on the caboose to have been 50 mph, and the speed was not reduced. Also, the speed of the train was not reduced as the locomotive passed signal 176.3, located at the east siding switch of Meeker, which displayed a "low" aspect. A short time after the locomotive passed the signal, the conductor on the caboose heard the engineer exclaim over the radio that "something was on the main track"; that transmission was followed immediately by an emergency application of the brakes. Extra 3311 West collided with Extra 551 West at 8:52 a.m. The brakes were applied in emergency when the locomotive was about 1,700 feet east of the caboose of the standing train.

As a result of the collision, the engineer and the front brakeman of Extra 3311 West and the conductor of Extra 551 West were killed. The 4 locomotive units and the front 10 cars of Extra 3311 West and the rear 5 cars and the caboose of the standing train were derailed and damaged extensively. About 300 feet of main track and siding were destroyed. Signal and communication lines along the right-of-way were destroyed.

Estimated costs of the collision follow:

Damage to locomotive and car equipment	\$ 349,400
Loss of lading	133,000
Damage to track	10,550
Clearing of wreckage	28,750
Damage to signals and communications	<u>1,000</u>
Total	\$ 522,700

Just before the collision, a track foreman and his crew were traveling by truck on a road which crosses the tracks about 790 feet east of the collision point. The truck, which was equipped with radio, had become stuck on the road, and they were attempting to free it when both trains passed them. The section foreman saw a red flag secured to the rear of the hopper car which was behind the caboose as Extra 551 West passed him. He heard someone ask over the radio, "Are you still there?"

Later he heard someone exclaim, "There's something on the main track!" Neither speaker identified himself. Immediately after the last transmission, Extra 3311 West passed him at a speed which he estimated to be between 45 and 50 mph. A warning signal was being sounded on the locomotive horn as it passed.

### Weather

The temperature at Meeker at the time of the accident was 60°F with 90 percent humidity; winds were from the southeast at 12 mph. It was cloudy with thunderstorms and visibility was 6 miles. The sun rose at 6:03 a.m.

### Method of Operation

At Meeker, a siding, 2.2 miles long, parallels the single main track on the south. It is connected to the main track at each end by a spring switch. The switch of the spur track, which extends from the siding to a sugar plant, is located 2,509 feet west of the siding's east switch. A 0°10' curve to the right, 5.63 miles long, begins 1,412 feet east of signal 174.1 and extends west through Meeker. The grade on the main track descends slightly for westbound trains. (See Figure 1.)

Trains are operated over this portion of the railroad by timetable, train orders, and indications of automatic block signals.

Protection for the rear of a train, as specified in the carrier's operating rule 99, is not required in this area. (See Appendix A.) The maximum authorized speed is 50 mph.

The signals involved in this accident are color-light signals. (See Figure 1 for their locations.) When the main track between the Meeker siding switches is occupied and the switches are lined for movement on the main track, signals 174.1 and 176.3 will display the following aspects: (The carrier's rules require that trains will be operated as indicated.)

<u>Signal</u>	<u>Aspect</u>	<u>Name</u>	<u>Indication</u>
174.1	Yellow	Approach	"Proceed, immediately reducing to 40 mph or slower if necessary prepare to stop before reaching next signal.
176.3	Red-over-lunar-white-over-number plate	Low	"Proceed at Low speed which will permit stopping short of train, engine, obstruction, or switch not properly lined and looking out for broken rails but not exceeding 20 mph to next signal governing in same direction."

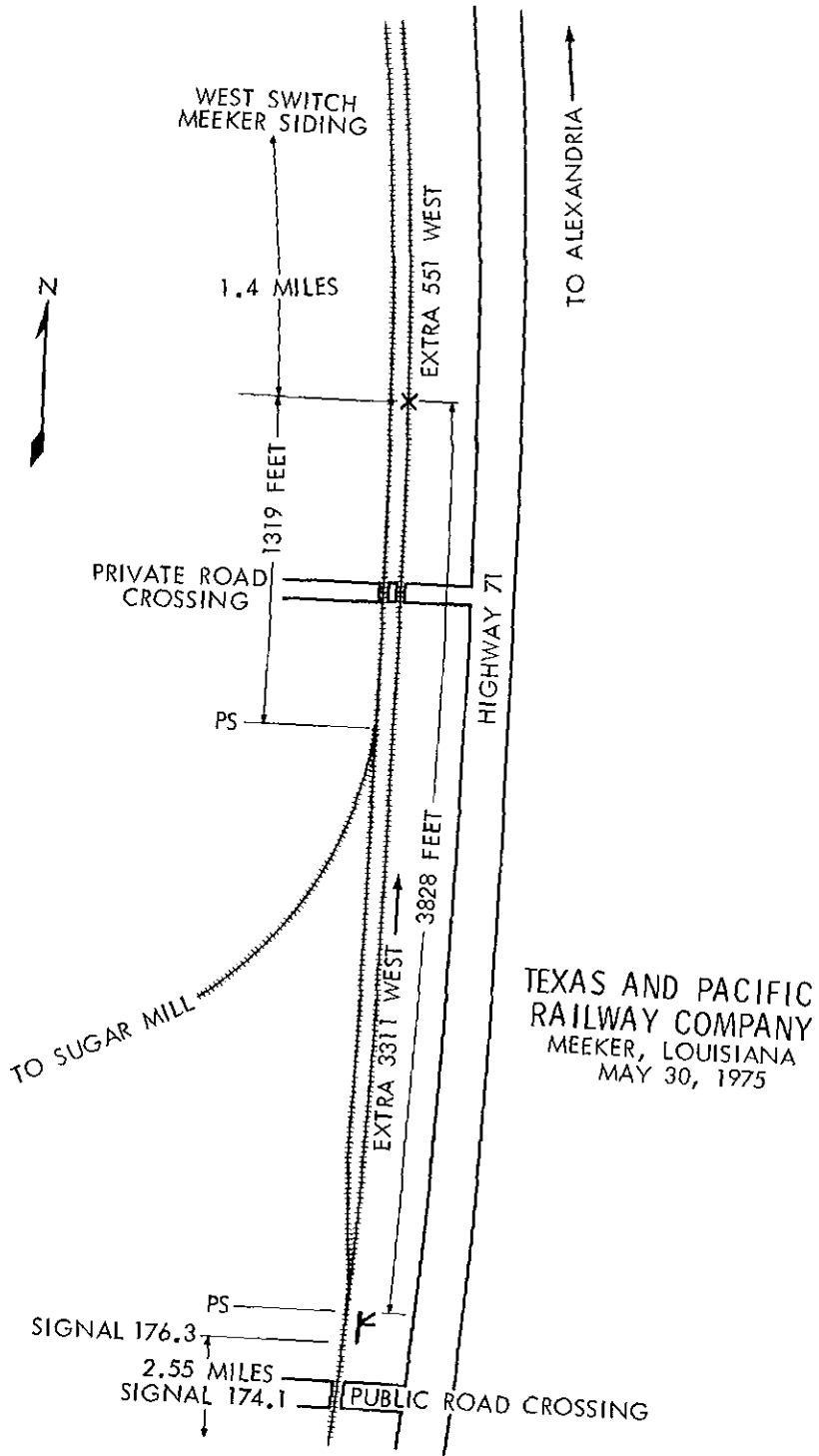


Figure 1. Accident site.



If the east siding switch is not lined for the main track and the main track is occupied, the white lunar signal is not lit and signal 176.3 will display a "stop-and-proceed" aspect.

The operator at Alexandria, Louisiana, where the railroad yard is located, can cause signal 178.8, located at the west end of the siding, to display a "stop" aspect (red) so that trains from the Rock Island Railroad can use the main track to enter the T&P Rwy yard at Alexandria. Signal 176.4 and 174.1 will then display "approach" aspects.

At other locations between Avondale and Alexandria, when the blocks are occupied the signals governing the block will display a "stop-and-proceed" aspect.

#### Crew Information

The engineer of Extra 3311 West was 66 years old and was first employed on the T&P Rwy as a fireman in 1945. He was promoted to engineer in 1956.

The T&P Rwy requires its engineers to be examined for vision, hearing, and color perception; no other physical examination is required. The results of the engineer's last three vision tests were as follows:

Date of Exam	Right Eye		Left Eye	
	without glasses	corrected to	without glasses	corrected to
9/30/65	20/40	20/20	20/40	20/20
10/30/68	20/100	20/20	20/50	20/25
10/23/74	20/100	20/20	20/100	20/20

Twenty employees who had worked with the engineer during the 2-month period before the accident indicated that he usually wore glasses while on duty.

The engineer had been involved in two other incidents in which the front brakeman had to apply the air brakes to prevent the train from passing a "stop" signal.

The front brakeman of Extra 3311 West was 25 years old and was employed by the T&P Rwy on March 4, 1973. He was promoted to conductor on April 14, 1975. His vision, hearing, and color perception were tested on November 13, 1974; the results were satisfactory. He had been assigned to 37 trains which had passed through Meeker during the 6-month period before the accident.

## The Train Equipment

The first locomotive unit of Extra 3311 West was a type U-33, manufactured by the General Electric Company. It was being operated with the short hood forward. The second and third units were type SD-40 and the fourth was a GP-38; each was manufactured by the Electro-Motive Division of General Motors Co. The first unit had a digital-type speedometer but no speed recorder. T&P Rwy locomotive units are not equipped with any form of train control, cab signals, or safety control (dead man). The units are equipped with a permanent radio. The units of Extra 3311 West were equipped with type 26 brake equipment.

A review of the inspection records for 30 days before the accident disclosed no defects which would have contributed to the accident.

After the accident, an inspection of the units disclosed that the controls were properly positioned for multiple-unit operation. The position of the operating controls of the lead unit could not be determined because of the extensive damage to the cab.

In this area, crewmembers on cabooses and locomotives can communicate with each other by radio. They can also communicate with other trains, with wayside stations such as the operators and dispatcher, and with mobile stations in motor vehicles. T&P Rwy radio operating rules require that employees identify the station from which they are calling, but do not require that the answering station be identified. The rules also require that employees familiarize themselves with Federal Communication Commission (FCC) radio operating rules, but do not include the FCC's rules in their rules.

The conductor of Extra 3311 West talked to the engineer by radio a number of times, but he did not converse with the front brakeman.

## Tests & Research

Signals --The signals were tested and found to function as intended; nothing was found that could have caused them to display other than the intended aspects.

A check disclosed that during the 30-day period before the accident, there was an average of 10 trains per day through the area and that during the same period, the operator did not stop any trains by placing signal 178.8, located west of Meeker, in a "stop" position.

Visibility --Shortly after the accident, trains similar to those involved in the accident were used to simulate the accident circumstances in order to determine visibility of signals. Signal 174.6 could be seen

by crewmembers on the locomotive when it was about 2,880 feet east of the signal. The rear of a train ahead, which was positioned at the same point as Extra 551 West, became visible to the crewmembers on the following locomotive when it was 2,700 feet east of the standing train.

The crewmembers on the caboose of Extra 3311 West could not have seen the aspects displayed by signals 174.1 and 176.3 before the locomotive passed the signals because of the curve of the track and the vegetation along the right-of-way.

Brake Tests -- After the accident, the brakes of the undamaged cars of Extra 3311 West were tested. Twenty of the 120 cars had either inoperative brakes or 12-inch-long piston travels. Cars with such piston travels usually are considered inoperative, since the piston has traveled its full length and is against the cylinder. In addition, 11 cars had pistons which had traveled more than 10 inches. The braking capability of the train, therefore, was reduced about 16 percent because of the defective cars.

The stopping distance for Extra 3311 West, with the brakes in emergency and while the train was moving at 48 mph, was computed to be 1,921 feet. (See Appendix B.)

## ANALYSIS

### The Accident

Based on physical evidence and tests, the Safety Board concludes that signal 174.1 was displaying an "approach" and that signal 176.3 was displaying a "low" aspect when Extra 3311 West approached and passed them. Since the engineer and front brakeman were killed in the accident, the Safety Board could not determine why train Extra 3311 West was not being operated in accordance with the signal indications.

Since it is unlikely that two crewmembers of the same train would fail to perceive the indications of these two consecutive signals, the Safety Board sought to determine why the signals were disobeyed.

If the operator at Alexandria places signal 178.8 in a "stop" position, both signals 174.1 and 176.3 display "approach" aspects. Signal 174.1 also displays "approach" when the main track at Meeker is occupied. Therefore, when the crewmembers on the locomotive first saw the "approach" aspect on signal 174.1, they may have assumed that the operator at Alexandria had placed signal 178.8 at "stop." They knew that if this were the case, they would not be required to stop until they arrived at signal 178.8--1.4 miles west of the point of impact. If the main track had not been occupied, there would have been sufficient distance in which to stop Extra 3311 West in order to comply with signal 178.8.

Normally, when the engineer of Extra 3311 West saw an "approach" indication at signal 174.1, he would radio the operator at Alexandria to determine if the train would be held out of the yard by signal 178.8. On hearing that radio transmission the conductor in the caboose would know that signal 174.1 displayed an "approach" aspect, and he could monitor the train's operation accordingly. Since the transmission was not made, the conductor of Extra 3311 West did not know what aspect was being displayed.

The exclamation that something was on the main track, the emergency brake application, and the blowing of the horn as the train proceeded west through the block were sufficient evidence to indicate that at least one of the crewmembers was functioning when the locomotive entered the occupied block. The exclamation made over the radio did not identify the caller, but the conductor recognized the voice as that of the engineer.

Neither crewmember on the caboose had been in contact with the front brakeman while the train was en route to Meeker, so his state of alertness as the train approached the east switch at Meeker and entered the occupied block could not be determined. Apparently, he was not alert, he did not have sufficient training or experience to enable him to recognize the dangers, or he was reluctant to contradict the senior engineer.

Signal 176.3 was 3,828 feet in front of the collision point. The rear of Extra 551 West should have been visible 2,700 feet before impact. Thus, if 1,921 feet were needed in which to stop the train from a speed of 48 mph, Extra 3311 West would have stopped if emergency braking had been initiated as soon as Extra 551 West became visible and if its brakes had been functioning properly. Longer reaction time and poor braking capability would have made the stopping distance more critical.

#### The Use of Radio

The radio system available to the employees on the T&P Rwy provides many advantages, one of which is safety. However, the Safety Board believes that the radio practices involved in this accident resulted from inadequate operating rules and deviations from those rules.

The Safety Board's investigation also revealed that T&P Rwy rules do not include FCC rules. For example, the transmitter overheard by the track foreman just before the collision did not identify himself or the station to which he was transmitting. Radio operating rules which require an employee to identify the station from which he is calling and do not require the person who answers to identify himself, do not comply with FCC requirements and can lead to unsafe operations.

Supervisors who use radios regularly have an almost constant opportunity to monitor their use and can, therefore, detect deviations from the rules and take action to correct them.

### The Engineer

The engineer of Extra 3311 West had been involved in two previous incidents in which another employee had to apply the brakes because the engineer did not obey signal aspects. During its investigation, the Safety Board found no records to indicate that the carrier had taken action to determine why the engineer failed to obey the signals.

The engineer's three most recent eye tests indicated a significant deterioration of his vision. However, if the engineer was wearing his eyeglasses at the time of the accident, he should have been able to see the aspects of both signals far enough in advance to comply with them.

The Safety Board did not find any evidence to explain the engineer's failure to obey signals 174.1 and 176.3.

### The Signal System

This accident emphasizes the need for a single aspect to protect occupied blocks.

Most automatic signals which govern entrances to blocks display a "stop-and-proceed" aspect when the block is occupied. However, at sidings where spring switches are used, the signals display "low" aspects which do not require trains to stop before proceeding, but allow them to proceed at low speed. Because spring switches usually are considered less reliable than remotely controlled or hand-thrown switches, the T&P Rwy has provided rule 104a which requires that the spring switch be thrown back and forth when the signal indicates "stop" or "stop-and-proceed." To circumvent this rule, a white lunar light was provided on the signal which not only indicates when the switch is properly lined for the main track, but also changes the aspect from "stop-and-proceed" to "low." The "low" aspect is being used as a switch-position indicator; however, in effect, it allows trains to proceed into an occupied block without stopping. An actual switch-position indicator would have shown the position of the switch points and would have allowed the continued use of the "stop-and-proceed" aspect to indicate an occupied block.

The Federal Railroad Administration (FRA) has proposed regulations to require a "stop-and-proceed" indication at the entrance to an occupied block or to a block whose signal circuit has been interrupted by a track condition which could adversely affect the safety of the train.

### The Reduced Braking Capability of Extra 3311 West

The presence of cars in the train with inoperative brakes and defective brakes because of excessive piston travel indicates that the brakes were not tested properly. Greater braking capability would have been present if a larger number of cars had normal brakes. FRA regulations do not permit cars with inoperative brakes or with piston travels of more than 10 inches to be dispatched from a terminal.

### Responsibility for Train's Operation

The operating rules of the T&P Rwy make the conductor responsible for the general direction and government of the train, and all employees on the train must obey his instruction. Usually, however, the conductor rides in the caboose and cannot see the signals before the locomotive passes them. Consequently, the conductor must depend on the front brakeman to observe the signals and to monitor the engineer's operation of the train accordingly. On the T&P Rwy and on many other railroads, the conductor does not have radio contact with the front brakeman since the engineer normally operates radio.

The Safety Board believes that the above operating practices make it difficult, if not impossible, for the conductor to insure the safe operation of the train.

The Safety Board has investigated a number of train collisions where the absence of an adequate backup system to insure that the train is operated in accordance with signal indications has resulted in loss of life and extensive property damage.

In most of the accidents, the only available backup was another employee in the cab of the locomotive. Many times this employee either was not alert or lacked sufficient training and experience to enable him to recognize the dangers and take control of the train. The Safety Board has recommended that the FRA and the individual railroads require an adequate backup system. An electro-mechanical backup system to control the train in accordance with the signal indication when the engineer failed to do so might have prevented the accident.

### CONCLUSIONS

1. Signal 174.1 displayed an "approach" aspect and signal 176.3 displayed a "low" aspect as Extra 3311 West approached.
2. Extra 3311 West was not operated in accordance with the indications of signals 174.1 and 176.3.

3. The engineer of Extra 3311 West was operating the locomotive as the train approached the rear of Extra 551 West.
4. Crewmembers on the caboose of Extra 3311 West did not know that the block at Meeker was occupied until so informed by the engineer.
5. If the crewmembers on the locomotive of Extra 3311 West had seen the rear of the train ahead at the earliest time possible, their train probably could have been stopped short of Extra 551 West by emergency braking.
6. The speed at which Extra 3311 West hit Extra 551 West could have been reduced further if there had been effective brakes on all cars.
7. Brakes on Extra 3311 West had not been tested properly before dispatch.
8. The alertness of the front brakeman of Extra 3311 West as the train approached the collision point could not be determined.
9. T&P Rwy employees did not comply with the carrier's rules for using radios.
10. The carrier's rules did not require compliance with FCC rules for railroad radio use, and the supervisors did not insure compliance with either the railroad rules or the FCC requirements.

#### PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of the collision was the failure of the engineer of Extra 3311 West, while operating the train in violation of a "low" signal indication, to perceive the train ahead in time to prevent a collision. A cause of the severity of the collision was the subnormal braking capability of a significant number of cars.

#### RECOMMENDATIONS

As a result of this investigation, the National Transportation Safety Board made five recommendations to the Administrator, Federal Railroad Administration. (See Appendix C).

The Safety Board reiterates the following recommendations which were made to the FRA as a result of other train collisions:

"In the promulgation of regulations governing railroad operating rules, where responsibility for safe operation of the train is assigned jointly to the engineer and the conductor, require that they be located and informed so that they can make quick effective decisions." (Recommendation No. R-73-11)

The Safety Board reiterates the following recommendation made to the FRA as a result of its Special Study, "Signals and Operating Rules as Causal Factors in Train Accidents":

"...that the Federal Railroad Administration develop a comprehensive program for future requirements in signal systems and operating rules that will require as a minimum:

- a. that all mainline trains be equipped with continuous cab signals in conjunction with automatic-block signals;

\*\*\*

- c. that engineers, in order to nullify a train control device, be required to take a prescribed positive action which would be recorded for later reference."  
(Recommendation No. RSS-71-3-45)

BY THE NATIONAL TRANSPORTATION SAFETY BOARD:

/s/ JOHN H. REED  
Chairman

/s/ FRANCIS H. McADAMS  
Member

/s/ LOUIS M. THAYER  
Member

/s/ ISABEL A. BURGESS  
Member

/s/ WILLIAM R. HALEY  
Member

December 30, 1975



APPENDIX A

Excerpts from the Uniform Code of Operating Rates.

**UNIFORM CODE  
OF  
OPERATING RULES**

Effective June 2, 1968

The rules herein govern the operation of these railroads, and must be complied with by all employes whose duties are in any way affected thereby

They supersede all previous rules and instructions inconsistent therewith

Special instructions may be issued by proper authority

\*\*\*\*\*

**MISSOURI PACIFIC RAILROAD CO.  
TEXAS AND PACIFIC RAILWAY CO.  
KANSAS, OKLAHOMA & GULF RAILWAY  
MISSOURI-ILLINOIS RAILROAD CO.**

and  
**AFFILIATED COMPANIES.**

**J. H. LLOYD**  
Vice President — Operation

\*\*\*\*\*

**DEFINITIONS.**

\*\*\*\*\*

**MAXIMUM SPEED.**—The highest speed authorized for the operation of trains and engines on main track except as otherwise restricted by yard limits, train orders, speed restriction signs, general orders, special instructions, or other restrictive conditions.

**RESTRICTED SPEED.**—Proceed prepared to stop short of train, engine, obstruction, or switch not properly lined.

**LOW SPEED**—A speed that will permit stopping short of train, engine, obstruction, or switch not properly lined and looking out for broken rail, but not exceeding 20 miles per hour

**AUTOMATIC BLOCK SYSTEM (ABS).**—A series of consecutive blocks governed by block signals, cab signals, or both, actuated by a train, engine, or by certain conditions affecting the use of a block.

\*\*\*\*\*

**SPRING SWITCH**—A switch equipped with a spring so that when run through in trailing movements the switch points return to their original position.

\*\*\*\*\*

**BLOCK**—A length of track of defined limits, the use of which by trains and engines is governed by block signals, cab signals, or both.

**BLOCK SIGNAL**—A fixed signal at the entrance of a block to govern trains or engines entering and using that block.

\*\*\*\*\*

**OPERATING RULES.**

\*\*\*\*\*

**19 Markers.**—The following signals will be displayed to the rear of every train, as markers, to indicate the rear of the train

- (1) One or more lights displaying red to the rear, or
- (2) Reflectorized markers displaying red to the rear, or
- (3) By day, marker lamps not lighted in places provided, or
- (4) By night, marker lamps lighted showing red to the rear and green to the front and side.

APPENDIX A

If a train is not equipped to display markers, a red flag will be displayed to indicate the rear of the train

\*\*\*\*\*

**99 Flagging Rule.**—When a train is moving under circumstances in which it may be overtaken by another train, the flagman must drop lighted red fuseses at proper intervals, and must continue observation to rear, and take necessary action to insure full protection.

When a train stops under circumstances in which it may be overtaken by another train, the flagman must go back immediately with flagman's signals a sufficient distance to insure full protection, placing two torpedoes and, when necessary, in addition, displaying lighted red fuseses. When recalled and safety to the train will permit, he may return, and when conditions require, he will leave the torpedoes and a lighted red fusee

When a train is seen or heard approaching before a flagman has reached a sufficient distance, he must immediately place torpedoes and continue toward the approaching train, giving stop signals

\*\*\*\*\*

**99 (k) Effective only where authorized by special instructions:**

Where ABS rules are in effect, and a train or engine is on a main track with at least two automatic block signals to the rear, protection against a following train or engine on that track is not required.

\*\*\*\*\*

**104 (a). Spring Switches.**—Spring switches are designated by letter "S" or letters "SS" on or near the switch stand, and facing point movements over them protected by signals, or indicators.

When signal in facing point movement displays Stop or Stop, Then Proceed at Low Speed indication:

(1) Test switch by throwing over and back by hand, examine switch points to see that they fit properly, and that switch is lined for route to be used

(2) Train or engine may then proceed as prescribed by Rule 350 or Rule 351

A train or engine trailing through and stopping on a spring switch must not make reverse movement, nor take slack, while any part of train or engine is on switch point until switch has been thrown by hand

Where there is no signal protecting trailing movement to a main track through a spring switch, or when signal governing movement to main track indicates Stop or Stop, Then Proceed at Low Speed, or when block indicator shows block occupied, the main track must not be fouled until it is seen that track is clear and protection afforded against following trains or engines on that main track

\*\*\*\*\*

## RESPONSIBILITY OF TRAINMEN AND ENGINEMEN.

**107 Co-operation Between Crew Members.**—

Conductors and engineers must bring about co-operation between all members of the crew

(1) Both the conductor and the engineer are responsible for the safety of the train and the observance of the rules, and under conditions not provided for by the rules must take every precaution for protection

(2) The general direction and government of a train is vested in the conductor, and all persons employed on the train must obey his instructions. Should there be any doubt as to authority or safety of proceeding from any cause, the conductor must consult the engineer and be equally responsible with him for the safety and proper handling of the train.

Conductors and engineers are responsible for the protection of their train. Conductors are responsible for the position of switches used by them and their trainmen

(3) Engineers are jointly responsible with the conductor for the safety of the train, and proper observance of the rules, and although they are under the direction of the conductor regarding the supervision of trains, they will not comply with any instructions which imperil the safety of the train or involve a violation of the rules

(4) Conductors and engineers must see that their subordinates are familiar with their duties, ascertain the extent of their experience and knowledge of the rules, and instruct them, when necessary, in the proper and safe performance of their work

(5) When the conductor is not present, trainmen must promptly obey the instructions of the engineer relating to the safety and protection of the train

(6) Other members of crew, after carefully reading train orders, must keep them in mind and assist in their observance, call attention of conductor or engineer immediately to any apparent failure to observe train orders, or to clear the time of superior trains, or to comply with rules and instructions

When safety of trains and observance of rules or train orders are involved, other members of crew are responsible to the extent of their ability to prevent accident or violation of rules. They will not comply with any instructions which imperil the safety of the train or involve a violation of the rules

When the conductor or engineer fails to take action to stop the train, and an emergency requires, other members of crew must take immediate action to stop the train

**108 In case of doubt or uncertainty, the safe course must be taken.**

\*\*\*\*\*

**351. Stop and Proceed Signals Per Rule 291.**—When a train or engine is stopped by a Stop, Then Proceed at Low Speed indication, it may proceed:

(1) On any track signaled for traffic in both directions, at Low Speed through the entire block, except when moving under flag protection per Rule 350, it must continue under flag protection as prescribed

When making reverse movement into a block, be governed by Rules 354 or 404

(2) On any track signaled for traffic in one direction, at Low Speed through the entire block.

**352. Passing Stop and Proceed Signals.**—Except as provided by Rule 104 (a) (Spring Switches), a train may pass, without stopping, a Stop, Then Proceed at Low Speed indication

(1) At Low Speed to enter siding or yard track when track is seen to be clear from signal to the switch

(2) At Low Speed to continue on main track at a meeting point when opposing train is seen to be entering siding and track is seen to be clear to switch used by train to be met

\*\*\*\*\*

**BLOCK SIGNAL, CAB SIGNAL, AND**  
(Block and interlocking signal indications do not

RULE & NAME	BLOCK AND INTERLOCKING ASPECTS	CAB SIGNAL ASPECTS
281 CLEAR		
285 APPROACH		
291 STOP AND PROCEED		
292 STOP		

**INTERLOCKING SIGNAL INDICATIONS**  
modify requirements of Rules 93, D 93 and 105)

INDICATION
Proceed
Proceed immediately reducing to 40 MPH or slower if necessary prepared to stop before reaching next signal
Stop, then proceed at Low Speed through the entire block
Stop

APPENDIX A

RULES AND INSTRUCTIONS GOVERNING  
THE OPERATION OF A  
RAILROAD RADIO COMMUNICATION SYSTEM

-----

Revised June 2, 1968

J. H. Lloyd, Vice President-Operation

GENERAL RULES

The following rules cover the use of a Railroad Radio System and govern employees using such systems:

A. Definition: A railroad Radio Communication System is one employing radio for the transmission of intelligence between units of mobile equipment, between a unit of mobile equipment and a fixed point, or between fixed points.

B. Radio communication systems are under the jurisdiction of the Federal Communications Commission. The Railroad Company and its employees are governed by the Commission's operating rules. Violation is a Federal offense for which severe penalties are provided.

C. Before using a railroad radio transmitter, employees must read, study and familiarize themselves with these rules.

10. Employees shall identify the radio station from which they are calling by prefacing their call with the Railroad name, for example:

- (1) "MP Caboose Train 192 calling MP engine 202".
- (2) "MP Track Foreman Smith calling Engineer Extra 700 North".
- (3) "MP switch engine 1234 calling Yardmaster, Osawatomie", or
- (4) "MP Carman Little Rock calling Engineer Extra 701 South".

11. During an exchange of communications exceeding 15 minutes in length, each station shall be identified at the end of each 15 minute period.

APPENDIX B

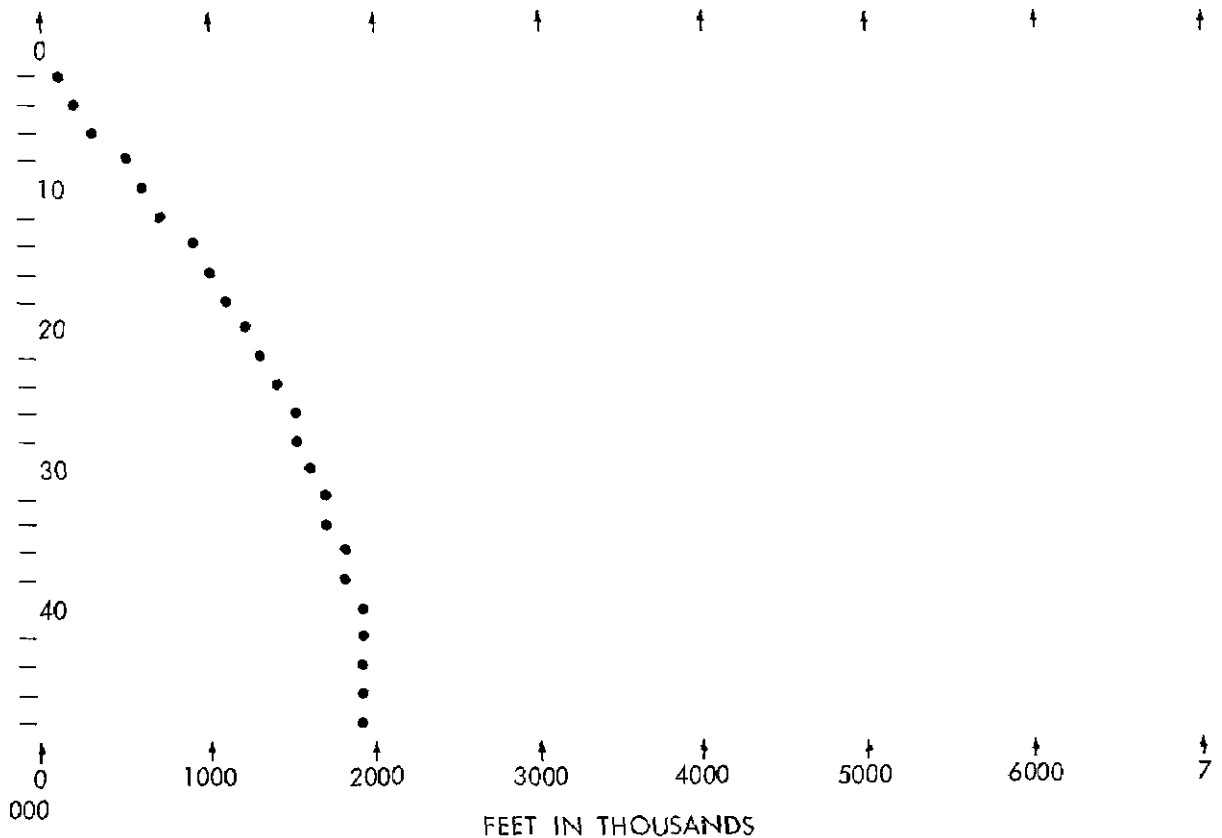
THEORETICAL STOPPING DISTANCE COMPUTED FOR EXTRA 3311 WEST

USING 'AVERAGE' OR 'CONSIST' METHOD	? CONSIST
USING 'FILE' OR 'TERMINAL' INPUT	? FILE
'AVERAGE' OR 'ACTUAL' CURVES AND GRADES	? ACTUAL
ENG STA OF LEAD UNIT OR CAR	? 934178
VELOCITY IN MILES PER HOUR	? 48
BRAKE CYLINDER PRESSURE IN POUNDS	? 69
'EMERGENCY' OR 'SERVICE' APPLICATION	? EMERGENCY
'VOLUNTARY' OR 'INVOLUNTARY' APPLICATION	? VOLUNTARY
WAS INDEPENDENT BRAKE APPLIED	? NO
BRAKE LEAKAGE FOR TRAIN IN POUNDS	? 0

GRAPH OF TIME AND DISTANCE

? YES

GRAPHIC REPRESENTATION OF  
TIME AND DISTANCE



NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

APPENDIX C

ISSUED: January 25, 1976

-----  
Forwarded to:

Honorable Asaph H. Hall  
Administrator  
Federal Railroad Administration  
400 Seventh Street, S.W.  
Washington, D.C. 20590  
-----

SAFETY RECOMMENDATION(S)

R-76-1 thru 5

On May 30, 1975, two Texas and Pacific Railway freight trains collided at Meeker, Louisiana. Extra 551 West had stopped on the single main track at Meeker to perform switching in an industrial plant. Extra 3311 West passed an "approach" signal and a "low" signal at 50 mph without reducing speed and entered the block occupied by Extra 551 West.

The engineer apparently saw the standing train when it was about 1,700 feet in front of him and applied the brakes in emergency. Extra 3311 West hit the rear of Extra 551 West at a speed of about 30 mph. The conductor of Extra 551 West, who was near the caboose, and the engineer and front brakeman of Extra 3311 West were killed.

This accident illustrated five areas in which corrective action is warranted:

(1) The Safety Board could not determine why the engineer failed to obey the signal indications. The Safety Board believes that since the front brakeman was a relatively new employee he probably lacked the training and experience necessary to recognize the dangers of the situation, and therefore also failed to control the train.

This accident again points out the need for a backup system to control the train in accordance with signal indications when the engineer fails to do so; dependence upon another employee is not adequate.

(2) The siding at Meeker is equipped with spring switches. To provide additional protection for operation over the switches, the carrier required that crewmembers operate the switches to determine if they are in proper position for movement at any time a signal protecting the

APPENDIX C

switches displays "stop-and-proceed." To eliminate the need for testing the switches, the carrier installed a white lunar light on the signal to indicate when the switch was lined for the main track. The white lunar light changes the signal from stop-and-proceed" to "low," which establishes two different aspects for an occupied block on the same portion of railroad.

(3) The carrier's operating rules make the conductor primarily responsible for the safety of the train. However, since the conductor rides in the caboose, he probably cannot see the signals, and consequently cannot determine if the train is being operated properly. Since he is responsible for the train's operation, he either should be located in a controlling position or provided with the necessary equipment to carry out his responsibility.

(4) The carrier's radio rules did not require a responder properly to identify himself contrary to Federal Communication Commission (FCC) regulations. Other irregularities, such as failure of sender to identify himself properly, were disclosed that if not corrected could lead to confusion and eventually to an accident.

(5) After the accident, the air brake systems on the undamaged equipment of Extra 3311 West were tested. Test results indicate that 20 cars had either inoperative brakes or pistons that have traveled 12 inches. This condition reduced the train's braking capability about 16 percent.

To correct the above deficiencies, the National Transportation Safety Board recommends that the Federal Railroad Administration:

1. Expedite the final rulemaking procedures with respect to Radio Standards and Procedures as set forth in proposed Part 220, FRA Docket No. RSOR-5. (Recommendation R-76-1) (Class II, Priority Followup)

2. Require that Texas and Pacific Railway employees comply with FCC regulations pertaining to radio operation. (Recommendation R-76-2) (Class II, Long-Term Followup)


3. Promulgate regulations to require an adequate backup system for mainline freight trains that will insure that a train is controlled as required by the signal system in the event that the engineer fails to do so. (Recommendation R-76-3) (Class III, Long-Term Followup)

APPENDIX C

4. Expedite the final rulemaking procedures with respect to "Stop and Proceed" Procedures", as set forth in proposed Part 217.17, FRA Docket No. RSOR-2. These rules prescribe the aspect that must be displayed by each automatic block signal when the block is occupied by a train or when the signal circuit is interrupted by an open switch, broken rail, or track obstruction, and the procedures which must be followed when trains proceed into the block. (Recommendation R-76-4) (Class II, Priority Followup)

5. Enforce regulations that pertain to the maintenance of train braking systems. (Recommendation R-76-5) (Class II, Priority Followup)

REED, Acting Chairman, McADAMS, THAYER, BURGESS, and HALEY, MEMBERS, concurred in the above recommendations.

By:   
John H. Reed  
Acting Chairman