Inv-2391

INTERSTATE COMMERCE COMMISSION

WASHINGTON

REPORT OF THE DIRECTOR

BUREAU OF SAFETY

ACCIDENT ON THE

COLORADO AND SOUTHERN RAILWAY

DES MOINES, N. MEX.

NOVEMBER 2, 1939

INVESTIGATION NO. 2391

SUMMARY

Inv-2391

Railroad:	Colorado and Southern	
Date:	November 2, 1939	
Location:	Des Moines, N. Mex.	
Kind of accident:	Rear-end collision	
Trains involved:	Freight	: Freight
Train numbers:	Extra 5293	: Extra 351-6307
Engine numbers:	5293	: C. & S. helper 351 and C. B. & Q. 6307
Consist:	96 cars and caboose	: 44 cars and caboose
Speed:	7 or 8 m. p. h.	: 33 m. p. h.
Operation:	Timetable, train orders and manual block system with permissive cards for following movements	
Track:	Single; tangent; 0.76 percent ascending for south-bound trains	
Weather:	Clear	
Time:	6:37 p. m.	
Casualties:	6 injured	
Cause:	Failure to control speed of train because of open double-heading cock on second engine.	

Inv-2391

January 10, 1940

To the Commission:

On November 2, 1939, there was a rear-end collision between two freight trains on the Colorado and Southern Railway at Des Moines, N. Mex., which resulted in the injury of five employees and one trespasser.

Location and Method of Operation

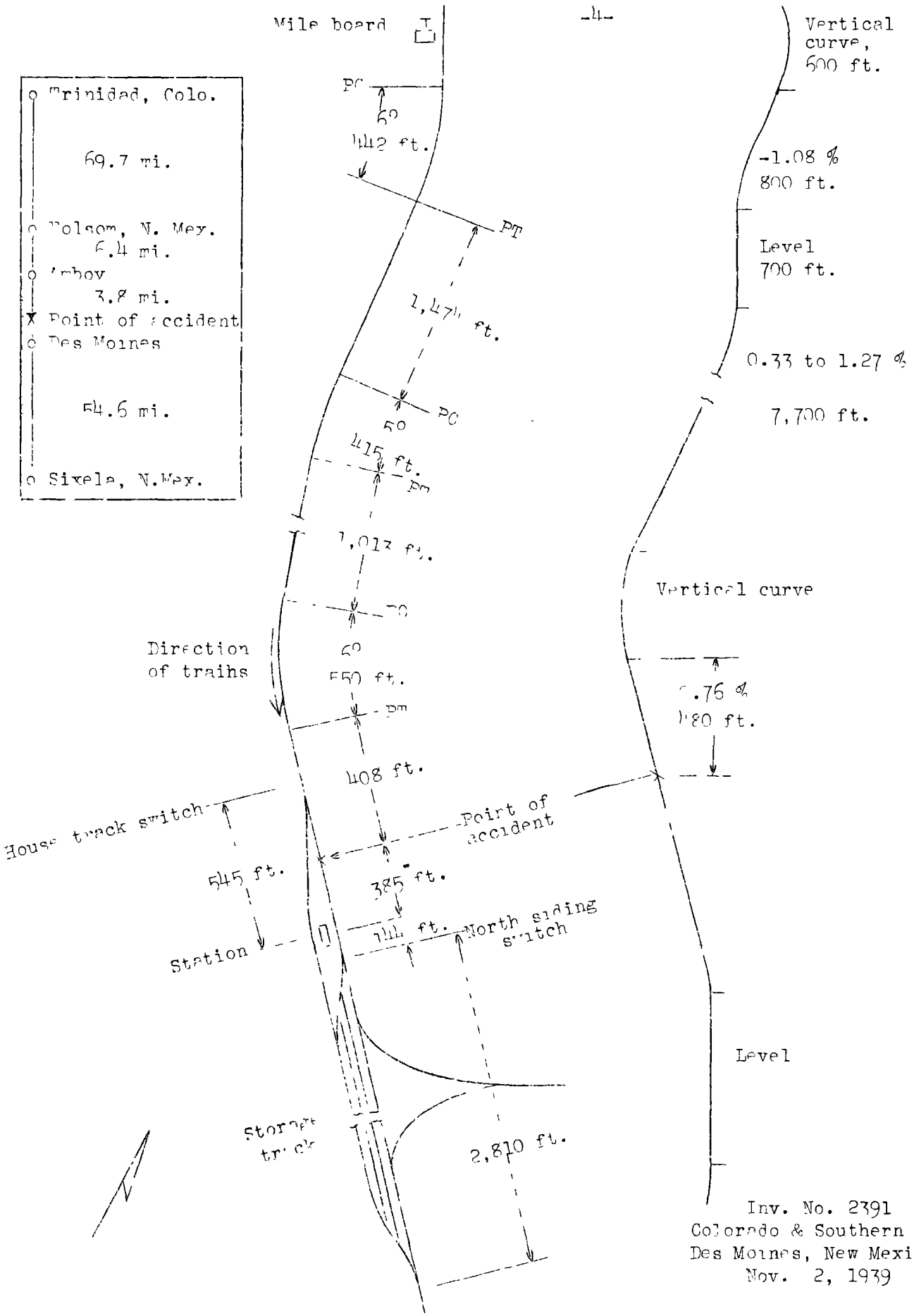
This accident occurred on that part of the Southern Division designated as the Trinidad and Sixela Subdivision which extends between Trinidad, Colo., and Sixela, N. Mex., a distance of 134.5 miles. This is a single-track line over which trains are operated by timetable and train orders; a manual block system with permissive cards is used for following movements only. The accident occurred on the main track at a point 385 feet north of the station at Des Moines. Approaching this point from the north there is a series of short curves and tangents, which is followed by a 6° curve to the left 550 feet in length and then a tangent a distance of 408 feet to the point of accident and some distance beyond. The grade for south-bound trains is generally ascending a distance of 8 miles, within which distance the maximum gradient is 1.22 percent, and then there is a vertical curve 600 feet in length which is followed, successively, by 1.08 percent descending grade 800 feet, level track 700 feet, descending grade a distance of 7,700 feet, within which distance the gradient varies from 0.33 to 1.27 percent, a vertical curve 700 feet in length, and 0.76 percent ascending grade a distance of approximately 480 feet to the point of accident and some distance beyond.

Paralleling the main track on the west there is a siding 2,810 feet in length, the north switch of which is located 144 feet south of the station. A storage track and a house track lie west of the siding; the north switch of the house track connects with the main track at a point 545 feet north of the station, which is located between the main track and the house track.

From Mile Post 291.48, located approximately 1 mile north of the station, to Mile Post 293.71 the speed of freight trains is restricted to 35 miles per hour.

Rule 1 of the special time-table rules and instructions provides:

> When block is not clear of preceding train, train dispatcher will authorize operator to issue permissive form "C" for following train in non automatic block signal territory.



Inv. No. 2391
Colorado & Southern Ry.
Des Moines, New Mexico
Nov. 2, 1939

Permissive Form C reads: * * * Proceed, expecting to find train_____in the block between_____and_____. Instructions at the bottom of the form read as follows:

> Form C may be used when a Stop-Signal is displayed and it is permissible to admit a following train to the block.
>
> Enginemen receiving this card will proceed as indicated, at restricted speed where the view is obscure.

Restricted speed is defined as: Proceed prepared to stop short of train, obstruction, or anything that may require the speed of a train to be reduced.

Instructions contained in the manual, Train Handling and the Care and Operation of Air Brake Equipment, in use on this railroad, provide:

> When double headers are run the brakes should be operated from the leading engine only, and the double heading cocks on all other engines must be closed and preparations to double head made as explained under the description of the different brake valves.
>
> The Double-Heading Cock is located in the brake pipe underneath the H-6 brake valve. In double-heading service, this cock must be closed on the second locomotive and the handles of the automatic and independent brake valves placed in Running position. Closing of this cock prevents charging of the brake pipe from main reservoirs located on other than the head engine; if this were not the case reductions of brake pipe pressure could not be controlled from the head engine as desired. With both brake valve handles carried in Running position, the locomotive brakes can be completely controlled from the head engine. However, the engineman on the second engine can apply or release his brakes independently of the train brakes by proper manipulation of the independent brake valve handle.

The operating rules of this railroad provide:

> At point where motive power or engine crew or train crew is changed, tests of the train brake system must be made as follows: After the brake system on a freight train is charged to not less than 5 lbs. below the standard pressure for that

train, and on a passenger train to at least 70 lbs. a fifteen pound service reduction must be made upon proper request or signal, brake pipe leakage noted as indicated by the brake pipe gauge (which must not exceed 5 lbs. per minute), after which the reduction must be increased to 20 lbs. Then an examination of the train brakes must be made to determine if brakes are applied in service application on each car. When this examination has been completed, proper release signal must be given and each brake examined to see that it releases properly.

Rule 14(a), of the operating rules, provides that one short blast sounded on the engine whistle is a signal to apply brakes and stop.

Rule 35 of the operating rules reads as follows:

The following signals will be used by flagmen:

Day signals ---- A red flag,
Torpedoes and Fusees.

Night signals-- A red light,
A white light,
Torpedoes and Fusees.

Rule 99 of the operating rules reads as follows:

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 fusees.

When recalled and safety to the train will permit he may return.

* * *

When a train is moving under circumstances in which it may be overtaken by another train, the flagman must take such action as may be necessary to insure full protection. By night, or by day when the view is obscured, lighted fusees must be thrown off at proper intervals.

* * *

It was dark and the weather was clear at the time of the accident, which occurred about 6:37 p. m.

Description

Extra 5293, a south-bound freight train, consisted of 1 loaded and 95 empty cars and a caboose, hauled by engine 5293, and was in charge of Conductor Poirier and Enginemen Gartside. This train left Trinidad, 79.9 miles north of Des Moines, at 12:01 p. m., according to the train sheet, departed from Folsom, the last open office, 10.2 miles north of Des Moines, at 5:47 p. m., arrived at Des Moines at 6:35 p. m., and stopped with the caboose standing north of the north house-track switch. Several minutes later the train started and had proceeded about 20 car lengths, attaining a speed of 7 or 8 miles per hour, when its rear end was struck by Extra 351-6307.

Extra 351-6307, a south-bound freight train, consisted of 41 loaded and 3 empty cars and a caboose, hauled by C. & S. helper engine 351 and C. B. & Q. engine 6307, coupled, and was in charge of Conductor Powledge and Enginemen Sullivan and London. This train left Trinidad at 3 p. m., according to the train sheet. At Folsom, the crew received clearance Form A and permissive Form C, the latter reading:

> Proceed, expecting to find Extra 5293 south in the block between Folsom and Des Moines.

The train departed from that point at 6:12 p. m., and, when approaching the station at Des Moines and moving at a speed of 33 miles per hour, according to the tape of the speed recorder with which engine 351 was equipped, struck the rear end of Extra 5293.

The caboose and rear two cars of Extra 5293 were demolished; the third, fourth and fifth cars from the rear stopped east of the main track and were badly damaged; the sixth car from the rear was derailed and knocked off center. Engine 351, of the 4-6-2 type, stopped with its front end 36 feet west of the main track and 321 feet south of the point of accident. The tender of engine 351 and engine 6307, of the 2-10-2 type, stopped to the rear of the first engine, with the rear end of engine 6307 fouling the main track. Both engines and tenders were badly damaged. The first eight cars jackknifed, stopped behind the second engine, and fouled both the main and the house tracks; five of these cars were destroyed. The ninth car stopped just south of the point of collision with its front truck derailed.

The employees injured were the two enginemen, the two firemen, and the front brakeman of Extra 351-6307.

Summary of Evidence

Engineman Gartside, of Extra 5293, stated that an air-brake test was made at Trinidad and the brakes functioned properly en-route. At Folsom he received a message to let Extra 351-6307 pass without delay when overtaken. As his train approached Amboy, 3.8 miles north of Des Moines, he looked back and saw Extra 351-6307 rounding Horse Shoe curve, which is located about 3 miles north of Amboy. When his train passed over the summit of the hill north of Des Moines he closed the throttle and approached Des Moines at a speed of about 25 miles per hour. When passing the station a message was received to let Extra 351-6307 pass at Des Moines. In order to let the extra pass on the siding, he intended to pull the train clear of the north siding-switch and to double the head end of the train on the storage track. The front brakeman asked to be let off at the south siding-switch, and when the air brakes were applied the speed was reduced to such an extent before the brakes were released that the train stopped. He whistled out the flagman and started the train, and it was moving at a speed of 6 or 8 miles per hour when the rear end was struck by Extra 351-6307.

Fireman Greenwade, of Extra 5293, stated that when his train stopped at Des Moines the engine was about 6 or 7 car lengths south of the south siding-switch.

Front Brakeman Nolan, of Extra 5293, stated that he got off the engine at the clearance point of the south siding-switch to line the derails preparatory to doubling the head end of his train into the storage track. He thought the train had stopped with the engine standing 10 or 15 car lengths south of the south siding-switch and, after starting, it had moved about 10 car lengths when the accident occurred.

Conductor Poirer, of Extra 5293, stated that his train was delayed at Folsom because of meeting Extra 5215 and it was necessary to flag Extra 351-6307, but they did not permit that train to pass at that point because of the length of their own train. After leaving Folsom he observed a brake which was sticking on the sixth car ahead of the caboose; he bled the air on that car and heard sounds made by flat wheels. When his train stopped at Des Moines he saw the reflection of the headlight of Extra 351-6307 coming over the hill at Amboy, apparently about 1-1/2 or 2 miles distant. The flagman went back immediately to flag, and the conductor went forward to the sixth car to ascertain the amount of damage to the wheels. The train, having started again, had moved about 20 car lengths and had attained a speed of 7 or 8 miles per hour at the time of the accident. He said that the weather was clear and that the accident occurred about 6:37 p. m.

Flagman Durand, of Extra 5293, stated that at Folsom he went back to flag Extra 351-6307, but was recalled before the

arrival of that train. As his train was passing through Amboy he could see the reflection of the headlight of Extra 351-6307 as it rounded Horse Shoe curve. Just before his train stopped at Des Moines he got off to go back and flag; he thought that at that time the caboose was in the vicinity of bridge 292.29, located 428 feet north of the point of accident. When he saw the reflection of the headlight he lighted a fusee and then heard two short blasts of the whistle, which he thought were in answer to his stop signals, although the whistle signal sounded a little unusual; then he heard the whistle sounded a second time. When he heard the first whistle signal he thought the following train was rounding the first curve south of the mile board and was about 1/2 mile distant. The speed of the approaching train increased and he started giving stop signals. He was about 30 or 35 car lengths north of the point of accident when the train passed him at a speed of 30 miles per hour, at which time there was no indication that the brakes were applied. There was no apparent reduction in the speed of the train prior to the accident, but he heard the brakes become applied at the time of collision. He did not drop off a lighted fusee when his train reduced speed approaching Des Moines because he assumed that the crew of the following train would be maintaining a lookout for Extra 5293.

Engineman Sullivan, of the first engine of Extra 351-6307, stated that an air-brake test was made at Trinidad and the brakes functioned properly en route to Folsom. At Branson, 19.9 miles north of Folsom, he received permissive Form C with instructions thereon to expect to find Extra 5293 in the block between Branson and Folsom. As his train approached Folsom the front brakeman and the fireman saw Extra 5293 departing, and soon afterward he stopped his train to extinguish a burning red fusee. At Folsom engine 351 was uncoupled to take water, and he expected the second engineman to take charge of the air brakes, which duty necessitated cutting in the double-heading cock underneath the brake valve of the second engine. After his engine was recoupled to the train he did not request the second engineman to cut out the double-heading cock, and he made no test to ascertain if he had control of the air brakes. He stated that it is not the practice to make an air-brake test when an engine is uncoupled and recoupled when taking water or coal; the rules require only that the air brakes be tested when cars are picked up, or when a change of crews or engines is made. The air gauge indicated the proper brake-pipe pressure, and he answered a proceed whistle-signal which he received from the second engineman. Leaving Folsom he controlled the speed of the train with the independent brake until the conductor had boarded the caboose. As his engine rounded Horse Shoe curve he saw Extra 5293 passing through Amboy. As his train passed over the summit of the hill north of Des Moines at a speed of 12 or 15 miles per hour he closed the throttle, made a

10 or 15 pound brake-pipe reduction, placed the brake valve in lap position for only a few seconds, and, the speed being reduced, released the brakes and, although the brake-pipe exhaust had not ceased, he felt certain that he had control of the brakes at this time. Because of the manner in which his train was moving, he thought, when he made the application of the air brakes, that the entire train was over the hill although he might have been mistaken. Soon afterward the fireman and the front brakeman warned him of a burning red fusee ahead, at which time his train was moving at a speed of about 25 miles per hour and was closely approaching the mile board. He made a brake-pipe reduction, from which there was a long exhaust, but the speed was not reduced; he placed the brake valve in emergency position, then sounded one long blast of the whistle to signal the second engineman to take charge of the air brakes. After continuing 10 or 15 car lengths he again sounded the whistle for brakes, in each instance the blasts being long enough to be heard by the entire crew. As he was too busy trying to control the train he did not answer the flagman's signals. He thought his engine was about 300 feet south of the mile board when he placed the brake valve in emergency position; there was no reduction in speed, which he estimated to have been about 35 miles per hour when he jumped off just prior to the accident. After the accident he and Engineman Gartside examined the second engine and they found the double-heading cock in open position. Engineman Sullivan had last been examined on the operating and air-brake rules in March, 1938.

Fireman Kennedy, of the first engine of Extra 351-6307, stated that as his train rounded the curve north of the mile board at Des Moines he saw the reflection of a burning fusee and warned the engineman, who applied the air brakes. Fireman Kennedy observed that there was an extraordinarily long brake-pipe exhaust, although he had noticed that usually there was a long exhaust when the brakes were applied; he then saw the engineman place the brake valve in emergency position and heard him sound the whistle signal twice. He thought that his engine was a short distance south of the station board when the brakes were applied in emergency and, seeing that the speed was not being reduced, he got down on the steps, from which position he could see the marker lights of the caboose ahead.

Front Brakeman Sims, of Extra 351-6307, stated that at Folsom when the two engines were recoupled he connected the hose properly and opened both angle cocks. He thought that after the fireman called a warning of the burning fusee, when approaching Des Moines, his train moved about 15 car lengths before the engineman made a service brake-pipe reduction, and then the train moved only a short distance before he placed the brake valve in emergency position. He thought the flagman of the preceding train was from 15 to 20 car lengths north of bridge 292.29 when

he flagged their train.

Engineman London, of the second engine of Extra 351-6307, stated that when the stop was made at Folsom his engine was near the coal chute, and after the first engine was uncoupled he cut in the double-heading cock and drifted a short distance to take coal and water. When the first engine returned he was oiling his engine, and he forgot to cut out the double-heading cock. He stated that the probable reason he did not remember was that usually water is taken on only the second engine at Folsom, as previously the first engine had sufficient water to go to Des Moines and return. As they rounded Horse Shoe curve and again when they reached Amboy, he could see the caboose markers of the train ahead. He had closed the throttle on his engine before the first engineman closed the throttle on the first engine. He observed on his gauge a brake-pipe reduction of 10 pounds and then felt the brakes apply; after moving a short distance he saw the burning fusee, and then felt the brakes become released. He got down on the gangway and saw the fusee, the flagman, and the caboose; he then heard one short blast of the whistle of the first engine, which he thought was in answer to the flagman; the speed was increasing, and he heard a second whistle, but he did not realize what had occurred. He had last been examined on the operating and air-brake rules in March, 1938.

Conductor Powledge, of Extra 351-6307, stated that he did not know that the first engine had been uncoupled at Folsom to take water. He inspected the right side of the train, which was on the outside of the curve, and by the time he reached the head end the engines had been recoupled. Usually the first engine does not take water at that point until it returns from Des Moines. He went to the station to get the orders, and when the train passed him it had attained a speed of about 10 miles per hour, but reduced speed sufficiently for him to board the caboose; he did not think any of the brakes had been applied on the cars. From his position on the left side of the cupola of the caboose he observed that the gauge registered 72 pounds pressure. After his train passed over the hill south of Amboy he felt a reduction in speed and slack action as if the brakes had been applied. He heard no whistle signal, although he did not think from his position he could have heard such signal and he did not think that the train was moving too rapidly to stop at Des Moines. He estimated the speed to have been about 30 miles per hour just prior to the time of accident; there was no shock at the rear end and he did not realize that there had been an accident until he started forward and saw the reflection of the burning fusee. Conductor Powledge stated that if he had known engine 351 was uncoupled at Folsom, he would have asked the enginemen about the double-heading cock and whether the proper air-brake test had been made.

He understood that the rules required an air-brake test be made after recoupling engines which had been separated. He stated that when the first engine is uncoupled and then recoupled the first engineman usually makes a brake-pipe reduction of a few pounds as the train departs.

Flagman Farrell, of Extra 351-6307, stated that when leaving Folsom he was in the cupola of the caboose, on the right side. About the time the caboose passed the mile board at Des Moines he saw the reflection of a burning fusee, but he was not alarmed at the rate of speed at which his train was moving. When the train stopped he looked at the gauge and observed that there was no brake-pipe pressure indicated.

Superintendent Horton stated that about 2 hours after the accident occurred he and General Foreman Mitchell examined the brake valves on engines 351 and 6307 and the air hose couplings between the engines. The brake-valve handle on engine 351 was in emergency position; the air hose connections between the engines had been made properly and the angle cocks were open. The air hose was tested later and found to be free of obstructions. The double-heading cock on engine 6307 was in open position, and the brake valve handle was in running position. Concerning the instructions relative to double heading, he said that if the double-heading cock is not closed on the second engine of a double header, air will be supplied to the brake pipe from the second engine and prevent service application of the brakes from the first locomotive. Under these circumstances the engineman of the first engine could apply the brakes only by placing the brake valve in emergency position, in which case the emergency application would not be obtained, although the brakes on the train would apply to some extent. The superintendent stated, during the interrogation of Engineman Sullivan relative to the requirements for testing the train brake-system when a change of engines or crews on the road was made, that so far as the air-brake rules were concerned a change of engines was made at Folsom when the first engine was uncoupled, and a test should have been made.

Air Brake Examiner Tramblie, of the Burlington Lines, stated that on November 13 a test was conducted at Denver with engines 350 and 6304 coupled to 22 cars, to determine what brake action could be obtained on a train from the first engine when the double heading cock on the second engine was open. It was found that no brake could be applied on the second engine or any car of the train when the brake valve of the first engine was placed in service position; the brakes on the first engine would apply with about 25 pounds cylinder pressure. When the brake valve of the first engine was moved to emergency position, the brakes were ap-

plied in full service on the second engine and on all cars, and an emergency application was obtained on the first engine. He said that a careful check of the speed chart taken from engine 351 showed that a good brake application was in effect for some distance before the collision occurred.

According to data furnished by the carrier, engines 351 and 6307 each were equipped with an H-6 automatic and an S-6 independent brake valve. A complete test was made on Westinghouse No. 6-ET test rack at the C. & S. Shop at Denver, and all ports and orifices were clear of obstructions and all four valves functioned properly on the test rack. Engine 351 was equipped with an 8-1/2-inch cross compound and an 11-inch single stage compressor; engine 6307 was equipped with one 8-1/2-inch cross-compound compressor. The double-heading cock of engine 6307 was located in the brake pipe.

Observations of Commission's Inspectors

The Commission's inspectors, in conjunction with officials of the railroad, made visual tests north of Des Moines to ascertain the distance a burning fusee could be seen by the engine crew of an approaching south-bound train. After dark with the burning fusee located 1,460 feet north of the house-track switch, at which point the flagman was standing when he flagged Extra 351-6307, its reflection could be seen from either side of the engine from 1 to 2 miles; the burning fusee could be seen plainly at a distance of 3,345 feet.

The speed-recorder tape on engine 351 indicated that the train was moving at a speed of about 12 miles per hour at a point approximately 4 miles north of Des Moines; then the speed was increased and was about 18 miles per hour at the peak of the hill, approximately 2 miles north of Des Moines. The speed continued to increase until 35 miles per hour was attained at a point approximately 0.3 mile north of Des Moines, then it showed a reduction to 33 miles per hour at the point of accident.

Discussion

According to the evidence the first engine was uncoupled to take water at Folsom and the engineman on the second engine opened the double-heading cock to assume control of the train brakes, but he forgot to close that cock after the first engine was recoupled. The first engineman made no subsequent test of the air brakes and consequently did not know that he did not have control of the brakes. As the train departed from Folsom the first engineman used the independent-brake valve to control the speed so that the conductor could board the caboose. The train

was being operated under a permissive Form C, and the various members of the crew had seen Extra 5293 ahead several times en route. As extra 351-6307 passed over the summit of the hill, 2 miles north of Des Moines, the engineman of the first engine made a brake-pipe reduction and, although the brake-pipe exhaust had not ceased, released the brakes a few seconds later, and he felt certain that he had control of the brakes on the descending grade southward, of which the maximum gradient was 1.27 percent. Soon afterward the fireman warned him of a burning fusee ahead and he applied the air brakes, but the speed was not reduced; he placed the brake valve in emergency position, but this failed to reduce the speed. He sounded one blast of the engine whistle for the second engineman to take charge of the air brakes and, after moving 10 or 15 car lengths, he sounded the whistle again; in each instance the sound was long enough to be heard by the entire crew. The speed increased, however, and was about 35 miles per hour when he jumped off just prior to the collision; the speed-recorder tape with which engine 351 was equipped indicated a speed of about 33 miles per hour at the time of accident.

According to the engineman of the second engine, when his train approached Des Moines his gauge showed a brake-pipe reduction of 10 pounds and then the air brakes were released. He saw the burning fusee, heard the whistle signal, which he thought was in answer to the flagman, and, although the speed was increasing and he heard a second whistle, he did not realize what was the trouble and he got down on the gangway without taking any action to stop the train.

The conductor, of Extra 351-6307, who was in the caboose, heard no whistle signal and did not think that the train was moving at a rate of speed too high for the train to be stopped at Des Moines. The flagman, who remained on the right side of the cupola, stated that he saw the reflection of the burning fusee when the caboose passed the mile board, but he was not alarmed at the rate of speed at which his train was moving.

The operating rules provide that at a point where motive power or engine crew or train crew is changed, a test of the train brake-system must be made. The division superintendent stated that the separation of the engines at Folsom constituted a change of engines, therefore, a brake test was necessary to comply with the rules for the operation of the air brakes. The first engineman, however, stated that he did not understand that this rule applied when an engine is uncoupled to take water or coal, and that it is not the practice to make a test under such circumstances. The conductor of the second train stated that he did not know that the first engine had been uncoupled at Folsom. He understood that in compliance with the rules a test of the

train air brakes is required after recoupling engines which have been separated. The conductor also stated that the engineman of the first engine usually applies the brakes with a slight reduction as the train departs, to ascertain if he has control of the air brakes.

Both enginemen of Extra 351-6307 had last been examined on the operating and air-brake rules in March, 1938, and the conductor had been examined in June, 1939, yet the evidence indicates that there was no thorough understanding or proper observance of the rules by the employees, and that failure to make a brake test under such circumstances as occurred at Folsom on the day of the accident is not unusual. The officials should ascertain that the employees have a proper understanding of the rules and that the rules are observed. An air-brake test at Folsom would have disclosed that the first engineman did not have control of the air-brakes. If an air-brake test had been made after the engines were recoupled at Folsom, undoubtedly this accident would have been averted.

Conclusion

This accident was caused by failure to control the speed of a following train because of an open double-heading cock on the second engine.

Recommendation

It is recommended that the proper operating officials take necessary action to assure a thorough understanding and proper enforcement of the rules.

Respectfully submitted,

S. N. MILLS

Director.