

INTERSTATE COMMERCE COMMISSION  
WASHINGTON

---

REPORT OF THE DIRECTOR  
BUREAU OF SAFETY

---

ACCIDENT ON THE  
FORT WORTH & DENVER CITY RAILWAY

---

SAMNORWOOD, TEX.

---

JUNE 13, 1938

---

INVESTIGATION NO. 2277

- 2 -

SUMMARY

Inv-2277

Railroad:	Fort Worth & Denver City
Date:	June 16, 1938
Location:	Samnorwood, Tex.
Kind of accident:	Derailment
Train involved:	Freight
Train number:	92
Engine number:	409
Consist:	30 cars and caboose
Speed:	5 m.p.h.
Operation:	Timetable and train orders
Track:	Single; tangent; slight ascending grade
Time:	3:50 a.m.
Weather:	Clear
Casualties:	2 killed and 1 injured
Cause:	Collapse of bridge, due to being struck by wreckage of highway bridge which had been washed out by flood waters.

Inv-2277

July 9, 1938.

To the Commission:

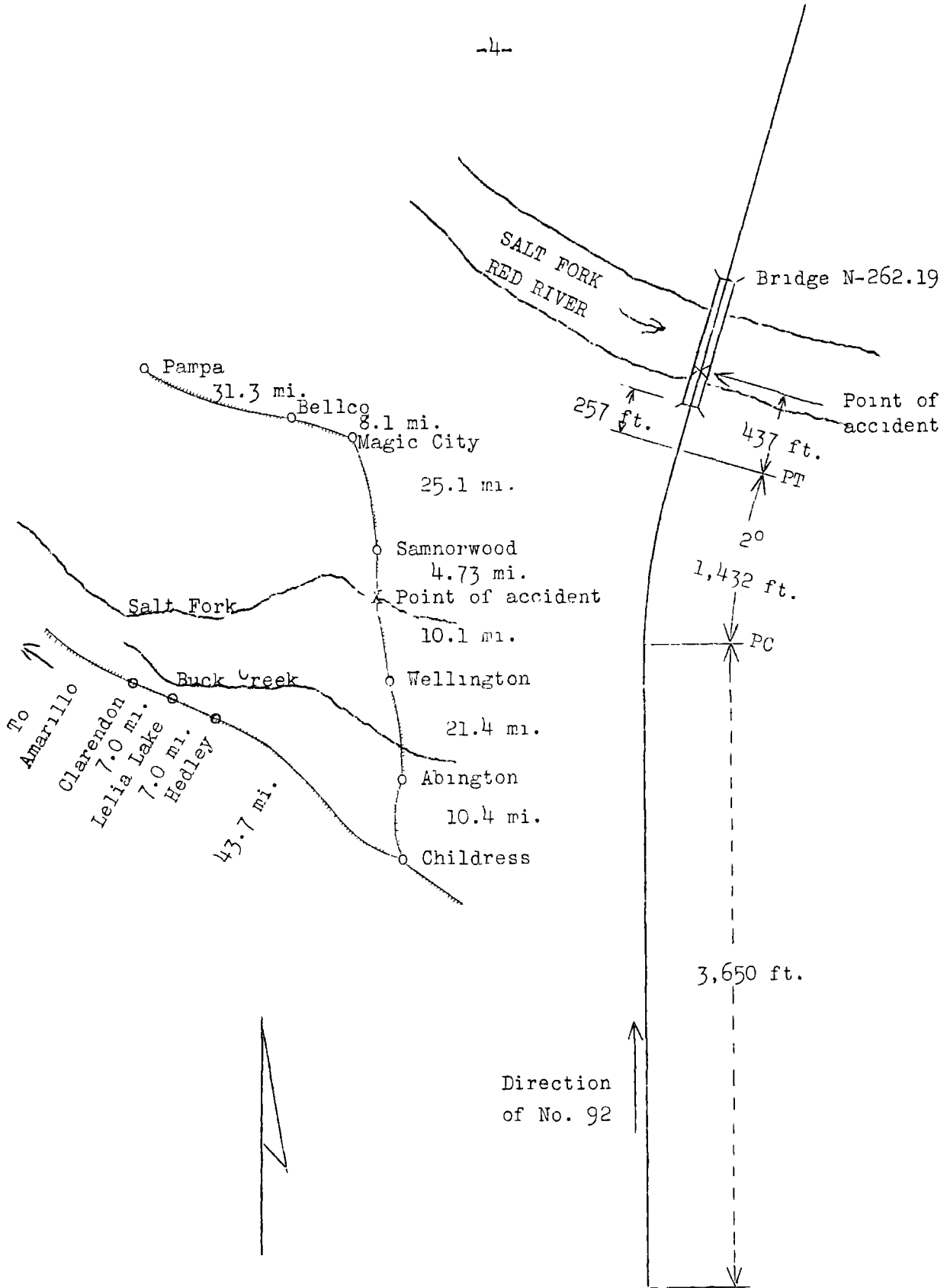
On June 16, 1938, there was a derailment of a freight train on the Fort Worth & Denver City Railway near Samnorwood, Tex., which resulted in the death of two employees and the injury of one employee.

#### Location and method of operation

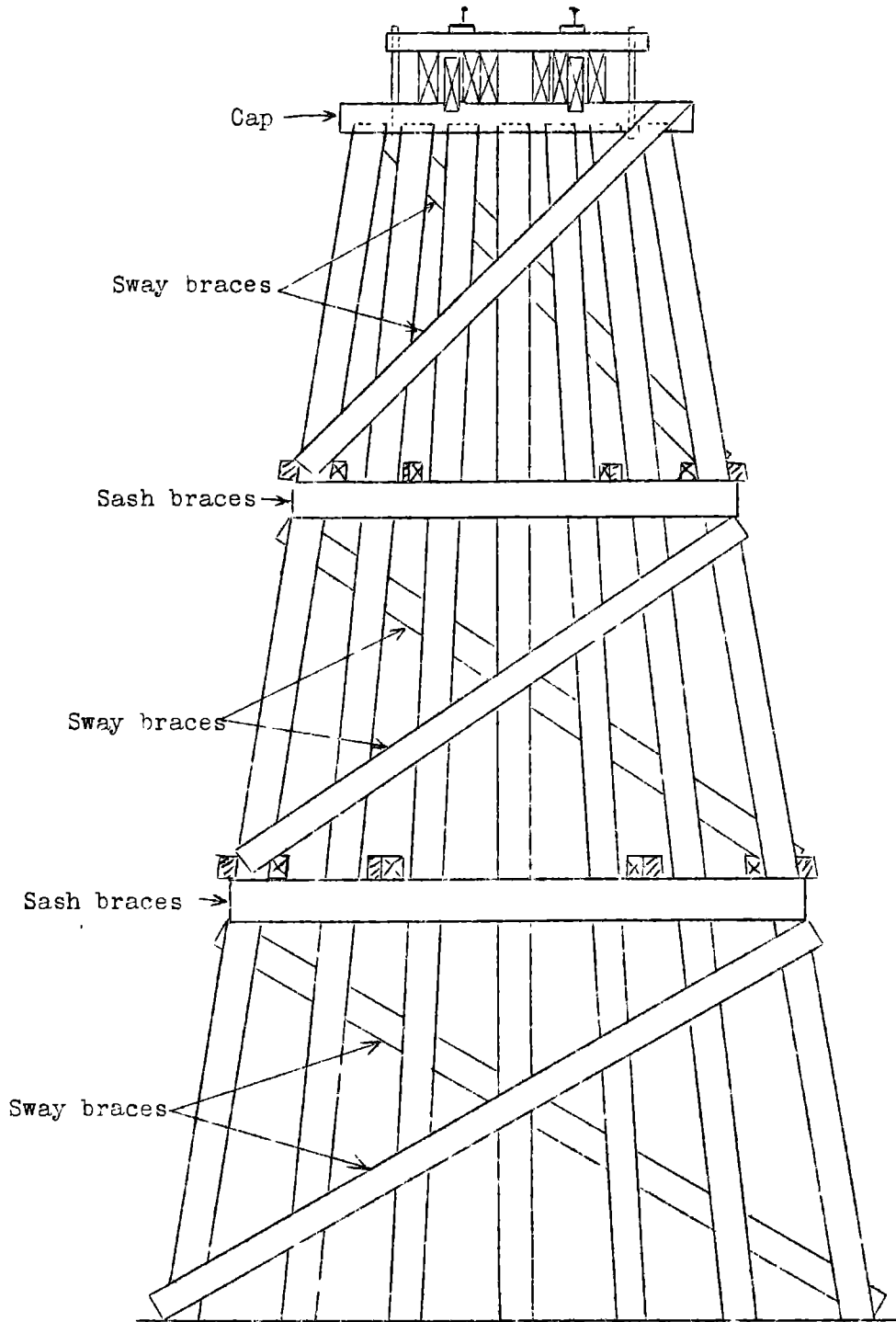
This accident occurred on the Childress and Pampa Sub-division, Amarillo Division, which extends between Childress and Pampa, a distance of 111.1 miles, and is a single-track line over which trains are operated by timetable and train orders, no form of block-signal system being in use. The accident occurred on bridge N-262.19 which spans the Salt Fork of the Red River at a point 4.73 miles south of Samnorwood. Approaching from the south the track is tangent for a distance of 3,650 feet, followed by a 2° curve to the right 1,432 feet in length, then tangent for a distance of 4,719 feet, the bridge being located on this latter tangent at a point .257 feet from its southern end. The grade for northbound trains is generally descending for more than 2 miles, with a maximum gradient of 0.6 percent, followed by a vertical curve for a distance of 1,600 feet to the bridge; it is then 0.24 percent ascending for a distance of 1,000 feet across the bridge.

The track is laid with 85-pound rail, 33 feet in length, with an average of about 19 ties to the rail length. It is well maintained for branch track.

Bridge N-262.19 is an open-deck, 46-span, pile trestle, 920 feet in length, built in 1932; all material is creosoted. Each bent consists of 7 yellow pine piles varying in length from 70 to 85 feet; the tip ends vary from 8 to 10 inches, and the butt ends from 14 to 16 inches, in diameter. The bents are located 20 feet apart and are from 52 to 55 feet in height above the river bed. The bent caps are of the built-up type, composed of two pieces, each 8 by 16 inches by 16 feet; there are three 9 by 24 inch stringers per rail. The ties are 8 by 8 inches by 10 feet, and are spaced 14 inches center to center. On each chord an 8 by 16 inch block, 7 feet long, dapped 3 inches fits down over the cap, and through each block there are four bolts, two on each side of cap. The tie above each bent-cap is fastened to the cap with a 1 inch bolt. Each bent is provided with three sets of 4 by 10 inch sway braces, and between each set of sway braces there are 4 by 10 inch sash braces on each side of the bent, located 17 feet and 33 feet, respectively, below the cap. At the same distances below the caps four 6 by 8 inch braces run parallel to the track for the entire length of the bridge, one on each side bolted to the outer piles



Inv. No. 2277  
 F.W. & D.C. Ry.  
 Samnorwood, Texas  
 June 16, 1938



TYPICAL BENT

and one each between the second and third pile from each side. The bridge is also tower-braced, every fourth panel being braced with cross braces parallel to the track on the outside of the piling. The result is that on each side of the structure there are 3 sets of cross braces tying two bents together and the next bent has no longitudinal cross-bracing. Quick sand in the bed of the creek varies from about 9 to 12 feet in depth and is underlain with clay strata of various kinds and thicknesses. Penetration of the piling into the clay varies from 12 to 14 feet. The maximum speed allowed for freight trains over this bridge is 20 miles per hour.

Circular No. 2797, issued March 16, 1938, by the superintendent of the Amarillo Division, calls particular attention to the Maintenance of Way and Structures Rules relative to the duties of section foremen, as follows:

Rule 132. They must go over their section during or after storms, either day or night, and carefully watch all places where trouble is likely to occur. If there is indication of a hard rain on parts of their section, the track in such territory must be given special attention. If on arrival at the end of their section it appears probable that the adjoining section may have been damaged and this condition not discovered by the foreman on that section, they will continue as far as considered necessary to insure safety to trains, or until the foreman of that section is met.

Rule 133. During and after storms they must examine all waterways, culverts, bridge foundations, etc., and report by wire all severe storms to the Superintendent, Chief Dispatcher and Roadmaster, stating whether or not any damage has been done on their section.

Rule 134. In case of severe storms, high water, washouts or unusual conditions of any kind, they must, if in their judgment safety demands it, detail men to watch the points at which trouble is likely to occur.

The weather was clear at the time of the accident, which occurred at 3:50 a.m.

#### Description

No. 92, a north-bound freight train, consisted of 30 cars and a caboose, hauled by engine 409, of the 2-8-2 type, and was in charge of Conductor Harper and Engineman Griggs. This train left Childress, 46.6 miles from Samnorwood, at 1:20 a.m., according to the train sheet, 2 hours 50 minutes late. It left Wellington, 14.8 miles from Samnorwood, about 3:20 a.m., according to the statements of the crew, and while moving over bridge N-262.19 at a speed of about 5 miles per hour the engine and tender plunged through the bridge at a point about 180 feet from its southern end.

After the derailment the engine and tender lay on their right sides on the bottom of the creek bed, about 27 feet east of the bridge, headed upstream and at right angles to the bridge; they were almost entirely buried in sand. The front truck of the first car was tipped downward on the projecting end of the broken bridge. The remainder of the train was not derailed or damaged. Five bents of the bridge collapsed. The employees killed were the engineman and the fireman, and the employee injured was the flagman who was riding on the engine.

#### Summary of evidence

Head Brakeman McKenzie, of No. 92, stated that an air brake test was made before leaving Childress and the brakes worked properly. A light rain was falling at Childress and also at Wellington, but the moon was shining through the clouds at the time of the accident. At Wellington they met No. 91, and a member of the crew of that train handed a note up to Flagman Brown who was in the cab of engine 409. This note, which was read by the flagman, Engineman Griggs and himself, stated that there were heavy rains from there to Meldavis, and that at Salt Fork the water was high; it also warned them not to leave Shamrock until they had seen the section foreman. He did not have any conversation with the engineman relative to the high water in the creek and nothing was said about stopping and inspecting the track. When they moved upon the bridge at Salt Fork the headlight was burning brightly, and the speed was about 5 miles per hour, the brakes just having been released. The engine had proceeded about a car length on the bridge when he saw ahead a rail which appeared to be about 4 inches out of line. Without delay he called a warning to the engineman who immediately applied the air brakes in emergency. Brakeman McKenzie climbed back over the tender and had reached the first car when the engine and tender plunged off the bridge. He stated that he had never seen high water in Salt Fork before, but he thought that at the time of the accident it was between 15 and 18 feet deep; the current was very swift.

The statement of Flagman Brown, of No. 92, agreed with that of Brakeman McKenzie. In addition he stated that at Wellington he talked with Section Foreman Collins who told him that he had preceded No. 91 across Salt Fork bridge and that there was water in Salt Fork, but he did not say how much.

Conductor Harper, of No. 92, stated that no message concerning heavy rain west of Salt Fork was delivered to him before leaving Childress but Superintendent Mode who was in the station at that point instructed him to tell the engineman to run carefully as there was a great deal of rain up the road; these instructions were carried out. The dispatcher also told him the same thing, but he understood that the rain was around Magic City. As the engine of No. 91 passed the caboose at Wellington the engineman called out that there was a lot of water up the river. The speed of his train was very low as it moved upon the bridge, and as there was

no jar when the train stopped, he thought the stop was for the purpose of inspecting the track. He had never seen high water in that creek before but estimated its depth to have been about 18 feet at the time of the accident.

The members of the crew of No. 91, a south-bound freight, stated that they passed over bridge N-262.19 sometime between 2:30 and 2:50 a.m. on the night of the accident, and that at that time the bridge was solid and in good condition. The water was higher in the creek than they had ever seen it, possibly 5 or 6 feet deep and the current was swift. The engineman and brakeman who were on the upstream side of the bridge, stated that they saw some drift material against the piling which appeared to be grass or vegetation of some kind. They had encountered heavy rains north of Salt Creek and section foremen had preceded their train from Bellco. The conductor stated that the message handed to the crew of No. 92 at Wellington read: "Hard rain Meldavis to Bellco. Have some one go ahead of you. High water at Salt Fork".

Dispatcher Henderson, on duty at Childress from 4 p.m. to midnight, stated that about 9:30 or 10 p.m. it started to rain in the vicinity of Clarendon, which is located on the main line, west of Salt Fork Bridge. About 10 p.m. the section foreman in charge of track at that location called him and reported that water had backed up and damage was liable to result, but he did not say how much water had fallen. No rain was reported south of Magic City and no water reported at Salt Fork Creek, but heavy rains had been reported north thereof and he had held No. 92 for sometime to see whether there was going to be a washout on the Childress and Pampa Sub-division. He stated that he had been employed on this line for some time and had never known of any water trouble at Salt Fork and did not know that the water-shed around Clarendon drains into Salt Fork.

Dispatcher Bush, on duty at Childress from midnight to 8 a.m., stated that the only conversation he had with the conductor of No. 92 was when he called from Wellington; at that time he mentioned weather conditions to the conductor but as the phone was grounded it was doubtful whether the conductor was able to get his message. About 2:30 a.m. a section foreman at Samnorwood reported that there had been heavy rains and that he was patrolling the track ahead of Nos. 91 and 92. The conductor of No. 91 also called him and said that he would report weather conditions to the conductor of No. 92. Dispatcher Bush stated that at the time he went on duty he knew that about 6 inches of rain had fallen in the vicinity of Clarendon, that the track had been washed out at that point early in the evening, but he did not know that the water in that area drained into Salt Fork. In the past there had been some bad washouts in that territory, but high water in Salt Fork had never been reported.

Section Foreman Collins, located at Abington, stated that he talked with the dispatcher about 9 p.m. on the night of the accident,



and the dispatcher informed him that there had been rain at Magic City and that it was coming southward. Although it had not yet started to rain at Abington he and his two men left that point at 9:20 p.m. for the purpose of patrolling the track. His section extends from mile post 222 to mile post 249½ which is about 13 miles south of Salt Fork, but he continued northward until he met Section Foreman Mills at mile post 273, approximately 11 miles north of Salt Fork bridge. When he passed over the bridge southward, about 2 a.m., he made an inspection with the aid of his flashlight, and the water appeared to be about 3 feet deep. He did not think it was necessary to take any precautions as there was not enough water to cause any damage. There was a small amount of vegetation around the piling, but no driftwood. At Wellington on the southward trip he talked with the crew of No. 92 and told them about the rain, that there was water in Salt Fork, and that it was clouding up again in the northwest. He then returned to Abington ahead of No. 91. He had formerly been in charge of the section upon which the accident occurred and on three different occasions he had seen higher water, there being one instance when it was 8 feet deep; the current is usually swift.

Superintendent Mode stated that because of rain reported near Magic City he got in touch with the section foreman at that point and instructed him to go north until he met No. 91, and then to precede that train southward. About 11 p.m. he was informed that the track had been washed out in the vicinity of Lelia Lake, which is located on the main line, and just as he was ready to leave Childress for that point he met Conductor Harper who told him that he had been called for No. 92. He informed the conductor that there had been a great deal of rain near Magic City and instructed him to advise the engineman to run carefully. The superintendent then proceeded to the washout on the main line and did not learn of the accident at Salt Fork Bridge until about 4 a.m. Superintendent Mode further stated that there are several highway bridges located upstream from the railroad bridge at Salt Fork, and he was of the opinion that these highway bridges were washed out, and the debris coming downstream had knocked out the railroad bridge. The wreckage of all of these bridges then continued down stream and took out about 450 feet of another highway bridge located about 4 miles downstream from the railroad bridge. This latter bridge was constructed of pine piling, steel caps and girders 27 feet long, with a heavy concrete deck and concrete bannisters; the deck was approximately 15 feet above the bed of the river. The gauge at Clarendon showed a rainfall of 2.55 inches on the night of the accident, at Hedley 3 inches; at Lelia Lake no exact measurement was taken, but the estimated fall was between 6 and 8 inches. Hedley, Lelia Lake, and Clarendon are located on the main line 43.7, 50.7, and 57.7 miles, respectively north of Childress, and west of Samnorwood. The regular quarterly inspection of bridge N-262.19 was made by Bridge Inspector Girdley in March, 1938, and the bridge found to be in good condition. The bridge was again inspected by Section Foreman Berg on May 16 and by Track Supervisor Lawrence on June 15, 1938.

Civil Engineer Stainer stated that the area of the watershed draining into Salt Fork is approximately 450 square miles. Approximately 1 mile of track was washed out within a 13 mile stretch on the Childress-Amarillo main line on the night of the accident, and the water from about 5 miles of this stretch of track went into Salt Fork. The air line distance between the main-line washouts and Salt Fork bridge is about 29 miles. Inspection of Salt Fork bridge after the accident showed that bents 11 to 15, inclusive, were washed away. Bents 11 and 12 were braced together, but bent 10 the southernmost remaining bent in the south section of the bridge is a single bent. In addition to the missing bents, the tower bracing was broken out of the lower panel of 2 towers immediately south of the gap, and five towers north of the gap. Engineer Stainer further stated that soundings taken before construction of the trestle, indicated 9 feet of quick sand at bent 11 and 11 feet 7 inches at bent 16. Below this quick sand there is 2 feet 6 inches of red clay, then 3 feet 6 inches of white clay and below that a very hard blue clay. The blue clay was so hard that it broke the testing auger.

#### Observations of the Commission's Inspectors

Inspection of the remaining portion of bridge N-262.19 by the Commission's inspectors indicated that it was in good condition prior to the night of the accident. In addition to the damage heretofore described, the batter piling at the twentieth bent from the south side was broken off at a point approximately 17 feet above the creek bed. The maximum height of the water during the flood was apparently 14 feet. One bent was found about 2 miles down stream; all 7 of the piles remained bolted together and were broken off about 50 feet below the cap. Other pieces of piling which had been broken off at both ends were also found.

Approximately 400 feet of a county bridge across Salt Fork, located about 7 miles upstream from the railroad bridge, was washed out during the night of the accident. This was an all wooden bridge constructed with 10 inch piling, 12 by 12 inch piling caps 14 feet 6 inches long, and 4½ by 14 inch stringers about 20 feet long. Parts of this bridge were found downstream near the wreckage of bridge 232.19.

#### Discussion

The investigation developed that about 11 p.m. June 15, a rain of cloudburst proportions fell within the watershed area of Salt Fork but some distance above bridge N-262.19. As a result Salt Fork was flooded and about 400 feet of a highway bridge located 7 miles upstream from bridge N-262.19 was washed out. The current in Salt Fork is swift and apparently the wreckage of this highway bridge drifted down and struck bridge N-262.19 with such force that it broke the piling and shoved the bridge out of line, weakening it to such an extent that it collapsed under the engine of No. 92. There was no indication that scouring of the creek bed was in

any way responsible for the failure of the bridge.

No. 92 was delayed for some time at Childress to make sure that the track was safe, as heavy rains had been reported in the vicinity of Magic City, located 25 miles north of Samnorwood. The track had been patrolled by a section foreman ahead of No. 91, a south-bound freight, a distance of about 70 miles, within which territory bridge N-262.19 is located. This section foreman passed over the bridge about 2 a.m. and at that time there was only about 3 feet of water in Salt Fork and no drift except vegetation against the piling. He saw nothing of an alarming nature and did not think it was necessary to take any precautions. At Wellington he talked to the crew of No. 92 and told them about the rain and that there was water in Salt Fork.

No. 91 passed over the bridge between 2:30 and 2:50 a.m.; at that time the bridge was solid and the crew observed that the water in Salt Fork was about 5 or 6 feet deep, and that there was no drift other than vegetation against the piling. No. 91 met No. 92 at Wellington, and the conductor of No. 91 handed a message to the engine crew of No. 92 warning them of the hard rain north of Samnorwood, and advising them to have some one go ahead of the train as there was high water in Salt Fork.

No. 92 moved upon the bridge at a speed of about 5 miles per hour, and the train had proceeded only a short distance when the brakeman saw that the track was out of line and immediately called a warning. Without delay the engineman applied the air brakes in emergency, but he was unable to stop the train before the engine and tender plunged through the bridge.

The cloudburst that apparently caused the Salt Fork to flood occurred near Lelia Lake, located on the Amarillo and Childress sub-division, about 50 miles northwest of Childress. Within a distance of 13 miles in this vicinity various portions of the track were washed out. Prior to the occurrence of the washout at Lelia Lake Superintendent Mode had been in the dispatcher's office at Childress and had kept in touch with conditions on the various parts of the division but upon learning of the washout, about 11 p.m., he went to the scene and remained in that vicinity until after the occurrence of the accident at bridge N-262.19. The dispatchers located at Childress stated that they did not know that the territory in the vicinity of Lelia Lake drained into Salt Fork.

#### Conclusion

This accident was caused by the collapse of bridge N-262.19, due to its having been broken and weakened by the drifting wreckage of a highway bridge located about 7 miles upstream which had been washed out by flood water.

Respectfully submitted,

W. J. PATTERSON

Director.