

In re Investigation of accident which occurred on the St. Louis & San Francisco Railroad, at South Greenfield, Mo., on July 13, 1916.

On July 13, 1916, there was a head-and collision between two passenger trains on the St. Louis & San Francisco Railroad, at South Greenfield, Mo., resulting in the injury of 35 passengers and 2 employees. After investigation of this accident, the Chief of the Division of Safety submits the following report:

The Ash Grove subdivision of the northern Division of the St. Louis & San Francisco Railroad, on which this accident occurred, extends from Fort Scott, Kansas, to Springfield, Mo., a distance of 104 miles. It is a single track line running approximately north and south, and trains are operated by the time-table and train order system, together with an automatic block signal system, northbound trains being superior to southbound trains of the same class.

The collision occurred on a four-degree curve, in a fifteen-foot cut, 508 feet north of the north passing track switch at South Greenfield, 67 miles south of Fort Scott, and 67 miles north of Springfield. Approaching the scene of the accident from the north, from a point about half a mile from the place where the accident occurred, the track is tangent for a distance of 1,396 feet, and there is a descending grade of .73%; then there is a four-degree curve toward the east, and the grade is practically level for a distance of 850 feet to the point of collision. The four-degree curve

is in a rock cut and brush along the top of the cut restricts the view from a southbound train to a distance of about 200 feet. Approaching the point of collision from the south for a distance of approximately a mile, there is a tangent, 1,329 feet long, followed by a curve toward the west of 3 degrees 19 minutes, 1,630 feet long, then 814 feet of tangent, followed by the four-degree curve toward the east for a distance of 1,502 feet to the point of collision, the grade for more than half a mile approaching the scene of the accident being practically one per cent ascending for northbound trains. The view from a train approaching the point of collision from the south is restricted to a distance of approximately 525 feet.

On the date of the accident, southbound passenger train No. 103, en route from Kansas City, Mo., to Memphis, Tenn., and consisting of a locomotive, 1 mail car, 1 baggage car, 3 coaches and 2 Pullman sleeping cars, with Engineman Churchill and Conductor Babcock in charge, left Fort Scott at 3.55 a. m., 35 minutes late. At Lamar, 40.1 miles south of Fort Scott, order No. 4 was received, directing this train to run 15 minutes late from Lamar to Ash Grove, together with a copy of order No. 7, directing train No. 106 to run 30 minutes late from Nichols to Lamar. Train No. 103 left Lamar at 5.10 a. m., 25 minutes late, and at 5.43 a. m. arrived at Lockwood, 19.9 miles from Lamar and 6.9 miles north of South Greenfield. It departed from Lockwood at

5.50 a. m., passed Dumbuck at about 5.55 a. m., and collided with northbound train No. 106 at South Greenfield at about 6.02 a. m.

Northbound passenger train No. 106, en route from Birmingham, Ala., to Kansas City, Mo., and consisting of a locomotive, 1 mail car, 1 baggage car, 2 coaches and 2 Pullman sleeping cars, with Engineman Kells and Conductor Brown in charge, left Springfield, Mo., at 5.07 a. m., 37 minutes late. Order No. 7 required this train to run 30 minutes late from Nichols to Lamar. It passed Nichols, 3.7 miles from Springfield, at 5.16 a. m., 39 minutes late, passed Ash Grove, 15 miles north of Nichols, at 5.35 a. m., 34 minutes late, and passed South Greenfield, 17.7 miles farther north, within a minute or two after six o'clock, about 30 minutes late, the collision occurring at about 6.02 a. m.

At the time of the accident the weather was clear. The estimated speed of southbound train No. 103 was 6 miles an hour, and of northbound train No. 106 was 12 or 15 miles an hour, at the time of the collision.

The automatic block signals installed on this line are of the three-position, upper right hand quadrant type, and it is the practice wherever feasible to connect the train order signals with the block signals on each side of a station so as to provide a distant indication when the train order signal is displayed. Approaching the scene of the accident from the north the signals governing the

movement of southbound trains are Nos. 1621, 1635 and 1651, the last named signal being located about 1,400 feet north of the north passing track switch at South Greenfield. From the opposite direction, the signals governing northbound movements are Nos. 1664, 1660 and 1654. Between signal 1660 and South Greenfield station there is a crossing with a branch line, known as the Aurora Branch Crossing, which is protected by manually operated signals. Originally, signal 1651 governing southbound movements, and signal 1660 governing northbound movements, were arranged to provide distant indications for the train order signal at South Greenfield, but in September, 1915, the station at that point was burned and the train order signal was destroyed. After the fire a temporary train order signal was erected, but instead of connecting the train order signal with the block signals as before, in order to give caution indications when the train order signal was displayed, the automatic block signals on each side of the station, Nos. 1651 and 1660, were arranged to work only in the caution and stop positions. At the time of the accident the signals were still operating in this manner. Signal 1654 is located approximately 100 feet north of the north passing track switch, the distance between signals 1654 and 1651 being about 1,300 feet.

Engineman Kells, of train No. 106, stated that he looked at his watch as he passed under a bridge about

three-quarters of a mile south of South Greenfield, and it was then 8.01, the time that his train was due at South Greenfield on its running orders. He received a clear indication at signal 1654; the next signal, No. 1660, was in the caution position, which, under the arrangements existing, was the normal position for that signal. At about that point he made a brake application, and when a point was reached where the fireman could see that the track was clear for the passage of his train and that the train order signal was not displayed, he released the brakes. He stated that the view of the next signal, No. 1654, was obscured until within about 300 feet of it; approaching that signal, he found it in the stop position. He immediately made an emergency application of the brakes, but as he had just released the brakes and the train brake system had not been fully recharged, he did not get full braking power and the engine and three cars ran past the signal. He thought his train was running at the rate of 28 or 30 miles an hour when he made the emergency application, and that the speed when he passed the signal was about 20 miles an hour. Enginemen Kells stated he knew the caution indication received at signal 1660 applied to both the train order signal at South Greenfield and block signal 1654 north of the station. South Greenfield was not an open telegraph office at that hour, but he knew that under the rules he was required to be prepared to stop either at the train order signal or at the next block signal. He stated that the reason he overran the block signal

was because, having just released the brakes, he did not get full braking power from the application which he made approaching block signal 1654.

Fireman Dunham, of train No. 106, stated that when approaching South Greenfield a caution indication was received. When the station came into view he told the engineman that everything was clear, meaning that the Aurora Branch Crossing was not occupied, and that the passing track, order board and station grounds were clear for the passage of their train. He said the speed at that time was about 38 or 40 miles an hour. The first indication he had of impending danger was when the engineman shut off steam and applied the brakes.

Conductor Brown, of train No. 106, stated that after passing the overhead bridge a short distance from South Greenfield he looked at his watch and told the brakemen that their time for South Greenfield was up, and seeing that the passing track was clear he remarked that train No. 103 had not met them at that station. He stated that he looked at his watch immediately after the collision occurred, and it was then two minutes after six.

Engineman Churchill, of train No. 103, stated that on the morning of the accident he had six minutes and twenty seconds to run from Dumbeck to South Greenfield, a distance of 3.8 miles, leaving there at 5:54:40, and the time on train No. 106 expiring at 6.01. The block signal at the south end of the siding at Dumbeck, No. 1621, was in the clear position, and the next signal, No. 1635, was also clear. He stated

that he had a clear view of the next block signal, No. 1651, for about half a mile, and that it was in the caution position when it first came into view, and remained in that position until he was very close to it, perhaps a couple of rail lengths, when it dropped to danger position. His train was then running at the rate of 40 or 45 miles an hour; he applied the brakes in emergency, but his train ran about twelve car lengths beyond the signal, where the collision occurred. He stated that he had been working steam down the hill but had shut off and let the train drift, making a light application of the brakes for the purpose of reducing the speed to about 40 miles an hour before reaching the curve which begins near signal 1651. He had released the brakes, and was about to make another application for the purpose of stopping at the passing track switch, when he saw the signal drop to the danger position. He stated he thought it was immediately after the collision when he looked at his watch, at 5:59:30; a few minutes later he compared watches with Engineman Kells, whose watch was about 15 seconds faster than his.

Conductor Babcock, of train No. 103, stated that when the engineman whistled for Dumbeck, about a mile west of that station, he thought they had about seven and one-half minutes in which to go to South Greenfield to clear train No. 106. Approaching South Greenfield he was riding on the front platform of the smoking car. He stated he did not consider that his train was running on particularly short time, although he knew that train No. 106 was due at South

Greenfield at 6.01. He stated that it was his custom in making a meeting point under such circumstances to get in a position where he could go to the front end as quickly as possible. He said that the collision occurred about half a minute before six o'clock and as the engine of his train was within 12 or 14 rail lengths of the passing track switch he thought that if nothing had happened there would have been time for his train to get into clear for train No. 106, although he said it probably would have taken all the time. His train porter rode on the engine from Lockwood, as it was customary for him to do, in order that he would be in a position to open the passing track switch without delay. Conductor Babcock stated that he did not consider the time so short that it was necessary to stop the train and flag in to South Greenfield; he thought there was sufficient time to permit the porter to run ahead and throw the switch for the purpose of allowing the train to enter the siding without stopping. He stated that it was the practice to make close meeting points; that they are expected to use the time they have on an opposing train and are supposed to be into clear when that time is up or to protect themselves. He stated that it would not be necessary for a flagman to go more than 500 feet from the north switch at South Greenfield in order to protect a train heading into the siding, as he would not have to go very far in order to be seen for a considerable distance from an approaching train.

Porter Davis, of train No. 103, stated that on this run



he usually got on the engine at Lockwood, whether the train went into the siding at Dumbeck or at South Greenfield. He did not notice the signal indications when approaching South Greenfield. He thought his train was running about 10 or 12 miles an hour when he jumped off just before the collision occurred. He stated that at other times when the signal north of South Greenfield has been found against them, the train has stopped and he has flagged ahead to the switch.

Fireman Mayberry, of train No. 103, stated that he looked at his watch at 6.03, but he was not sure how long that was after the collision occurred, although he thought three or four minutes had elapsed. He stated that the first signal north of South Greenfield was in the caution position when his train approached it, but that it dropped to danger just before the engine passed it. He estimated the speed at the time the engine passed the signal at about 15 or 16 miles an hour, and at about 10 or 12 miles an hour when the collision occurred.

Signal Engineer Trout stated that the signals on this line were placed in service in 1902. He said that the controlling circuits are so arranged that the southbound signal north of South Greenfield, signal 1651, would go to the stop position when a northbound train passed a point five poles north of the north switch at Danley, or a distance of approximately 5,300 feet. He stated that it was the practice to have the block signal approaching the station in either direction give a distant indication for the train order signal, as well as

for the next succeeding block signal, but that since the fire at South Greenfield last September the automatic block signals approaching South Greenfield have been working to the forty-five degree or caution position only, and are not connected with the order board. He stated that following the accident the signals involved had been examined and tested and were found to be operated by the intended and proper track sections.

This accident was caused by train No. 103, an inferior train by direction, occupying the main track on the time of train No. 106 without proper flag protection, as well as by the failure of the engineers of both trains to obey the automatic block signal indications.

The engineer and conductor of southbound train No. 103 were at fault for attempting to go to South Greenfield on very short time to meet train No. 106. While there is some difference in the statements regarding the time at which the collision occurred, the weight of evidence establishes the time of the accident rather definitely at 6.02 a. m. In that case, train No. 103 could not have reached the passing track at South Greenfield and gone into clear without encroaching upon the time of train No. 106, and the movement should have been protected by flagging. And, furthermore, six or seven minutes is altogether too short a period of time for a passenger train, under such circumstances, to attempt to run a distance of 3-1/2 miles and get into clear for another passenger train which is superior by direction. The practice of running on such short time for the purpose

of making a meeting point should not be permitted by any railroad company.

According to the statement of Engineman Churchill, of train No. 103, which was also confirmed by his fireman, signal 1651 dropped to danger position only a few seconds before their train passed it. The collision occurred a distance of about 900 feet beyond that signal. The investigation made by Signal Engineer Trout indicated that all of the signals involved were working as intended. If the signals were working properly, the statements regarding the operation of signal 1651 cannot be true, as this signal would have gone to the stop position as soon as train No. 106 passed a point approximately 6,300 feet south of signal 1651, in which case the indication displayed by that signal, when it came into the view of the engineman of train No. 103, would have been danger instead of caution, as stated. It is therefore believed that the engineman of train No. 103 either overlooked the danger indication of signal 1651 until his train had nearly reached it, or he disregarded it in an effort to reach the passing track switch at South Greenfield before the arrival of train No. 106.

Engineman Kells, of northbound train No. 106, was at fault for the reason that after receiving the caution indication at automatic block signal 1660 he failed to have his train properly under control so as to be able to stop before passing automatic block signal 1654, which gave a proper danger indication.

No night telegraph office is maintained at South Greenfield, and in the day time but few orders are issued at that point. The records indicate that during May, 1916, eleven train orders were issued, and in June seventeen train orders were issued, while during July, up to the 17th, but eight orders were issued. Most of the train orders issued at this station are Form 19 orders. The investigation of this accident disclosed that in view of these circumstances it is a common practice for the caution indications afforded by automatic block signals 1651 and 1660 to be disregarded. Movements of both passenger and freight trains past these block signals were witnessed, and the caution indications of both of them were evidently regarded as clear indications. This was one of the conditions which led directly to this accident, and that such a practice was allowed to grow up and continue probably for a considerable period of time indicates general laxity of inspection and discipline. The special arrangement of signals which existed at this point was apparently intended as merely a temporary expedient, but as it materially affected the block system, it should not have been allowed to remain in service for a period of several months.

All of the employees involved in this accident were experienced men. Engineman Churchill had been on duty 2 hours 50 minutes; Conductor Babcock had been on duty 6 hours 50 minutes, and Engineman Kells had been on duty 5 hours 25 minutes.