

Editorial Comment

Improving Automatic Interlockings

THE COLLISION which occurred at a railroad crossing protected by an automatic interlocking at Morning Sun, Iowa, on June 13, as described in detail elsewhere in this issue, constitutes no indictment of automatic interlockings. According to the conclusion of the Bureau of Safety, it is believed that this accident was caused by the failure of an engineman properly to observe and obey a signal indication governing the movement of his train over the crossing. In other words, this accident was due to the failure of an engineman rather than to any failure of the signal apparatus of the automatic interlocking. It might, of course, be claimed that if enginemen fail properly to observe and obey signal indications, no sort of signal or interlocking protection will prevent accidents. This general statement is, of course, true, but it might also be stated that if derails had been in service at this crossing the engineman might have been more cautious in approaching the crossing. In any event, the presence of derails as an absolute check would have eliminated the possibility of an engineman attempting to "bluff" his way over the crossing, when he knew a train was approaching on the other road. However, it is a well-recognized fact that main-line derails, except under special circumstances, create more hazards than they eliminate, and the idea of using derails to enforce obedience to signals, in lieu of adequate supervision, has been outlawed for years.

It is on this principle that the installation of automatic interlockings has increased rapidly during the last 15 years until more than 300 such plants are now in service in the United States and Canada. Many of these plants protect high-speed, heavy-traffic lines, and it is inevitable that sooner or later there will be accidents at such interlockings, the same as at manually-controlled plants. We repeat, therefore, that the Morning Sun accident is no indictment of automatic interlockings, as such.

Need for Recorders

Nevertheless improvements can be made, and with this thought in mind there are some lessons to be gained by a study of the report of the Morning Sun accident. The first item of importance to be noticed is the need for better instruction and supervision of enginemen, and although such matters are not, as a rule, under the jurisdiction of signal officers, this accident report offers an opportunity for reiteration of the necessity for adequate supervision of enginemen. Although the passenger engineman claimed that he had a proceed signal, the evidence in the report tends to disprove his statement. One means of providing a definite record of such sequence of operation is to install automatic graphic recorders at automatic interlockings. Two states require the use of such recorders at all automatic plants, and at least one railroad installs such a recorder voluntarily at each plant constructed on its property. Such a recorder should check the time each train enters each approach section and the interlocking home

signal limits, as well as the time that each signal changes from the stop to the proceed aspect. This record eliminates disputes and, in some cases, expensive litigation. Furthermore, if enginemen know that the operation of their trains is being recorded, they will take more care to observe speed restrictions and signals. Incidentally, it is well to so locate the instrument housing as far from the crossing as the extent of the railroad property will permit, thereby minimizing the chances of the instruments being damaged in case of an accident at the crossing.

While discussing the subject of graphic recorders, some consideration might be given to the improvement of these devices. Continuous operation of the recording sheet necessarily limits the speed of the tape to about four to six inches an hour, for otherwise the reel would be run off in less than a week, requiring replacement at intervals too frequent for economy of the maintainer's time, especially at outlying points. However, at a speed of six inches an hour, there is such a slight difference in position that two indications of perhaps two seconds apart are difficult to compare. The record would be much better if the tape speed were perhaps three feet per hour. However, such a speed would waste too much tape and require renewals too frequently unless some means is devised to operate the recorder only during periods when trains are approaching or passing through the limits of the plant. Intermittent operation would perhaps preclude the use of continuously-flowing ink as a recording medium, but sensitized paper could be secured on which impressions could be made by stencil points.

Operative Distant Signals

Regarding the matter of non-operative distant signals, a subject which has been dealt with previously in these columns, the Morning Sun accident offers further opportunity to advocate the desirability of using operative distant signals, especially for automatic interlockings. One argument often advanced for using non-operative distant signals is that train speeds over the approach sections are already limited, because the speed over the crossing at an automatic interlocking is limited by rule to perhaps 20 m.p.h. The defect in this argument is that the rules are not always obeyed. For example, in the Morning Sun accident, the passenger train was not a regular run for the engineman; the train was late and, as a result of these and other circumstances, the speed, according to the preponderance of evidence, was from 40 to 45 m.p.h. when approaching the crossing at which the accident occurred. The reason for operating the train at such a speed is, of course, a matter of conjecture. It may be that the engineman approached the interlocking unexpectedly. Perhaps he did misinterpret the home signal aspect; in any event he did not have time to reduce his train speed. In any of the instances cited, the use of an operative signal would, no doubt, have been effective in giving him sufficient advance warning.

Viewing the matter entirely aside from the Morning

Sun accident, it is an established fact that some engine-men cannot judge speeds accurately when reducing from high to low speed, as was proved by evidence reported on page 140 of the March issue. Therefore, it would appear to be worth while to give the engineman as much advance warning as possible, which can readily be done by providing operative distant signals.

A non-operative distant signal is nothing more than a road marker for an engineman to use in locating his position; it affords no information as to whether the plant is lined up for his train. As a result, the engineman must observe and act upon the aspect of the home signal after he enters the approach control section and after he comes within sight of the home signal. The track control section in approach to the home signal involved at Morning Sun was 2,500 ft. long, which may be long enough for speeds of 20 m.p.h. but is not enough for speeds of 40 m.p.h. or over.

An automatic interlocking, whether installed at a crossing will not previously protected, or to replace a manual plant, will effect decided savings in operating expenses. Furthermore, as a matter of policy, it is highly desirable to prevent accidents at automatic interlockings. In view of these facts, it would seem advisable to provide at each plant the best safety features available, including graphic recorders and operative distant signals.

Collision on the T. & P.

ON JUNE 14, there was a head-end collision between a passenger train and a freight train on the Texas & Pacific, at T. & P. Jct. (Dallas) Tex., which resulted in the injury of six passengers. An abstract of the report of the Bureau of Safety concerning this accident is as follows:

In the immediate vicinity of the point of accident, this is a single-track line over which trains are operated by time table, train orders, and an automatic block-signal system. The accident occurred on main track within interlocking limits, where movements of trains is governed by signal indications.

The signals and switches in this vicinity are controlled by an interlocking plant operated from Tower 119. Signals 1, 2 and 4 are located 2,921.2 ft., 483.2 ft. and 89.2 ft., respectively, east of the point of accident. These signals are of the 3-position, upper-quadrant semaphore type, displaying red, yellow and green, for stop, caution and proceed, respectively. Signal 1 is an automatic signal and provides an approach indication for westbound trains approaching the interlocking plant; it is normally in approach position and requires a train to "approach next signal prepared to stop." Signal 2 is a semi-automatic signal, located 63.2 ft. east of the east passing-track switch, and governs movements via either the main track or the passing track, and signal 4, which is also a semi-automatic signal and is mounted on a signal bridge, governs the movement of eastbound trains leaving interlocking limits. The weather was partly cloudy at the time of the accident, which occurred about 11:56 a.m.

Extra 669, an eastbound freight train, consisting of 68 cars and a caboose, hauled by engine 669, arrived at T. & P. Jct. at 11:52 a.m. The route had been lined by the operator and Extra 669 proceeded on the main track, and continued eastward on that track at a low rate of speed with the intention of clearing the interlocking sig-

nals and then backing into the yard to set out a car; while this movement was being made the train was struck by Train No. 1.

Train No. 1, a westbound passenger train, consisting of 10 cars, passed Forney, 16.3 miles east of T. & P. Jct., at 11:39 a.m., according to the train sheet, 7 minutes late, passed distant signal 1 displaying an approach indication, passed home signal 2 displaying a stop indication, and collided with Extra 669 while traveling at a speed variously estimated to have been between 4 and 20 m.p.h.

Engineman Leach, of Train No. 1, stated that the brakes on his train had been properly tested at Texarkana, their initial terminal, and functioned properly. He received clear signals until he approached T. & P. Jct., and the train was traveling at a speed of 60 or 65 m.p.h. His view of the distant signal for T. & P. Jct. was obscured, but the fireman called its caution indication when about 9 pole lengths from it. He said he made a service reduction of 10 or 15 lb. but the brakes did not seem to hold and on passing the distant signal he placed the brake valve in emergency position, not having released the brakes after the service application. He saw and called the red indication of the home signal; on passing that signal the speed was about 10 or 12 m.p.h., and it was further reduced to 4 or 5 m.p.h. at the time of the accident.

Master Mechanic Vinsant stated that after the accident engine 907 was taken to the Dallas roundhouse, coupled to engine 669, with the brake valve cut out, and the brakes were tested with the brake valve on engine 669 and found to apply and release properly. A check of the speed recorder tape on engine 907 showed a steep decline in the speed line and starting at this point the speed of train No. 1 was reduced from 65 m.p.h. to approximately 18 m.p.h. within a distance of about 1,300 ft. and the train stopped within the next 500 ft.

Signal Engineer Weatherby stated that the movement made by Extra 669 was right and proper and could have been made safely had the signals been observed. He did not consider it a hazardous move to route a train on the main track against an opposing train as was done in this case. If the freight train had been moved into the passing track with the rear end fouling the main track, train No. 1 would have had a greater distance in which to stop, although he stated that, with the engineman failing to stop at signal 2, he probably would not have stopped at signal 6, the following signal.

According to the evidence, train No. 1 overran the stop signal a distance of 483 ft. and collided with the opposing train. It is apparent that Engineman Leach did not begin braking soon enough to bring his train under proper control when approaching interlocking limits and to comply with the restrictive signal indications.

In this connection the indication which was displayed by Signal 1, as shown by the T. & P. rule book is:

"Approach next signal prepared to stop."

The corresponding approach indication of the Standard Code of the Association of American Railroads is:

"Prepare to stop at next signal. Train exceeding medium speed must at once reduce to that speed."

In previous reports this Bureau has repeatedly recommended the principle of requiring a definite speed reduction for high-speed trains at approach or caution signals, and on many roads the approach indication as now used on the Texas & Pacific has been revised to conform to the present standard code.