

volts and i, 0.121 amp. This indicates a rail resistance of 0.255-ohms per thousand feet. After the work on the joints, the readings were E, 0.57 volts, I, 0.160 amp.; e, 0.56 volts and i, 0.140 amp. This indicates a rail resistance of 0.0197-ohms per thousand feet, or a reduction of 93 per cent in rail resistance. Weekly tests have been recorded for the last seven months, and with the latest readings the rail resistance amounts to 0.0228-ohms per thousand feet. The limiting resistance at the battery has been increased from 0.3 ohms to 0.5 ohms.

A test was then made on a circuit by spraying the joints with oil without loosening the bolts, but did not result in any benefit. In another test the bolts and angle bars were loosened allowing them to rattle under traffic, after which they were re-tightened without oiling, and although this made equally good improvement immediately after the test, this circuit has again developed high resistance. Several more track circuits have been treated like the first two described with equally good results.

We are planning on again spraying the joints on these test circuits at the end of a one-year period, and I believe that by doing so we will continue to have low rail resistance indefinitely. My conclusions are that where rail joints have not been oiled for several years and have developed a rusty, frozen fit on the rail, little or no improvement will be made in the rail resistance by spraying with oil. On the other hand, I believe that if joints are oiled yearly from the time the steel is laid, the rail resistance will remain consistently low.



Use of Marker Lamps

"What is the modern thought with reference to the use of marker lamps on automatic signals, either for semaphores or light signals? Have any roads, previously using marker lamps, eliminated them?"

Markers Are Now Unnecessary

W. H. Stilwell

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The practice of using marker lamps on automatic signals started at a time when oil lamps were used almost exclusively for signal lighting. The lamps were not only inefficient, but "lights out" were common occurrences. Electric headlights for locomotives were not in general use, and if marker lights were not used the failure of a signal light could easily result in an engineman overrunning a signal on account of his failure to identify its location. Under those conditions it appears that marker lamps were necessary, or at least highly desirable. Time, however, has brought about a change. The development of the double-filament lamp for use in color-light signals and an efficient low-wattage lamp for semaphore signals, together with improvements in associated equipment, has brought about the electric lighting of signals generally. The oil lamp is still in use in places but it is an improved lamp. It is more efficient than the older one and more dependable. A higher class of maintenance now prevails, and "lights out" are far less frequent. The electric headlight is now in general use and if a signal light should fail, there is little excuse for an engineman overlooking the signal.

The practice of using marker lamps on the Louisville & Nashville began with the installation of the first automatic signals on single track. The lighting of these lamps was discontinued in March, 1932, as it was felt that the expense of upkeep was no longer justified.

Eliminate Special Signals

C. A. Dunham

Superintendent of Signals, Great Northern, St. Paul, Minn.

The general use of marker lamps, in my opinion, is not good practice. It is necessary to provide two lamps on all "Stop and Stay" interlocking signals, and where the semaphore is used, such stop signals must display two arms. Block signals, in the opinion of the writer, should display only one lamp and where the semaphore is used only one arm should be displayed.

Good signaling should distinctly provide for the "Stop and Stay" indication. Good signaling should also distinctly provide for the permissive indication. The interlocking signals and the automatic block signals displayed in such a manner should be clearly and readily understood by enginemen and trainmen. I hardly need to add that the signal system must be uniform throughout the railroad. The use of so-called "special signals" for some alleged special purpose should be severely avoided.

Markers Satisfactory on the Pennsylvania

W. M. Post

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In the signal system on the Pennsylvania the basis for night indications for semaphore or color-light signals is two lights, no more and no less, on every signal except dwarf signals. If one light is out, the signal must be regarded as displaying its most restrictive indication. The marker light also designates the kind of signal displayed, as in the following examples:

- 1—Two red lights in a vertical line—Stop signal
- 2—Two red lights staggered—Stop-and-proceed signal

Where position-light signals are used, the marker light designates the kind of signal displayed, for example:

- 1—Horizontal row of lights and no marker—Stop
- 2—Two red lights staggered—Stop-and-proceed signal

Prior to 1905, signals in automatic block territory were marked by an illuminated letter "A" on the former lines east and by a number (no light) on the lines west. The use of the marker light over the entire system was decided on in 1905 after very extensive and careful discussion by the officers of the former lines east and lines west. The use of marker lights on the Pennsylvania has been satisfactory, contributing much toward making the signal system complete.



Bureau of Safety Director Addresses A.R.A. Safety Section

W. J. Patterson, director of the Bureau of Safety, Interstate Commerce Commission, delivered an address before the Safety Section of the American Railway Association and the Steam Railroad Section of the National Safety Council at a joint meeting held in Cleveland, Ohio, on October 3. In his address, Mr. Patterson summarized the practices involved in certain accidents investigated by the Bureau of Safety. By reviewing the outstanding causes and events pertaining to several of the more serious train accidents of the year, Mr. Patterson pointed out the necessity for a critical examination of train-operation practices in their relation to operating rules and to the protective devices that have been provided. The improper handling of train orders continues to be a prominent factor in the occurrence of train accidents; also violations of speed restrictions were involved directly or indirectly in at least 17 out of 87 accidents investigated by the Bureau during the fiscal year ending June 30, 1934, it was pointed out.