

roads have a certain fixed maximum resistance per contact which determines whether or not these should be sent to the shop, it would be necessary to use a meter to find the actual condition of the contact; 5 to 10 ohms resistance is sometimes allowed, if there is only one in a circuit. To test the resistance of track relay or operating contacts, the resistance of the lamp would have to be about one ohm, and in that case it would be too sensitive to use on line breaks. The test lamp is better than nothing for testing line breaks but it is my belief that most maintainers are furnished with some kind of voltmeter (if not they should be). It hardly seems logical to carry a voltmeter on your motor car and a test lamp in your pocket, since the use of the latter is limited.

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More Discussion on Approach Lighting

TO THE EDITOR:

With reference to the discussion on "Approach lighting for signals"—as published in *Railway Signaling* for June, there seems to be no doubt as to the desirability of approach lighting when semaphore signals are concerned. Usually a rather heavy cost is involved to provide central energy, and if primary batteries are used there is no question about the economy of the approach lighting scheme. Because of the fact that a blade also is involved it is quite possible to approach light semaphore signals without entirely eliminating the possibility of ascertaining whether a signal is inoperative or not.

The situation is entirely different when colorlight signals are used. "Approach Lighting" in this instance is a wrong term to use. What we are really providing is a normal danger system of signals; going back many years to the old controversy about the desirability of normal clear or normal danger schemes.

A canvass has been made on the Santa Fe in connection with a proposed control of signals to ascertain what per cent of these signals would involve circuits which would allow the signal to indicate caution before the engineman came in view of the signal. It was found that about forty per cent of the signals involved could not be observed to change from stop to caution. This investigation was made only in connection with about one-tenth of the signals involved in a single track installation. I venture to say that at least 75 per cent of the signals would be involved if the entire number of signals in an installation were considered, so that any claim for the desirability of normal danger control seems to fail in this respect.

So far as bulb life is concerned; a properly arranged scheme of transferring bulbs periodically from the green to the yellow light and then from the yellow light to red, seems to have given the Santa Fe a maximum life per bulb which is all that we could desire even from a normal danger scheme. So that this argument seems to fall by the wayside.

We have no assurance as to the length of time of a failure of power so that the size of the storage battery we provide is more or less of a guess anyway.

Now as to economy: if memory serves correctly a rather close estimate was made some years ago to ascertain whether normal danger or normal clear signaling was the most economical. In the present discussion colorlight signals only are being considered and it is possible that the situation is somewhat different in this respect; but as I remember the results, it was determined that the volume of traffic had a great deal

to do with the economy of normal danger or normal clear signaling, this being due to the cost of circuits which were involved for normal danger control. It is possible that this phase of the situation is changed because of the different design of circuits and apparatus which are now available.

The big thing in all signal installations is to provide a scheme which will insure that a proceed signal will be displayed in a large majority of cases when it is proper that such a signal shall be displayed. With a normal clear scheme the necessary inspection to insure this display is always possible, either by the maintainer as he rides over his territory, or by any other employe who is working on the railroad or operating trains over it. Such an inspection and assurance has an economic value. Whether this value is greater than that of the supposedly decreased cost of operation with interest and all other charges taken into account, is the debatable point; but I think the whole subject merits analytical discussion based on the interest on first cost, plus cost of increased maintenance, plus possible increased failures, due to introduction of more apparatus plus cost of stops brought about by insufficient inspection as compared with the possible saving in power.

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Joint Monthly Inspection of Switches

TO THE EDITOR:

On the Northern district of the Chicago, Milwaukee & St. Paul we have inaugurated a joint monthly inspection of all main-line switches which is proving to be a decided benefit in eliminating failures of track and signal equipment at these switches. The signal maintainer accompanied by the section foreman, inspect the switch and correct any defects at once, thus preventing trouble. The following letter of instruction was sent to all maintainers and the superintendent sent a similar letter to all section foremen:

To all maintainers:

"The signal maintainer and the section foreman will make a joint inspection of switches in their respective automatic signal territories along the following lines:

1. That this joint inspection be made at least once each month.
2. That it not only be an inspection but a trip to remedy any defects either in the switch or signal apparatus connected thereto, which repairs should be made immediately—the maintainer to give the section foreman any necessary help, and the section foreman to do likewise for the maintainer.
3. It is suggested that the maintainer's motor car be used for making this inspection, as by this means it will require only the section foreman and the maintainer for this work.
4. As far as possible we would suggest that the maintenance of the switches be taken care of at these monthly inspections.
5. The maintainer will report to his assistant signal supervisor the date these joint inspections are made and will specify the actual switches inspected.

If the above directions are followed the failures on switches and switch instruments should be reduced to almost nothing, and the switches will be kept in much better condition and both departments will be benefited thereby. You will therefore immediately get in touch with the section foreman in your territory to make these inspections."

Minneapolis, Minn.

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