

DISCUSSION ON THE EFFECT OF TREATED TIES ON ELECTRICAL APPLIANCES USED IN BLOCK OR GENERAL SIGNAL SERVICE.*

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The question of the effect of zinc-treated ties on the electrical appliances used in the block or general signal service of railroads has just been called to the writer's attention, and in such manner as to indicate that in some cases this has been found serious, and, believing it to be important that the facts be known, he has deemed it best to correspond with the signal officers on the various lines, addressing an inquiry to each. The reason that it applied more particularly to the treatment of railroad ties seemed to justify the writer in doing this. The inquiry has met with quite free and cheerful responses, and the data obtained are, therefore, placed before the members of the Association for general information and to encourage further study of the matter.

The writer takes this means of thanking those who have contributed information for their ready response.

Chicago and Northwestern Railway.—We have put in a large number of ties which have been through the zinc-chloride treatment, and our experience indicates that if a track section were completely renewed with ties having this treatment, it would be impossible to operate a section over 1,200 feet in length. If, however, the ordinary renewals are made each year, that is, 12 to 15 per cent. of the total number of ties in a section, there is very little trouble. These ties act as condensers, but even this does not interfere with the circuits.

The worst trouble with ties having this treatment is in hot or dry weather, whereas in cool, wet weather the effect of the treatment is practically nil. After the ties have been in the track about one year, the effect of ties on circuits seems to disappear, so that if the ties in a track are renewed in the ordinary manner they may be in a few years entirely renewed without bad results to the signals.

Illinois Central Railroad.—Regarding the use of red oak treated ties in territory equipped with automatic block signals, in 1904 and 1905 we completed a piece of second track construction, in which all the ties were red oak treated with the zinc-chloride process, and we found on installing the automatic block service that the track circuits were entirely too long for this class of ties, and we were obliged to reduce them about 50 per cent. in length. It was our observation, however, that the conditions that required this reduced length of circuit had been eliminated as the ties became more seasoned, and it is not our impression that we would meet with any difficulty in maintaining the longer track sections, even in track that was entirely laid with zinc-chloride treated ties, where the track had been laid long enough so that the ties were being renewed at the rate of three or four hundred per mile per year.

We developed by investigation that we would experience no more trouble with a track of this kind than with a track laid with white oak ties, where freshly laid zinc-chloride ties do not exceed 25 per cent. of the total.

In regard to the effect of creosoted ties on block signals, our experience is so limited as to be of little value. Our signal people claim that they observed last year on some track laid with rock ballast, and in which some creosoted ties had been placed, that there was some disturbance of signal circuits and some reduction in the length of the circuit had to be made. However, the piece of track in question was in rather bad shape for ties, a very large number being put in, and the condition was not a normal one.

It seems possible, however, that we may find some difficulty in maintaining track laid exclusively with creosoted ties, but this we can tell very little about at this time.

Delaware, Lackawanna and Western.—In reference to difficulties in our work in the signal system from treated ties, creosoted or otherwise—at the present time we have

very few creosoted ties in service. These are at points where our track circuits are very short, and we have, therefore, experienced no difficulty in working our signals properly. We have had some difficulty in working long track circuits, say, one mile in length, where green, untreated ties have been laid, but trouble of this kind has been of short duration. We have, however, had no end of trouble on account of refrigerator cars dropping salt brine on the ties, which in turn formed a good conductor, conveying current from one rail to another instead of going back to relay, causing the relay to remain open, holding the signal in the danger position.

Atchison, Topeka and Santa Fe.—About the only reliable case we had was one with a long track section where a large number of zinc-treated ties had been introduced at one time. We could not get current enough to the far end of the section to work the relay. It was easy enough to straighten this out by cutting the section, but we wanted to find out a little more about the matter, therefore made some tests to ascertain whether we could not work the same section with some rearrangement of the batteries. In making this test we discovered that there was a developed current in the section somewhere, and in testing for it found that this current was developed by the application of our own battery. The current disappeared finally after a certain discharge and could only be developed by one polarity. The last test made was to use the lost polarity for the development of the current, and after taking a reading reversing the current quickly to see what the effect would be, we found that an application of reversed current would immediately neutralize the current which we had already developed.

We were not able to continue the tests, because the circuit was in service and had to be kept working, but our deductions were that we had constructed a crude kind of storage battery by the use of treated ties in connection with our tie-plates, spikes and rails. In order to do away with this trouble, as far as possible, we have arranged to cut our western sections down to half a mile, and believe this will take care of all conditions unless a whole half-mile section happens to be renewed at one time.

Great Northern Railway.—We have been through one severe experience with track circuit trouble, where a new line was laid on ties which had been treated to the zinc-chloride process.

When we first set up our batteries on this work it was found that the current from same was almost wholly lost at a distance of from 1,000 to 1,500 feet. This was due to the zinc in the ties serving as a conductor, which for a time caused a decided tendency toward short-circuiting and grounding of the current passing through the rails.

In the course of seven or eight days from the time batteries were connected to the rails, it was noticed that an improvement had set in, and gradually from that time on the treated ties gave less and less trouble until practically all ill effects from their use disappeared. If a similar case presented itself now, we would arrange to connect the track batteries with the rails, not less than thirty days prior to the signal system going into service, thus allowing the batteries to insulate the spikes from the ties, which is the effect produced by the small electric current passing from the rails to the ties through the spikes.

It is our judgment that the zinc-treated ties used for ordinary yearly tie renewals will not cause any track circuit trouble. The length of the track circuit sections, of course, has a bearing on the subject. It is good practice to limit the length of track sections to 3,000 feet, even though non-treated ties are used.

We do not know that the creosoted tie has caused any trouble in this direction.

Contractors in various parts of the United States are figuring on bids for the construction of the new \$20,000,000 passenger station which the North-Western road is going to erect on West Madison Street, Chicago.

* American Maintenance of Way Association.