

Evidently, it would not be economy. But this degree of treatment will keep the tie from rotting for 14 years; the time it takes to wear it out is only 11 years, and it may be that a treatment which will keep decay away for 11 years can be secured for 26c a tie. The annual expense of the untreated tie, we saw, was 15.1c. First cost of treated tie is 70c plus 10c plus 26c or \$1.06, and the annual expense figures out to 13.4c plus 1.5c or 14.9c, so it seems that it would be a small saving to so treat that class of tie when used with tie plates.

Calculations concerning all kinds of ties can be made as above, the basis of such calculations must be the long experience of practical trackmen, combined with the knowledge of processes, results, and costs of men in the wood preserving business. The difference of a couple of cents as above shown may appear paltry and insignificant, but when the difference amounts to 5c or so on a single tie, and we are considering some millions of ties, the potential value of reasoning along the above lines is evident. The above method of analysis could of course be used as between two kinds of ties, both of which it is intended to use untreated, for example, to chose between a 60c tie good for six years and a 75c tie good for eight years. It may also be combined with considerations of safety and those other factors which go to make up general desirability, in such a case as the question of tie plating on tangents. Ties without plates may, as indicated by experience, be good for five years, and for eight years with them, and the above method of calculation, modified as required, would serve to demonstrate the existence or non-existence of an economy.

The line of enquiry just concluded, then, shows us a good way to calculate as to whether it will be a paying proposition to treat a certain kind of tie which is going to be used under a certain set of conditions, as regards traffic, ballast, drainage, use or non use of tie plates and so on. But in order to thus calculate, we assumed the possession of a lot of information concerning the performance of the tie treated and untreated; our next line of enquiry will deal with the securing of the requisite information upon which to base calculations.

It is evident that the first knowledge that it is necessary to secure concerns the past performances of untreated ties under all the varying track conditions, and it would seem that a systematic series of questions and answers, covered by reports from section foremen to roadmasters, and from roadmasters to the man in charge of the matter, would lay clear the records of different classes of ties. A compact and simple series of questions concerning ties removed from track could be drawn up for each section foreman to answer, through observation, and a summary of these reports, covering the different classes of ties in service, with a striking of averages, would provide the required information. It is clear that better means of determining when each tie that has to be removed was put in the track would have to be provided than at present; also, to the eyes of many, the general impression given by observing an old tie is that it just naturally got decayed, dirty, worn out and generally undesirable and was therefore taken out. A little further examination of parts of the tie, however, will disclose just how far the process of decay was responsible for its failure, if at all, and what part mechanical wear had to play in the matter, and it is probable that the methods of making these

observations would have to be brought to the attention of some. In this country, the greater part of our ties are made from jackpine, cedar, spruce, tamarac, hemlock, fir and oak. It is evident that all of these will not make the same showing or fail from the same causes. It is evident that it will not pay to chemically treat ties which are worn out before decay sets in. It is evident that before it can be intelligently determined just what ties it will pay to treat, we must have all the information obtainable concerning the performance of all kinds of untreated ties under all kinds of conditions, and it seems that a carefully planned and simple systems of reports covering personal observations would supply that information.

The second line of information which it is necessary to secure will deal with the treating processes, costs, methods, degree of treatment, variations of cost and efficiency with degree of treatment, results of different treatments with different woods, under different conditions, and so on—a large order, truly. It would seem that the records of the results of past efforts would have to be collected and systematically arranged to as great an extent as possible; experimental test sections of track, wherein ties of different kinds, treated to varying degrees by different methods, would be the subject of the tests, would apparently be requisite, and the services of expert chemists would be required. Then, having secured information concerning the effect of the treatment of different woods used under differing conditions; having combined this with information concerning the same tie untreated, and having calculated on the basis of our complete information, we are then, and not till then, in a position to say whether, by treating our ties, we are effecting an economy in the interests of the railway and in the interests of the nation.

It is not the intent, in this paper, to discuss the relative efficiency of various methods of chemically preserving ties, but rather to indicate that there is a great deal to be taken into consideration before we can be sure that we are right in applying any of these methods. It may be of interest to state, however, that creosote oil is rapidly taking the place of zinc chloride as the most used preservative—has taken it, rather—and in some cases the two are used in combination. Similar treatment will not benefit different kinds of wood to the same degree; in fact, the age at which the tree was cut, the method and length of time used in seasoning, and the time of year the tree was cut, all have their effect on the internal structure of the cells and fibre of the timber, and therefore on the degree of success attending the chemical treatment. In Europe, it is estimated that over four-fifths of the wooden ties in use are treated with some kind of chemical preservative.

The thing most worthy of notice is that our timber resources are not what they are popularly supposed to be, or anything near it, and that it is in the interests of the community at large that what remains should be conserved as much as possible. But in that attempt to conserve, it is necessary to proceed correctly. The whole thing is a matter of dollars and cents; if by chemically treating a tie which lasts only half as long now as it can be made to last, and if it will pay the railway to do so, it is certainly in the interests of the community at large that this be done. But if by going ahead and indiscriminately treating all ties over a certain value, and thereby throwing

away the cost of the treatment in many cases, the loss is one borne not only by those individuals directly concerned, but through them, by the country at large.

Service Department for Railways Recommended.

L. C. Fritch, formerly General Manager, Eastern Lines, Canadian Northern Ry., Toronto, and now General Manager, Seaboard Air Line Ry., Norfolk, Va., has written the Railway Age Gazette as follows:

For some time I have considered suggesting the creation of a new department on railways, to be known as the "department of service." Service is of paramount importance in an organization and my past experience leads me to believe that if the railways made it the business of some one department to see that service of the highest order was rendered, much criticism directed against the carriers would disappear.

The present organization on most lines does not provide a clearing house where important matters can be sifted and reduced to concrete form for the information of the president and the board of directors. A department with a competent, responsible head, therefore, would fill this need and result in a saving in expense and in added efficiency in service to the public, which cannot be over estimated. After 30 years experience in railway work I am firmly convinced of the need of the further application of business principles to the operation of our railways, and to this end I suggest the creation of a business department the organization and duties of which are outlined as follows:

DEPARTMENT OF SERVICE. Organization.

Executives—

- 1 Vice President.
- 1 Assistant to Vice President.
- 1 Chief clerk.
- 6 Clerks.
- 3 Stenographers.
- 1 File clerk.
- 1 Assistant file clerk.
- 1 Messenger.

16

Inspection Bureau—

- 1 Chief inspector.
- 1 Inspector, maintenance of way.
- 1 Inspector, maintenance of equipment.
- 1 Inspector of transportation.
- 1 Chief clerk.
- 3 Clerks.
- 3 Stenographers.
- 1 File clerk.
- 1 Messenger.

13

Statistical Bureau—

- 1 Statistician.
- 1 Assistant statistician.
- 4 Clerks.
- 3 Stenographers.
- 1 File clerk.

10

Labor Bureau—

- 1 Negotiator.
- 1 Assistant negotiator.
- 1 Clerk.
- 1 Stenographer.

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Summary—

- 16 Executives.
- 13 Inspection bureau.
- 10 Statistical bureau.
- 4 Labor bureau.

43 Total number of officers and employes.

OUTLINE OF WORK.

1. Expenditure supervision—
 - (a) Allotments to departments and sub-departments on monthly expenditure.
 - (b) Supervision over all new-work expenditures.
 - (c) Audit of vouchers and payrolls.
2. Efficiency methods—
 - (a) Analysis of present practices and methods.
 - (b) Improvements in methods and practices.
 - (c) Reduction in waste and non-essential methods and operations.