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T. R. Truax

Forests Products Laboratory, Madison, Wisconsin

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THE TIE PROBLEM AND A NATIONAL FORESTRY PROGRAM

By T. R. Truax, Wood Technologist,
Forests Products Laboratory, Madison, Wisconsin

The yearly supply of crossties for our railroads constitutes a heavy demand upon the forest resources of the country. There is a total mileage of steam and electric railways in the United States of approximately 450,000. Over a considerable period of years the annual replacement of ties on both steam and electric lines has been in the neighborhood of 300 ties per mile. On this basis the normal average consumption of crossties would amount to about 135,000,000. In 1920, the Forest Service* estimated the normal annual consumption of ties at between 100 million and 125 million, but this estimate apparently did not include the electric railways. Taking a conservative figure of 120,000,000 ties and 36 board feet as the average contents per tie, it is found that the drain upon our forests amounts to approximately 4½ billion board feet yearly. In terms of cubic feet of standing timber required yearly crossties stand next after fuel, lumber, and posts.

Producers of railroad ties, in common with other large manufacturers of forest products are therefore dependent upon the forests of the country as a source of raw material, and are vitally concerned in a national forestry program because the stability of their industry is dependent upon a permanent supply of timber. The gradual depletion of our timber resources has made it increasingly difficult for manufacturers of ties, in the regions where there is the largest demand, to obtain sufficient suitable material in competition with other industries. This has led to profound changes in lumber and timber distribution, and in general has placed an additional burden upon our transportation system.

During the past few years Douglas fir ties have invaded the Middle Western and Eastern States. These are regions which in the past have been supplied with the standard oak tie cut immediately along the rights of way or with southern pine ties from the south. During 1919 orders amounting to nearly 100,000,000 board feet were placed for Douglas fir ties for eastern roads because of the uncertainty of securing adequate supplies along their rights of way and because of the excessive costs of local ties. In other words, oak ties cut within a few miles of the right of way and bearing practically no freight charge were to some extent being replaced by fir ties hauled overland across the continent or shipped through the Panama Canal. Tie manufacturers are thus reaching out to the last remaining supply of virgin timber of the country to meet the demand of the eastern tie markets, and if the wooden tie industry is to live it behooves it to look out for a future supply of raw material and a better utilization of the present supply.

A Two-fold Forestry Program

A national forestry program that will meet the requirements and welfare of the tie-producing industry must embrace two provisions of paramount importance; namely, (1) the providing of a future supply of timber by reforesting our forest lands and giving them adequate protection, and (2) the conserving of our present supply and securing of maximum service from the ties that are now placed in service.

The most reliable statistics show that forest depletion has gone on until an area of approximately 81,000,000 acres has been so severely cut and burned as to become an unproductive waste, and this is being increased at the rate of three to four million acres yearly. In addition, an enormous area supports so small an amount of timber, or timber of such inferior character, that its economic value is negligible. The area of virgin forest has decreased until it is but one-sixth of the original. The United States is not only cutting heavily into its remaining virgin forests every year, but is also using up the smaller material upon which our future supply of timber depends, much more rapidly than it is being replaced. If the industries dependent upon our forests as a source of materials are to continue, it is thus imperative that a national plan of growing and protecting these forests must be undertaken at once.

The solution of the problem presented by forest depletion is not by reducing the utility of our forests but by putting the idle lands to work growing more timber. The large area of land in the United States capable of growing forests
but not suitable for any other economic use, estimated at 463 million acres, would provide an ample supply of wood if it was kept productive. To make and keep it productive requires the concerted action of the National Government, the several States, and the private owners. The public has very large interests at stake, and certain fundamental causes of forest devastation can only be removed by public action. Chief among these are the fire hazard of forest properties, particularly of growing forests, and a property tax system which discourages or may prevent the landowners from engaging in the business of growing timber. On the other hand, a measure of responsibility rests upon the private owner and should be recognized in handling his land. The job of growing timber must be shared equitably by the public through the National and State Governments and by the private land owners.

Better Utilization of Present Supplies...

The second principal concern of the tie-producing industry should be how best to conserve its present supply of raw material, and how to secure maximum service from the ties now placed in use. For these tasks research in forest products holds the central and principal part. Accurate information on the natural durability and mechanical properties of various species, the effectiveness of various methods of protecting different species against decay, improved methods of manufacture, and improved rail fastenings and tie plates must be obtained if the wooden tie industry is to hold its present position of importance. Unless continued improvement in the preparation and use of wooden ties is maintained, substitute ties may be expected to come into more general use, and to a constantly increasing extent occupy the field now held almost exclusively by wooden ties. In many cases much information is available at the present time and requires but the cooperation of the tie manufacturers, users, and research men to put it into practice.

Decay is one of the principal causes of failure in ties. It has been stated that the average life of untreated ties in the United States is about 7½ years, whereas if an efficient preservative treatment is applied the average life can be lengthened to perhaps 15 years. Of the 120 million ties used yearly by the railroads and electric lines of this country only about one-third are treated. If all ties were treated, instead of but one-third as at present, the 80 million untreated ties now being used each year could eventually be reduced to 40 million treated ties. The number of ties then required yearly would be but 80 million, or a saving of 40 million, which
is equivalent to over $1^{1/2}$ billion board feet. This saving has been estimated by the Tie Committee of the American Railway Engineering Association in its report of 1920 to be about 2 billion board feet.

The magnitude of this possible saving becomes more apparent when compared to the quantity of material required for other uses. The possible saving from the treatment of ties is nearly equal to the total quantity of wood used for pulpwood, exceeds that required for mine timbers, shingles, poles, vehicles, implements or cooperage, and is equivalent to about one-half of all the standing timber consumed yearly by fire. The importance of crosstie preservation in our National forestry program is thus obvious.

Our methods of tie manufacture are wasteful of material and should be carefully studied with the view of obtaining more ties from the same volume of timber. It is argued by some that the specifications have in the past resulted in a loss of from 35 to 40 per cent in certain classes of our timber, and that modifications may be made which will not only increase the number of ties from a given volume of timber but which will simplify the silvicultural management of the stands. The solution of the problem requires the combined efforts of the tie manufacturer, the railroad engineer, and the forester.

Research must also determine the relative suitability of various woods for ties. Woods that have not been used extensively in the past but of which there are considerable quantities available, such as western hemlock and western firs, may be used in the place of scarcer and more valuable woods, such as pine and oak. Here a determination of the possibility of giving the woods a preservative treatment and the mechanical properties which will enable them to withstand mechanical wear are of vital importance.

Research in forest products has already supplied much information which has enabled a conservation of our forests without a curtailment of the use of wood. There is still much that can and must be done by research if the wooden tie is to retain its place in railroad construction against competitors. In this the keynote is a national forestry program including forest protection, reforestation, and research, that there may be a perpetual supply of timber ample for all legitimate purposes if used with a minimum of waste and a maximum of economy.