

Canadian Railway and Marine World

October, 1917.

Some Present Day Problems in Railway Maintenance Work.

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Railway maintenance, as performed by the maintenance department is a constant building up of the breaking down process caused by the wear and tear of traffic, and the effect of the elements and time. It covers a pretty broad field, embracing in its scope the roadbed, track, bridges, waterways, fences, buildings, water supply and other kindred work. The subject is too extensive to be covered, even in a general way, by one paper, so this paper will be confined to a few notes on the track structure itself, and the present day problems pertaining thereto. The track structure, as it is called, embraces the roadbed as well as the rail and ties. The roadbed and track of a railway is one of the most important parts of the complete railway structure, and may, on account of its importance, be called the backbone of the system. To keep it in good condition, the railway must provide a certain sum of money each year, have a stock of material, and a trained organization of men.

The present day tendency in Canadian railway practice is toward the large car and the long train, and, as Canada is a country of long distances, this tendency will grow. Large cars and long trains require big locomotives to haul them, and big locomotives mean more wear and tear on the track. This condition is manifesting itself at a time when material is high in price and hard to get hold of; when labor is scarce and independent in attitude; when operating costs are growing in volume; while rates, both freight and passenger, remain almost stationary. Yet the Canadian railways must have and maintain good tracks if passengers and freight are to be carried safely and expeditiously. Canada's long winter climate and short season for the carriage of water borne inland traffic places the railways in the premier position in the transportation field.

The railway maintenance men of Canada, in common with those of the rest of the continent of North America, are today facing three important problems, viz., (1) Stronger and more permanent track; (2) The obtaining and holding of labor; (3) The more economic use of material and labor. The first may be obtained in a degree by better drainage, both of the surface and under type; ballast of a better grade and more of it; heavier tie plates of the shoulder type, and the more extensive use of treated ties.

Should you ask a maintenance man what he thinks of the importance of track drainage, he will concede right off that it is one of the most important matters there is, and nine times out of ten he will tell you that the farther you keep the water away from the subgrade the better the track will be. He generally recognizes water as an enemy to be feared and guarded against, all as a matter of theory. As a matter of practice, track drainage gets secondary consideration. There are many good reasons for this.

When the extra forces are put on in the spring there is great anxiety to get the ties in, the new rail laid, and the track surfaced, because the men higher up know about these things, and take a natural interest in their completion. The side ditches and other drainage work, instead of receiving first attention in the spring, are left until the last. We go into the winter with nice clean side ditches, when there is little or no water running, and through the spring and summer with dirty ditches, when it rains the greater part of the time. All this time the drains are working the moisture down into the subgrade, and storing up trouble and extra expense for cold weather. My own opinion is that we should start in the first thing in the spring and carry on the ditching work, simultaneously with the tie renewals, surfacing and other work, with extra section men specially taken on for this purpose. In this way all the work in connection with the track will be carried on in an orderly manner, and the greatest benefit derived. There are many locations where conditions must be met with drainage works of a special character, but for ordinary conditions, and ordinary conditions predominate, a good ditch well maintained is all that is required.

Ballast pits in the past have, in the majority of cases, been chosen more with a view to short haul and low cost in handling rather than to the desirability of the ballast. The result has been that a lot of fine dusty ballast has been put out, which has given us dusty track, and the money put into the venture has not proved a good investment. In the future we shall have to make a closer study of these things, and when it is not possible to obtain bank gravel of the right quality, resort to the use of broken stone or washed gravel. Ballast of this kind is bound to be high in cost, so that we shall have to be more critical of the quality of the material chosen, pay more attention to our handling methods, and see to it that the dead ballast is stripped off the roadbed so that the new ballast will not become mixed with the old.

Shoulder tie plates have proved money savers in lessening labor in holding track to gauge; and those with the canted rail seat have helped to prolong the life of the rails by adjusting the wearing surface of the railhead to conform more closely with the coning of the wheels. My own opinion is that we should lengthen the outside margin of the plate an extra inch to get more bearing on the outside, and to prevent the plate being shoved down into the tie by the crushing force of the loaded rails. This feature should prove a help on the inside of curves. The extra margin would of course, increase the weight of the plate about three-quarters of a pound, and, no doubt, it would have to be thickened slightly to make it stiffer, on account of the increased length, making the increase in weight around a full pound. The ex-

tra cost at ordinary prices would amount to about 2c each, and at present prices about 4c each. Personally, I would favor a tie plate with shallow, blunt ribs, or a smooth bottom, rather than those with deep sharp ribs, as there is less danger of the wood fibre being cut into and destroyed by rot. With a more extensive use of treated ties, which must surely take place in the future, this feature will require close attention.

Time was when the cedar tie occupied the first place in Canadian railway tracks. It was chosen because it was low in price, easy to manufacture, and resisted rot for a longer time than other woods. Under heavy loads it has not lived up to the first impression it gave, and has given out in other ways. Experience has shown that it is not so good as the harder woods for curved track, and without tie plate equipment it is very easily cut by the rail bases. This led the railways to cast around for a harder tie, and the result has been that you will see the harder woods, such as jack pine, tamarack and hemlock favored today, although the life in some respects is shorter. Oak ties are nearly out of the question in Canada, as the supply of native timber is too small, and the cost of importing too high. With the treated tie we can increase the lifetime to about 12 years, and bring into use varieties of wood which today cannot be used in the untreated state. The argument has been set forth that the treated tie showed such a small margin in saving over the untreated article that a drop of a cent or two in the price of a tie would wipe the saving out. This argument carries a good deal of weight with the powers that hand over the money, but my prediction is that the prospective future supply of ties will alter this viewpoint.

The second problem which is staring us in the face is the obtaining of labor; and the retention of it after it has been obtained is becoming a still more serious matter. It is the opinion of some quarters that wages may remain high after the war, and that there will be a scarcity of good labor. This is a reasonable view and the prophets may be right. Be that as it may, we are sure to face a labor shortage for the next three or four years. The solution of the problem would, at the first glance, appear to be to go into the market and bid up to the price the other employers of labor are offering, and take our chance of getting men. However, there are some sceptical people who will tell you that you cannot make bricks without straw, that men are scarce, and that the few who are available are offered more attractive living conditions by other branches of industry. It is true that the manufacturer and the contractor have offered higher wages and more attractive living quarters to the men than the railways have, but we can overcome this in a degree by providing better living accommodation. Railways with their commissary departments for the supply of their dining car services, should be in a