TREATED WOOD-BLOCK PAVING OFFERS NEW CANADIAN INDUSTRY

Possibilities for Development Investigated by Forest Products Laboratories --- System has Many Advantages and Would Make Profitable Use of Wood From Forests of the Dominion

The possibilities for development of the treated wood-block paving industry in connection with the utilization of forest products in Canada has lately been investigated by the Forest Products Laboratories, recently established as a division of the Forestry Branch of the Department of the Interior. The supply of material for street paving is causing much consideration to the municipal authorities in Canada as elsewhere. Wood blocks are superior in many ways to mineral substances, and if they can be so treated and laid as to stand heavy traffic and Canadian climatic conditions, they will prove a valuable paving material. The laying of such pavements would also make profitable use of wood from the Canadian forests.

Information on the subject, now available, is contained in a pamphlet issued by the Department and prepared by Mr. W. G. Mitchel, M.Sc., a member of the technical staff.

At the present time, he writes, when the constantly growing volume and complexity of street traffic in cities, and the rising standards of public hygiene are forcing the attention of municipal and highway engineers throughout the country to the importance of the selection of road-surfacing material, the subject of wood-block paving is of most timely interest. In recent years, a few of the larger Canadian cities have adopted wood-block paving to a limited extent, but cities of Eastern Canada have been rather conservative in their attitude toward this type of paving.

In Canada, Vancouver has the largest area of treated wood-block pavement in service. At the present time the total length of creosoted wood-block pavement in that city is approximately twenty-three miles. Some of the earlier paving construction in Vancouver was with blocks treated by immersion in "carbolineum," but subsequent to 1909 all creosoted blocks have been treated by pressure impregnation. Here, as in the comparatively few other Canadian cities where it was adopted, the dipped wood-block pavement has given good service during ten to twelve years of use. Pressure impregnation has, however, superseded immersion treatment amost entirely for paving-block manufacture.

Has Grown in Favor.

The experience of those cities of the United States, where wood-block paving has been most extensively adopted, has shown that for many kinds of service creosoted wood-blocks are entitled to a high place in the classification of road-surfacing materials In 1905 the total area of such pavement in the United States was slightly less than 1,500,000 square yards, while in 1913 the city of Minneapolis alone had in use over 1,000,000 square yards, which indicates in a striking way the extent to which this type of pavement has grown in favor during the last decade.

The Forest Products Laboratories have under consideration an extended investigation of the possibilities of treated wood-blocks for road-paving, dealing with the relative merits of different native woods, details of seasoning and preservative treatment and methods of laying, having particular regard to the climatic and traffic conditions to be met in Canadian cities. It is the intention of this department to place under close observation several stretches of wood-block paving which are subject to representative conditions of service, in the hope of obtaining more or less direct correlation between the data gathered from periodical inspections and the results of laboratory investigations.

Although the successful practical introduction of preservative treatment for timber dates from quite early in the last century apparently its first adoption in connection with wood paving-block manufacture was about forty years ago. A case is noted of the laying of creosoted block pavement in Galveston in 1878. The wood used in this case was southern pine, and, while the pavement was not laid in accordance with what is now recognized as best practice, it gave excellent results and lasted until its destruction in the flood of 1900.

Progress in Timber Preservation.

Treatment with creosote oil or heavier tar-products is practically the only method applicable for paving-block manufacture. During recent years very considerable progress has been made in all lines of the timber-preservation industry both in Europe and the United States. Improvements in method of treatment, perfection of mechanical equipment used, the careful study of such factors as selection and seasoning of woods, and design and methods of laying pavement have combined to bring the development of wood-paving practice to a point where its adoption may no longer be considered an experiment, and where its possibilities in modern city street paving merit most careful study.

The essential requisites of modern city paving are durability, safety, low traction-resistance and ease of cleaning. Considerations somewhat less important economically require that pavement shall be such that the noise and vibration from heavy street traffic will not be excessive, and that such factors as the radiation of heat, reflection of light and emission of unpleasant odors will be minimized. On a basis of the foregoing requirements, modern treated wood-block pavement is regarded by many authorities as closely approaching the ideal.

Comparative Values.

The following table, compiled by the Forest Service of the United States Department of Agriculture, is representative of the opinions of a number of highway engineers in several of the larger cities of the United States:

Pavement Qualities.	Percentage.	Granite.	Sandstone.	Asphalt (slicets).	Asphalt (blocks).	Brick.	Macadam.	Creosoted wood.
Cheapness (first cost)..	14	4.0	4.0	6.5	6.5	7.0	14.0	4.5
Durability ..	20	20.0	17.5	10.0	14.0	12.5	6.0	14.0
Ease of maintenance..	10	9.5	10.0	7.5	8.0	8.5	4.5	9.5
Ease of cleaning..	14	10.0	11.0	14.0	14.0	12.5	6.0	14.0
Low traction resistance ..	14	8.5	9.5	14.0	13.5	12.5	8.0	14.0
Freedom from slipperiness average of conditions)..	7	5.5	7.0	3.5	4.5	5.5	6.5	4.0
Favorableness to travel ..	4	2.5	3.5	4.0	3.5	3.0	3.0	3.5
Acceptability ..	4	2.0	2.5	3.5	3.5	2.5	2.5	4.0
Sanitary quality.	13	9.0	8.5	13.0	12.0	10.5	4.5	12.5
Total number of points ..	100	71.0	73.5	76..0	79.5	74.5	55.0	80.0
Average cost per square yard laid 1905 ..		$3.26	$3.50	$2.36	$2.29	$2.06	$0.99	$3.10

In more recent practice improved methods of treatment and laying, and greater care in the selection of timber stock have combined to produce a higher standard of durability than the above comparison would indicate.

European Methods of Treatment.

In Europe the methods of creosote treatment of paving blocks vary considerably. In England the pressure method of impregnation is used, and specifications require an absorption of from 10 pounds to 12 pounds per cubic foot. The wood which has been used most extensively in England for paving-block manufacture is the so-called "Scotch" pine (Pinus silvestris), known also as Baltic or Swedish pine.

In France, heretofore, the method of treatment has been by simple immersion in open tanks, and the absorption has been correspondingly small—from 3 pounds to 4 pounds per cubic foot. The time of immersion in this treatment was twenty minutes in oil of a temperature of 80 degree centigrade. Comparatively recently the modern methods of pressure impregnation have been adopted in Paris, and an installation has been completed for this method of treatment. A mixture of coal tar, pitch and creosote oil will be used in this case. The woods largely in use in France for paving purposes are Baltic pine and a native pine (Pinus pinaster; Eng., Cluster pine; Fr., Pin maritime), the latter of more open and less uniform structure than the former.

In the United States pressure impregnation is used almost entirely for the treatment of paving blocks. A much heavier absorption is required by American specifications, up to 20 pounds or 22 pounds per cubic foot, although from 16 pounds to 20 pounds is the usual standard.

In American wood paving-block manufacture, those species which have been used include Southern pine, loblolly pine, Norway pine, Douglas fir, tamarack, white birch, larch, and hemlock. The experience with the latter two has not been satisfactory, and these species are not regarded as suitable for such service.

Uniform Methods Necessary.

As factors contributing to the success of wood-block pavement, the methods of laying, cushioning and filling, and the workmanship of actual construction are details scarcely less important than the manufacture and treatment of the blocks. Regarding some points there is still considerable difference of opinion among highway engineers whose experience has been most extensive. In England the practice is to use blocks of somewhat greater depth than in America. Four inches is the minimum, and on heavily travelled thoroughfares 5-inch blocks are used. The blocks are in all cases laid with the grain vertical, and in European practice are of fairly uniform section of 3-inch by 6-inch or 7-inch.

In block-pavement construction in England and on the Continent, the use of a sand cushion has been abandoned. The concrete foundation is laid and finished to an absolutely true contour of the finished pavement, either with or without the addition of a top mortar course, and this is allowed to set before the blocks are laid.

It is generally admitted that the success of European wood-block paving has been largely due to the high standard of workmanship secured. American operators now require more uniform methods and more careful work in actual construction than were formerly thought necessary.

Industry in Canada.

The Canadian wood-preserving industry is represented at present by four producing companies: the Dominion Tar and Chemical Company of Sydney and Winnipeg, the Canada Creosoting Company, of Toronto, the Dominion Creosoting Company of Vancouver and Alex. Bruce & Company, of Fort Frances, Ontario.

Alex. Bruce & Company own and operate a plant located about four miles east of Fort Frances, on the main line of the Canadian Northern Railway, Port Arthur to Winnipeg. This plant is equipped for treatment by the Bruening-Marmetschke process, which employs as preservative medium a combined solution of zinc chloride and aluminum sulphate. The plant is provided with two cylinders, power-house and other auxiliary equipment for pressure treatment. Creosote has not been used at the plant and railway cross-ties have constituted the great part of timber treated.

The Dominion Tar and Chemical Company operates tar distillation plants at Sydney, N.S., and at Sault Ste. Marie, Ont., producing creosote oil. In connection with the distillation plant at Sydney the company operates a treating plant, equipped with one cylinder. This has been used chiefly for creosoting piling and railway cross-ties. The Transcona plant of this company is largely engaged in the treatment of railway ties at present, although the creosoting of wood-paving blocks is a growing part of the business.

The plant is located about six miles east of Winnipeg, and has connection by Canadian Northern Railway and Canadian Pacific Railway with that city. There are ample storage yards in connection with the plant for the storing and seasoning of ties and other timber. The storage yards are served by four parallel narrow-guage tracks, and a locomotive crane is used for handling material in the yards and at the treating plant.

The actual plant equipment includes four treating cylinders of 6 feet 6 inches diameter, three of which are 135 feet long, and a fourth of 84 feet length. Treatment of railway ties includes yard seasoning, or equivalent steaming and vacuum treatment of ties, followed by impregnation with creosote oil up to 3 gallons per tie.

Oil storage is provided by tanks of 20 feet diameter and 14 feet height. These are used as a source of direct supply for treating cylinders, and ample outside storage capacity for creosote is provided by five additional tanks. Power plant and machine shops complete the plant equipment.

The Canada Creosoting Company, of Toronto, operates a plant at Trenton, Ont. This plant has recently been completed, and is equipped for pressure treatment of railway ties, paving blocks and other timber stock.

Good Shipping Facilities.

The plant is located on a property of 42 acres on the east bank of the Trent river. It has access to the Grand Trunk, Canadian Northern, and Canadian Pacific railways, and has facilities for water transportation. The plant equipment includes saw-mill, boiler plant of 200 horse-power capacity, and one treating cylinder of 133 feet length, 7 feet diameter. The cylinder is served with overhead oil tank, run-off-tank, high pressure pumps and vacuum pump. Storage for creosote is provided by two outside tanks, capacity 150,000 gallons each .

The plant of the Dominion Creosoting Company, Vancouver, is situated on the north arm of the Fraser river. The company's property comprises about 22 acres, with a river frontage of 1,300 feet.

The company operates a saw-mill with a daily production of from 55,000 to 70,000 feet, board measure, per day of ten hours. The paving-block mill is equipped with two block-sawing machines, having a total capacity of 1,600 square yards of block pavement per day.

The creosoting plant proper includes two retorts of 7½ feet diameter and 100 feet long, designed for working pressure of 200 pounds per square inch. The equipment includes air and oil pumps, working and storage tanks for creosote oil, and steam plant of 100 horse-power capacity. The yard and plant buildings are served with transfer tracks between buildings and connecting with the loading pier on the river front. Canadian Pacific railway sidings provide additional shipping facilities.

Vancouver, Victoria, Calgary, Moose Jaw, Winnipeg, Toronto, Hamilton, Ottawa and Montreal are among the Canadian cities where wood-block paving has been adopted to some extent. Douglas fir has been used almost exclusively on the Pacific coast for paving-block manufacture. Hard (Southern or yellow) pine blocks have been imported by some of the Eastern cities, and Norway pine, tamarack and hemlock blocks are also in use. Birch and maple are regarded as valuable woods for such service by some authorities, although these species have not yet been adopted to any extent in Canada.

Factors in Choice of Pavement.

Initial and ultimate cost, durability, availbility of supply and adaptability to conditions of traffic are factors upon which the choice of a pavement surface depends. The factor of availability of supply will influence Canadian practice, because of high transportation costs. In the East the supply of timber for paving-block manufacture will be drawn from Norway pine, tamarack, birch, hemlock and maple. At the present time imported yellow pine blocks compare favorably in price with native wood blocks, but this is an anomaly due to present market conditions, and can hardly be expected to continue. The coast cities have hitherto used Douglas fir blocks almost exclusively. It is possible that such other species as tamarack or hemlock may replace fir for this purpose. At present there is a considerable diversity of opinion as to the suitability of Douglas fir for paving-block manufacture. Difficulties of treatment have hitherto been responsible for the development of some prejudice against this species, although it is claimed that this trouble has been overcome by recent improvements on methods of seasoning and impregnation.

The initial cost of wood-block paving is rather higher than for other types of pavement. Compared with asphalt surface on an equal foundation its first cost is considerably greater. The cost of wood-block pavement will vary considerably according to design, and more particularly in proportion to the cost of timber stock, cost of treatment and labor for constructure. This variation ranges from $2.50 to $3.90 per square yard.

A cost-figure is reported from Minneapolis of $2.50 per square yard, representing an average of several years' construction. The cost of a 3-inch treated-block pavement in Moose Jaw is reported as $2.84 exclusive of excavation. Vancouver reports as low a cost as $2.10 per square yard, exclusive of excavation and foundation. In this case the cost per yard of treated blocks was $1.85, half of which represents the actual cost of treatment. The timber stock was Douglas fir and a twelve-pound impregnation was required.

These figures can hardly be assumed as representative of costs in the East. Probably a fair cost-figure in Eastern Canada would be from $3.25 to $3.85 per square yard for a 4-inch pavement on a 6-inch foundation. This cost is slightly higher than that of brick pavement, and approximately the same as that of asphalt block.

HON. T. C. NORRIS,

Premier of Manitoba, who is shortly to make an appeal to the electorate.

Orcharding and Eating

By Peter McArthur

Elfrid, June 16th:—There is one thing that I am getting about tired of. Every young scientist who comes to pay me a visit proves his efficiency by discovering a new bug or blight on the place and goes away triumphantly bearing his samples with him. Yesterday Mr. Pinn, of the District Representatives staff, called in casually to get acquainted and as I had noticed that several of the little apple trees in the new orchard had died mysteriously after coming into leaf I asked him to examine them to see if it was the San Jose scale or any of my familiar enemies. He protested that horticulture was not his line but he examined the trees. Presently he asked musingly, as he pointed to a peculiar formation of the bark: "I wonder what the cause of that is?" Then he took out his jack-knife and investigated. Raising a splinter he revealed a row of little eggcells in the pithy centre of the twig and in each cell there was a little worm. As the wood around them was discolored and apparently dead it was easy to see what had killed the tree. The little colony had stopped the flow of sap. As every branch was found to have a similar colony the work of the pest was thorough. Not being a specialist on such critters, Mr. Finn refused to name them positively though he intimated that the damage might possibly have been done by the white tree cricket. As I had never heard of them before I felt that he was probably right. The unfortunate part of it is that these young men usually are right when they suspect the presence of a new pest or blight. Say, I think the best thing I can do is to have a general round-up of the bugs on the place and invite Prof. Caesar to come over from Guelph and name them all for me at one session. Getting them named one at a time is beginning to tell on my nerves.

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This week the Department of Horticulture completed its work in the orchard. Mr. Webster came along and pruned the trees to a finish, making a job that I am proud to have anyone inspect. In looking at his work I can understand exactly what is meant by having every part of the tree open to the light and air though I find it hard to realize how he manages it. When I go to prune a tree it requires a trial by jury to decide just what branches should be cut out and what ones should be left in, and even the most over-grown and woodiest tree never seems to have enough of the right branches in the right place to enable me to get the results I want. But Mr. Webster always seems to find exactly the material he needs. When he has completed a tree the top is rounded like an umbrella, and at a little distance looks so smooth that you feel as if you could rub your hand over it. In the body of the tree no two branches are crossing or touching, all are swinging free, and in such a position that the fruit they bear will have a chance to mature properly, and be properly colored. As I look at his work I feel that I still lack the moral courage to prune a tree as he does. I am always afraid to cut out branches because they seem to leave such ghastly holes, but he just cuts away with the certainty that comes of knowledge, and when he is done you feel like going and getting a photographer to make a picture of the tree. This is the first time that I have seen summer pruning done, and I have taken quite a notion to it. Although I did not try it it looks easier than winter or spring pruning. You do not have to use your imagination so much because the foliage is all on the trees, and you can see just what a change will be made by each twig when cut out. You can also see what branches must be removed in order to let in the light. In short, the summer pruning of a tree is much like giving a man a hair cut. You can snip around until you get everything in the shape in which it should be. The chief trouble seems to be that when the branches are covered with leaves it is harder to shake to the ground the stuff that is being pruned out. If it were not for the fact that the summer is usually the busiest time on the farm I am inclined to think it would be the best time for beginners to do their pruning. I noticed that Mr. Webster put his ladder up through the tree and selected the highest branch for a starting point. He cut this back to a lateral branch at the right height, and then began with his pruning shears to cut the branches all around in the same way. By working from the highest central point he soon made a sloping roof for the tree. When this was done he worked down through the body of the tree, and as he always worked from the inside he could see where the light and air were to be let in. Though he seemed to cut somewhat mercilessly I noticed that he seldom removed large branches unless they happened to be diseased, and altogether, although he made a bigger showing on the trees, he probably removed less wood than would be taken out by an inexperienced pruner. Besides looking easier I am told that summer pruning has the advantage of stimulating the growth of fruit buds for the ensuing year. It is believed that trees pruned in the winter time are more likely to put out a larger wood growth, but the most cheering piece of information I received was that from now on my trees should not require more than a couple of days work each year. Having been put in thorough shape by a systematic pruning a limited amount of attention should keep them up to the minute. If that is all the time that is required I may be able to do the work myself.

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Last night the littlest boys were invited to pick some of the first strawberries of the season, and before leaving for school this morning they left orders for a short cake for supper. This is something that makes me sit up and take notice, for a strawberry shortcake properly made, is a dream, a poem, and a culinary triumph! Now don't begin to argue because the chances are ten to one that you don't know what a shortcake is or should be. When I used to live in restaurants they used to serve what they called "strawberry shortcake" and I understand that in most of the hotels and public eating places they still perpetrate the same offence. What they used to offer me was a kind of layer cake in which the layers were supported by white or half red indurated knobs that they called early strawberries. The cake part tasted much like old-fashioned jelly-cake without the jelly, and poured over the three story affair there was usually a skimpy supply of whipped skim milk that masqueraded as cream. Take it away! Take it away—way! Don't offend my sight with it, much less my palate. But a real strawberry short cake! Now listen and perpend. The housewife having secured the necessary ripe full-flavored, firm strawberries and picked them free of hulls and leaves proceeds with the operation by making a batch of super-biscuit dough. By super-biscuit dough I mean biscuit dough that is a trifle richer in shortening than ordinary biscuit dough. Not enriched sufficiently to make it friable like shortbread, or floeculent like piecrust, but divinely poised between the two extremes, a comestible that will melt in your mouth, and yet has enough consistency to require the touch of your teeth. Far be it from me to offer any housewife the proportions of flour and other ingredients that are used to make such a biscuit dough as this. I have often tried to learn the proportions but have been forced to the conclusion that the matter is one of inspiration—plenary inspiration. At exactly the right moment this exactly correct biscuit dough is put in an oven heated to exactly the right temperature, and two scones of it are cooked to exactly the right point. When exactly cooked the scones are taken from the oven, broken open and lavishly buttered with fresh June butter that was churned from new cream yesterday and kept cool in a pail swinging in the well. You must be sure to break open the scones for to profane them with a knife might break down the texture and cause a certain sogginess. After the butter, one scone is placed on a platter and covered to the point of smothering with crushed strawberries. Then the next layer is placed on top and similarly smothered. While still smoking hot the delectable mass is brought to the table. When serving, it must be broken with a spoon in order to preserve the texture, and each helping must be floated in fresh country cream. What's that you say? You tell me that M. Escoffier, the famous Parisian chef who adds scientific knowledge of food values to culinary genius, asserts that strawberries with cream is a gastronomic crime? He says that the acid of the strawberries combines with something in the cream to make something else that is entirely indigestible? O don't bother me with such talk as that. Strawberries and cream were wedded in the dim past, they have come down the ages hand in hand, and whom am I that I should put them asunder? Give me another helping and send for the Doctor!