

Engineering Department

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Wagon Tires.

Vehicles designed for carrying loads of a ton or more should have tires at least four or, better, five inches wide. With expensively built stone roads the effect of narrow tires may be so repaired as to keep the road in a fairly good condition though at very great cost. But broad tires are particularly necessary on roads such as are constructed in this country. Narrow wagon tires are the greatest destroyers of gravel and broken stone roads, built and maintained as they are in Ontario. Even with the traffic, which is not excessive, our country roads will not be kept in a moderately good condition so long as they are subjected to the strain placed upon them by narrow tired wagons.

There are two aspects of the question of tire widths to be considered:

(1) The relation of the tire to the amount of horsepower needed to move load.

(2) The effect of different widths of tires on the road.

With respect to the first of these, the tractive force required, the effect of the width of the tires varies with the condition of the road. On a smooth, hard, unyielding pavement there is practically no difference. With soft roads, deep with semi-liquid mud, the advantage is slightly in favor of the narrow tire, since the wide felloe has a tendency to carry the mud with it. It is with the intermediate stage, such as exists on a good gravel or dirt country road, that the benefit arises. Through such surfaces the narrow tires cut, and the load is, in effect, being constantly drawn up hill, but the broad tires roll smoothly along the top. A wagon having tires wide enough to keep the wheels from cutting into the road will plainly draw more easily than one which plows through the mud instead of running over it. Experiments have shown that the loads, which on narrow tires sink to the axles, can be drawn without difficulty when broad tires are used. The broader base takes the firmer hold of the road, and the wheel revolves more easily and perfectly. It is admittedly the case that wide tires are an advantage on farms, but there appears to be a persistent effort put forth to prevent their use on the roads.

It is urged against wide tires that they do not roll freely in the ruts made by the smaller tires. So long as the narrow tires are commonly used, this will be the case to some extent; but, on the other hand, if wide were generally used, the ruts would not exist. In any case, with narrow tires the bottom of the ruts made by the narrow tires are uneven, and the narrow rims are constantly grinding against the sides of the ruts, creating the greatest friction, so that the objectionable difference is not so great as

appears on first sight, if it exists at all.

It is further contended that the wide tires come in contact with more or less loose stones than do those with a narrow tread. The greater resistance offered in this way is more than counter-balanced, however, by the loose stones dropping in the narrow ruts. In the one case the wheel goes to the stone, in the other the stone gets in front of the wheel. The irregular bottom of the ruts, and the stones in the narrow ruts keep up a constant vibration of the wagon, which transmits a swinging motion to the tongue, galling and annoying the horses and destructive to conveyances.

Broad tires actually improve a road by rolling it down hard, and leaving it smooth so that water runs off without doing injury. Narrow tires cut and grind, burst and plow their way into the road, leaving ruts and holes to catch and hold water. The difference between the two is on a par with the difference between a pick and a pounder. The one tears up, the other consolidates.

The narrow tire is a rut producer. With a load of two thousand pounds each wheel must support five hundred pounds. Then, a narrow straight line, the width of the tire, must support five hundred pounds. With macadam, gravel and dirt roads the narrow tires commonly used must have a greater bearing, and so, the width of the tire being fixed, the wheel sinks into the road so as to extend the bearing along its circumference. In this manner the rut is commenced. Other narrow wheels follow, deepening the rut and loosening the earth around it. After a rain water lies in the hollow to assist the work of destruction.

Broad tires on the contrary are a benefit rather than a detriment to the road. They do very largely the work of a roller. Instead of a bearing of one and a half or two inches, the width of a narrow tire, this is increased to four, five or more inches. The advantage is at once apparent. The broad tires do not sink at all so deeply into the road as do the narrow, but distribute their weight across the road as well as lengthways. Their broad bases do not slip from protuberances so readily, and the consequent jolting is avoided. They do not push loose stones before them, tearing up the road as do narrow tires, but pass over them, pressing them into the road. Grinding, upheaving and fracturing do not take place as with narrow tires, the road is compacted and compressed, and rendered thereby less pervious to moisture. This means that at all times the road is better while the cost of maintenance is greatly reduced, were the benefit of broad tires understood in Ontario, our unimproved roads would be more cheaply kept in repair.

In descending hills with heavy loads, it is a frequent practice with teamsters to lock one or more wheels. It is evident that the injury resulting to the road, which is very great in any case, is much increased when the road is supported by cutting tires. Hills, even under ordinary traffic, are expensive to maintain, and the width of the tire used with locked wheels becomes a very important consideration. In nearly every part of the province, this is the case to some extent. But there are districts where hills, many of them steep, are of common occurrence. In such localities the practice of locking wheels is very common, and the necessity for wide tires is of the utmost consequence.

While a width of four or five inches is very satisfactory on farm wagons, the drays and tonnage wagons used for the transportation of excessively heavy freight in towns could reasonably be twice this. England, and all the progressive European countries, have laws regulating the width of tires according to the load vehicles are designed to draw. Sometimes the width is regulated by the size of the axle. In France, a country which presents some of our most perfect models in roadmaking, tires on market wagons range from three to ten inches, the majority being four to six. The gage of the wheels is sometimes set so that the track of the front wheel comes inside the track of the rear wheels. In New York State the turnpike law grants reduced rates of toll to vehicles with broad tires. The Michigan road law provides that users of wide tires are entitled to a rebate of half their road-tax.

That wide tires are not more generally used in this country is to some extent the result of prejudice. People are not accustomed to seeing them, and wide tires appear strange and awkward. When wide tires are generally used, as they certainly will be, the reverse will be the case and narrow tires will be looked upon as an oddity and a very objectionable one. As a means towards overcoming this practice, town and city municipalities could well afford to provide their watering carts, garbage wagons and other vehicles used in corporation work with wide tires.

City and rural municipalities cannot too soon set laws in motion in this regard. Obviously the use of wide tires cannot be made immediately compulsory, without working injustice. Provision could be made, however, that a by-law regulating the matter could come into force after a term of years; fair warning would, therefore be given and little inconvenience would be felt. Before the time for enforcing the by-law had arrived, the use of wide tires would in anticipation, have gradually become more common. The beneficial effect of wider tires would then be apparent to all, and public opinion would demand and sustain the enactment.

The people are competent to judge in this matter, as in others affecting personal and public interests. The great reason that wide tires are not now used