

Engineering Department

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Road Graders.

FOLLOW A DEFINITE PLAN.

It should be the duty of the township road commissioners, councillors, or a committee of the council (according to the local system of road management) to go over the roads early in the year and determine what grading is required.

This work should be staked out according to definite widths and dimensions of the roads as required by township regulations. The grader, when it commences in the spring, should proceed to each place of work consecutively, and should be in use continuously until all the grading is done for that year.

At the present time it is customary for the grading machines to go here and there over the township without method—one day on one side of the township, next day on the opposite side, then to another distant part, backward and forward, wasting a considerable part of the wages of man and teams in moving from one part of the township to another. By following a well-considered schedule the cost of moving the machine between the different pieces of work is reduced to a minimum.

Some distinction should be made between the grading of new roads and repair of old roads. Where the roads are being metalled from year to year with gravel or broken stone, it is not, as a rule, advisable to grade a greater length of road than can be gravelled or macadamized the same year.

SELECT THE RIGHT MAN AS OPERATOR.

One of the first essentials in providing that the roads will be properly graded is to select the right man to operate the grader. He should be an active and energetic man with some mechanical experience; one who will take an interest in his work, who will make a study of road-making and who will be willing to follow the instructions given him by the township road commissioner or councillor having supervision of the work.

PROFIT BY HIS EXPERIENCE.

When such a man is found he should be engaged from year to year so that his growing experience will render him more efficient.

There are many townships which do not employ a regular operator, but instead allow the grading machine to be handled by anyone and everyone. In some cases it is even passed around in the performance of statute labor from beat to beat. Managed in so careless a manner a grading machine will be a source of disappointment only.

USE THE HORSES FOR THE SEASON.

The same horses should be used in operating the grader for an entire season, at least. "Green" horses are very awkward, will not pull together, waste

much time, and even a reliable man as operator, cannot, under such circumstances, perform good work. It is a great waste in many ways to attempt to use a grading machine with horses provided, as is sometimes done, as a part of statute labor. Horses used continuously become accustomed to the work, to each other, and to the driver, and will produce much better results.

OR USE A TRACTION ENGINE.

Some townships, instead of horses, use a traction engine. Where one can be rented from a local thresher, it can usually be obtained very cheaply in the early part of the year. Where a considerable stretch has to be graded without turning, as in cutting off the shoulders of old gravel roads, a traction engine is much preferable to horses. It is more steady and does not stop to rest.

CROWN AND WIDTH OF GRADE.

The township regulations as to the width and dimensions of road should be closely followed in grading. These generally provide for a width of twenty-four feet between the inside edges of the open drains or roads of greatest travel; twenty feet on roads of moderate travel, and eighteen feet on roads of least travel. A rise of from half an inch to one inch to the foot, from the inside edge of the drain to the centre of the road is ample crown for a new road, after the gravel or stone has been placed on it. More than this is unnecessary and an injury. There is a tendency in the use of graders to crown the roads excessively, and this should be guarded against.

REPAIRING OLD ROADS.

Road graders are much in use in the repair of old gravel and stone roads, in restoring the crown, but, unfortunately, it is no exaggeration to say that miles of road have been ruined by misuse of graders in this work. Old roads are commonly flat, sometimes concave, with square shoulders at the side. In repairing these shoulders there may be a small amount of stone which has been crowded out by the wheels of vehicles, and which it is safe to draw again to the centre of the road. On no account should the square shoulders at the side be drawn to the centre of the road. These shoulders are composed of earth and sod, and if placed on top of the old gravel or stone foundation will merely turn to slush in wet weather and utterly ruin the road. The only way to repair such roads is to cut off these shoulders, throwing them away from the road across the open ditch, if necessary, and then to restore the crown by placing a coating of new gravel in the centre of the road.

The ratepayers of Port Arthur have approved of a by-law to construct a water-works system. The system provides for pumping from Thunder Bay to a reservoir on a hill 250 feet high, from which water would be distributed by gravitation.

Roadmaking, as with other branches of construction, has been much influenced by the introduction of machinery, and today by its use, roads can be built more perfectly, quickly, and at less cost than ever before. A few years ago the most pretentious road machine in any of the township municipalities was the drag scraper. The most widely used of the more modern implements is the road grader, and this has almost revolutionized the cost of preliminary earthwork, while it is exceedingly useful in the repair of old roads. There are new townships in the Province which have graders, the majority only one, quite a number have two, while others have three and even four. With about 300 in all throughout the Province, the outlay for graders above, at an average cost of \$250 each, represents a total investment of \$75,000.

Road graders are now so commonly employed in the construction and repair of roads, and their utility is so generally recognized, that it is scarcely necessary to urge their adoption. They are modern, labor saving implements which do their work better and more cheaply than can be done by hand, and that nearly 300 townships of Ontario have purchased them is forcible evidence of their value. It is not their use which it now seems necessary to urge, but rather there is need of guarding against their misuse.

In too many townships the councils have rested content with merely buying a grader, and having done this seem to be satisfied that they have done their duty. Unfortunately the grading machine is not possessed of intelligence, it does not know when or how a road should be graded. So that, unless a method is established, and unless a capable man is engaged to operate it, the grader is likely to give but little service.

COMMENCE EARLY.

Arrangements should be made every spring to have the grader ready and in use as soon as the ground is sufficiently dry. The soil is then in its best condition for manipulation, having been mellowed by frost, the roads are rough and most in need of treatment. Roads which are properly graded early in the spring are at once compacted by traffic and they will remain in their best condition all summer. If the work is left until late in the season clay soils become baked and hardened, difficult to handle, and rough when finished. Sandy soils, if loosened up late in the year, will be much more dusty than if treated early in the spring, when they are damp and readily compacted by traffic.