

ROAD MAINTENANCE SYSTEMS AND METHODS.*

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THERE is no phase of the road subject which is more important than that of maintenance. The impression is quite general throughout this country that there are certain types of roads which are permanent. This is a mistaken idea. No permanent road has ever been constructed or ever will be. The only things about a road which may be considered permanent are the grading and the concrete culverts and bridges, and even they may not be lasting.

Roads constructed by the most skilful and experienced highway engineers will soon be destroyed by the traffic, the frost, the rain and the wind unless they are properly maintained, but the life of such roads may be indefinitely prolonged by continuous and systematic maintenance. Even a poor road may be greatly improved by proper maintenance. In other words, a poor road with proper maintenance may become better, in time, than a good road without it. Damage to a road from traffic or weather may be repaired at its inception with a slight expenditure of time and money, but if allowed to go on without attention for a considerable length of time it will involve a heavy outlay for repairs, and even threaten the existence of the road.

Systems of Maintenance.—There are several systems of maintenance in use in this country, among which may be mentioned the intermittent system, the patrol system and the gang system. Under the intermittent system should be included the working of certain roads by toll-gate companies, and the maintenance of roads by contract and by citizens in working out their property and poll taxes. Under the patrol and gang systems should also be included the combination of the two systems.

The intermittent system is that under which roads are repaired or maintained spasmodically once or twice a year. This is the system, or rather lack of system, which has prevailed throughout the United States until within the past few years, and needless to say it is the one under which the poorest results have been secured.

There may be some reason for toll roads, but, on the whole, this system is un-American, contrary to the spirit of our free institutions, and has been found unsatisfactory. The reason for this is that the tax is too direct and burdensome to be borne by the road users alone.

The contract system has been used to some extent in various states, but has not been found entirely satisfactory. As a general rule, the work is let to the lowest bidder. The amount paid for the work is small, and such poor service is rendered by the contractors that in many cases the roads have become worse rather than better. Under proper engineering supervision and inspection, and with plans, estimates and specifications prepared in advance, the contract system of maintenance might prove as efficient and economical as in construction work.

Under the personal service or labor tax system no state, county, town or township has ever built or kept in repair a system of first-class improved roads. This system is not applicable to any class of road work, with the possible exception of earth road dragging, in sparsely settled portions of the country. The principle of working out the road taxes is unsound, unjust and wasteful, and the results obtained under it are unsatisfactory in

many particulars. During the past few years many of the states have abandoned this method. It was abolished in France about 125 years ago. It is estimated that of the eighty million dollars spent on roads in the United States in 1904, approximately thirty million dollars was worked out, whereas, in 1913, of approximately one hundred and eighty-six million six hundred thousand dollars spent on roads, only about fifteen million dollars was worked out.

The patrol system is that which provides for the permanent employment of skilled laborers or care-takers, each of whom has charge of a particular section of road.

The gang system provides for the employment of a corps of skilled laborers, who may be assigned to any part of a county, township or town where the work is most needed. This system is particularly effective for bituminous-macadam repairs.

The patrol system has been used very successfully in France for over one hundred years, and there is no doubt that it would give satisfactory results in many of the most densely populated sections of this country. It has been used to some extent in Maine, New York, Massachusetts, Maryland, New Hampshire, Connecticut, Rhode Island, Pennsylvania, and in a few counties in various other parts of the country. Men who are constantly employed in this way become experienced in their particular lines of work. They soon learn to do the work well, and will take pride and interest in it. There is no doubt that in certain kinds of maintenance operations one man will accomplish more and better results in 313 days than 313 men will accomplish in one day.

The ideal system would appear to be a combination of the patrol and gang systems whereby the patrol men or caretakers look after their particular sections of road during certain seasons of the year, and at other times work together in small gangs. A parallel to this system is found in the maintenance-of-way departments of our great railways. These provide patrolmen and track walkers who look after small defects, and section gangs to do the work which requires more than one man's services.

The assignment of caretakers or patrolmen should be left entirely to the engineer in charge. In this way the system may be rendered more elastic and more efficient.

It would be impossible to adopt the patrol and gang system everywhere throughout the country, on account of sparse population and limited resources, but there are many communities in which it might be used. It is difficult to find a community which is so poor that it could not afford to employ eight or ten laborers and three or four teams continuously, and there are thousands of towns, townships and counties which could afford ten times such a force. That such a plan would be more efficient than the intermittent systems would appear to be self-evident.

In dealing with the subject of maintenance aside from its administrative features, the only wise and safe plan is to provide, after making careful estimates, for a cash appropriation sufficient to maintain every mile of new road constructed. Funds should also be provided for taking care of the old roads. These appropriations and expenditures should be kept absolutely separate from the construction fund, and if it is possible to do so the maintenance funds and the repair funds should also be separated. If a community can not afford to set aside a fixed and adequate sum for the maintenance of a high-class road, then it is doubtful whether it can afford to build such a road.

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