

year at almost any price so that you will not lose these organizations that have been built up during the past several years.

We have in Wisconsin as many as 400 or 500 day-labor outfits that have been building roads for 5 or 6 years. We have developed several hundred foremen and several hundred roller men and firemen, and we intend to keep them busy on our most important work and I believe it would be a mistake for us not to do so.

Discussion

Q. Do the patrol men put all their time on the road?

A. During the time they are working, they do. They furnish the wagon and team, and we furnish the road machine, small tools, planer or drag.

Q. What kind of drainage do you use? A. Drainage, of course, is important. Tiled drainage has been stated to be the panacea for all evils. We have soils in Wisconsin that you could put tile drains in until you could not put a sheet of paper between and it would not do a bit of good because the soil is so impermeable that in the spring, with the frost going out, the water will not pass through the tile.

Q. What about an open ditch? A. It should be most carefully considered on every type of road. We are coming more and more to build wider grades, much along the line of railroad grades, with a sharp declivity into the ditches. We are trying to get a greater distance between the bottom of our ditch and the surface of our road and we are building wider grades and deeper ditches. We have no standing water on the edge of our roads except in marshes.

Q. Would your road commission be responsible if a man ran into one of your ditches? A. Our grades are 24 ft. wide on top at least, and on a straight stretch, now that we have a bone-dry law, they are pretty safe. While you and I may not agree about prohibition, yet I believe it is going to cut out a lot of irresponsible and reckless driving and that accidents are going to decrease. So far as I know, there did not come to my attention one suit last year against a county for damages on the state trunk highways. That does not say that there were no accidents, because I, myself, saw a good many cars piled up, but there was no chance to bring an action for negligence. I am a crank on the subject of maintenance. Every day in the year, have a man out on the road.

Q. How many miles would you give to each patrol man? A. That would depend upon the travel on the road and the condition of the road, but he can look after from six to ten miles.

Q. What kind of material do you use? A. We put clay on the sand roads and gravel on the clay roads. We use the same material that the road is built with.

Q. One man would have from six to ten miles to keep in repair? A. Yes; if he has a big job such as widening or making a fill, he is allowed to hire a certain amount of help. Our average help on a patrol section last year was about \$150 for the season.

Q. Does the patrol man have a horse and cart or a car? A. A wagon and two horses. We have a few truck patrol sections, but they have not been as satisfactory to us as the team patrol section. For gravel or macadam, use the truck, but not for dirt roads.

Q. In grading an old road do you take it from the centre or from the sides? A. We usually have to widen them and we grade into the centre.

Q. You never grade out? A. If we have a road that is fairly ample and that has a ridge on the side, we throw that sod over in the ditch. Usually our work is widening a road from 15 ft. to 28 or 30 ft.

Q. Would you not fill the ditch with that sod? A. We throw it out.

Q. How deep would the ditch be? A. They average about 2 ft. That is what we are coming to.

Q. How do you provide for the farmer getting into his property? A. The farmer must make his own entrance. In other words the Wisconsin law is that the state is responsible to the public to put a road past a man's place,

but if he wants to use that place, it is his own business. If we commenced to put culverts for the farmers or the people in the villages, the farmers would have an entrance to their fields a rod apart if it did not cost them anything.

Q. How do you standardize the class of culvert they use? A. The only thing we stipulate is that they must pass the water.

Q. Some farmers might put in a lot of old rails? A. That is all right if they will pass the water and not wash out our road. The farmers are using almost entirely corrugated culverts.

Q. If a gravel road is gone down the centre, and if there is a clay shoulder on the sides, do you approve putting that clay shoulder in the centre and putting gravel on top? A. Absolutely not. We used to think that when we had a piece of macadam or gravel road, that we had something sacred that we ought never to disturb, and that if we did anything to it we should put it on top of it. We have no more respect for a gravel road surface than we have for a cat. We are using scarifiers and tearing them up three, four and five inches, and re-shaping them again, and then if we are going to do something to them we add it on top of that gravel. You will find no trouble in tearing these gravel roads to pieces from end to end. We are using scarifying graders and we rip these gravel roads up from end to end and reconstruct them, and that is the reason we are so favorable to the gravel road,—because it never gets to the point where you cannot rebuild it for a very small amount of money. If a macadam road gets full of holes it is pretty expensive and difficult to rebuild it.

Q. Where do you get your patrol men? A. We get our best patrol men from the retired farmers. We have men who retired three or four years ago with \$15,000 or \$25,000, thinking they had a competence for the rest of their lives, and now they find it just about half enough, and these are the best men we can get, because if they had sense to accumulate \$25,000 on the old farm, they have got sense enough to make good patrol men.

Q. In delivering the gravel upon the highway in the first place, do you use dump wagons or ordinary farm wagons? A. We use the ordinary flat-bottom wagon. If we have to haul the gravel 10 or 15 miles, we are using trucks to haul from the central crushing plant.

Q. Do you throw the clay shoulders into the ditch and then shovel them out again? A. We throw them out into the ditch, and with certain types of graders we can cut the ditch out and throw it up on the bank.

Q. A ditch 4 ft. deep? A. Yes, 3 or 4 ft. deep; we can do that with a heavy steel grader.

Q. How much gravel do you put on? A. Our standard 9-ft. road takes 1,400 yds. of gravel to the mile. Up to a haul of 3 miles, the team is the cheapest, and for a longer haul than that the truck is the cheapest.

Q. What load do you expect a team to haul? A. The average load is 1½ yds.

Q. What drag do you use? A. A small one-man road machine and a planer.

Q. You have two kinds of roads, the state road and the county road? A. Yes.

Q. When you come to a village do you skip over and not touch it at all? A. State and federal aid extend to villages, and they both go into cities up to a point where the population stops and the land may be considered as agricultural land.

Q. Do you screen the crushed gravel? A. If we have gravel that is running excess clay or sand, we take that out before it is sent through the crusher.

Q. How do you set your crusher jaws? A. As close as we can get them. We do not want the material any larger than an inch.

Q. Do you ever use lake gravel? A. No, we have not, but it would be all right if used on clay soil.

Q. What about using pebbles? A. Clean pebbles are pretty hard to bind and keep bound.

Q. Would you recommend 2-in. rocks to go on a clay