

DISCUSSION OF REPORT OF COMMITTEE ON MAINTENANCE

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It has been suggested that we conduct this discussion in such a way that all may have some part in it. I believe that can be best done by taking up the subjects—about six in number—one at a time, with the understanding that if anyone has anything to say about any of them, an opportunity will be afforded. The discussion is not to be considered in any sense as fault finding, but is designed rather to bring out important points as they may appeal to us and, if possible, suggest a new view of some of the things that have been discussed in this paper.

DUST PREVENTION AND SURFACE TREATMENT OF GRAVEL AND MACADAM ROADS

The first sub-committee report was on the matter of dust palliatives on gravel and macadam roads. It appears to me that one important point in connection with this subject is the question as to where to stop on this sort of work. For example, in Ohio, we have for the last two or three years been doing work of this sort on gravel and traffic-bound roads, and I have come to the conclusion that it is not justified except as an alternative where there is not money enough available for pavement. These are the reasons. It is not justified unless the traffic reaches, say, about 700 or 1,000 vehicles a day, and when that point is reached paving is justified. Also, when a change is made from the maintenance of a loose gravel surface to that of a bituminous surface, the cost increases considerably, and I do not believe that it can be justified from an economic standpoint, except, as I say, as an alternative where money is not available for paving. There is no doubt that it will be received with great popular approval. We find in Ohio that a greater demand for that sort of work exists than we have the funds to take care of, but we do not believe it should be carried too far. The paper brought out the fact that there is a great variation in the cost, particularly with reference to gravel. This is true, I think, because of the great variation in gravel. What Iowa calls gravel Michigan and Ohio and eastern States like Vermont do not. Gravel is the name for a material that varies widely in its characteristics, hence the same methods can not be used in various States. There is danger that this fact will not be duly appreciated and that the results of efforts to apply the proposed methods will not be successful.

The report speaks of shaping up macadam pavements. It appeals to me that it would be best to classify any stone or gravel road that can be shaped up with a blade grader as a traffic bound road, and treat as

macadam any other type of stone road that can not be changed except by adding patches to the top when once it has been rolled into shape

On the question as to the kind of covering to use I should like to bring out the point that where light bituminous materials are used, that is, materials applied at approximately air temperatures, the covering material should be under one-half inch. The heavier the bituminous material, or rather the higher the temperature required to apply it successfully, the larger is the size of covering material that may be used. I do not know of any scientific study that has been made of the desirable amount of covering. In Ohio a number of years ago we looked into this matter and found that previously some thought had been given to it which indicated that one prevailing practice was entirely wrong. We worked out on more or less a scientific basis a table of the amounts of materials required for different kinds of bituminous material, and we found that the amount depended on three factors: (1) The kind of bituminous material, (2) the character of the surface, and (3) the weather conditions under which it was applied. If anyone present can add to the discussion of this subject we would be glad to hear it.

CRACK FILLERS ON CONCRETE PAVEMENTS

With regard to crack filler, the report shows a lack of uniformity in practice. We are told that the penetration varies from 35 to 250. I imagine that the men who are using materials of penetration 35 will hotly defend their materials against those using 250. Evidently they are not both correct. Then there is the matter of the covering to be used. According to the report, those that are used include sand, gravel, stone, corn fodder, and sawdust. I take it that the use of some of those materials means that they have no local mineral aggregate available.

With reference to the cleaning of cracks, I think the point might be made that sometimes too much cleaning is done. Cracks are often filled that do not need to be filled. The report advises study of the question as to whether it is necessary to fill at all the small cracks which develop, particularly in reinforced concrete. We have some ideas today, but perhaps they are more or less traditional and have no basis in actual fact.

SNOW REMOVAL AND SNOW REMOVAL EQUIPMENT

In the matter of snow removal and snow removal equipment, we again encounter extremely variable conditions in different parts of the country. Take my own State of Ohio for example. Snow removal is largely a gamble with us. We may have snow this winter and we may not have any worth considering for five years. Snow removal is neces-

sary of course, particularly in industrial districts where the roads have to be kept open. We have highways that carry as much freight as the railroads paralleling them, and the movement is not seasonal. It goes on the year round. So it is necessary to keep the roads open. One fact that should be brought out, and that is verified by those States that are carrying on a large snow removal program, is that snow removal really doesn't cost anything because of the fact that its cost is more than offset by the saving in maintenance cost the following year. That is, you will find if you remove the snow on heavy traffic routes that the cost of the snow removal will perhaps not amount to as much as the extra cost of maintenance if the snow is not removed—not to mention the value of the open road, and the prevention of loss to those who have to move over the roads.

GUIDE, CAUTION AND DANGER SIGNS

I believe that we all recognize that the Joint Board on Interstate Highways, appointed by the Secretary of Agriculture, has accomplished a great work in the past year in coming to a decision on standard warning and direction signs, more perhaps than the members of the board themselves hoped to accomplish when they started on their work. The good that will come of their recommendations will depend upon the cooperation of the States. I believe the time has come to get rid of our pet ideas about signs and adopt the standards that have been proposed after a good deal of thought and a good deal of practical experience. I would suggest that as a further means of making these signs effective that some study be given to the manner of displaying them, that is, what kind of posts they should be put on, and how they should be set, because this will have much to do with whether they are seen or not, and whether they are used or not. We have found in what work we have done that this is very important. You can design signs but you have the further problem of erecting them, and erecting them in a way that they will be effective.

COVERINGS FOR POORLY CONSTRUCTED AND DISINTEGRATING CONCRETE ROADS

On the matter of coverings for concrete roads the report gives practically no information except to cite the experience with a number of roads. As I read it, it appeared to me that there might have been a further investigation of the experience in the eastern States. Practically all the examples were in Ohio and Indiana, a few in Pennsylvania. It seems to me that perhaps you would find some examples involving a longer period of service in some of the New England States. This subject is one, I believe, that demands much further investigation because of the large mileage of concrete roads we are building and the fact that

the future will necessitate the rebuilding and resurfacing of a lot of them. How well this is done is going to have much to do with the cost. Just take, for example, the matter of the thickness of a new concrete slab over an old concrete road. There is absolutely no agreement on that question.

STANDARDIZED MAINTENANCE ACCOUNTING

With reference to cost accounting, I am going to make a suggestion that I believe would help standardize maintenance costs throughout the country. I believe that it would not involve very much work and certainly it would be of considerable help if the U. S. Bureau of Public Roads would devise a model system of books for use in keeping highway maintenance costs. A study could be made of the systems in use in various States as a basis for the model system. Last spring I wrote to fifteen or twenty States for their forms, but I did not have time to make the kind of study of them that would enable me to get any good out of them. If this work could be done by someone at the Bureau all the States would benefit by it. The suggestion might be broadened to include cost accounting and records of all kinds used on road work. I don't look upon a record as being of any value except as a guide to future practice. You can keep all sorts of records. If you don't utilize them they are a waste of time, and it has been my observation that in some cases the matter of record keeping has gone to seed, and in others it has not been carried as far as it might.

I. H. MacDonald, U. S. Bureau of Public Roads, in discussing the report called attention to the fact that the American Association of State Highway Officials at its last annual meeting appointed a committee, including representatives of the Bureau and the State highway departments, to standardize forms of maintenance records. Mr. MacDonald also pointed out the possibility of dust prevention or dust suppression by the use of small crushed stone as a covering maintained as a loose surface without binding material. He stated that for limited traffic and where hard, heavy crushed stone is available, this method would provide in the original construction a considerable measure of dust suppression without the expense which attaches to the application of artificial palliatives.

P. W. Henry, American Institute of Consulting Engineers, in discussing the report, pointed out that some States successfully take care of their macadam roads by the use of dust palliatives, thereby postponing the time for replacing these roads with a more expensive type of surface. He also expressed the opinion that the concrete highway which has deteriorated forms an ideal foundation for a bituminous concrete wearing surface.