PRACTICAL ADVICE TO ROAD SUPERINTENDENTS AND MUNICIPAL COUNCILS*

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THE problem of improving a highway can be divided into two distinct parts, each differing considerably from the other: First, preparing the plan; second, carrying out the work.

Although these two parts of the problem cannot be studied independently on account of their reciprocal relations, their respective solution may, nevertheless, be confided in a direct manner to persons with different qualifications.

It is the engineer to whom is generally given the task of preparing the plan. It is he who generally makes the first inspection and preliminary survey, examines the course, studies the nature of the soil and drainage conditions and the means of improving them if need be, improves the alignments and the grades, finds and examines carefully all available material which may be used with economy in that locality or outside of it, and inquires as to present traffic conditions and provides for the future in this connection while also keeping in mind the present value and the probable development of municipalities served by the road.

Municipal Officials Must Co-operate

In order that the engineer may fulfil his duty in the solution of this part of the problem, it is important that he should be assisted by the municipal authorities. It is evident that it is the latter who are more conversant with many of these questions. It is therefore necessary when the engineer makes an inspection of roads to be improved in a municipality, that intelligent men with a knowledge of all local conditions are placed at his disposal to give him the required information.

One or two men who are thoroughly conversant with the locality can supply all the information needed on the subject of drainage for the roads in question, traffic conditions, material, labor, etc. Owing to their residence in the locality, they can tell us, for instance, the parts of the road which are most affected by the spring thaws, and the parts of the road where wash-outs occur, and they also can best inform us regarding the action of the water in the water-courses over which we must build permanent bridges, and regarding the location of sand and gravel beds, field stone, quarry stone or other material which might be used economically.

Therefore, I ask municipal authorities to do all in their power to give all possible information to engineers, so that both parties interested, the government and the municipality, may attain the end they have in view—viz., to improve the roads in the most economic and most satisfactory manner in the public interest.

Without the interested co-operation of the municipal authorities, the information given to the minister by the engineer, if it is not erroneous, will certainly have a tendency to incompleteness, and our conclusions may often be inexact.

Much May Escape Attention

For if there is a great deal of information which the engineer may gather himself by personal observation, there is certainly a great deal more which may escape his attention because he does not live in the locality. The diagnosis of a doctor cannot be complete without precise information being given by his patient. The same applies to the preliminary inspection by the engineer, which cannot be satisfactory unless his own personal study is supplemented by information given by those who live in the locality where the road is to be built.

After this serious preliminary study, the engineer can come to rational conclusions and prepare a plan which should be the most economic and most satisfactory for the interested parties. He will prepare his estimates and leave the execution of the work to an experienced foreman who should act under his personal direction.

Carrying Out the Work

If the engineer, under the conditions outlined above, must bear the responsibility of the planning of the work, he should also be entrusted with the responsibility of carrying it out. For this part he must also have the sincere and complete co-operation of an active, devoted and competent foreman, who should take personal interest in the work, the execution of which will come under his charge. This cannot be otherwise, as the engineer, however frequently he may visit the job, cannot exercise a permanent personal control over all the details of the work under construction, except through periodical inspection both of the work under construction and of the sketches and plans.

He can, of course, to a certain extent keep control of the work through written or verbal instructions to the foreman. Be this as it may, satisfactory results cannot be obtained unless the engineer has complete confidence in his foreman; at the same time this must be reciprocated by the latter, who must be disposed at all times to receive gladly the instructions and advice of the engineer.

I am not trying to contend by this that the foreman must always accept without comment the engineer's instructions; the latter being unable in the nature of things to be constantly on the job, a mass of details regarding which he knows nothing, may cause his judgment to be erroneous, so that should the foreman deem it advisable to draw the attention of the engineer to certain facts unknown by him, it is the foreman's duty to do so. After serious consideration and careful discussion of the suggestions and explanations of the foreman, the engineer must exercise his final judgment or else submit the question to his superior, and the decision once rendered must be accepted by the foreman without exception and with the full desire to carry it out in the best possible way, and not as sometimes happens, with the bad faith of the man who intends to demonstrate that his advice should have been followed because the method decided upon would fail.

The foreman who has direct and permanent control of the work plays a very important part in the economical execution of the work. This complete control must be exercised in two distinct ways: The organization of the job and the quality of the work.

Organization of the Job

This includes a wise disposition and equitable control of labor and a rational disposition and use of the plant and tools. This question of labor is one which requires a large amount of attention, the more so in these times of economic disturbance, as the demands of labor are the most distressing problems for both industry and the government. The workman not only demands better daily remuneration for his work, but also insists that the length of the working day be considerably diminished.

However, as against this the first cost of the materials for road construction has only slightly increased; for example, stone from efficient quarries commands to-day approximately the same price as in 1916; the same thing applies to gravel, sand and bituminous material. Cement, however, has reached a much higher price, its cost having increased approximately 40 per cent.

Bearing in mind this increase in the cost of labor, it is more than ever important to obtain from our labor the maximum efficiency through a more rational distribution of the men on the work, and by more efficient methods of doing the work, at the same time carrying out as far as rationally possible the use of tools and machines to diminish labor costs.

To arrive at this goal it is necessary to see that each gang is composed of exactly the number of men necessary for the work planned. For example, it is obviously irrational to place six men at spreading stone when four or even two would be sufficient. It is also necessary to see that there shall not be four carts drawing stone to the crusher when three or two would be amply sufficient.

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