

SPECIFICATIONS FOR STREET ROADWAY PAVEMENTS

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Specifications for Street Roadway Pavements by S. Whinery

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S. WHINERY

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FOR

STREET ROADWAY PAVEMENTS

BY

S. WHINERY
M. Am. Soc. C. E.



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INTRODUCTORY.

In addition to their value as memoranda and aids in preparing specifications for a particular project, carefully prepared general specifications, embodying the latest approved practice, sometimes supply the most useful and acceptable brief treatises upon any particular branch of engineering work. It has been partly with this thought in mind that the following set of specifications for standard street pavements has been prepared and is now offered to city engineers and municipal authorities.

To widen their range and increase their usefulness, copious foot notes have been added, referring to alternative requirements and methods of construction, and giving some of the reasons for the preference or adoption of the construction called for in the specifications. It is recognized that in a good many matters of detail embraced in these specifications there is difference of opinion among able engineers, many of whom are at least as competent as the writer to determine what is best. They are not offered in a dogmatic spirit, or with the hope that all the provisions found therein will be accepted. If they shall be of some assistance in bringing about correct standards for such specifications, their preparation will have been justified.

Theoretically, three general classes of engineering specifications may be noted. In the first the aim of the engineer is to specify the end or result that it is desired to secure, leaving the contractor free to originate and follow the methods by which these results are to be attained. In the second the engineer aims to secure the desired end, by specifying in detail the materials and the methods which in his opinion will accomplish the purpose, he himself assuming responsibility for the results. Either of these two classes of specifications is permissible, and the engineer may choose the one which in his opinion seems best adapted to the character of the work to be done, and the conditions under which it must be prosecuted.

In the third class of specifications, met with more frequently than they should be, the engineer undertakes to prescribe not only the character of the materials to be used and the methods to be pursued, but also the results to be attained. The position thus assumed is illogical, and often unreasonable, and may lead to complications between the engineer and the contractor. If a contractor be required to turn out a product which shall conform to certain standards, he may properly be given much, if not full latitude, as to how the stipulated results shall be secured, and may be held fully responsible for the outcome; if on the other hand the engineer chooses to specify with more or less minuteness the character of the

materials to be used and the methods of construction to be followed, and enforces compliance therewith, it seems fair and just that he should assume responsibility for the results produced, and therefore unfair to hold the contractor to responsibility for consequences arising from the use of materials and methods which he was allowed no choice or latitude in selecting.

In street paving work, of well-known and standard character, the second class of specifications seems preferable for a number of reasons, the leading one being that the time required to develop the good or bad quality of the work must usually extend over a considerable number of years, and the conditions to which the pavement may be subjected in the meantime are likely to vary so widely that it may be very difficult, if not impossible, to prescribe a satisfactory standard of service and endurance. Disputes are therefore liable to arise between the municipality and the contractor as to the latter's liability, or conditions may make it difficult or impossible to hold the contractor to strict account for that liability.

It is believed that in the present state of the art it is entirely practicable to so frame specifications for the materials to be used and the methods to be followed in the construction of street pavements, and to so enforce compliance therewith, that the engineer and the municipality may safely assume responsibility for the quality of the work produced. While it may be true that local conditions sometimes make it very difficult to enforce compliance with specifications, the same conditions are likely to make it at least equally difficult to secure effective responsibility on the part of the contractor for any long-period guarantee of the work done by him; and the contractor who negligently or purposely violates the specifications during construction is not likely to be more faithful or scrupulous in living up to any guarantees he may make with regard to the future, even where the terms and conditions of such guarantees may be clearly defined and indisputable. The writer has discussed the subject of time guarantees as applied to street pavements pretty fully in his book, "Municipal Public Works," and the above brief statement seems all that is necessary here.

In conformity with this view of the matter, the following specifications aim to set out as definitely and clearly as practicable the requirements for the construction of good pavements of the several standard kinds, and it is assumed that the engineer will be able to, and will enforce them.

It is, however, not infrequently the case that circumstances will compel the engineer to provide for the construction of new kinds of pavement, the value and usefulness of which have not been determined, and for which experience has not furnished the necessary data to enable him to prepare adequate specifications. In such cases the wisest course to follow is to specify results only, safeguarding the interests of the Municipality as fully as possible, and throwing upon the promoter or contractor full responsibility for the materials used, the skillful construction of the work, and the utility of the

product. A proposed form for a general specification of this character will be found at the end of the set.

No attempt has been made to submit specifications for proprietary or patented pavements, or those composed wholly or in part of materials which are patented or protected by trade-marks. The owners or contractors engaged in constructing these pavements, often, if not usually, claim the right to dictate the specifications under which the work shall be done, and the municipal engineer who is called upon to construct such pavements, must, in each case, determine whether the specifications offered are adequate and satisfactory. In many cases the form of general specifications for "untried or experimental pavements" given herein may appropriately be used.

The engineer is, in common with all men, fallible, and he can hardly hope, in the preparation of specifications, to make them perfect; to cover every item and particular; or to escape some ambiguities of expression, and some degree of indefiniteness. The writer can only claim that he has aimed, in the light of a considerable experience, to set out as fully and definitely as practicable the requirements for the proper construction of high-class street pavements, and has endeavored to avoid loose or obscure terms and expressions. The ideal specification is one that furnishes a wholly sufficient guide to the accomplishment of the desired purpose; that provides for every possible contingency which may arise, and is couched in language which not only means exactly what it was intended to mean, but is incapable of any other interpretation. It is needless to say that no example of such a specification can be instanced as a model.

It has been the aim to make these specifications fair and just to the contractor; that is, to require of him no impracticable or indefinite service, or the assumption by him of risks other than those fairly involved in the conduct of the work.

If the plans and specifications for any work which a contractor bids upon are so full, specific and clear, that he may know exactly what he will be expected to do, and if they do not require him to assume unusual chances and risks, he may intelligently name prices which he believes will compensate him for the service. Having done so, his proposal having been accepted, and a contract entered into accordingly, the engineer and the municipality have a right both in law and equity to demand that he will do exactly and fully what he has contracted to do. No excuses on his part can be valid and none should be accepted. He may in all fairness and justness be required to "toe the mark" strictly. To the neglect to recognize and enforce these principles is chargeable the greater part of the poor and unsatisfactory work so common in street pavement work in our cities. Unexpected contingencies may, of course, arise where some changes and concessions may be proper and just, but these should be, and usually are, very rare. On the other hand, sweeping general clauses in contracts and specifications intended to catch the

contractor "goin' or comin'," unnecessarily stringent stipulations which were never intended to be strictly enforced, but were put into the specifications with the idea that they would help hold the contractor up to a high standard, and "one-sided" contracts intended to give the municipality an unfair advantage over the contractor, are as inadvisable in policy as they are wrong in principle. Nothing should be put in a specification that is not clearly essential to secure the results aimed at, and, this having been done, every requirement should be enforced. The existence in specifications of requirements that are not intended to be enforced, gives the contractor a pretext for neglecting others that may be important.

In these specifications will be found a number of details that are often not regarded as important and which, when found in paving specifications, the contractor is frequently allowed to ignore. In the writer's opinion, based upon his experience in street paving, every one of these requirements are essential to the production of high-class work, which, it is hardly necessary to argue, is, in the end, the most economical work from the standpoint of the municipality.

It may be argued that the adoption and enforcement of these specifications would have the effect of raising prices. In many cases this would doubtless prove true. Contractors are entitled to a fair and reasonable compensation for their services. It is admitted that in some cities the prevailing prices for some kinds of pavements are below the actual cost of the work if it were done in a proper manner, conforming strictly to the specifications. Illogical as it undoubtedly is, the low price at which work is taken is sometimes considered a sufficient reason for accepting work below standard. The consequence is that bidders not only count upon concessions and lax enforcement of the specifications, but bid lower and lower, expecting that further concessions will enable them to get out with an undeserved profit. This is one of the most serious evils in the paving business to-day, and the highest public interests demand a thorough reform. Low first cost, desirable as it may be, is the poorest economy if it be secured at the sacrifice of the quality of the work. If one pavement costs twenty per cent. more than another, but renders forty per cent. more service, it is obviously the cheaper of the two.

Contractors are prone to contend that this or that provision in a specification is unusual, unnecessary or unfair. In dealing with them the engineer should bear in mind that no requirement of a specification which is clearly and definitely stated so that the bidder may understand exactly what it means and what he will be expected to do, and may frame his prices accordingly, can be unreasonable or unfair to the contractor. Unusual or unnecessary requirements may result in unwarrantably increasing the cost of the work, and this may raise a question between the engineer and the municipality employing him, but it can furnish no occasion for questions of fairness or unfairness between the contractor and the engineer.

NEW YORK, Dec. 27, 1906.