

Reference, however, should be briefly made to an entirely different product, known as "Roc-mac," a solution which has recently been adopted with considerable success in this country after having withstood satisfactory tests in Great Britain. In use it differs essentially from other binding materials inasmuch as its action is purely chemical, whereas the action of the others is more physical. Roc-mac solution is a patented substance which unites chemically with limestone screenings to form a carbonate compound of good binding and adhesive qualities. No heating of any of the materials is required, nor is any special plant necessary for its use. It can be laid during almost any kind of weather and is not greatly affected by extremes of temperature or by weather conditions.

Reference to the above preparations shows that engineers and road experts have been fully alive to the situation, and are confronted with problems which, although seemingly more commonplace than the design and construction of bridges and other structural works, are yet more complex and difficult of solution. In road construction it is a vital matter these days to change with changing circumstances; for instance, road builders had scarcely adjusted themselves to the changed conditions brought about by the swiftly moving automobile, and made what was then considered adequate provision for their requirements, when the motor truck was introduced to further complicate the problem of the construction and maintenance of roads. They are now face to face with a situation which demands not merely remedial measures, but some more or less permanent cure. The motor truck has come and come to stay; the number is certain to increase and multiply, particularly in interurban districts, and the type of road which their heavier and more rumbling loads and their greater impact necessitate, must be built, and built to wear. Neither water-bound nor bituminous macadam roads will, for any length of time, withstand the intensive and irregular stresses produced by heavily loaded and moderately speeded motor-trucks. While the foundation of the ordinary macadam roads, particularly where they have been gradually built-up with periodical resurfacing, is likely to be sufficiently strong and rigid, it is imperative that such a foundation be kept intact from the impounding action of motor trucks by means of a sufficiently thick, durable and waterproof surface. Road authorities are consequently turning their attention to the construction of a modified form of city pavement for use on the principal highways.

Advantage of Pavements.—That good street pavements are essential to the highest development of the commercial, sanitary, social and educational life of any city cannot be disputed. To any city or town they are an asset which cannot be computed in mere figures. The hall mark of any city is its good pavements, which attract and impress not only the casual visitor, but the manufacturer or investor bent on introducing industries or investing capital. Pavements are part and parcel of the everyday life of the merchant, the manufacturer and the private citizen—all of whom are affected financially and otherwise according as the pavements are good, bad or indifferent. The beneficent and far-reaching influence of pavements upon the social, aesthetic and commercial life of any community cannot be enlarged upon within the scope of this paper, but briefly the principal advantages derived from the construction of pavements are:—

(1) Tractive power is diminished and the cost of transportation correspondingly decreased—benefits accruing alike to commerce and business.

(2) The fixing of a permanent grade and building line permitting of permanent and uniform improvements to buildings, residential and commercial, fronting on the street—chiefly private benefits.

(3) Increased efficiency of fire protection afforded by the better transportation of fire-fighting apparatus—benefits to the community at large.

(4) Enhanced values of property abutting on streets.

(5) The beautifying of the street through having a regular and uniform appearance as to lines and levels—chiefly aesthetic benefits.

(6) The more efficient sanitation and cleanliness and resultant healthfulness, the dust and mud problem being to a great extent eliminated—sanitary benefits.

(7) The furtherance of pleasure driving and thereby the promotion of social intercourse—community benefits.

In short, on business streets, good pavements are an indispensable necessity to good business and commerce; on residential streets they naturally add to the comfort, pleasure and health of the community. Reference was made to good pavements as it cannot be contended that any or all classes of pavements confer the above benefits on the life of public and private citizens. The next important question is, therefore, the selection of a type of pavement which will meet with the special requirements of the location and be suitable for the purposes to which it is to be more particularly put. This selection of a pavement is a contentious matter upon which divergent opinions obtain, depending upon whether they are looked at from the standpoint of the individual property owners, the manufacturers or promoters of the pavement, and last but not least the standpoint of the engineer in charge. As the bulk of the paving work in cities is done under local improvement, the determination of the kind of paving material to be used lies almost wholly with the property owners, the opinion of the majority of whom must prevail. This system is, therefore, open to criticism and tends to abuse of privileges as it means that the whims of property owners are assented to and a class of pavement laid on an objectionable layout which is frequently not suitable from an economic or engineering standpoint—being cheap in first cost, or entirely unsuited to the grades of the street. Utilitarian, not sentimental, principles should be given first consideration. The adoption of a type of pavement best adapted to the city as a whole or to any particular kind of street is frequently entirely overlooked. No particular type of pavement is equally adapted to meet the requirements of all cities, nor is any one kind of pavement suited to all the streets in the same city. The needs of each city should be specially studied, just as the needs of each street in any city should receive particular attention. The present and prospective uses of the street, the relative location to existing pavements, the traffic conditions, present and probable, the nature and kinds of materials available, the nature of the sub-soil, the cross and longitudinal grades—all these are highly important factors to be considered in determining the best pavement to be adopted for any particular street. Commonplace and commonsense as are all of such matters, infrequently they are either wholly or partially disregarded.

The most important factors which should govern the design of city pavements, are those affecting the health and comfort of the citizens in eliminating, as far as possible, the nuisances arising from dust, noise, odors and slipperiness. While it is generally conceded that the best, most durable and latterly the most economical type of pavement to lay on steep grades of business streets is