

MUNICIPAL DEPARTMENT

EXPERIMENTAL TESTS OF PAVING MATERIALS.

A memoir on this subject was presented to the College of Engineers and Architects of Palermo, by Mr. Salvatore Rotigliano. His work relates to the City of Palermo, but as, in addition to the experimental data referring to the materials of the Palermo district, it also contains explanations of the author's general method of investigation, we consider it deserving of the reader's attention. Mr. Rotigliano, after making some remarks about the mechanical and physical action to which street pavements are subjected, reduces them to two, viz., friction and impact. Therefore, paving materials must thoroughly resist these two actions, and also withstand crushing strains well. Knowledge of the resisting power to these two sources of wear, friction and compression, is not enough to enable a proper selection of material for paving. It is requisite also to have an idea of the degree of hardness, not exactly in the sense of the term as defined by mineralogy, but the resistance to external mechanical actions. Resistance to friction is very important, because the rapid wear of the paving, besides involving great expense for renewal, also creates dust, so inconvenient and dangerous in large cities. From the point of view of hygiene, paving materials should have but little absorbing power for liquids, which, in addition to causing ruptures by freezing, favour the rapid development of pathogenic microbes.

The natural materials tested by Mr. Rotigliano were compact dolomitic-limestone from the "Cona d'Ore," a mountain ridge surrounding the city of Palermo, lava from Etna and Vesuvius, and the bituminous limestone of Ragusa. The artificial materials were asphalt compressed in the form of small slabs and blocks from the "Compagnie Generale des Asphaltes de France," proprietors of the deposits of Seyssel (Savoie), concrete and Portland cement blocks from Casale Monferrato. Several pieces of apparatus are employed to determine the resistance to wear; amongst which were those of Deval, Siebeneicher, Bauschinger and Muller.

Mr. Rotigliano adopted the Dory instrument of the Palermo "School of Applications for Engineers." The quality of the sand employed in the testing apparatus has a great influence on wear. The test was made with Mazzana sand from the Vallo di Sicilia, containing about 96 per cent. of silica; it was passed through a sieve with 400 meshes per cm.², and dried to obtain a regular flow from the funnels of the apparatus. The amount of water and sand employed, velocity of the grindstone pressure also, have an effect on wear by friction. As an index of wear by friction, the experimenter took, like Canevazzi, the height of the prismatic

layer worn from a sample under the unit pressure of 1,000 kg. per m.², during the time required for the grindstone to travel from a point on the central circumference of the millstone for a distance of one kilometre at a speed of 0.82 m. per second. This index has not yet been adopted at Paris or Berlin, the wear being estimated by loss of weight or volume in the sample, though it would be well were it adopted generally for specifications. The index of wear was determined for all the materials mentioned in well defined conditions described in the memoir. The standard of comparison was Roccadifalco limestone, which is the best known rock in Palermo, owing to its extensive utilization for paving. The crushing tests were made by the usual methods, without, however, interposing between the compressed surface of the sample and the prisms of the machine any yielding substance as lead plates, because it is admitted that they alter the resistance, especially with hard stones. The absorbing capacity was tested by the ordinary method. Square test pieces were made, dried naturally, and the apparent volume and weight determined. Then they were placed in a vessel filled with water, at atmospheric temperature, taking care during the first five days to make immersion gradual, so as to obtain an easy disengagement of the air contained in the pores. Submersion lasted ten days. Then the samples were taken out, wiped dry with a cloth, and again weighed. The difference between the

weights before and after submersion compared with the apparent volume, amount of water per unit of volume was taken as the hygrometric. The experimenter concludes by stating that it is difficult to find a stone unites to an eminent degree all the qualities needed for hygienic, durable materials. In any case, the stone must be thoroughly studied, and by aid of accurate data the mechanical and physical properties of the materials in order to make the best selection.

Mr. Rotigliano made a number of remarks regarding the special materials, which we shall not repeat, they are only of local interest. We however, remark that it results only from his experiments that asphalt, and compressed, is, in opposition to what is commonly supposed, possesses a considerable degree of permeability. According to Dr. Bellegrini, absorption of water only exists in melted concrete blocks resist the wear action well, but have a great water-impregnating capacity. The memoir concludes with a series of tables with experimental results and three tables of diagrams.

We are informed by Mr. W. C. E. that the item published in the CANADIAN CONTRACT RECORD of December 11th, regarding the disposal of his interests in the New Iron Works, of Wingham, was incorrect. Mr. Bullock states that he still retains stock in the company, and that a reorganization of the company is likely place.

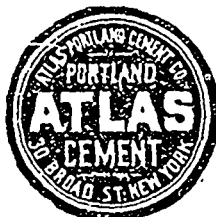
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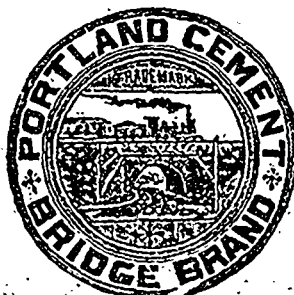
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