

**MUNICIPAL
DEPARTMENT**

**AN INVESTIGATION OF THE BENEFIT
OF STRUCTURE ON THE WEARING
POWER OF PAVING BRICK.***

By PROFESSOR EDWARD NORTON, JR.
(Concluded.)

THE TESTING OF THE SAMPLE.

After checking up the numbers and identification marks of these brick, they were divided into charges of five each. Some of the makes of brick were represented by only a few samples, owing to misunderstandings on the part of the maker, while others were represented by forty or fifty brick. The standard charge of five test brick was then made up in volume to ten per cent. of the cubic contents of the rattle by addition of eight Canton standard paving brick, selected from my standard pile in the laboratory. The first series of charges was then subjected to the abrasion test, being weighed after both 1,000 and 2,000 revolutions at standard speed and in a standard barrel. When this series had been completed as many of the different makes as were represented by enough brick to make a second set of charges were then carried through in similar manner, using Canton standard brick to fill up whatever vacancy in the ten per cent. volume was demanded. A third series of tests was then made, using the remnants of the different makes of test brick which were left, and in most cases so adjusting the charges that end cut and side cut brick made from the same kind of machine were pitted against each other in the same charge, and no Canton brick were required to fill up these charges to the required volume. After completing the abrasion test on all of the samples which were forwarded to me the results were collated and put in tabular form.

A careful study of this table reveals some results which, I think, will be of great value to the paving brick industry and which are doubtless as much of a surprise to many paving brick makers as they have been to me. The conclusions which have been described in the early portions of this paper, as drawn from the Ohio Survey test, are completely overthrown by the results of this series, and since in this series every condition of manufacture in which variation could exist has been rendered almost absolutely uniform, for not only was the clay perfectly homogeneous, but also the pugging was in most cases done by the same machine and the clay was used before drying out. The drying in natural air without heat was certainly nearly uniform. The burning and cooling were absolutely fair and impartial, and the testing, it goes without saying, was equally so. In fact, until all the results were collated no one had any idea

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as to what conclusions could be drawn from the test.

The only element of variation which has been allowed to enter into the series was that which was purposely made irregular, being the kind of machine which was used in manufacturing the brick.

THE CONCRETE RESULTS.

In the succeeding chart I have shown graphically the results of the study of the tabulated loss in the table above. The very marked superiority of end-cut brick over side-cut brick is a surprise to me, and the equally plain advantage of repressing end-cut brick, and the equally plain advantage of repressing side-cut brick cannot be mistaken by the most casual observer.

Now that the facts are obtained it seems easy to account for this fact. In the first case the line of pressure is at right angles to the lines of structure or lamination of the brick, while in side-cut brick the line of flow of the particles and the line of pressure in the repressed die are parallel, consequently the slight change in volume which occurs in repressing operates towards condensing the laminations of the end-cut brick, while it operates towards opening up and increasing the laminations of the side cut brick. It will be noted in this table and chart no names or no clues are given which will enable one manufacturer or brickmaker to compare his brick to the disadvantage of others who may have had material in the same test. Also, I can state that several of the more important machine manufacturers have bricks from both their side-cut and end-cut machinery represented in this series; hence, it cannot be claimed or believed by any fair-minded person that the results of this test are meant to in any way prejudice one class of machinery or one class of makers against another class. The whole object has been to ascertain the truth in a spirit in scientific inquiry, and the results are so conclusive and so strong that it would seem that this Association ought to find real financial profit from the work done.

ASPHALT PAVEMENTS.

The city of Buffalo has 51 miles of asphalt pavement, making an area of 1,000,248 sq. yds., representing a greater area of asphalt roadway than may be found in the continental state of Europe. Asphalt has become the ideal pavement for both residence and traffic streets. It affords sure footing for horses when properly compounded with gritty substance. The wear and tear on vehicles and horseflesh is much less on asphalt than on stone or any other form of pavement, at the same time the absence of rumbling noise, incident to stone, brick or macadam, is a great recommendation in its favor. The cubic contents of asphalt in the United States will measure more than 7,000,000 cubic ft., while with the concrete foundations the cubic contents run up to 23,000,000 cubic ft., and weigh a million and a half tons. Asphalt pavements and cement go hand in hand. In Europe Portland cement has become the favorite material for foundations of all kinds of pavements, while in the United States natural cement is still largely used for this purpose. Portland cement is being recommended and used where the first cost is not too closely scrutinized.

The United States has vast deposits of asphalt in California and Utah, while there are smaller deposits in other states, notably Kentucky and West Virginia. The Kentucky asphalt has assumed a commercial aspect of great promise. The real necessity of going out of the country for raw material is fast diminishing. The strong competition of the native and Bermudez asphalt has brought down prices. The Trinidad asphalt suffers an export duty and again a duty of 20 per cent. In 1895 we imported to the value of \$46,255, paying a duty of \$9,251, while the island of Trinidad, in 1893, exported to the value of \$153,640, the Barber Co. being the largest exporter from the island.—Cement and Engineering News, Chicago.

The town of Barrie, Ont., is about to commence arbitration proceedings to determine the value of the present waterworks system, with a view of purchasing the same from the owner. Mr. Willis Chipman, C.E., who acted in a similar capacity in the recent Cornwall case, has been engaged as arbitrator.

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