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ROLL CRUSHING OF PREPARED CLAY FOR BRICK MANUFACTURE

by F. C. Gillespie.

SUMMARY

A sample of prepared clay, submitted by Machens Bricks, obtained from the Kings Meadows works, was treated in a high speed roll crusher in order to assess the desirability of further mixing after this treatment. The process was observed by Mr. H. D. Schramm of Machens Bricks, and the treated sample was returned to that firm for pressing. Nine of the bricks so obtained were dried and fired at this laboratory.

The original prepared material was extremely heterogeneous, and while considerable improvement was effected by roll crushing, it is considered that the treated product would benefit by further mixing. All bricks developed small cracks during drying, and firing above 950°C opened cracks further. Firing to 1150°C was necessary to fuse any particles of ironstone, but the resultant pitting was barely noticeable. It is likely that the ironstone would fuse at a lower temperature in the kilns in use at the works.

DESCRIPTION

Mainly sandy yellow clay, fairly uniform in moisture, with occasional lumps of both dry and overwet material. There were also appreciable quantities of white clay, red clay usually associated with ironstone, and a few quartz or quartzite pebbles.

PROCEDURE

With the rolls set at approximately one-eighth of an inch gap, the material, after rough mixing, was fed to the machine as fast as possible. It is estimated that had it been possible to maintain a steady feed rate, approximately 1 cwt./min. could have been treated.

The characteristics of the rolls are as follows:—

Roll width six inches.

Roll diameter 10 inches.

Peripheral speed of each roll 750 feet/min.

Bricks were allowed to dry naturally by exposing them on a laboratory bench. At each firing temperature, the soaking time was six hours.

RESULTS

Crushing

The treated product consisted mainly of large flakes approximately three-sixteenths of an inch thick, in which the moisture appeared to be well distributed, but thin bands of red, white and yellow were evident. Ironstone appeared to be well reduced to below three-sixteenths of an inch size, but most of the quartz and quartzite was ejected by the rolls owing to the small roll diameter.

In the remaining portion, which was granular to powdery, variations in moisture and colour were apparent, but any small lumps of dry material crumbled readily, and would be well dispersed in any subsequent mixing process.

Drying and Firing			Firing Contraction				
Pressing Moisture	Ignition Loss	Drying Contraction	950°C	1000°C	1050°C	1100°C	1150°C
16.8%	8.6%	3 $\frac{3}{4}$ %	1%	1 $\frac{1}{2}$ %	2 $\frac{1}{2}$ %	3 $\frac{3}{4}$ %	4 $\frac{1}{2}$ %

Slight cracks appeared during drying, and these were not affected by firing to 950°C. Above this temperature, cracking was more severe, although all bricks were fairly sound. Ironstone fusion was just visible on bricks at 1150°C. The fired colour of all bricks was red, with occasional streaks of lighter colour.