

TR 12. 179-182

R. 538

LUCK'S BRICK WORKS—DULVERTON

Introduction

Six samples for use in extruded brick manufacture were obtained by the department and a further three samples were supplied by Mr A. Luck of Devonport.

Samples

- A Bush pit North face
- B Bush pit South face
- C Works pit (reef)
- D Mudstone from Works pit
- E Sub-surface of Works pit
- F Sand from Sassafras pit
- G Bush pit North face at three feet below present floor
- H Bush pit South face at three feet below present floor
- I Bush pit North face, surface sample.

Summary

Two general sources of clay material are under examination, the present Works pit and the newly opened Bush pit. The Bush pit material given a good firm smooth brick and is ideally suited for extrusion processing.

The Works pit contains layers of impurity material which are detrimental to the final product and the problem of homogeneity is constantly attendant. In addition this material is very prone to core cracking and high shrinkage.

It is therefore, recommended that production should be concerned with material from the Bush pit, which, with proper attention to winning and processing should yield a consistently satisfactory product.

Preparation and Testing

All samples with the exception of the sand, were crushed and rolled to a size which approximated the treatment possible with equipment at present on site. Water was incorporated and after a single pass through a Rawdon pug mill, the material was de-aired and extruded.

Satisfactory extrusion was achieved with all clay samples and mixtures, there being no significant difference in extrusion performance with any of the materials.

Bricks were cut from all columns, marked, air dried and finally oven dried at 110° C for twenty-four hours. After evaluation, bricks were fired at various temperatures, with two-hour soakings, cooled and examined.

Test Results

The samples and mixtures processed were as follows:—

- (1) Bush pit North face, 40%; Bush pit South face 40% plus 20% sand.
- (2) Bush pit North face, 50%; Bush pit South face, 50%.
- (3) Works pit, 100%.
- (4) Works pit, 90% plus 10% mudstone.
- (5) Works pit, 90% plus 10% sub-surface.
- (6) Bush pit North face three feet depth.
- (7) Bush pit South face three feet depth.
- (8) Bush pit North face surface sample.
- (9) 50% (6) plus 50% (7).

Sample	Water Lost on Drying	Green	950° C	1000° C	1050° C	1200° C	Firing Loss at 950° C
	Total Contraction						
	%	%	%	%	%	%	%
1	28	10	10	10	14	17	4.7
2	28	9	10	11	16	18	5.1
3	28	11	11	14	17	19	4.4
4	28	10	11	13	14	*	4.4
5	30	12	13	15	16	19	4.6
6	28	7	8	....	....	....	3.2
7	28	7	8	....	....	....	3.2
8	25	7	8	....	....	....	3.7
9	26	8	9	....	....	....	5.4

* Distorted.

The water lost during drying should not be interpreted as water added to the mix for processing, as the original materials contained a significant amount of water, viz.:—

Sample	Water Present in Original Material
	%
A	7
B	4
C	13
D	9
E	25

Conclusions

For simplicity of interpretation this material can be classed into two groups, the Works pit and its attendant materials (samples C, D and E) and the Bush pit which is represented by all the remaining samples except the sand.

Works Pit Samples

The basic reef material (C) of the Works pit although suitable for extrusion yields a product subject to heavy core cracking. Additions of mudstone (D) or sub-surface material (E) do nothing towards mitigating this defect, which is due to the intrinsic nature of the basic raw material. It would not be advisable to extrude this material without the addition of modifying agents.

Bush Pit Samples

All Bush samples, whether from depth or location seem sufficiently similar in performance to be of the same general composition. The greater the degree of uniformity of the material

used will, of course, give a more regular performance and particular attention should be paid to the winning of this material to ensure the maximum efficiency for extrusion.

The extruded material shows a high degree of shrinkage which is to be expected with this method of processing. Bricks are well fired at 950°/1000° C, have a smooth surface with a light buff red colour. Preliminary compression tests indicate good mechanical strength and this coupled with other advantageous features confirms this clay is suitable for extrusion.