

Reg. Nos. 884-906. Luck Bros., Dulverton
 BRICKMAKING TESTS ON BORE SAMPLES
 OF CLAY AND SHALE

SUMMARY

Samples of clay and shale obtained by boring on the property of Luck Brothers Pty. Ltd., have been tested for suitability for brick production by stiff-plastic pressing, certain blends were also tested by de-aired extrusion. The area was surveyed by Mr. T. D. Hughes, and the bores located as shown on the Department of Mines map 1781-37 (see page 90).

Considerable variation in properties was found between the individual samples, and only bores 2 and 3 yielded materials similar to those obtained from the quarry, vide Report No. 768-769). Bores 5, 14, 15 and 16 consisted largely of sandy clays, much weaker and more difficult to work than No. 768 and 769; while bores 6, 11, 12 and 13 were strong and plastic, and rather prone to cracking during drying and firing. Quartzite pebbles up to two inches diameter were fairly common, although some samples appeared to be completely free of stony materials.

Bores 2, 3, 5 and 6 were combined in a blend very similar in properties to the 2/1 blend of Nos. 768 and 769. The blend of bores 11, 12 and 13 was found to be subject to severe cracking, and bores 14, 15 and 16 produced a blend which was too weak for satisfactory brick production. Blending of materials from the area covered by bores 11, 12 and 13, with those from the vicinity of bores 14, 15 and 16 should result in clay suitable both for pressing and extrusion.

In order to minimise the effect of variations in the quality of these clays and shales, it is suggested that quarrying should be carried out along an extensive face, care being taken to ensure thorough mixing of materials from the entire face.

Bore No.	Depth (ft.)	Reg. No.	Parts in Blend	Blend No.	Parts in Blend	Blend No.
2	0 - 8½	884	1	B22
2	8½ - 14½	885	..	..	1
2	14½ - 18½	886	..	..	1
3	0 - 8½	887	..	..	1
3	8½ - 12	888	..	..	1
5	0 - 12	889	..	..	1
5	12 - 22	890	..	..	1
5	22 - 26	891	..	..	1
6	0 - 11	892	..	..	1
6	11 - 16	893	..	..	1
11	0 - 10½	894	1	B23
12	0 - 8	895	..	..	1
12	8 - 16	896	..	..	1
12	16 - 20	897	..	..	1
13	0 - 8½	898	..	..	1
14	0 - 7	899	7	B20	1	B24
14	7 - 12	900	5	..	..
14	12 - 18	901	2	B21	1	
14	18 - 21	902	1	..	..
15	0 - 12	903	..	..	1
15	12 - 16	904	..	..	1
15	16 - 21	905	..	..	1
16	0 - 18	906	..	..	1

PREPARATION AND TESTING

Each sample was crushed wet, by passing three times through high speed rolls, commencing with a three-eighths of an inch gap, and finishing with one-eighth of an inch gap. Numbers 899 and 900, 901 and 902 were combined as composites before crushing. Water was added as required, and stiff-plastic clots formed with a horizontal pug-mill; re-pressing was then carried out in a screw press. Blends prepared from the crushed materials were stiff-plastic pressed, and also extruded with de-airing in an auger machine. Extrusion without de-airing was not attempted.

Briquettes were dried, and fired with two hours soaking at various temperatures; and the fired briquettes were then tested for efflorescence.

RESULTS

I—Forming and Physical Characteristics

Material	Forming Method	Tempering Moisture (%)	Workability	Wet Strength	Pebble Content	Remarks
884	S.P.	22	Good	Very high	Nil	..
885	S.P.	20	Good	High	Nil	..
886	S.P.	20	Fair	Medium	Nil	..
887	S.P.	18½	Fair	High	Medium	..
888	S.P.	16½	Fair	Medium	Medium	..
889	S.P.	18	Good	Medium	Nil	..
890	S.P.	17½	Poor	Low	High	..
891	S.P.	16½	Poor	Low	High	Laminates readily
892	S.P.	20	Very poor	Very high	Nil	..
893	S.P.	18	Good	High	Low	..
B22	S.P.	18	Fair	Medium	..	..
B22	D.A.	20½	Fair	High	..	One edge notched
894	S.P.	16	Very poor	High	High	..
895	S.P.	22	Good	High	Medium	..
896	S.P.	21½	Good	High	Low	..
897	S.P.	19½	Fair	High	Medium	..
898	S.P.	18	Fair	High	Nil	..
B23	S.P.	18½	Fair	High	..	..
B23	D.A.	20½	Fair	Very high	..	..
B20	S.P.	19½	Poor	Low	Low	Laminates readily
B21	S.P.	17½	Very poor	Very low	Low	Laminates very readily
903	S.P.	20	Poor	Low	Low	Laminates readily
904	S.P.	18	Poor	Low	Medium	Laminates readily
905	S.P.	17½	Poor	Very low	Medium	Laminates readily
906	S.P.	16½	Very poor	Very low	High	Laminates very readily
B24	S.P.	17½	Poor	Low	..	Laminates readily
B24	D.A.	21	Good	Medium	..	Edges badly notched

NOTE—S.P. = Stiff-plastic pressed.
D.A. = De-aired extruded.

II—Drying and Firing Contractions

Material	Forming Method	Drying Contraction (%)	Total Contraction after Firing (%)			
			900°C	950°C	1,000°C	1,050°C
884	S.P.	6½	7½	9½	11½	13½
885	S.P.	5	5½	7½	11½	13½
886	S.P.	4½	6	8	9½(S.B.)	..
887	S.P.	4	4½	7½	9	11
888	S.P.	3½	4½	6½	7½(S.B.)	..
889	S.P.	3½	4½	6½	9	10½
890	S.P.	3½	4	5	7½	8
891	S.P.	3½	3	4½	5½	6
892	S.P.	6	7½	8½	10½	12½
893	S.P.	4½	7	8(S.B.)	..	..
B22	S.P.	4½	5½	6½	8½	10(S.B.)
B22	D.A.	6	7	9½	11	11½(S.B.)
894	S.P.	4	4½	4½	6	7
895	S.P.	5½	6½	7½	10	12
896	S.P.	5	6½	7½	10	13½
897	S.P.	5½	7	8½	10(S.B.)	..
898	S.P.	4½	5½	6½	8½	10(S.B.)
B23	S.P.	5	5½	6½	9	10½(S.B.)
B23	D.A.	7	8	9½	11½	12½
B20	S.P.	4½	5	6	7½	9
B21	S.P.	3½	4	4½	6	8½
903	S.P.	4½	4½	5½	6	7
904	S.P.	3½	3½	4	5	6
905	S.P.	3½	3½	4	5	6
906	S.P.	3½	3½	4	5½	6
B24	S.P.	3½	4	4½	6	7½
B24	D.A.	6	6	7	8½	9½

NOTE—S.B. = Slightly bloated.
 S.P. = Stiff-plastic pressed.
 D.A. = De-aired extruded.

III—Efflorescence

Traces of yellow or green vanadium type efflorescence were observed on all briquettes tested. White efflorescence, probably magnesium sulphate, appeared as traces on Nos. 888 and 889, and as faint traces on Nos. 885, 886 and B22.

Marking of Specimens

The firing temperature is marked on all briquettes according to the following code:—

Temperature	Code
900°C	AC
950°C	AB
1000°C	A
1050°C	B