TR2_115_119

GEOLOGICAL FACTORS AFFECTING THE FOUNDATIONS OF THE PROPOSED WHEAT SILO, DEVONPORT

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The proposed site for the wheat silo to be built at Devonport is on portion of the wharf area reclaimed by the Devonport Marine Board.

This area is underlain by Tertiary basalt covered by varying thicknesses of alluvial sands, part natural and part placed there from dredging operations. Jurassic dolerite outcrops not far away (in the vicinity of the Mersey River Bridge to East Devonport) and presumably underlies the basalt. However, between the basalt and dolerite is an unknown thickness of Tertiary clays.

A drilling campaign has recently been undertaken with the object of determining:--

(1) The nature of the material above the basalt.
(2) The depth to the top of the basalt. As the surface is flat, this is, in effect, to find the shape of and variations in the roof of the basalt.
(3) The nature of the basalt; in particular the degree of weathering and the joint pattern.
(4) The thickness of the basalt.
(5) The number of basalt flows and if more than one, the thickness and nature of the material separating them.
(6) The material below the basalt.

A percussion plant, from the Mines Department, was first used and although the answer was supplied to the first two questions the plant was not able to penetrate the basalt for more than a few feet and, after some plant was lost in attempting this, it was decided to try a diamond drill. After a great deal of difficulty, the drill succeeded in drilling through the basalt into clay, but was not able to continue further.

The results of the drilling, as far as the answers to the above questions are concerned, are as follows:—

(1) The principal material above the basalt is sand, part of which is natural, but the majority of which has been pumped on the site from dredging operations in the river nearby. In the north-west part of the site, there was once a hopper where limestone was loaded into ships for the B.H.P. Co. Some of the limestone spilled onto the then surface and has been passed through in the drill holes. It is interesting to note that in bore 2, the limestone is at a depth of 40 feet from the present surface whereas in bores 1 and 12, closer to the bank it is only 20 and 12 feet from the surface, showing that the filling in this part varies from 40 to 12 feet in depth. In the south-eastern portion of the area, below the sand but above the basalt, are 10 feet or so of boulders, clay and sand.
(2) As the following table of the bore logs shows, the depth to the basalt varies considerably, becoming gradually greater as the river is approached. As the surface is horizontal this means that the roof of the basalt is not flat. It will be noted in the accompanying section that the basalt roof is not shown as an inclined plane but as a series of steps. Due to the vertical jointing of the basalt, as weathering proceeded, blocks of basalt would break off giving this step effect. Apart from this general stepping off towards the river, the boring shows minor irregularities in the roof. It is obvious that the basalt reported at a depth of 16 feet in bore 8 was a boulder. The greater than expected depth of 42 feet in bore 6 is evidently caused by some local erosion.
(3) The basalt is the fine even grained olivine variety, so typical in the coastal areas of north-western Tasmania. It contains plentiful zeolites and calcite has been deposited along joint planes. Jointing is frequent and generally near vertical, though in some

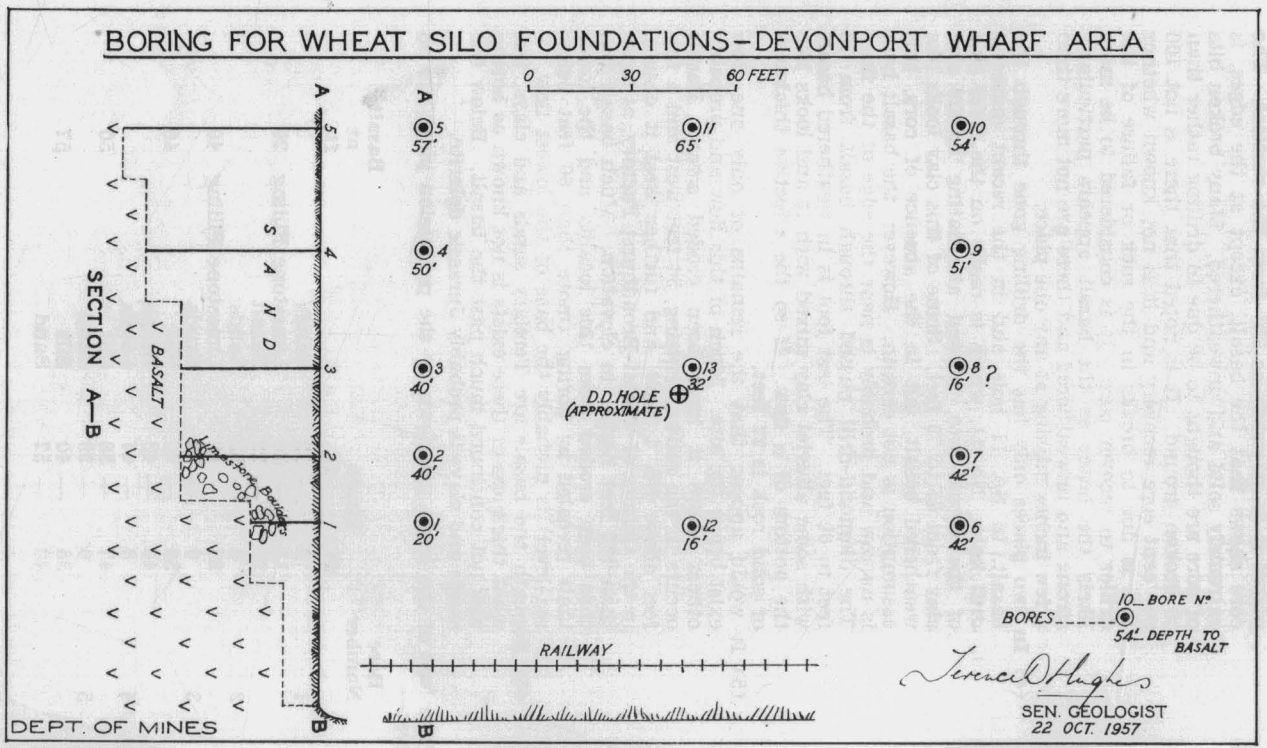
BORING FOR WHEAT SILO FOUNDATIONS – DEVONPORT WHARF AREA
0 30 60 FEET
A
B
SECTION A–B
SAND
BASALT
Limestone Boulders
5
4
3
2
1
5 57'
4 50'
3 40'
2 40'
1 20'
11 65'
13 32'
12 16'
10 54'
9 51'
8 16' ?
7 42'
6 42'
D.D. HOLE (APPROXIMATE)
RAILWAY
BORES
10 BORE N°
54' DEPTH TO BASALT
Terence D. Hughes
SEN. GEOLOGIST
22 OCT. 1957
DEPT. OF MINES
1517-29

Plate 30

5 cm

places it is as much as 30° from the vertical. The core shows that the basalt, except at the edges, is extremely solid and unweathered. Many broken bits of core are thought to be due to drilling rather than to broken ground. It is noted that there is not 100 per cent core recovery and it is not known whether this is due to breaks in the rock or failure of the driller to recover core. It is considered to be more likely the latter as the basalt appears particularly strong and unweathered and there are not more than a few inches missing at any one place.

(4) In two places only has the drilling gone through the basalt, in No. 11 hole and in the recent diamond drill hole. No. 11, which is really on the river side of the actual site, showed alternating basalt and clay from 65 to 75 feet. Some of this clay looks like weathered basalt, but in the absence of core, this assumption is not certain. However, the basalt here is narrow and probably is near the edge of the flow. The diamond-drill passed through basalt from 38 feet to 60 feet. The last foot is in weathered basalt with some alluvial clay mixed with it and looks like the bottom of a flow. If so the effective thickness of solid rock is 22 feet.

(5) It would appear that the remains of only one flow exist below the site. Much of this flow and probably others above it have been eroded away. Basalt occurs in the railway cutting, 54 feet west and a few feet above No. 1 Bore, and further west it occurs, in the vicinity of Tootal-Broadhurst Factory, at more than 100 feet higher in elevation. Much basalt has thus been eroded from this locality and the lower limit revealed by boring (more than 60 feet below sea-level) is probably the base of the lowest flow.

(6) Beneath the basalt are Tertiary sands and clays, but what thickness of these exists is not known as boring was not continued much past the basalt. Below the sands and clays is probably Jurassic dolerite.

The logs of the bores put down by the percussion plant are as follows:—

Bore Number	Strata ft.			Basalt at ft.
1	0	— 12	Sands	
	12	— 20	Limestone Filling	20
	20	— 22	Basalt	
2	0	— 32	Sands	
	32	— 40	Limestone Filling	40
3	0	— 39	Sands	
	39	— 40	Silt	40
	40	— 43	Basalt	
4	0	— 47	Sands	
	47	— 50	Silt	50
5	0	— 35	Sand	
	35	— 40	Silt	57
	40	— 57	Sand	

6	0	— 42	Sand	42
7	0	— 30	Sand	
	30	— 42	Clay and Boulders	42
8	0	— 16	Sand	
	16		Basalt (?)	?
9	0	— 51	Sands & Boulders	51
10	0	— 50	Sand	
	50	— 54	Basalt Boulders	54
11	0	— 59	Sands	
	59	— 65	Sands & Boulders	65
	65	— 66½	Basalt	
	66½	— 70	Clays	
	70	— 73	Basalt & Clay	
	73	— 74	Sandy Clay	
	74	— 75	Basalt	
	75		Sands	
12	0	— 5	Sand	
	5	— 12	Limestone Filling	16(?)
	12	— 16	Clay	
13	0	— 32	Sand	
	32	— 35½	Weathered Basalt	32