TR20_53_56

4. Examination of Talisker Blue Metals Quarry, Relbia.

V.M. Threader

The Talisker Blue Metals quarry [EQ195026] is situated on a basalt outcrop at the eastern end of Talisker Sugarloaf (122 m above m.s.l.). The original height of the quarried outcrop is estimated to have been 76 m above m.s.l. Annual production is currently 55 000 m^3.

The purpose of the investigation was to determine the useful life of the quarry.

The base map was prepared by surveyor G. Benn and five seismic spreads were fired on the northern and western boundaries of the quarry to assist the writer in determining the form of the basalt occurrence (appendix 1).

GEOLOGY

The area forms part of the Launceston Tertiary basin which consists of a succession of freshwater sediments several hundred metres in thickness. Quaternary alluvium occupies the valleys of the major water courses and the remnants of Late Tertiary basalt flows cap some hills. The outcrop being quarried may possibly be such a remnant with a more or less flat base, or it may either be a basalt pipe or dyke or a volcanic plug in which case it would be continuous in depth and possess steep to vertical walls. An exposure of Tertiary clay on the northern boundary of the quarry which appears to make a contact with the basalt and radiating columnar jointing in the quarry both strongly suggest the latter interpretation.

MAGNETIC SURVEY

Closed magnetometer traverses were run over the quarry, the adjoining Talisker Sugarloaf and a hill one kilometre south-west of the quarry. The traverses were restricted to two hours duration to minimise long term variations. The results are only of limited value due to the extremely low reading obtained. The instrument used was a McPhar Fluxgate magnetometer. Lines of equal magnetic flux intensity are shown on Figure 10. The 100 nT line is wholly within the basalt area and appears to approximate to the basalt boundary. Two highs were noted north-west and south-east of the quarry floor, while the floor itself gave a low reading. The higher readings should correlate with greatest basalt thickness. It is not currently known whether the greater thicknesses inferred from the data are due to irregularities in the base of the basalt or to the existence of basalt feeders.

Readings were also taken on Talisker Sugarloaf which is capped by basalt (fig.10 inset). Readings were relatively low except for two readings at either end of the traverse. This may be due either to thick soil cover or relatively thin or highly weathered basalt. Readings on the hill one kilometre to the south-west were even lower with little change from background.

BASALT RESERVES

An estimation of quarriable basalt (table 1) has been made on the assumption that the occurrence has vertical sides and is of uniform quality. In the final reserves figure an allowance is made for variations which are almost certain to be found, particularly on the sedimentary contacts.

These basalt volume estimates should be reduced by about one third to allow for exigencies and thus provide a safe working margin giving 100 000 m^3 and 150 000 m^3 of *in situ* rock or 150 000 m^3 and 225 000 m^3 of crushed rock (factor 1.5).

Table 1. ESTIMATED RESERVES, TALISKER QUARRY

Section	Area to floor level (m^2)	Area to 10 m below floor level (m^2)	Width (m)	Volume to floor level (m^3)	Volume to 10 m below floor level (m^3)	Overburden to be removed Area (m^2)	Volume (m^3)
A	700	-	10	7 000	7 000	5(x10)	500
B	1 850	2 500	20	37 000	50 000	100(x20)	2 000
C	1 250	2 050	20	25 000	41 000	100(x20)	2 000
D	1 300	2 400	20	26 000	48 000	75(x20)	1 500
E	975	1 750	20	19 500	35 000	60(x20)	1 200
F	1 000	1 750	20	20 000	35 000	60(x20)	1 200
G	675	1 150	20	16 750	11 500	75(x20)	750
H	-	-	10	-	-	75(x55)	1 875
Total				151 250	227 500		11 025

At current production this volume would give a useful life of 2.5-3.75 years from the beginning of 1975. An estimated 10 000 m^3 of clay would need to be removed for this output to be achieved. The overburden removal cost could probably be offset by its sale to the brick industry, as clay material from this area has been satisfactorily tested for this purpose.

It is not known at present to what depth the basalt continues, but 10 m below the quarry floor would be close to the quarriable limit because of drainage considerations.

RECOMMENDATIONS

The unfavourable results of investigations outside the immediate quarry area (see also appendix 1) indicate that diamond drilling is not warranted. It would however be useful for some selected sites to be tested by percussion drill to confirm the findings in this report.

Drilling sites recommended are in the floor of the quarry and in the vicinity of the 150 nT readings in the quarry and also the 100 nT readings on Talisker Sugarloaf (samples of drilling should be collected for examination). The Western Junction-Breadalbane basalt plain has also been inspected but appears unsuitable due to the high degree of decomposition of the basalt which is general throughout this area. The Talisker Blue Metals quarry is considered to be unique in the area and the only quarriable alternative when the present site is worked out would be dolerite.

APPENDIX 1

Seismic survey

W.L. Matthews

Proved reserves of basalt at the Talisker quarry are limited and it was thought possible that rock might underlie areas surrounding the quarry. Five seismic spreads (geophone interval 7.6 m) were laid out in the positions shown on Figure 10 and were fired from each end.

Seismic velocities indicated by the spreads suggest that much of the area around the northern part of the quarry is underlain by Tertiary sediments or weathered basalt to a considerable depth. This in turn suggests a very steep contact between the sediments and basalt.

In all spreads, a surface layer (V_0 = ∿370 m/s) can be interpreted as being soil and probably clay with open fractures. It is approximately 3-4.5 m thick in all spreads. With the exception of Spread 2, this surface material is underlain by material with a seismic velocity of 1220-1400 m/s. This is a fairly typical velocity range for Tertiary sediments, but may also be due to weathered basalt. An intermediate layer (V_1 = 730 m/s) underlies the end of Spread 2 and is underlain by a layer with a seismic velocity of 2070 m/s. On firing from the other end, only two materials are indicated with velocities similar to the other spreads. The spread has been interpreted as a three layer spread but the validity is a little doubtful as the topography and, or, wedging of layers may account for the velocities indicated. In any case, if the 2070 m/s material is basalt it would be too weathered to be used for crushed rock.

The seismic velocity exhibited by the material being quarried is probably of the order of 3660-4570 m/s. If a safety margin is taken and it is assumed that material with a velocity of 3050 m/s underlies the areas where

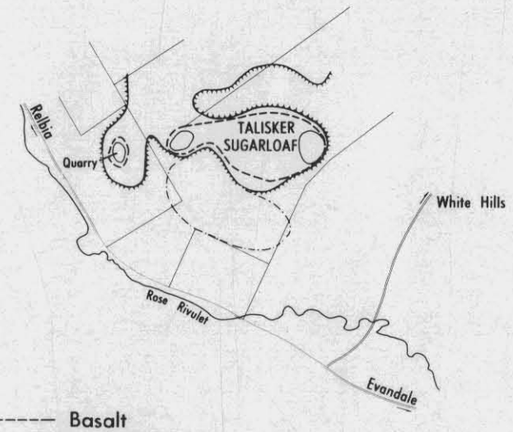
these spreads were undertaken, it is possible to calculate the minimum depths at which such a material would occur at the ends of the spreads.

Spread No.	*Direction of spread*	*Minimum depth of material (m)*
1	South-west end	34
	North-east end	32
2	North-west end	32
	South-east end	33
3	South-west end	33.5
	North-east end	33.5
4	North-west end	31
	South-east end	32
5	North-west end	32.5
	South-east end	32.5

CONCLUSION

There seems little doubt that quarriable material does not occur at depths of less than 30 m below the areas where the seismic spreads were undertaken. The material from the surface to this level is probably soil and Tertiary sediments or weathered basalt.

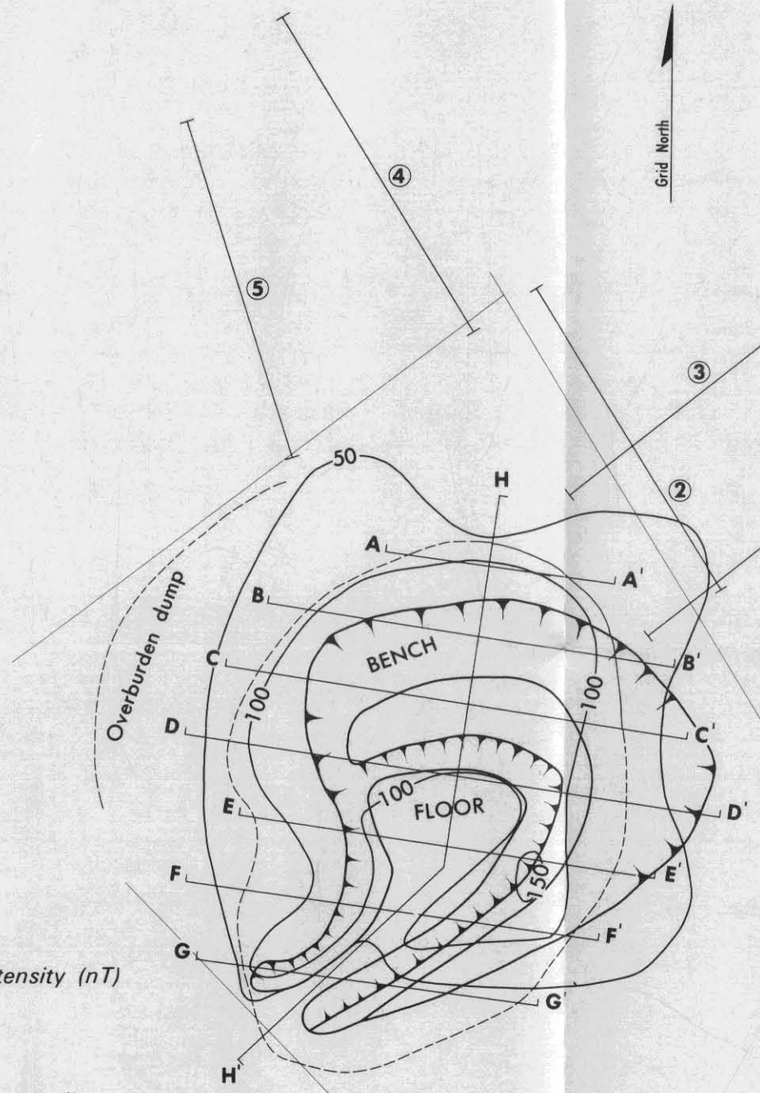
[15 July 1975]



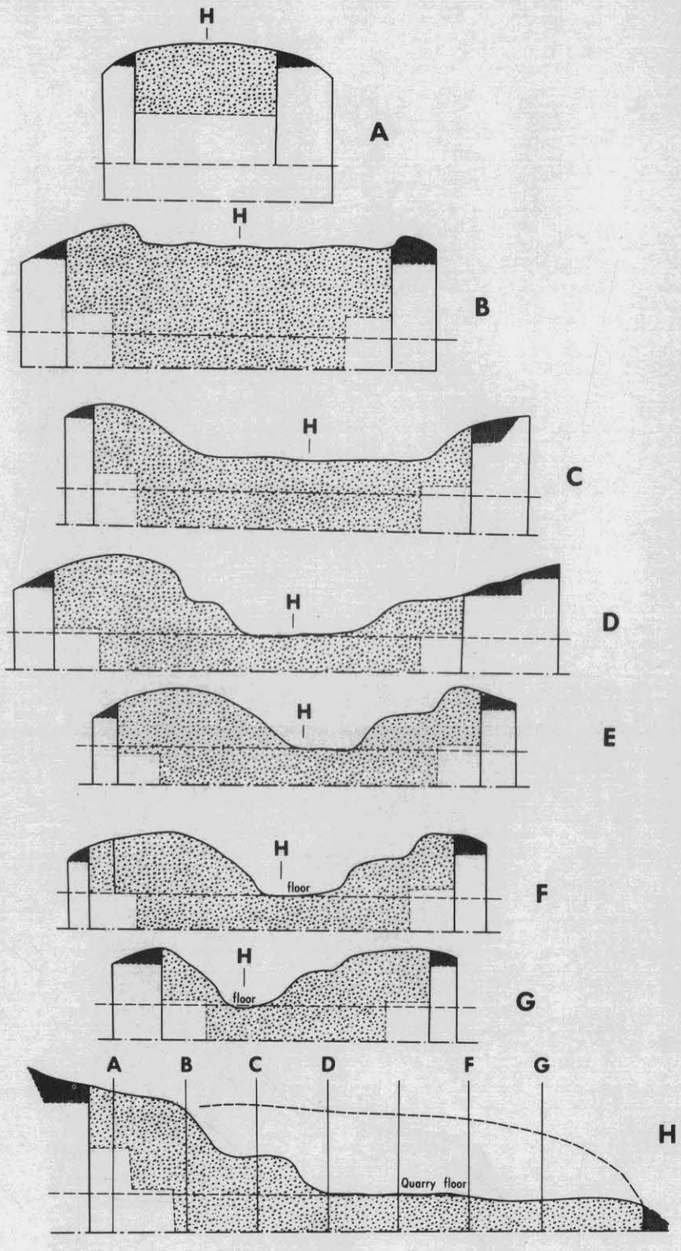
Basalt
Landslip area
High ground
Lines of magnetic flux density 100nT
Fence

0 100 200 300 400 500 Metres

LOCATION



Outline of quarry workings
Lines of equal magnetic intensity (nT)
Seismic spreads
Fence
Section line
Geological boundary
(solid line where contact exposed)



0 10 20 30 40 50 Metres

Area of removable rock
Overburden to be removed
Quarry floor level
10 metres below floor level

5 cm

TALISKER QUARRY – RELBIA

GEOLOGIST : V.M.Threader

0 10 20 30 40 50 Metres

3985 – 47

Department of Mines, Tasmania

FIGURE 10

TR20_53_56