

TR9-162-163

R. 478

23. BEACH SANDS, FRASER RIVER, KING ISLAND.**Sample**

A sample of beach sand, approximately 40 lbs in weight, was obtained by the Chief Chemist and Metallurgist from the Fraser River area, King Island. The sample was obtained on behalf of Messrs. Curtain, Burrows and Gatenby for investigation of the possible application of jigs for tin concentration from this type of material.

The sample tested contained 0.58 per cent of tin.

Sink-float tests using acetylene tetrabromide showed that the sample consisted of 88 per cent by weight of "heavy minerals" with a specific gravity greater than 2.95.

Investigation

The jig test was performed on a Denver laboratory type mineral jig No. M1. This is an efficient unit and its performance is probably superior to that of a commercial jig.

A concentration ratio of about 10 to 1 would be required to produce a tin concentrate of approximately 5 per cent tin if major recovery was possible, and the jiggling conditions were adjusted accordingly during a trial run to produce the required weight of concentrate. Jiggling conditions are quoted in the table of test results. Sizing analyses were determined of the jig concentrates and tailings, and a composite feed sizing was calculated.

Summary

1. No appreciable concentration of tin was achieved by jiggling. The concentrate produced amounted to 7.8 per cent by weight, and contained 0.75 per cent of tin. Tin recovery was 10.0 per cent. This result is compared with the jig test on similar material reported in Investigation R.461 in which jig concentrate was 37.3 per cent by weight containing 0.13 per cent tin with a recovery of 42.6 per cent. The ratio of weight recovery to tin recovery in concentrates is almost the same in each case.

2. Sink-float separations showed that 88 per cent of the sample consisted of heavy minerals with a specific gravity greater than 2.95. These minerals are mainly monazite, zircon, ilmenite and rutile.

3. Sizing analysis of the sample showed that 93.5 per cent of the total sample is coarser than 150 mesh, but that 88 per cent of the tin is finer than this size. This indicated that wave action on the beach has concentrated and classified these minerals to a high degree so that the reaction of all the mineral grains to hydraulic influences is somewhat similar. This factor explains the poor selectivity of the jig on this type of material.

It is of interest to compare the various plants treating beach sands on the East Coast of Australia in so far that the concentration problem is similar, and jigs are not used in any of the plants. Pinched sluices and spirals are the most popular primary concentrators.

Test Results

Jig Concentration

Jig conditions: Stroke $\frac{1}{8}$ inch.
 Hutch water: 1860 ml/minute.
 Wash water: 100 ml/minute.
 Feed Rate: 100 grams/minute.
 Speed: 440 strokes/minute.
 Ragging: Half inch deep layer of No. 1 shot.
 Hutch screen: Six mesh B.S.S.

Product	Per Cent		
	Weight	Tin	Tin Distribution
Jig concentrate	7.8	0.75	10.0
Jig tailing	92.2	0.57	90.0
Composite feed	100.0	0.58	100.0

Sizings

Fraction	Concentrate Per Cent			Tailing Per Cent			Feed Per Cent		
	Wght.	Tin	Dist.	Wght.	Tin	Dist.	Wght.	Tin	Dist.
+100 mesh	74.3	0.3	3.0	47.8	Trace	49.8	Trace	0.3
+150 mesh	23.2	1.21	37.7	45.4	0.1	8.9	43.7	0.15	12.0
+200 mesh	2.4	16.6	53.5	6.5	4.56	58.1	6.2	4.91	57.5
-200 mesh	0.1	43.4	5.8	0.3	56.2	33.0	0.3	53.1	30.2
	100.0	0.74	100.0	100.0	0.51	100.0	100.0	0.53	100.0

Per Cent Recovery of Tin in Individual Sizings

Plus 100 mesh: 100. Plus 150 mesh: 34.3. Plus 200 mesh: 10.2.
 Minus 200 mesh: 2.8.

Sink-Float Separation of Feed

Float in Sp.G. 2.95—12.0 per cent.
 Sink in Sp.G. 2.95—88.0 per cent.