

TR 11-172-175 R. 525 PART 1

29. MT REX: EXAMINATION OF MILL PRODUCTS

Introduction

Following a telephone call from Mr Brinkman, the Chief Chemist and Metallurgist visited the Mt Rex treatment plant. Samples were taken of the table feed, concentrate and tailing (Test N-1).

Following adjustment to the water valve on the jig and the installation of a crude sizing device (an underflow weir) in the rod mill discharge launder, the plant was run feeding both jig and table. These were sampled (Test N-2).

A sample of table concentrate was taken for table flotation tests (Test N-3).

Flowsheet

During Test N-1 the flowsheet was a jaw crusher, rolls and rod mill all in series followed by tabling of the rod mill discharge.

Test N-2, as described above, split the rod mill discharge between jig and table.

Table Concentration (Test N-1)

By application of the two product formula to the product assays we had:—

Product	Weight Per Cent	Assay Per Cent Tin	Distribution of Tin Per Cent
Concentrate	3.7	13.8	67.1
Tailing	96.3	0.26	32.9
Head	100.0	0.76	100.0

These products sized and assayed as follows:—

TABLE FEED

Fraction	Per Cent		
	Weight	Tin	Distribution Tin
+ 44	47.1	0.48	31.7
150	34.9	0.63	30.8
-150	18.0	1.49	37.5
Composite	100.0	0.71	100.0

TABLE CONCENTRATE

Fraction	Per Cent		
	Weight	Tin	Distribution Tin
+ 44	16.7	18.5	22.4
150	67.8	10.4	51.5
-150	15.5	23.2	26.1
Composite	100.0	13.8	100.0

TABLE TAILING

Fraction	Per Cent		
	Weight	Tin	Distribution Tin
+ 44	34.8	0.19	25.6
150	48.9	0.08	15.1
-150	16.3	0.94	59.3
Composite	100.0	0.26	100.0

From these sizings it was deduced that the tin recovery for the various size fractions was:—

Size Fraction	Aperture (Microns)	Tin Recovery Per Cent
+ 44 mesh	350	60
150 mesh	105	90
-150 mesh	47
Overall	70

Jig Concentration (Test N-2)

Samples of the jig feed and tailing were taken, sized and assayed with the following result.

JIG FEED

Fraction	Per Cent		
	Weight	Tin	Distribution Tin
+ 44	40.2	0.86	27.5
150	44.0	1.21	42.3
-150	15.8	2.41	30.2
Composite	100.0	1.26	100.0

JIG TAILING

Fraction	Per Cent		
	Weight	Tin	Distribution Tin
+ 44	16.3	0.16	3.8
150	30.2	0.08	3.5
-150	53.5	1.20	92.7
Composite	100.0	0.69	100.0

Table Concentration (Test N-2)

Samples of table feed and tailing were similarly treated.

TABLE FEED

Fraction	Per Cent		
	Weight	Tin	Distribution Tin
+ 44	12.1	0.44	22.7
150	49.0		
-150	38.9	2.36	77.3
Composite	100.0	1.19	100.0

TABLE TAILING

Fraction	Per Cent		
	Weight	Tin	Distribution Tin
+ 44	14.5	0.10	9.8
150	32.6		
-150	52.9	0.82	90.2
Composite	100.0	0.48	100.0

Table Flotation (Test N-3)

A sample of plant produced table concentrate was subjected to table flotation after preparation under the following conditions:—

Reagent	Rate (lb/ton)	Conditioning Time (mins)
Sulphuric Acid	3.2	2
Potassium Ethyl Xanthate	5.0	1
Kerosene	0.9	1
Total		4

Results were:—

Product	Per Cent				Per Cent Distribution		
	Weight	Tin	Sulphur	Lead	Tin	Sulphur	Lead
Table Conc.	26.0	59.1	1.85	2.7	79.6	6.1	12
Table Midd.	49.0	7.73	3.07	1.9	19.6	19.2	16
Table Tail.*	25.0	0.62	23.43	17.0	0.8	74.7	72
Total	100.0	19.3	7.84	5.9	100.0	100.0	100

* Contains most of the floated sulphide.

Concentrate Impurities

As the ore contains other metals (see head assay of R.514, Manson, *et al.*, 1966), the table rougher concentrate from Test N-1 was assayed with the following result:—

Tin	13.8	Copper	1.0
Lead	4.1	Zinc	1.3

Comments

In Test N-1 the assays show a good recovery of tin from a low grade feed.

The wide size distribution in the table feed adversely affects the operation, the plus 44 mesh being too coarse for tabling. The minus 150 mesh should be separately tabled for slime tin.

In the table feed the larger amount of tin compared with the weight of the minus 150 mesh fraction indicates overgrinding of the tin. This is to be expected after three grinding stages without any attempt to recover tin between them.

In Test N-2 a rough sizing has been made by the underflow weir but the jig feed contains too much fine material which is relatively rich in tin. This fine tin would not be recovered in the jig. This is confirmed by the jig tailing where 92.7 per cent of the tin is minus 150 mesh. However, the jig tailings size much finer than the feed to the jig indicating that the jig had not settled down when sampled.

On the table fine tin is being lost. This is to be expected unless special provision is made to treat slime tin.

In Test N-3 table flotation has been shown to be suitable for up grading the rougher concentrate. No attempt was made to find optimum conditions.

The rougher concentrate contains significant quantities of other metals but recovery of these by differential flotation is, at this stage of mine development, impracticable.

Recommendations

Lack of a sizing device on the jig and table feeds is the main problem in the plant at present. It is recommended that a trommel be put in the circuit after the rolls with $\frac{1}{2}$ inch and 44 mesh screens. The plus $\frac{1}{2}$ inch material would be stockpiled and in batches returned to the rolls for further crushing. The plus 44 mesh would be fed to the jig, the jig tailing going to the rod mill, the discharge from which should join the minus 44 mesh from the trommel as table feed.

Reference

MANSON, W. St C., JAMES, P. L. and WELLINGTON, H. K., 1966—R.514—Mt Rex: Tin concentration test. *Tech. Rep. Dep. Min. Tas.*, 10, 135-137