

## 21. R. 571

**MT REX—BRINCKMAN AND DICKER WORKINGS.  
EXAMINATION OF TABLE FLOTATION SULPHIDES.**

**Introduction**

Investigation R.557 showed that lead, zinc, and copper could be concentrated from the sulphide product made during table flotation of the rougher tin concentrates.

The Director of Mines asked that this work be extended with the object of making a lead-zinc-copper concentrate that contained as little tin as possible, as tin is a penalizable impurity in such a concentrate.

Accordingly, a sample of current table flotation sulphides was obtained by the Chief Chemist and Metallurgist on 3 July 1968.

**Procedure**

The presence of galena in the sulphides necessitated a froth flotation stage in the operations as this mineral cannot be separated from cassiterite by gravity means.

As the material was too coarse for froth flotation, a ball mill grinding stage was necessary.

Attempts were made to produce a lead, zinc, copper concentrate by selective flotation on the ball mill ground product.

This flotation tailing, mainly pyrite, was then examined using:

1. gravity concentration to recover tin;
2. flotation to remove pyrite thus leaving a moderately high grade tin concentrate as a flotation tailing; and
3. gravity concentration of the flotation tailing produced in (2) to obtain a high grade concentrate.

All ball mill grinding was performed batchwise in a pulp of 77% solids.

The test work has been confined to operations which the mine owners could put into practice.

**Test Conditions and Results**

Several tests were carried out under varying conditions. As test N5 incorporated most of the above procedure, it is quoted as being typical of results obtained.

**Flotation Conditions.**

Reagent	F1C	F2C
pH	9	7
Lime lb/ton	3	
Sulphuric Acid lb/ton		1
Copper Sulphate lb/ton	0.5	
Sodium Cyanide lb/ton	0.1	
Sodium ethyl Xanthate lb/ton	0.5	0.2
Methyl iso-butyl Carbinol: as required for froth	0.2 (approx).	0.1 (approx.)
Condition time/minutes	5	
Flotation time/minutes	5	3
Grinding —Batch 77% solids		

**Grind Sizing**

Fraction (B.S. Fraction)	Weight (%)
+ 85 #	1.3
+ 100 #	1.6
+ 150 #	9.4
+ 200 #	16.9
+ 300 #	15.1
- 300 #	55.7

**Results**

Product	Wght.	Per Cent				Per Cent Distribution			
		Copper	Lead	Zinc	Tin	Copper	Lead	Zinc	Tin
F1C	69.1	4.90	26.5	24.2	0.11	78.1	90.2	86.5	4.8
F2C	12.8	6.60	12.5	18.5	0.24	19.5	7.9	12.2	2.0
FT/PC	5.3	0.50	1.35	1.36	26.5	0.6	0.3	0.4	89.4
FT/PT	12.8	0.60	2.50	1.36	0.47	1.8	1.6	0.9	3.8
Composite Head	100.0	4.34	20.3	19.3	1.57	100.0	100.0	100.0	100.0

F1C=Copper, lead, zinc concentrate.  
PC=Pan concentrate of tin

F2C=Pyrite concentrate.  
PT=Pan tailing.

**Comments**

The results of the above test should be taken as indicative only of what could be achieved in plant treatment. More sophisticated methods would result in the preparation of separate concentrates of copper, lead and zinc, but, as mentioned previously, the procedure has been confined to that which it is considered the mine owners could put into practice. Even so, to produce the mixed concentrate would involve extension of the present treatment plant to include regrinding followed by froth flotation.

Batch treatment of stockpiled sulphides would probably be the most practical method of operation.