TR2-168-169

R. 314 and 316

GRINDABILITY OF RENISON BELL ORE

Sample

A sample of ore was obtained in June to determine the grindability of the ore sample at various sizings. The sample was obtained over a period of an hour from the ore belt after reduction by the mill jaw crusher. Another sample (R 316) was obtained to check on the variation of grindability of the ore.

Investigation and Procedure

Relative grindability of the ore was undertaken at various sizings for interpretation of capacity of the five feet by four feet Marcy Mill recently installed at Renison Bell.

The grindability tests were made on the ore sample after reduction to — 6-mesh size finally with rolls. Closed circuit tests similar in procedure to the method described by Messrs. F. C. Bond and W. L. Maxson in Trans. American Institute of Mining and Metallurgy Engineers (1935, 1939, 1943 and 1949) was utilized to determine grindabilities. Grinding was undertaken in pulp containing 67% of solids. Periods of grinding were fixed at 122 revolutions of the ball mill, and grinding periods were repeated until the weight of undersize obtained by wet and dry screening was constant.

The — 6-mesh ore was submitted to sizing with the following results:—

Fraction B.S. Screen	*Percent Weight*	*Percent Weight Cumulative*
+ 52	76.7	76.7
+ 60	2.3	79.0
+ 85	4.2	83.2
+ 100	1.6	84.8
+ 150	3.7	88.5
— 150	11.5	100.0

Relative grindability is expressed as grams per revolution of the ball mill.

To use a commercial ore as a standard, hard unweathered ore was obtained from the King Island Scheelite Mine in 1945. Grindability and mill data are as follows:—

KING ISLAND SCHEELITE, HARD ORE.

Mesh of Grind B.S.	Grindability g.p.r.
52	3·042
85	2·147

Mill Size .... 6 feet by 6 feet Ruwolt grate discharge mill.
Ball Charge .... 20,180 lb. (approx.).
Feed to Mill .... 13 tons per hour, 78·1% + 52-mesh.
New — 52-mesh production 10·153 tons per hour.
Power consumption 5·53 kwH per ton.

Results

Mesh of Grind B.S.	*Renison Bell Ore Grindability*	*Circulating Load*
	g.p.r.	*Percent*
52	3.309	129
60	2.935	170
85	2.123	276
100	2.090	305
150	1.087	720

Sample R 316 showed a relative grindability of 2·674 at 85-mesh size.

Ball Mill Capacity

Based on the relative sizes of the six feet by six feet and five feet by four feet mill and grindabilities the capacity of the five feet by four feet mill would be:—

Mesh of Grind B.S.	*Tons per Hour*
52	4.5
60	4.0
85	2.9
100	2.8
150	1.5