

TRB-188-194

R. 437

**SIZING—D.S.M. SCREEN**

This report contains the results of screening a sample of Renison Associated Tin Mines N.L. mill Ball Mill discharge with a one foot DSM 60 degree Type TA screen fitted with wedge wire stainless steel screen with a stated aperture of 0.4 mm.

Five tests were undertaken, and sizing analysis and tin distribution are shown for these samples. In addition samples of Ball Mill discharge, Dorr Classifier overflow and classifier sands were similarly examined for comparative purposes of the two methods of sizing.

The results of the tests can be summarized briefly by stating that the DSM screen undersize and the mill classifier overflow are similar in sizings.

The examinations show that sizing by DSM screening results in a considerably higher efficiency than by mechanical classification as shown by the samples of Ball Mill discharge and classifier products.

On a weight basis the mill classifier shows efficiencies of 40.3, 48.8 and 52.3 per cent at 100, 150 and 200 mesh sizings, and the DSM screen tests show separation efficiencies ranging from 70.3 to 93.9 per cent. Separation of tin at these sizings indicates efficiencies of 26.8 to 35.9 per cent in the classifier circuit as compared with 70.6 to 91.9 per cent in the DSM Screen tests, and the results of these tests are shown below.

The tin distributions are also shown and whereas it can be anticipated that little or no segregation of the tin occurs in wet screening, the sizing by classification shows appreciable accumulation of tin in the classifier sands.

Tests	Separation Efficiency		
	Minus 100 Mesh	Minus 150 Mesh	Minus 200 Mesh
Mill Classifier— Weight	40.3	48.8	52.3
Tin ..	26.8	32.9	35.9
D.S.M. Screen—			
Test 1. Weight ..	86.8	92.8	93.9
Tin ..	86.1	90.5	91.9
2. Weight ..	72.4	83.9	86.7
Tin ..	70.6	78.2	82.2
3. Weight ..	70.3	74.3	74.9
Tin ..	71.4	74.7	75.3
4. Weight ..	82.2	87.4	88.6
Tin ..	81.5	86.8	89.3
5. Weight ..	83.5	88.9	89.7
Tin ..	81.4	86.8	88.6

Tests 1 and 2 were conducted on separate samples, and Tests 3, 4, and 5 were undertaken on one pulp sample with density adjustments between sampling periods. This procedure shows segregation of solids in the closed circuit pump operation, but this would not materially alter the efficiency of separation in each test.

Screening tests with DSM Screen 60° Type TA, one foot wide, screen aperture 0.4 mm:—

Test No.	Pulp Gal./Min.			Solids Tons/Hour			Pulp Percent Solids			Solids Percent Weight		Electric Vibrator
	Feed	U'size	O'size	Feed	U'size	O'size	Feed	U'size	O'size	U'size	O'size	
1. .. ..	39.1	35.0	4.1	5.33	3.69	1.64	36.9	30.3	70.8	69.2	30.8	Off
2. .. ..	49.5	44.5	5.0	32.8	1.83	1.45	20.8	13.8	59.3	55.8	44.2	..
3. .. ..	20.0	13.7	6.3	6.73	3.58	3.15	64.0	55.4	77.8	53.2	46.8	On
4. .. ..	36.6	29.6	7.0	8.15	5.32	2.83	51.2	44.7	70.6	65.2	34.8	Off
5. .. ..	71.0	60.4	10.6	8.16	5.55	2.61	32.4	27.3	54.1	68.0	32.0	On

*Sizings and Tin Distribution*

Test No. and B.S. Fraction	Weight	Percent				Composite Screen Feed	
		Sn	Sn	Units Sn	Sn Dist.	Percent	Sn Dist.
1 O'size + 44 ..	6.6	0.49	3.23	2.5	6.6	2.5	
+ 60 ..	4.6	0.55	2.53	2.0	5.8	2.5	
+ 85 ..	8.4	0.61	5.12	3.9	13.0	5.8	
+100 ..	2.0	0.73	1.46	1.1	4.3	2.1	
+150 ..	5.6	1.18	6.61	5.1	18.9	13.6	
+200 ..	1.1	2.30	2.53	2.0	8.9	11.3	
-200 ..	2.6	2.52	6.55	5.0	42.5	62.2	
Comp. O'size ..	30.9	0.91	28.03	21.6	100.0	100.0	
1 U'size + 44 ..	..	..	..	..	..	..	
+ 60 ..	1.2	0.54	0.65	0.5	..	..	
+ 85 ..	4.6	0.53	2.44	1.9	..	..	
+100 ..	2.3	0.59	1.36	1.0	..	..	
+150 ..	13.3	0.83	11.04	8.5	..	..	
+200 ..	7.8	1.54	12.01	9.3	..	..	
-200 ..	39.9	1.86	74.22	57.2	..	..	
Comp. U'size ..	69.1	1.47	101.72	78.4	..	..	
Test 1	..	..	..	..	..	..	
Comp. Head ..	100.0	1.30	129.75	100.0	..	..	

Test No. and B. S. Fraction	Weight	Percent		Dist.	Composite Screen Feed		
		Sn	Units		Percent Weight	Sn	Dist.
2 O' size + 44 ..	7.3	0.51	3.72	3.2	9.1	4.9	
+ 60 ..	4.7	0.57	2.68	2.3	5.4	2.7	
+ 85 ..	10.4	0.57	5.93	5.1	12.8	6.2	
+100 ..	2.6	0.65	1.69	1.5	3.5	1.9	
+150 ..	11.2	0.99	11.09	9.6	19.7	14.7	
+200 ..	2.5	2.24	5.60	4.8	8.1	11.2	
-200 ..	5.4	2.24	12.10	10.4	41.4	58.4	
Comp. O' size ..	44.1	0.97	42.81	36.9	100.0	100.0	
2 U' size + 44 ..	1.8	1.11	2.00	1.7			
+ 60 ..	0.7	0.62	0.43	0.4			
+ 85 ..	2.4	0.54	1.30	1.1			
+100 ..	0.9	0.52	0.47	0.4			
+150 ..	8.5	0.70	5.95	5.1			
+200 ..	5.6	1.32	7.39	6.4			
-200 ..	36.0	1.55	55.80	48.0			
Comp. U' size ..	55.9	1.32	73.34	63.1			
Test 2							
Comp. Head ..	100.0	1.16	116.15	100.0			
3 O' size + 44 ..	11.4	0.76	8.66	7.4	12.1	8.4	
+ 60 ..	6.9	0.72	4.97	4.3	9.4	5.7	
+ 85 ..	9.4	0.72	6.77	5.8	16.4	9.3	
+100 ..	2.3	0.88	2.02	1.7	5.6	3.7	
+150 ..	7.1	1.06	7.52	6.4	18.7	16.0	
+200 ..	2.0	1.76	3.52	3.0	7.1	10.7	
-200 ..	7.7	1.74	13.40	11.4	30.7	46.2	
Comp. O' size ..	46.8	1.00	46.86	40.0	100.0	100.0	
3 U' size + 44 ..	0.7	1.73	1.21	1.0			
+ 60 ..	2.5	0.66	1.65	1.4			
+ 85 ..	7.0	0.59	4.13	3.5			
+100 ..	3.3	0.71	2.34	2.0			
+150 ..	11.6	0.97	11.25	9.6			
+200 ..	5.1	1.76	8.98	7.7			
-200 ..	23.0	1.77	40.71	34.8			
Comp. U' size ..	53.2	1.32	70.27	60.0			
Test 3							
Comp. Head ..	100.0	1.17	117.13	100.0			

Test No. and B. S. Fraction	Weight	Percent		Dist.	Composite Screen Feed Percent Weight Sn Dist.		
		Sn	Units		Weight	Sn	Dist.
4 O'size + 44 ..	6.7	0.89	5.96	3.5	7.1	3.7	
+ 60 ..	4.5	0.84	3.78	2.2	7.2	3.5	
+ 85 ..	8.7	0.93	8.09	4.7	9.4	4.7	
+100 ..	1.6	1.37	2.19	1.4	1.8	1.7	
+150 ..	6.6	1.76	11.62	6.8	21.1	16.4	
+200 ..	1.7	3.24	5.51	3.2	9.5	13.8	
-200 ..	5.0	2.03	10.15	6.0	43.9	56.2	
Comp. O'size ..	34.8	1.36	47.30	27.8	100.0	100.0	
4 U'size + 44 ..	0.4	0.95	0.38	0.2			
+ 60 ..	2.7	0.79	2.13	1.3			
+ 85 ..	0.7						
+100 ..	0.2	0.65	0.60	0.3			
+150 ..	14.5	1.13	16.39	9.6			
+200 ..	7.8	2.32	18.10	10.6			
-200 ..	38.9	2.20	85.57	50.2			
Comp. U'size ..	65.2	1.89	123.17	72.2			
Test 4							
Comp. Head ..	100.0	1.70	170.47	100.0			
5 O'size + 44 ..	5.2	1.04	5.41	2.9	5.4	3.0	
+ 60 ..	4.1	0.89	3.65	2.0	4.6	2.2	
+ 85 ..	8.1	0.97	7.85	4.3	10.5	5.2	
+100 ..	2.0	1.50	3.00	1.6	2.9	2.0	
+150 ..	6.2	1.98	12.28	6.7	19.0	15.0	
+200 ..	1.5	3.57	5.35	2.9	9.8	13.7	
-200 ..	4.9	2.54	12.45	6.7	47.8	58.9	
Comp. O'size ..	32.0	1.56	49.99	27.1	100.0	100.0	
5 U'size + 44 ..	0.2	1.03	0.21	0.1			
+ 60 ..	0.5	0.73	0.37	0.2			
+ 85 ..	2.4	0.66	1.58	0.9			
+100 ..	0.9	0.78	0.70	0.4			
+150 ..	12.8	1.20	15.36	8.3			
+200 ..	8.3	2.40	19.92	10.8			
-200 ..	42.9	2.24	96.08	52.2			
Comp. U'size ..	68.0	1.97	134.22	72.9			
Test 5							
Comp. Head ..	100.0	1.84	184.21	100.0			

Ball Mill classifier circuit using the screen analysis of the samples of mill BMD, C/O and C/S supplied by Renison Bell, the derived C/load ratio is 2.778. Therefore on a weight basis, C/O = 26.5 per cent weight of the classifier feed (or BMD) and C/S = 73.5 per cent weight of the classifier feed (BMD). These figures are the basis for the calculation of the following table which shows overall sizing analysis.

Product	Size	Weight	Percent Overall			Classifier Feed (Derived) Percent	
			Sn	Sn Units	Sn Dist.	Weight	Sn Dist.
Class. Sand—	+ 60	19.8	0.89	17.62	10.6	20.9	11.1
	+100	19.0	0.99	18.81	11.3	21.0	11.9
	+150	15.1	1.91	28.84	17.4	19.8	18.9
	+200	5.3	3.87	20.51	12.4	8.3	14.4
	-200	14.3	3.09	44.19	26.6	30.0	43.7
Comp. Class. Sand ..		73.5	1.76	129.97	78.3	100.0	100.0
Class. O'flow	+ 60	1.1	0.74	0.81	0.5		
	+100	2.0	0.45	0.90	0.6		
	+150	4.7	0.54	2.54	1.5		
	+200	3.0	1.09	3.27	2.0		
	-200	15.7	1.81	28.42	17.1		
Comp. Class. O'flow		26.5	1.36	35.94	21.7		
Comp. Class. Feed ..		100.0	1.66	165.91	100.0		