

O T T A W A

November 26th, 1941.

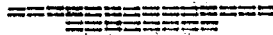
R E P O R T

of the

ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 1123.

Investigation on the Suitability of Tallol Reagents
as Frothing Agents in Flotation of Sulphide
and Gold Ores.



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Shipment:

Two samples, one of distilled and the other of crude tallol (called by the trade name of "Copacol"), were received on October 14th, 1941, from the Consolidated Paper Corporation Limited, Three Rivers, Quebec, per H. Freeman, Technical Director. These samples, which weighed 5 pounds each, had been manufactured at the Corporation's Wayagamack Division.

EXPERIMENTAL TESTS:

Tests were conducted to determine the suitability of crude and distilled tallol reagents as frothing agents, making comparative tests against pine oil and cresylic acid which are frothers commonly used in flotation processes.

The ore used in the investigations assayed as follows:

Gold (Au)	-	0.13	oz./ton
Silver (Ag)	-	0.16	"
Iron (Fe)	-	9.03	per cent
Pyrite sulphur	-	1.63	"
Pyrrhotite sulphur	-	0.02	"
Arsenic (As)	-	0.59	"
Copper (Cu)	-	Nil	

The tallol reagents gave lower recoveries of gold and sulphide minerals than did the pine oil and cresylic acid. In an alkaline circuit the distilled tallol gave a flotation tailing which assayed 0.03 ounce gold per ton and 0.22 per cent sulphide sulphur; the crude tallol gave a tailing which assayed 0.035 ounce gold per ton and 0.19 per cent sulphide sulphur. With pine oil and cresylic acid, the flotation tailing assayed 0.01 and 0.015 ounce of gold per ton and 0.07 and 0.08 per cent sulphide sulphur respectively (Test No. 1). In an acid circuit the flotation tailings assayed 0.03 and 0.035 ounce of gold per ton and 0.29 and 0.34 per cent sulphide sulphur ~~with distilled~~ with distilled tallol and crude tallol respectively (Test No. 2).

The tallol reagents gave fairly stiff froths. They have a tendency to float slimed gangue, thus lowering the ratio of concentration.

Details of Tests:

Test No. 1.

Samples of ore were ground in water to 68 per cent minus 200 mesh with 0.4 pound of soda ash and 0.10 pound of potassium butyl xanthate (Z-9) per ton of ore. To the flotation cell, 0.14 pound of potassium butyl xanthate per ton of ore and a frothing reagent were added. The froth was removed for 8 minutes.

The amounts of frothing agents used were as follows:

Test No. 1-A:	distilled tallol	-	0.148 lb./ton of ore		
" "	1-B: pine oil	-	0.124	"	" "
" "	1-C: cresylic acid	-	0.320	"	" "
" "	1-D: crude tallol [⊕]	-	0.150	"	" "

The pH of the flotation solution was as follows:

Test No. 1-A	-	9.2
" " 1-B	-	9.2
" " 1-C	-	9.15
" " 1-D	-	9.2

Results of Flotation Tests:

Test No.:	Product:	Weight, per cent	Assays		Distribution, per cent		Ratio of concentration
			Au, oz./ton	S, per cent	Au	S	
1-A	Feed	100.00	0.127	1.60	100.0	100.0	10.67:1.
	Conc.	9.37	1.06	14.97	78.5	87.6	
	Tailing	90.63	0.03	0.22	21.5	12.4	
1-B	Feed	100.00	0.119	1.65	100.0	100.0	11.44:1.
	Conc.	8.74	1.26	18.19	92.3	96.1	
	Tailing	91.26	0.01	0.07	7.7	3.9	
1-C	Feed	100.00	0.127	1.67	100.0	100.0	13.16:1.
	Conc.	7.60	1.49	20.98	89.1	95.6	
	Tailing	92.40	0.015	0.08	10.9	4.4	
1-D	Feed	100.00	0.144	1.72	100.0	100.0	6.26:1.
	Conc.	15.96	0.72	9.79	79.6	90.7	
	Tailing	84.04	0.035	0.19	20.4	9.3	

⊕ Crude tallol is very thick and viscous. It was prepared by saponifying with caustic soda (1 part caustic soda to 5 parts crude tallol) and then diluting to 5 per cent tallol.

(Test No. 1, cont'd) -

Character of the Froth:

Test No. 1-A: The froth is very stiff, fairly well covered with sulphides; has a slightly slimy appearance. The bubbles are large.

Test No. 1-B: The bubbles are medium in size. The froth is fairly stable, getting slightly brittle towards the end of flotation. The bubbles are well covered with sulphides.

Test No. 1-C: The bubbles are medium to large in size. The froth is fairly stable, getting brittle towards the end of flotation. The bubbles are well covered with sulphides.

Test No. 1-D: The bubbles are large, covered with sulphides and gangue minerals. The froth is very stable and stiff.

Test No. 2.

Samples of ore were ground in water to 68 per cent minus 200 mesh with 0.10 pound of potassium butyl xanthate per ton of ore. To the flotation cell, 5.4 pounds of sulphuric acid, 0.14 pound of potassium butyl xanthate per ton of ore, and a frothing agent were added. The froth was removed for 8 minutes.

The amounts of frothing reagent used were as follows:

Test No. 2-A: distilled tallol - 0.37 lb./ton of ore.

Test No. 2-B: crude tallol - 0.25 " " "

The pH of the flotation solutions was 6.25.

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(Test No. 2, cont'd) -

Results of Flotation:

Test No.	Product	Weight, per cent	Assays		Distribution, per cent		Ratio of concentration
			Au, oz./ton	S, per cent	Au	S	
2-A	Feed	100.00	0.122	1.69	100.0	100.0	8.24:1.
	Conc.	12.13	0.79	11.86	78.4	84.9	
	Tailing	87.87	0.03	0.29	21.6	15.1	
2-B	Feed	100.00	0.126	1.65	100.0	100.0	8.05:1.
	Conc.	12.42	0.76	10.82	75.6	81.9	
	Tailing	87.58	0.035	0.34	24.4	18.1	

Character of the Froth:

Test No. 2-A: The bubbles are medium in size. The froth is quite stable and carries an appreciable amount of gangue slime.

Test No. 2-B: The bubbles are small in size. The froth is quite stable and carries an appreciable amount of gangue slime.

Conclusions:

The tallol reagents used as frothing agents are not so suitable for flotation of gold and sulphide minerals as are pine oil and cresylic acid. The former gave low recoveries of gold and sulphide minerals; the flotation tailings assayed from 0.03 to 0.035 ounce of gold per ton and 0.19 to 0.34 per cent sulphide sulphur. With pine oil and cresylic acid the tailings assayed 0.01 and 0.015 ounce of gold per ton and 0.07 and 0.08 per cent sulphide sulphur.

The tallol reagents have a tendency to float slimed gangue, thus lowering the ratio of concentration.

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