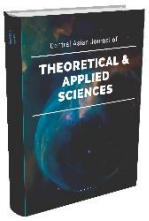

CENTRAL ASIAN JOURNAL OF THEORETICAL AND APPLIED SCIENCES

Volume: 03 Issue: 01 | Jan 2022 ISSN: 2660-5317

Processing of Layout Tails of Gold-Extracting Plants

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Received 29th Nov 2021, Accepted 29th Dec 2021, Online 06rd Jan 2022

Abstract: *In this article, we have studied stale tailings of gold recovery factories. Which contains the minerals gold, silver and iron oxide. After studying, we can decide in what ways to recycle these tails. The results of the study of the possibility of utilizing the sands of the tailing dump formed as a result of the production activities of the gravitational, flotation and magnetic gold recovery factories are presented. This article focuses on the extraction of precious metals from the gold-mining factories. This is mainly due to the use of gravitation techniques at the Chadakso gold-smelting plant, where the experiments were conducted in a research laboratory and collected.*

KeyWords: *solution, gold, silver, flotation, carried, gravity, reagent, hydrocyclone, concentrate, product.*

Due to the fact that when concentrating the old tailings of the factory, the output of concentrates and the content of precious metals from them are small, for their enrichment the cheapest methods of gold concentration and the corresponding apparatuses were chosen.

One of the first machines for enriching the tailings of the factory was chosen hydrocyclone. The enrichment results of the original tailings without any additional processing are shown in Table 1. The enrichment was carried out at various relations of T:Z and the size of the holes in the Peskovoy nozzle. The best results were obtained at T: W = 1: 4 and the size of the hole in the pesto nozzle 4 mm.

Table. 1.Results enrichment tail in laboratory hydrocyclone GL

Name products	Output,, %	Content, г/т		Extract, %	
		gold	silver	gold	silver
Sands	84,7	0,37	16,60	89,54	87,88
Drain	15,3	0,24	12,67	10,46	12,12
Sample 1	100,0	0,35	16,0	100,0	100,0
Sands	71,6	0,33	17,1	81,48	74,20
Drain	28,4	0,19	15,0	18,52	25,80
Sample 2	100,0	0,29	16,5	100,0	100,0

As it is seen in Table 1., there is some concentration of gold, but with significant losses in the fine-grained fraction.

In tab. 2. shows the results of double enrichment of tailings on a laboratory hydrocyclone; Hydroclone 1 was re-treated in the same hydrocyclone.

Table 2 The results of double hydro-cloning tails

Name products	Output,, %	Content, г/т		Extract, %	
		gold	silver	gold	silver
Sands	84,65	0,39	16,6	91,23	88,92
Drain	15,35	0,20	11,4	8,77	11,08
Sample 1	100,0	0,36	15,8	100,0	100,0
Sands	78,43	0,34	17,05	89,21	82,56
Clay	21,57	0,15	13,1	10,79	17,44
Sample 2	100,0	0,30	16,2	100,0	100,0

As it can be seen from the table. 1.2, after hydro-cycloning of tails and repeated hydro-cycloning of the discharge of hydrocyclone 1, one can distinguish the pesto fraction containing 0.34-0.39 g / ton of gold and 16.6- 17.05 g / ton of silver when extracting 89.21-91 into it, 23% gold and 32.56-88.92% silver.

In industrial conditions with the help of modernized short-cone hydrocyclones, it is possible to get, apparently, higher results.

The sands of the hydrocyclone were enriched on a laboratory screw separator with a helix diameter of 150 mm, and the discharge of the hydrocyclone was enriched on a 1200 x 200 laboratory sluice with a felt covering. 'The experiments were carried out according to the scheme shown in Fig. 1, the results are shown in Table 3.

Table 3 The results of tailings enrichment on a hydrocyclone, screw separator and gateway

Enrichment Products	Output,, %	Content, gr/t		Extract, %	
		gold	silver	gold	gold
(Concentrate Sun	18,71	0,89	27,60	46,26	32,68
Konstantin gateway	6,09	0,46	22,16	7,78	8,54
Combined end	24,8	0,78	20,53	54,04	41,22
Tails sun	55,2	0,25	12,57	38,33	44,54
Gateway tails	20,0	0,14	11,25	7,63	14,24
united tails	75,2	0,22	12,35	45,96	58,78
Sample 1	100,0	0,36	15,8	100,0	100,0
Concentrate Sun	21,8	0,62	23,3	45,08	31,4
Konstantin gateway	7.1	0,31	18,7	7,34	8,2
united end	28,9	0,48	21,4	52,42	39,6
Tails sun	52,2	0,23	14,20	40,02	45,76
Gateway tails	18,9	0,12	12,55	7,56	14,64
united tails	71,1	0,20	13,76	47,58	60,4
Sample 2	100,0	0,30	16,2	100,0	100,0

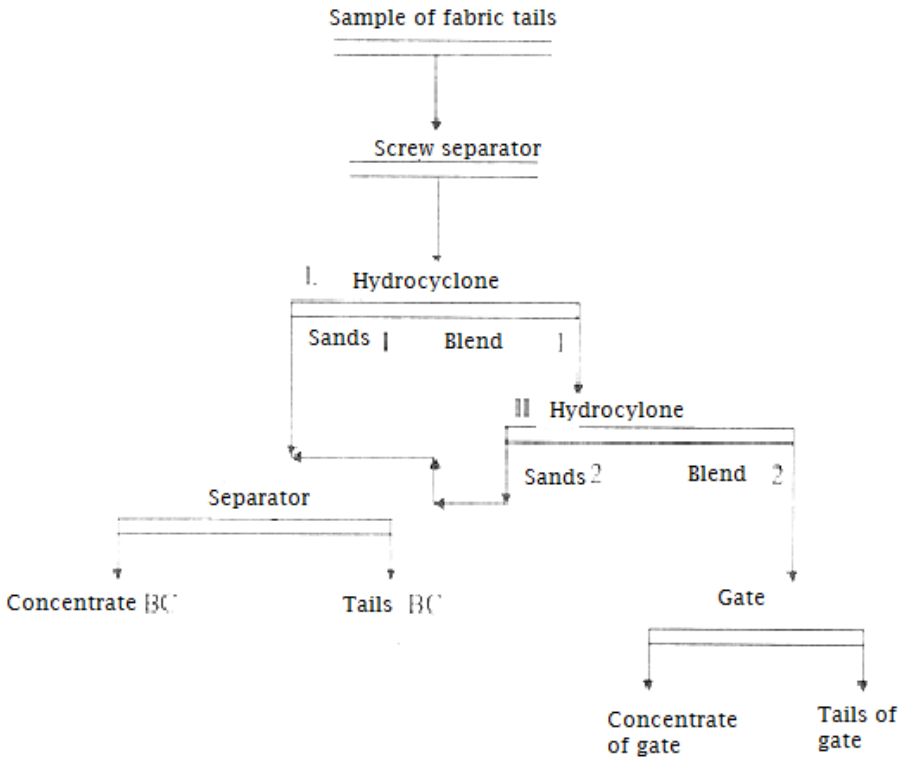

Fig.1. Scheme of gravitational enrichment of tails of the factory on a hydrocyclone, a screw separator and a gate

For comparison, experiments were carried out on tailings enrichment on a concentration table according to the scheme shown in Fig. 2. The operation mode on the concentration table: the swing frequency is 110 strokes per minute, the swing amplitude is 11 mm, the transverse tilt of the deck is 10 mm / m, the flow rate of flush water is 4.8 cubic meters / min. The results of the experiments are given in table 4.

Table 4 Results enrichment tails on the concentration table

Enrichment Products	Output,, %	Content, gr/t		Extract:%	
		gold	silver	gold	silver
Sample N1					
Concentrate1	2,1	4,2	180,8	25,94	23,58
Concentrate12	9,4	0,58	28,3	16,10	16,52
Promtproduct	8,0	0,35	19,2	8,24	9,54
Tails	80,5	0,21	10,07	49,72	50,36
Sample N1	100,0	0,34	16,1	100,0	100,0
Sample N2					
Concentrate1	1,8	3,62	157,1	22,47	17,24
Concentrate2	9,8	0,43	31,7	14,53	18,94
Promtproduct	7,5	0,31	17,8	8,02	8,14
Tails	80,9	0,20	11,29	54,98	55,68
Sample N2	100,0	0,29	16,4	100,0	100,0

As it follows from table 4. the enrichment of tails on the table, you can highlight graviconcentrate containing 3,62-4.2 g/t gold and was 157.1-180,8 g/t silver for extraction of metals of 22.47-25,94 and 17,24-23,58 %, respectively. The total recovery of gold and silver in a rough concentrate is 45,02-50,28

and 44,32-49,64%, respectively. However, the metal content in it will be: gold - 0,68-0,88 g/t, silver - 38,05-40,98 g/t.

When cleaning out rough concentrate a significant amount of precious metals goes into intermediate products.

To reduce the output of industrial products and povyshenie concentration of noble metals in concentrate tailings initial factory passed the sieve casings, 0.25 and 0.15 mm, and the coarse fraction was milled for 5 min in a ball mill. The resulting material, to crushed to a particle size of 0.25 and 0.15 mm were subjected to enrichment on the table in the same terms as the original tails. The results of the experiments are given in table.5.

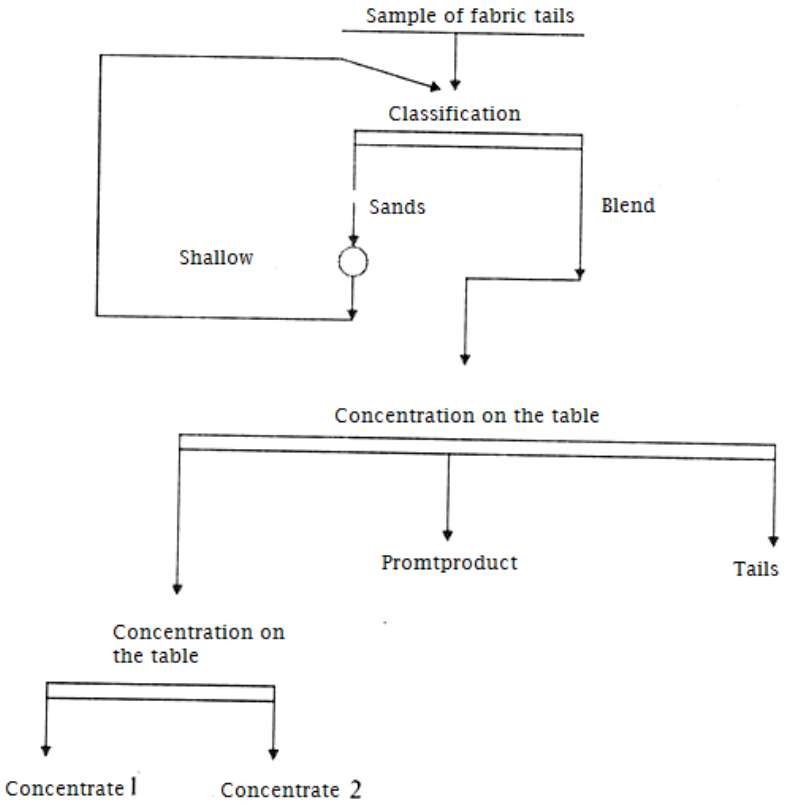

Fig. 2. FLOWSHEET TAILINGS BY SHAKING TABLE

Table 5 The results of enrichment on the concentration table regrind factory tails

Enrichment products	Output%	Content, gr/t		Extract, %	
		gold	silver	gold	silver
Sample N1, 0,25-0 мм					
Concentrate 1	1,8	6,93	277	35,64	31,36
Concentrate 2	4,9	1,91	40,71	26,70	12,53
Promtproduct	6,2	0,30	13,8	5,31	5,38
Combined concentrate	12,9	1,84	60,73	67,65	49,27
Tails	87,1	0,13	9,26	32,35	50,73
Sample N1					
|(0,25-0мм)	100,0	0,35	15,9	100,0	100,0

Sample N1, 0,15-0 мм					
Concentrate 1	1,7	6,81	265	32,16	28,51
Concentrate 2	4,5	3,06	46,4	38,30	13,21
Promtproduct	5,6	0,32	14,0	4,98	4,96
Combined concentrate	11,8	2,34	63,58	75,44	46,68
Tails	88,4	0,10	9,53	24,56	53,32
Sample N1					
(0,15-0 мм)	100,0	0,36	15,8	100,0	100,0
Sample N2, 0,25-0 мм					
Concentrate1	1,7	5,63	220	30,87	22,94
Concentrate12	5,2	1,86	94,2	31,14	30,05
Promtproduct	6,1	0,36	16,7	7,08	6,25
Combined concentrate	13,0	1,65	61,74	69,09	49,24
Tails	87,0	0,11	9,50	30,91	50,76
Sample N2					
(0,25-0 мм)	100,0	0,31	16,3	100,0	100,0
Sample N2, 0,15-0 мм					
Concentrate1	1,6	5,34	204	28,48	20,15
Concentrate2	4,8	2,22	73,2	35,48	21,70
Promtproduct	5,8	0,35	17,1	6,77	6,12
Combined concentrate	12,2	1,74	63,70	70,73	47,97
Tails	87,8	0,10	9,60	29,27	52,03
Sample N2					
(0,15-0 мм)	100,0	0,30	16,2	100,0	100,0

As can be seen from table 5, after regrinding the coarse fractions of tailings to 0.25 or 0.15 mm, it is possible to reduce the gold content in the tailings to 0.1 and 0.13 g/t, silver to 9.26-9.6 g/t gold Content in the concentrate increases to 5.34-of 6.93 g/t, and the total recovery it is in the United graviconcentrate to C7,65-75,44 %. These data indicate the potential to raise the levels of enrichment tailings gravity methods. After classification sand to crushed to 0.15-0.25 mm.

According to the scheme with the inclusion of the operation of tailings regrinding to a particle size of 0.15 mm (Fig. 3) experiments were conducted according to the scheme, including the double hydrocyclone acting of the original tails, the double helical separation of the granular part and the fine fractions of sluicing and tailings spiral separation followed by enrichment on a concentration table of all heavy fractions and concentrates.

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