# ROLE OF CLEANING OPERATIONS AT THE SELECTIVE FLOTATION FLOWSHEET

# Antoaneta Boteva

**Hristina Petrova** 

Veselinn Mehandgiisky

University of Mining and Geology "St. Ivan Rilski" 1700 Sofia, Bulgaria University of Mining and Geology "St. Ivan Rilski" 1700 Sofia, Bulgaria

### "Elatzite - med" Mirkovo, Bulgaria

#### ABSTRACT

The importance of cleaning operations at the selective flowsheet of a processing of mineral raw materials defines thoroughly from their decisive meaning for the receiving of the concentrates of the necessary consumer properties. The preparing of norms for the applying of the cleaning operations allows their applying in an optimum extent while the significant decreasing of the extraction of the fundamental components of interest to us prevents. The necessity of an additional milling of respective intermediate products examines in the article. Key words: cleaning operation, flowsheet of flotation.

#### INTRODUCTION.

The construction of the flowsheet by which a given raw material will be processed is a key moment at the dicing of the ore dressing plant. The flowsheet is a sequence of operations whom ought to put under the processed raw material. The cleaning operations are an important constructive part of the flotation flowsheet. The right inclusion requires precisely understanding of the role, which they can build in the common sequence of operations realized at the processing of raw materials.

# VARIANTS OF AN UTILIZATION OF THE CLEANING OPERATIONS IN THE FLOTATION FLOWSHEET.

The fundamental variants for an utilization of the cleaning operations in the flotation flowsheet are given in the figures 1-6 but the factual variety is much greater.



Figure 1. Flowsheet with rougher concentrate cleaning.







Figure 3. Flowsheet with separate cleaning of the concentrate from I and II rougher flotation's.



Figure 4. Flowsheet with two rougher operations and with scavenger of the middling products.



Figure 6. Flowsheet with more rougher flotation operations.

#### ANALYSIS OF THE VARIANTS FOR AN UTILIZATION OF THE CLEANING OPERATIONS IN THE FLOTATION FLOWSHEET.

The utilization of the cleaning operation realizes in two fundamental variants:

1. Without preliminary additional milling of the product fed for a cleaning.

2. After an additional revealing by means of an additional milling of the twins in products fed for a cleaning.

Two pointed out variants can realize with an additional feeding flotation reagents and without an additional feeding of flotation reagents. Each one of the pointed out variants has its own special features of a realization. The accepting of the variant that includes about a given cleaning operation ought to realize only after an investigation in detail of the material constitution of the cleaned product. The practice has proved the following relationships of the efficiency of the cleaning operation from the material constitution of the products:

1. When in the product for cleaning twins are between component of interest to us and the other components participant in the ore, then an additional milling is not necessary. In this case ought to be divided grains sharply distinguishing by their hydrophobicity. Then an utilization of additional depressors is not necessary.

2. When in the product exist twins of the component of interest to us but it is easy regrading mineral, then more



Figure 5. Flowsheet with scavenger of the middle from first cleaning.

suitable the cleaning operation leads without additional milling and reagents while twins remains in the chamber product whom after control floatation separates a concentrate. This concentrate puts under an additional milling. In this case runs away the possibility for depression of the grains of the mineral of interest to from slime coatings of the slime mineral.

3. When twins in the product before cleaning are between ore minerals and minerals of the inserting rocks then preliminarily additional milling of the product put under cleaning forces by all means.

4. The cleaning of the concentrates without decreases the common extraction from the ore of the component of interest to us is possible only in the cases of:

• a selective disclosure of the mineral grains before cleaning;

• a reducing to minimum of the slime forming;

• preliminarily rubbing in of the mineral grains in order to an increasing of flotabitility of the grains of the components of interest to us;

• a removal of the residue concentration of collectors and activators in the flotation pulp.

5. The increasing of numbers of the cleaning operations in many cases leads to losses that could escape if flotation machines ensuring better secondary enrichment of the concentrates apply in the frame of the froth layer.

6. In an utilization of cleaning operations in the floatation flowsheet, its place and the number of the cleaning operations ought to select according to the kinetics of a floatation of the basic minerals.

#### CONCLUSION

The right choice of the variant, the place and the number of the used cleaning operations decides to a great extent the

possibility of receiving qualitative concentrates at high degree of an extraction of the component of interest to us.

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