

# **FILTER CAKE DESATURATION: A LABORATORY-SCALE STUDY OF TWO COPPER SULPHIDE FLOTATION TAILINGS SLURRIES DEWATERED IN A FILTER PRESS**

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## **ABSTRACT**

Cake desaturation (often referred to as 'cake blowing') is a critical step in the dewatering of the majority of mineral tailings slurries. It is achieved by introducing compressed air on one side of the filter cake. The air displaces the interstitial liquid which is pushed to the opposite side of the filter cake and exits from the chamber through one (or both) of the filtrate discharge manifolds. Further cake moisture reduction can be achieved by extending the cake blowing time for several minutes after the displacement has been completed. The aim of filter cake desaturation is to reduce the cake moisture content to the point where it is no longer thixotropic. This is to avoid liquefaction in filter cake transport (by trucks or conveyor) and at the stacking location. Usually, the final cake moisture target is determined by the geotechnical engineer designing the dry stack. The moisture target varies widely, depending on the mineralogy of the solid particles and the particle size distribution.

Optimising the desaturation process during the filtration tests is very important in minimising the capital cost of the air compressors and the energy consumption of their operation. Considering the massive throughputs of tailings dewatering facilities, particularly in the copper sector, the amount of money to be saved by appropriate focus on the filtration test work, with particular attention to the cake blowing stage, is significant. Predicting the CAPEX and OPEX accurately can influence the viability of the project.

In this paper, two copper sulphide flotation tailings (one of which includes tailings from a CIP gold circuit) slurries with differing mineralogy and particle size are dewatered in a laboratory-scale filter press and the resulting filter cakes are blown with compressed air at different compressed air flow rates and for a range of times. The mineralogy of the two slurries are examined to help explain the differing desaturation performance and resulting final cake moisture content.

*Keywords: filtration; filter press; tailings; dewatering; desaturation; mineralogy*