



# SILVER RECOVERY INCREASE POTENTIAL STUDIED WITH SPEED OPTIMIZATION SERVICE AT SAUCITO

**Obtaining the optimal rotation speed optimizes wear life whilst providing a higher metallurgical performance with less energy consumption using our speed optimization service.**

The flotation mechanism speed has a direct impact on the metallurgical performance, wear life and energy consumption in the flotation process.

Our experts successfully completed a Speed Optimization Service at Saucito mine to examine the key factors involved in maximizing Ag recovery and improving energy consumption.

## CHALLENGES

- Changing ore body
- Valuable minerals losses in fine particles
- Restricted froth recovery due to high Fe & Zn content in Pb rougher concentrate

## SOLUTION

- Assess Ag, Pb, Zn & Fe values recovery response to rotation speed variation
- Energy consumption optimization

## BENEFITS

- Complete flotation process assessment
- Untapped Potential to increase Silver recovery at the first Pb rougher cell
- Possibility to obtain higher Ag recovery with lower energy consumption

## About the mine/customer

The Fresnillo, Saucito mine is one of the Group's most important operations, with a contribution of 32% to total silver production in 2018 which generated 21.9% of total adjusted revenue for the leading precious metals group in Mexico. The underground silver mine was commissioned in 2011 with a mining capacity of 7,800 tpd/2,600,000 tpy.

## History

Outotec and Saucito mine have been working together for several years, supplying and servicing mining equipment. The gradual depletion of higher ore grade areas has resulted in the mine having to implement initiatives to improve operations. We have been working side-by-side with Saucito mine in order to assist in maximizing their performance on the flotation circuit.

In December 2019 we conducted a FloatForce rotor speed optimization study on the first Pb rougher cell. Sampling campaigns were conducted at different rotor speeds and airflow rates to determine the ideal conditions that would allow maximized Ag recovery.

## Objectives

- Maximize Ag recovery in rougher Pb concentrate
- Minimize Zn & Fe values in rougher Pb circuit
- Study airflow and rotation speed responses in the circuit

## Solution plan

- Ore's response study (2 days)
- Design of experiments (1 day)
- Sampling campaign (3 days)
- HSC® Chemistry mass balancing (4 days)
- Optimizer simulation (2 days)

Saucito mine proactively supported with:

- Ensuring safety throughout the whole Service
- Sample preparation and chemical assays
- VFD Installation in the designated Outotec TC-100
- Site arrangement, information sharing.

## Site work

The first step when performing Design of Experiments (DOE) is to identify the maximum and minimum operational parameters for both Rotation Speed and airflow. The sampling campaign consisted of 14 sampling rounds, where the feed, concentrate and tails were sampled in each round.

## Results

- Ag recovery response is more sensitive to airflow rate than to rotation speed.
- If applied to the first Pb rougher cell, the optimized set of parameters shows a potential to increase approximately 11% Ag recovery while reducing the overall energy consumption by 3%
- The optimized set of parameters is obtained by reducing rotation speed in 1 rpm and increasing airflow rate to approximately 77%.

## Conclusion

Our speed optimization service at Saucito mine untapped the available potential to increase Ag recovery and reduce energy consumption at the same time.

To validate the optimized set of parameters, we recommend continuous testing of the speed optimization results at site while monitoring results, with the possibility of replicating them in the remaining cells.

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**“Saucito mine and Outotec have a great relationship. Cooperation is always mutual and within a great work environment.”**

Outotec develops leading technologies and services for the sustainable use of Earth's natural resources. Our 4,000 top experts are driven by each customer's unique challenges across the world. Outotec's comprehensive offering creates the best value for our customers in the mining, metal, energy, and chemical industries. Outotec had sales of approximately EUR 1.3 billion in 2018, and its shares are listed on NASDAQ Helsinki.

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