

Redesigned carbon retention screen delivers a multitude of benefits

A Canadian gold mine was looking for a solution to recurring shutdowns and high costs from the frequent replacement of its worn-out carbon retention screens. FLS not only developed a new screen, but also provided process recommendations that led to almost 300% greater wear life, together with improvements in productivity and worker safety.

Background

Carbon retention screens in CIL and CIP allow high-tonnage plants to use larger tanks and achieve much greater flow rates than other gold recovery screening methods. At the same time, the slurry's abrasive nature often shortens the effective life of the screens, requiring frequent downtime for replacement.

Challenge

A large gold producer in Quebec was having to replace its carbon retention screens every 13 weeks because of extreme wear. Screen replacements required 12 hours of labour, with the machine being shut down for two or more days each time.

Thanks to a close working relationship, the mine reached out to us for recommendations on a new screen that would last longer — stating a goal of reaching 20 weeks of wear life for its carbon retention screens.

“The experience behind our team, along with its tenacity in securing greater improvements to the carbon retention screen and the customer’s process, led to phenomenal results. The consistent wear pattern we now see with this screen has contributed greatly to its increased wear life”

Dallin Wood
Global Service Line Manager

Solution

After visiting the site to evaluate the screening process – studying both the material and the screen wear patterns – our technicians recommended a trial with a new screen wire geometry that increased the screen’s overall open area from 23% to 26%. The first trial was a success, with a 10-week increase in screen life from 13 weeks to 23 weeks, and mine management was pleased to have exceeded their goals. Our technicians, however, felt the screen life could be further improved.

After performing a finite element analysis (FEA) on the new screen, reviewing its vibration and other test results, our FLS technicians recommended another design that had the same wire geometry, but that would provide 29% overall open area. The mine agreed to a second trial with the new screen design, which resulted in an increased screen wear life of an additional six weeks, for 29 total weeks.

After more than doubling the screen life, we might have stopped at that point, but our technicians evaluated the mine’s entire adsorption, desorption and refining process, recommending some additional small changes to the carbon management, as well as other ADR and leaching maintenance. A third trial implementing all our technicians’ recommended improvements ultimately increased the carbon retention screens’ effective life to 35 weeks.

Outcome

The increase in screen life from 13 to 35 weeks far exceeded the gold producer’s expectations, with the additional 22 weeks of life per screen resulting in significant savings. In all, the new carbon retention screen design provided the mine with:

- Nearly triple the screen wear life
- 6% larger overall open area on the screen
- Increased production and profitability
- Increased safety
- 50% reduction in screen waste



Mine management was pleased to detail the multiple benefits it has realized following the installation of the new carbon retention screens:

- **Improved safety:** The screens are now safer to operate because maintenance personnel interact with them less. The previous average of 48 screen replacement hours per year has decreased to less than 18 hours per year.
- **Better sustainability:** Screens that last longer result in fewer screens in the landfill. This improvement cut the site’s carbon retention screen waste by more 50%, bringing the mine closer to its sustainability goals.
- **Increased profitability:** Improved screen life decreased screen maintenance shutdown by an average of five days per year, resulting in five extra days of production. The site maintenance hours that were previously dedicated to the screens have been shifted to other projects, resulting in fewer overtime hours and a more efficient plant.

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