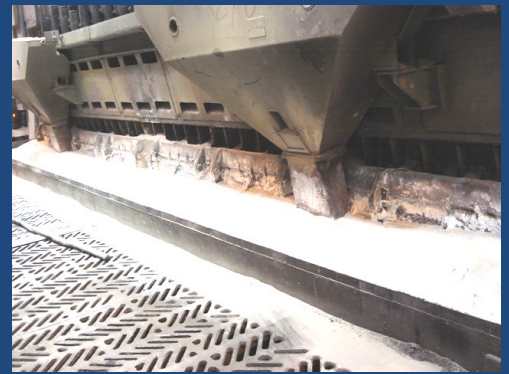


Heat Balance adjustment by new anode cover design

Client: Rusal

Location: Krasnoyarsk, Russia



The Project

The pots at KrAZ smelter have operated with increasing levels of amperage prior to the project. Due to limitations in heat loss through the insulating alumina anode cover material, pots have been operating with high metal level in order to compensate for the required extra heat loss. This led to frequent alumina cover collapse. High temperature of manifolds and flangesheets, which contributed to high levels of Fe contamination in the metal, increased risk of manifold blockages and sidewall break-out. These conditions led to increased operating instability and reduced current efficiency.

The aim of the project was to adjusting the heat balance by allowing more heat dissipation through the anode cover by revising the material composition and practices. These actions allowed reduction in metal level.

LMRC's Role

LMRC replaced the alumina anode cover with a mixture of crashed bath and alumina (CBA). The new cover

material offered a strong, permanently sealed cover with increased heat dissipation from the top of the anode. In addition LMRC engineers revised anode cover application practice, making them more visual and easy to follow.

An experiment was conducted on 11 pots for four months and LMRC role was:

- Managed the shift from alumina to CBA cover and ensure that work standards for the new CBA cover were specified and met.
- Provided weekly management of pot heat balance by analysis of trends in pot parameters
- Set a controlled process to reduce metal level, considering the health of the anode, cathode

and sidewall.

The Results

At the end of the experiment the following improvements were observed:

- The Pot Sealing Efficiency was improved from 88% to 93%
- A significant reduction in labour requirement to maintain the CBA cover.
- Significant increase of 2.25% in average metal tap for the 11 pots.
- Reductions of 6-12.7% in metal level were made on most test pots.
- Additional significant reduction in metal level was made long after the test was finished.

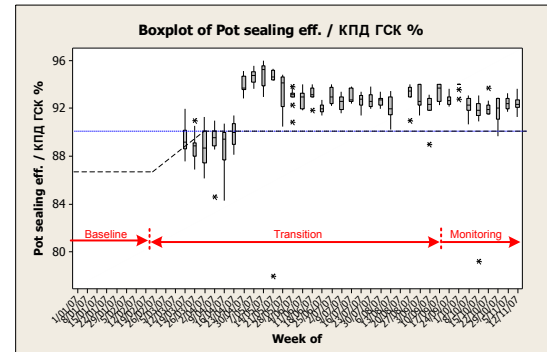


Figure 1: Sealing efficiency of test pots.

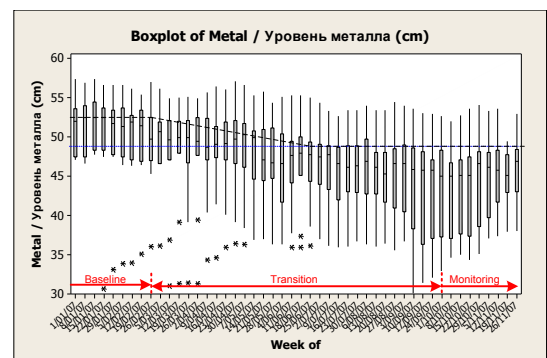


Figure 2: Metal level of test pots.



LIGHT METALS RESEARCH CENTRE
THE UNIVERSITY OF AUCKLAND

uniservices