

Amperage Increase Program on Aluminium Reduction Cells

Client: Noranda Aluminum Inc.

Location: New Madrid, USA



The Project

The project was put in place to help Noranda achieve its amperage increase plans. The aim of the project was to identify the constraints limiting amperage increase and find solution pathways to remove these constraints.

Following an audit by LMRC staff, an amperage increase roadmap was developed highlighting which constraints were to be removed as amperage increased.

A development plan was also put in place to find solutions to the constraints. This involved developing a thermo-electric model for the two cell technologies used at Noranda and exploring appropriate design changes to increase the amperage capabilities and performance of both cells.

Our Role

1. Audit the smelter to identify amperage increase constraints and developed a joint plan with the client to address these constraints.
2. Developed a thermo-electric model that identified the amperage capability of existing designs and explore design improvements.
3. Technical support on technological, operational and managerial improvements through periodic on-site presence.

The Results

During the initial audit, both the amperage increase constraints, and several first order issues were identified and quickly corrected by the plant. This allowed improved operations within a few months.

The thermo-electric model was used to identify amperage capability and required design changes.

Among the changes that were made following the thermo-electrical model findings were

–improved anode cover recipe and change of cover level this helped to dissipate more heat from anode yoke and reduce the increased stress on the anodes as amperage increase.

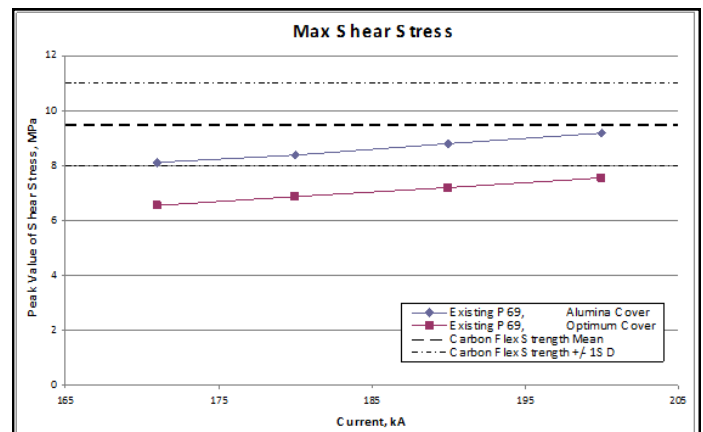


Figure 1: Stress on anodes and impact of anode cover.

Another design change identified was a modified collector bar design, this helps increasing amperage through higher heat dissipation and lower resistance.

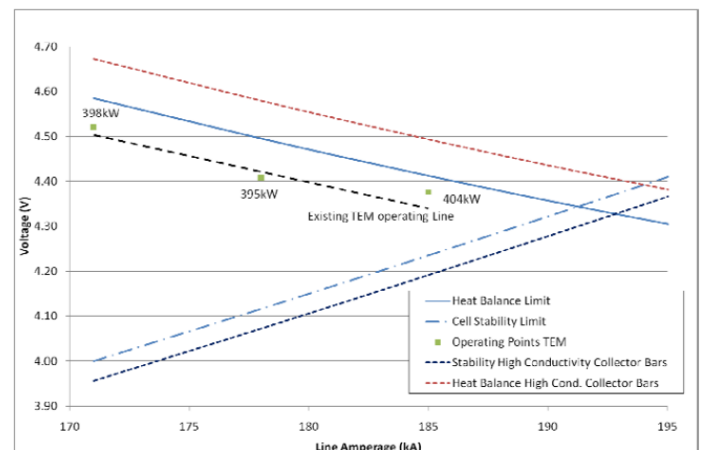


Figure 2: Impact of improved collector bars on cell capability

This program assisted the smelter to increase its amperage significantly without causing problem to the process.



LIGHT METALS RESEARCH CENTRE
THE UNIVERSITY OF AUCKLAND

uniservices