

Alcoa and STAS: Partners in R&D

Since 2001, Alcoa and STAS have teamed up to work on a number of research and development (R&D) projects. This partnership between the industrial and technological communities has yielded excellent results.

Automated Anode Positioning System

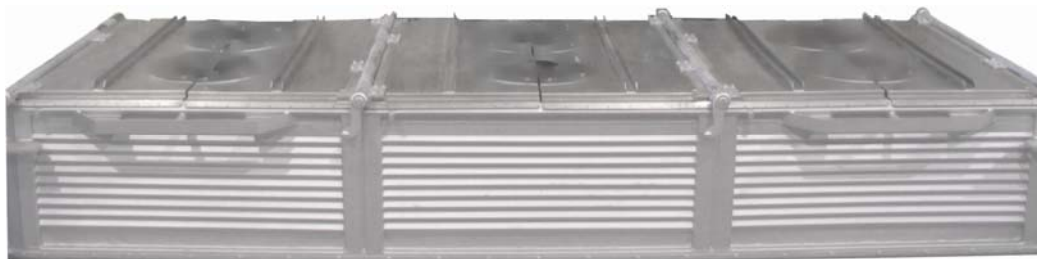
At the Deschambault Smelter, over 150,000 anodes in the 264 electrolytic cells need to be replaced every year. This is an ongoing task under difficult conditions for floor operators. The degree of precision of this procedure has a significant impact on the environment and the stability of the electrolysis process. To facilitate the process, Alcoa and STAS developed a fully automated anode positioning system. It both improves health and safety conditions for floor operators and ensures optimal precision in the positioning of anodes.

This automated positioning system, for which Alcoa has obtained a patent, is currently installed on two mobile overhead cranes and is used on a regular basis at the Deschambault Smelter.

Anode Tray Covers

In 2000, a team at Deschambault Smelter achieved a first in the aluminum industry: the development and installation of covers for anode trays and crust bins in order to reduce fluoride emissions. As a result of this initiative, fluoride emissions declined by nearly 70% in the first year following implementation for the cooling area.

The maintenance costs for the tray covers proved very high and their seals generated about 13 metric tons of contaminated waste annually. Consequently, in January 2004, STAS and Alcoa set out to design a high-performance, low-maintenance anode tray cover equipped with fully recyclable replacement parts. An initial prototype was created in August 2004, followed by a second in June 2005. Both have been used at the Deschambault Smelter on a regular basis. Their performance guided us in the development of a new model of anode tray cover that will be used in the new smelter at Fjardaál, Iceland.



Anode tray cover

Anode Stub Inspection System

Cleaning is required on anode butts to remove the waste material. An inspection is necessary to ascertain that the stubs need to be repaired before they are fitted with new anodes. Before 2006, the Stub inspection was manually carried out at Alcoa Deschambault. Alcoa, with the collaboration of STAS, decided to develop an automated inspection system.

The objectives were to develop and implement a low-cost solution to perform the inspection task automatically. The inspection system, based on artificial vision, is integrated within the existing conveyor system of the rod plant. Anode rod assemblies are inspected in line while they are

transported on the conveyor. This equipment is now fully operational and evaluates all stub profiles and toe-ins. Information coming from the equipment is used to decide if the anode rod assembly has to be routed to the repair area.

In the past five years, the partnership between Alcoa and STAS has made it possible to complete the development of these three products that are now commercially available through STAS. One other product – a butt analyzer, which will measure residual carbon levels to help optimize the electrolysis process and retroactively measure the anode quality – is also about to be completed.