

Optimization of energy consumption in primary aluminum production by Lowering the pot voltage

(Case Study:Almahdi Aluminium Smelter)

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Abstract: The line of one of complexes of Al-Mahdi Aluminum Company has 240 production pots with a nominal current of 175 kA. In these pots, the electricity transmission is from the bus bars at both sides of the tap and the duct that lateral bus bars have less surface metal stability compared to those in the input pots. These pots have 18 anodes and 17 cathodes. These pots are fed by linear breakers in the tap and the duct sides, the feeding operation and the voltage regulation of these pots are performed by automation control. The technical knowledge of working with pots in this complex has been experimentally obtained by performing production operation processes over the years. The decrease in the consumption voltage of production pots and the increase of ampere efficiency through various methods have always been on the agenda over the years and followed up. I have been supervisor in this workhouse for many years and in many cases, I have presented and implemented some programs to reach these objectives. Moreover, it should be noted that in 2003, I have directly cooperated with a Russian group to reduce the voltage of a number of pots.

One of the methods proposed to reduce the voltage of the production pots was to change the type of their feeding from linear feeding to intrusive feeding as follows: Regarding the fact that in each linear feeding, 3 or 4 dumps alumina were poured on the crust and 75-100 kg of urine was introduced into the pot, it was decided to work on the on pots with the lowest cost and feed the pots in a position similar to the point feeder by installing two punches on each breakers in the tap and the duct side and directing the aluminum inside in the Orebine towards these punches. The purpose of this decision was to reduce the voltage of the pots and increase the efficiency as well as prevent deposition of excess alumina on the cathode, This was accompanied by the problems discussed in this article.

Keywords : “voltage; aluminium smelter, electrolyze cell”