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A New Method for Automation and Optimization of Pot lines in Aluminum Factories

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Abstract: In this paper, the potline section of Iranian Aluminium Company is taken into consideration. From technical, manpower, and economic viewpoint, the voltage fluctuation is considered as one of the main problems in this section. This problem is mostly made as the result of the sludge created at the pot bottom, the drying of the crust surface, the anode effect, and so on.

In the old and new lines, these fluctuations are chiefly controlled by non-optimal methods using a lot of manpower in which the voltage fluctuations can create a lot of risks and costs for both the factory and the power network.

In this study, due to the consecutive property of the reduction cells, we designed a mechanism that had the ability to pass high current through the pot lines in such a way that it could control the pots in a parallel independent series from each other; and could stabilize all the cells during any fluctuation and after that. In this method, the speed of retaining the normal mode after fluctuation increased and the manpower was used more logically and with more accuracy. Also, a significant improvement was noticed in the consumption of energy, costs, and rate of production as well as a considerable improvement in safety.

Keywords: potline, voltage fluctuations, reduction cells