# Application of Aluminium Metal Business System (AMBS) Principles and Tools to Increase Productivity of Anode Covering Material Plants

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**Abstract**

With the removal of aluminum spray from the anodes, demand for cover material increased from 370 tonnes to 500 tonnes / day. To support the achievement of this result, actions based on the principles of AMBS were carried out:

- Principle 1- Systematically analyze the process and propose improvements in operation and maintenance. Result achieved: increased operational availability from 83 % to 92%, applying the SPC (Statistical Process Control) methodology;
- Principle 2- Improve satisfaction and customer service level (Reductions). Result achieved: reduction of the variance of the percentage of alumina in the anode cover material (ACM), according to the standard established by the client;
- Principle 3- Improve the feed flow of crusher crushing systems. Result achieved: study and implementation of operating logic to increase plant productivity (ton / h);
- Principle 4 - Implement the sense of ownership among crushing operators, through productivity / operator / shift measurement. Result achieved: increase in overall team productivity;
- Principle 5 - Recognize the good practices of teams with leadership follow-up. Result achieved: increased team engagement.

Keywords: Self-optimization, flowmeter, anode covering material.

## 1. Introduction

For a company remain strong and competitive in its line of business, a policy of continuous improvement and cost efficiency is essential. In this scenario, the removal of aluminum spray had a prominent role. This action directly impacts the production of ACM, since it will be the material that will replace the role of the spray in the main function of isolating the anode, reducing the effects of the oxidation in the pots. The ACM also has other important functions, such as to perform the thermal balance of the pots and to control the level of bath among others [1].

Due to these vital and irreplaceable functions of the ACM, the production plants of this material had the challenge of increasing the quantity of material supplied to the pot in 33% without any increase in equipment capacity, and for this improvement in efficiency, the principles and foundations of the AMBS methodology were used as a basis.

During the next topics we will detail how each principle of the AMBS contributed to the increase of production.

## 2. Standardized Work

One of the success factors was the standardization of the operational performance analysis, starting with an evaluation and exchange of quick and objective information in the shift exchanges between the operators and driven in KPI's presents in Table 1.

**Table 1. Table shifts exchanges.**

**CRITICAL PROCESS GROUP - Crust** — ALBRAS

| | INDICATOR | UN | GOAL | SUN | MON | TUES | WED | THU | FRID | SAT |
|---|---|---|---|---|---|---|---|---|---|---|
| Silo Level | Alumina | t | | | | | | | | |
| | Crust | t | | | | | | | | |
| | Bath | t | | | | | | | | |
| | ACM | t | | | | | | | | |
| Transported Material | ACM Send to the Pot's | t | | | | | | | | |
| | Alumina Entry | t | | | | | | | | |
| Crust | Butts | Peças | | | | | | | | |
| | Crushed material | # | | | | | | | | |
| Recipe | Alumina on ACM | % | | | | | | | | |
| Granulometry | > 3,5 mm | % | | | | | | | | |
| | < 200 # | % | | | | | | | | |
| Unscheduled Stops | Interfering Time | Min. | | | | | | | | |
| | Equipment / Reason | # | | | | | | | | |

The other action taken was the definition of a new methodology of analysis of the breaks for decision making, based on statistical process control (SPC), where the equipment breakdown numbers are analyzed on a weekly basis in sequence graph (see Figure 1), from Figure 2. These graphs are created with the objective of stratifying these data so that these parameters are the factors that will guide decision making.

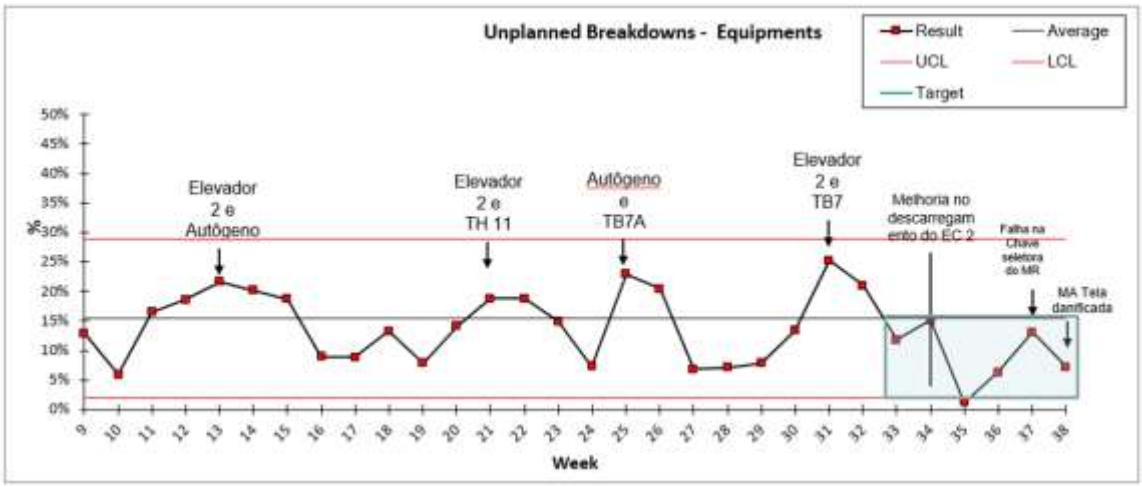


**Figure 1. SPC of equipament failure.**

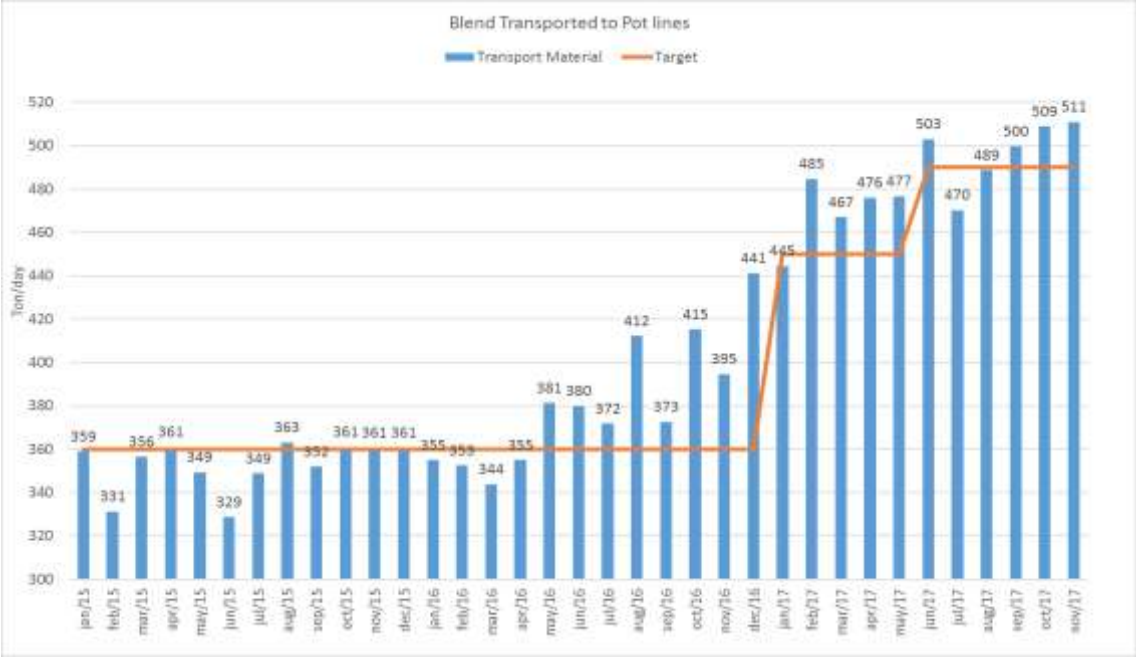


**Figure 7. Production evolution.**

## 8. Reference

1. Siegfried Wilkening, Pierre Reny and Brian Murphy, Anode cover material and bath level control, *Light Metal*s, 2005, 367 – 372.