Aluminium skimming and treatment at crucible.

Befesa New approach.

Befesa realized that its expertise in robots could help in this field to improve reliability, investment cost and ease of operation of traditional machines whose designs have not changed significantly in 20 years and also give a better performance

We approached this field in two phases

First phase

Crucible skimming of dross and bath which is fundamental for furnace maintenance besides having a very positive economic result. This phase is critical to have a later efficient treatment at crucible. Without skimming the addition of flux (AlF3) does not get well introduced in the liquid aluminium and also the aluminium, even after treatment, can "pick up", specially Na, from the "bath".

Befesa with more than 40 years supplying different cast house equipment worldwide had observed that many crucible skimming operations had a very low availability record or had a high maintenance dedication. The main reason was the difficulty of cleaning the scooping system and the need to place accurately the crucible/ladle, the skimming tools were also expensive and difficult to clean implying hard, dirty work and high operating costs.

The starting point was in Nordural smelter located in Iceland where manual skimming was carried out, Nordural is a plant with a very practical approach to problems, always concerned in safety, manpower health and ergonomics, reliability and low operating cost.

Befesa had collaborated with Nordural since day 1 of the smelter and mutual understanding and collaboration helped develop this world first time project of the first phase that implied crucible skimming using a robotic arm for the first time in the world.

The installation and commissioning took 4 weeks. The first year this machine skimmed 69 560 crucibles (over 300 000 tons) and had a reliability of 99.7%.

Second phase

Metal treatment to eliminate Alkali and Alkali rare earths (Na, Ca and Li)

Nordural decided that a second back up machine was required because, despite the excellent reliability of the first machine, it was not possible to revert to manual skimming in case of a break down. Befesa decided to equip the second machine with a system for treating aluminium in crucibles to reduce the content of alkali metal and alkali-rare earths. This incorporated an Aluminium fluoride dosing system and a rotor.

Different tests confirmed that obtained results were equal or better to industry traditional equipment (TAC or RAM) achieving results of Na and Ca in less time for the same amount of AlF3 addition.

The flexibility of the robot allowed for features that were impossible with traditional equipment like moving the rotor to different points of the crucible to make a far more homogeneous mix.

Since then Befesa has supplied machines for 2 other clients that are in operation and another 2 in commissioning stage

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