

T.T. Tomorrow Technology

Strategy for automatic furnace skimming

G. Campice, due Carrare

More accurate, effective, timely and rapid dross cleaning allows big production, quality and economic advantages. This is well known and is the main target of a new range of manual, automatic or semiautomatic de-drossing and furnace cleaning equipment which easily adapts to every cast house and aluminium smelter.

In the last five years developments in the design and manufacture of equipment to skim and clean furnaces were pushed not only by productivity and quality issues, but by health and safety standards. The opportunity to withdraw operators from hot, dangerous and laborious work areas firmly

the best possible performance for the following targets:

- 1) To shorten the time the operations which need the furnaces door kept open
- 2) To skim the furnace in accurate and effective way, removing the minimum amount of aluminium
- 3) To clean the furnace walls and bottom without damaging the refractory lining
- 4) To submerge the scrap in the molten bath
- 5) To mix and homogenise the bath.

The automation (both of the frequency and of the operation itself) of these routine furnace tending procedures significantly improves all the aspects

control tool movements in a gradual and progressive manner through the joystick of the remote control, or the movement can be fully automatic (without any direct intervention by the operator). If the operator controls the movements directly, he is positioned in a cabin, or is operating the remote control console from the safest location, protected from the potential risk of splashes of molten metal from the furnace.

The system can be mounted on rails in front of the furnace doors, thus allowing the equipment to operate on more than one furnace, or else it may be fixed in front of one furnace. The flexibility and precision of this furnace tending operation provide a number of safety, economic and production advantages including:

- Increases furnace utilization by reducing the amount of time required to effectively and accurately de-dross the furnace
- Improves heat transmission
- Increases the speed of the cold charge melting cycle due to the potential to mix and submerge the scrap into the melt
- Avoids dross, sludge and metal build-up that can progressively reduce the furnace capacity, pollute the metal analysis and require unscheduled downtime to carry out substantial furnace cleaning using hammer drills, etc.
- Increases refractory life by avoiding the thermal stress caused by long de-drossing time and the mechanical stresses that results when percussion tools are used to clean the furnaces
- Reduces the manpower required to carry out the mixing and de-drossing operations
- Improves the safety of the cast house by keeping the operator away from the furnace door during such operations
- Eliminates the need for forklift truck operations in front of the furnaces.



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Rail mounted furnace cleaning equipment during cold tests

supports this choice. T.T. Tomorrow Technology of Italy has developed manual, automatic or semi-automatic furnace cleaning machines designed to operate in the arduous cast house environment and meet the safety, economic and production requirements of today's aluminium industry. The furnace cleaning machines have been successfully installed in a large number of aluminium production facilities. Each of them has enabled the user to realize a number of important benefits, including increased furnace productivity, improved operator safety, reduced maintenance costs, and a major fuel saving.

The furnace cleaning machines are designed and manufactured to reach

of the melting process. It is well known that dross acts as a thermal insulation on the molten bath, thereby reducing the efficiency of heat transfer from the flame to the metal: the opportunity to easily and quickly remove the dross from the liquid metal surface results in higher heat exchange efficiency, permitting a lower chamber temperature and consequent cost savings in fuel and in metal oxidation.

During the de-drossing operation the tool is moved back and forth with precise and controlled movements parallel to the liquid surface. This optimum standard of control eliminates the waves and oscillations that are often experienced with more traditional de-drossing systems. The operator can

Experience with using furnace cleaning machines produced by T.T. Tomorrow Technology has yielded very positive feedback as regards the following characteristics:

- Ease of use
- High reliability
- Minimal maintenance
- Flexibility (when used with more than one furnace)
- Easy and user-friendly implementation in the existing process operations.

In accordance with T.T. Tomorrow Technology design policy, the machine configuration, structural characteristics and working parameters have been designed to make the equipment simple, reliable and easy to maintain. All electrical and hydraulic components have been positioned on the main frame of the machine on the side away from the furnace so as to avoid exposure to heat and molten metal splashes. This also eliminates



Fixed furnace cleaning, metal mixing and bottom clearing equipment

the potential for fires from hydraulic oil that a burst pipe could potentially project into the furnace. An installation advantage of these machines is that they need no special foundations or extensive civil works.

Author

Giovanni Campice is Managing Director of T.T. Tomorrow Technologies, based in due Carrare, Italy.