Equipment Spotlight...

Reliable Tending and Handling Machines for Primary and Secondary Aluminum

By G. Magarotto, T.T. Tomorrow Technology

Based in Padova, Italy, T.T. Tomorrow Technology S.p.A. has over two decades of experience supplying specialized vehicles and automated equipment to the primary and secondary aluminum industry. The company partners with customers to develop and deliver the most suitable solutions that are simultaneously efficient and reliable. The company's core products include furnace tending vehicles and systems for aluminum casthouse operations and carbon technology for cleaning, handling, and slotting anodes for primary aluminum smelters. This equipment has been delivered to aluminum producers around the world, from China to Europe, the Middle East to Russia, North America, and Mexico.

Furnace Tending Vehicles

T.T. Tomorrow's furnace tending vehicles are designed for charging solid metal into the furnace, skimming dross, and cleaning the bottoms and sidewells of furnaces (Figure 1). These vehicles are highly efficient and customizable, as they are designed to fit the specific needs of the customer.

Generally speaking, the tending vehicles feature a high charging capacity (up to 10 net tons), horizontal telescope arm length stroke up to 12 m (40 ft), quick changes of the tooling, and 4-wheel drive and sharp turning radius. They also include diagnostic assistance and PLC set-up through remote internet connection with T.T. Tomorrow's main office in Italy.

Since the vehicle operator plays a key role, these furnace tending machines have been engineered to enhance the ergonomics of the operator cabin and provide a control and adjustment system that improves productivity. The cabin is outfitted with a comfortable, well-designed environment where the working position can be customized. A lifting system on the cabin is also installed to ensure the driver visibility in certain difficult working conditions. The pilot-operated proportional joysticks make it possible to operate the vehicle in a well-controlled and efficient manner during all charging, skimming, and cleaning activities.

Figure 1. A furnace tending machine.

In addition, the tending vehicles have low operating costs, which are the result of systematic development of their design along with careful selection of the mechanical, hydraulic, and electrical components installed on the machine. Powered by high performance low emission engines, the vehicles run at low rpm in order to provide fuel savings and prolong their operating life. T.T. Tomorrow offers a full training course for operators and maintenance personnel, with careful instructions being provided regarding how a preventive maintenance program can also contribute to low maintenance costs.

Carbon Technologies

The success of the primary aluminum industry is not only dependent on increased productivity while reducing costs, but also on improving its environmental performance. Therefore, the entire aluminum industry is actively seeking to reduce its carbon footprint. Recent reports show an overall decrease in the carbon intensity of primary aluminum production, with Europe, the Middle East, and Russia leading the ranks in this regard. Several projects and studies are focused on further reducing CO_2 and other emission from aluminum production.

Over the years, T.T. Tomorrow has supported the environmental efforts of the primary aluminum industry, having built a niche market in the carbon area within smelters. The company has supplied anode slot cutting technology to a number of major companies (Figure 2), including Rusal, Emirates Global Aluminium, Rio Tinto, Trimet, and more.

Figure 2. Anode slotting machine.

The anode slotting machines are able to make any possible slot shape, with 8-12 mm of thickness and up to 450 mm deep. These machines provide a number of benefits, including increased pot stability, improved current efficiency, and better alumina dissolution. In addition, the machines ensure a reduced number of anode effects (thus eliminating harsh environmental and health and safety issues), a reduction in greenhouses gas and CO_2 emissions, and an increased energy savings up to 170 kW/ton of aluminum produced (data may vary from smelter to smelter). T.T. Tomorrow is also able to provide support technologies for the anode slot cutting machine, including baked anode and stub holes, cleaning lines, and auxiliary and handling equipment and robots.

Conclusion

T.T. Tomorrow Technology looks to its future with the certainty that it is on the right path. The company completed the construction of a new 3,000 sq m production facility in 2021. Connected to its main operations, the new facility utilizes the best available technologies to provide assembly and testing of vehicles and equipment. This will reduce lead times and enable T.T. Tomorrow to satisfy the increasing demands of the aluminum industry. ■