T.T. automated scrap handling and furnace charging at Sapa Finspang

T.T. Tomorrow Technology S.p.A. design and manufacture special vehicles and equipment in the casthouse. The company, which is based in Padova, Italy, design tailor make furnace tending vehicles, charging equipment, automatic skimming and cleaning equipment as well as heavy transport vehicles for molten metal transport and tapping, scrap handling and coil handling and transport.

One of the latest completed contracts include the automated scrap handling and furnace charging system, at Sapa Heat Transfer, Finspang which manufactures aluminium strips for various types of heat exchangers used in the automobile industry.

The charging machine raises a maximum of four pre-loaded charging boxes of scrap. Each charge box has a capacity of 10 tonnes of aluminium scrap. The charging boxes when filled automatically travel by means of the charging machine to one of the melting furnaces to charge its load.

Figure 1. The T.T. Tomorrow Technology charging machine takes on board the preloaded charging box full with scrap. The rails can be seen in the picture foreground. The picture also shows that each charging box is weighed and a notice board is over each charge box station.

In addition of two new Mechatherm furnaces the automated scrap handling and furnace charging system will also serve the existing furnaces at Sapa Finspang. To enable all the melting furnaces to be served by the new system T.T. Tomorrow Technology laid 50 metres of rails (See figure 1). Operating with a stop/go traffic light system and laser scanners as no person/operator is allowed to approach the furnaces on the red light when the automatic furnace charging system is in operation.

The equipment, designed and manufactured by T.T. Tomorrow Technology provides operators with benefits in safety and improvements in environmental control. All the operations of the charging as well as the data control of the scrap weight and the safety control of the operational area in the cast house are monitored and controlled by PLC on wireless technology. Only a supervisor and no other operators or vehicles are therefore involved in the charging operation of the melting furnaces.

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Figure 2. After scrap loading the charging boxes travel to the unloading position in front of the furnaces and automatically discharge their load into the furnace.

Figure 3. With the furnace door open the charging box is automatically rammed into the furnace to discharge the scrap for melting. After discharge of the scrap the system will return to the loading bay to await the loading of more scrap.

Low temperature Oxyfuel burners from Linde

The new 40-tonne melting furnace is equipped with four 2 MW (total installed power is 8 MW) low-temperature Oxyfuel burners from Linde. The system features an intelligent automated power control based on continuous measurements of furnace and metal temperatures.

Low-temperature Oxyfuel is designed and developed for providing uniform temperature in the furnace and for fast and uniform melt down of the charge. Sapa has for several years been operating a 28-tonne melting furnace with low-temperature Oxyfuel burners at the Finspång plant. The excellent results from that installation lead Sapa to the decision to install low-temperature Oxyfuel in the new furnace.

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