

NEWS

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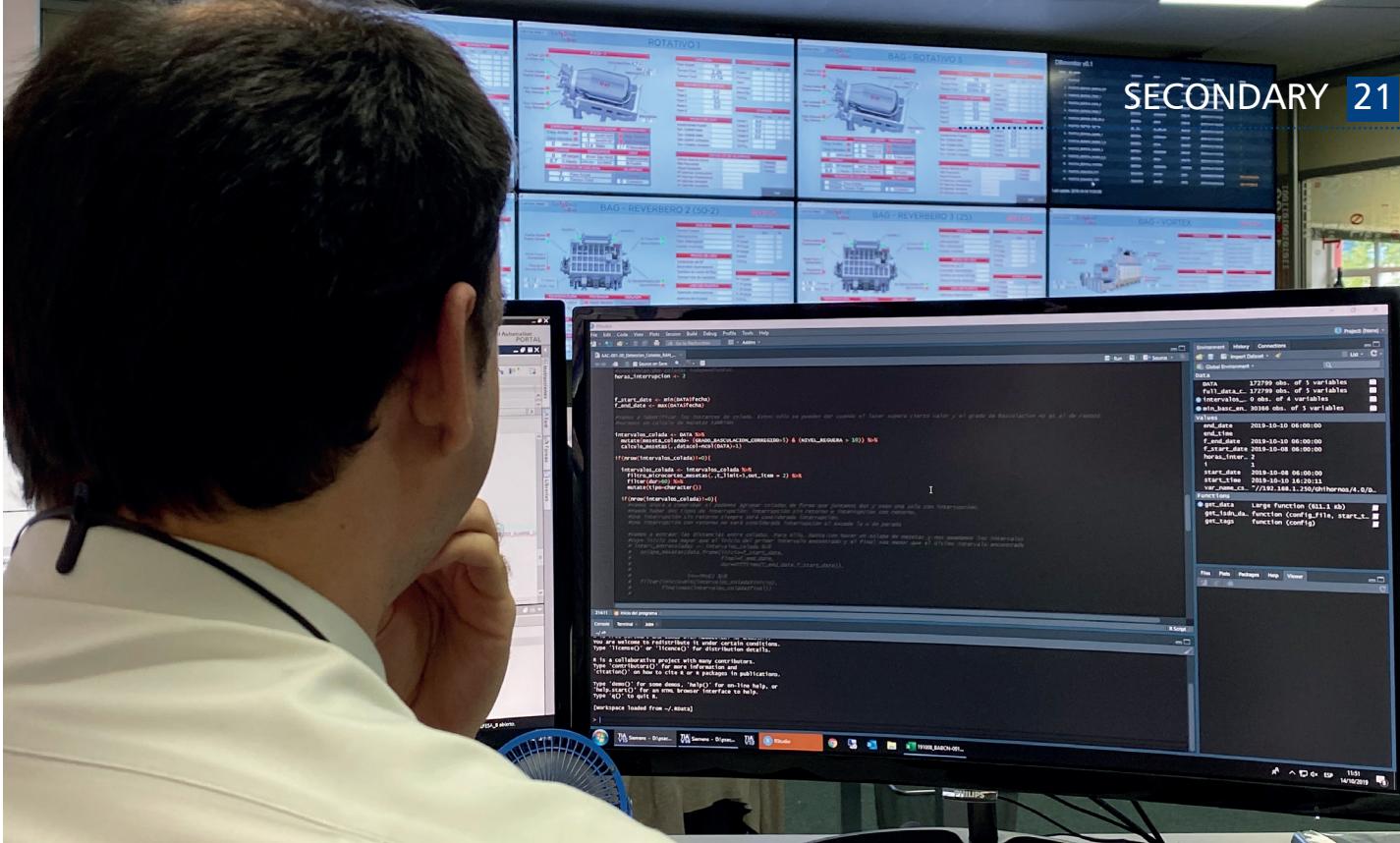
# ALUMINIUM INTERNATIONAL **TODAY**

THE JOURNAL OF ALUMINIUM PRODUCTION AND PROCESSING

[www.aluminiumtoday.com](http://www.aluminiumtoday.com)  
May/June 2020—Vol.33 No.3



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# Creating value from aluminium dross

In response to the growing interest for a circular economy, environmental restrictions and a very competitive market in terms of product quality, process productivity and profitability, the aluminium sector has been pushing the top equipment suppliers to develop competitive technologies and processes to recover the most of the aluminium dross and scrap.

When aluminium is melted, the generated dross should be removed to ensure high quality aluminium. Typically, the black dross (from secondary melting operations) can contain from 5% to 30% of aluminium. By other side, the white dross (from primary smelters) is much richer and contains a higher concentration of metal, which can be from 20% to 80%.

The aluminium content in the dross, even from black or white dross, can be recovered by means of a subsequent melting process. There are several technologies for this process, being the tilting rotary furnace the most effective way to process dross as it maximises energy efficiency and metal recovery.

GHI Smart Furnaces, a leading European furnace supplier, with vast experience in aluminium recovery technologies has developed cutting edge equipment to increase the profitability of dross recovery plants.

As an outstanding reference, GHI supplied and designed together with Befesa, its dross recovery plant in Germany with a total input capacity of 140.000 tpy and its two aluminium recycling plants in Spain with 100.000 tpy each.

The state-of-the-art plants were

developed with the efficient, safest and most sustainable technologies. The plant in Bernburg, Germany has a leading role in the Dross recovery industry. The final products are ingots and liquid aluminium, which are then sold to customers, mainly from the automobile and packaging industry.

## Recovering the aluminium from dross

Today's waste is not waste anymore, but a resource that can be processed to create value. GHI's tilting rotary furnaces along with the salt slag coolers, the holding furnaces and the implemented 4.0 technology, provide the highest aluminium recovery yield, an optimised energy consumption and provide the safest and the most environmentally friendly process of the market.

The main equipment to recover aluminium from dross is the Tilting rotary furnace. GHI Smart Furnaces developed a new concept in rotary melting furnaces which provides profitable metal yields and produces significantly lower contaminant waste than traditional models, which produce high amounts of waste salts. Several references in Europe and Latin

America support these facts.

The value proposition of this equipment can be resumed as:

- Oxy-fuel burners produce a high-intensity flame and better transmission of heat to load.
- The TRF is available in different sizes from 10 to 65t capacity.
- The amount of salts required in the process can be reduced by 50% compared with other types of rotary industrial furnace.
- Lower costs of fume collection and filtration equipment since fewer combustion gases are produced.
- The tilting body of the furnace makes it easier to empty and clean.
- The proven lining designs and qualities increase the equipment lifecycle and minimise the maintenance costs.
- The 4.0 technology developed by GHI, allows the characterisation of the melting process thus increasing the process control and optimising the cycle time.

## Increasing the profitability and minimising the environmental footprint

The salt-slag from the rotary tilting



furnace, usually contains between 3 to 10% of residual metallic aluminium. The salt slag cooling system designed by Befesa and supplied by GHI thanks to its technological partnership, holds the fumes and prevents the oxidation of the contained aluminium, increasing the metal recovery and drastically reducing the space required for cooling the traditional salt slag bins. The fumes, undesired emissions and odours are significantly reduced with this system.

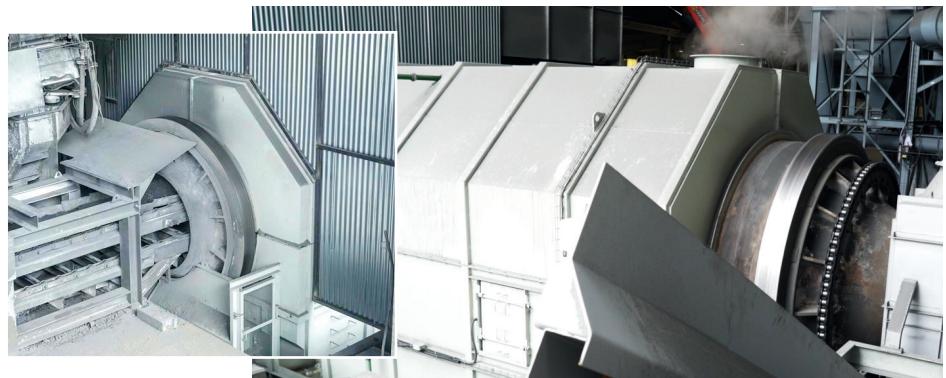
The principle of operation of GHI's salt slag cooling system is based on the cooling down of the salt slag coming from the rotary furnaces, which is later classified depending on the size and metal content.

The cooling system is automatically fed by a fit for purpose conveyor that carries the salt slag from the rotary tilting furnaces, avoiding the use of traditional baskets.

The system triggers automatically when the emptying of salt slags of the rotary furnace starts. The salt slag is poured over the conveyor and is transported to the inlet of the cooler feeding a trommel where it starts to cool down. Cooling below 400°C is accomplished in a few minutes, avoiding the oxidation of the remaining aluminium, and increasing the aluminium recovery.

The trommel has two directions of rotation based on its operation mode: cooling-wise and emptying-wise.

At the outlet of the trommel, the temperature of the salt slag is continuously measured to determine the proper operation mode, and hence the direction of rotation, upon reaching the target temperature. The external side of the trommel is provided with several buckets positioned in such a way that depending on the direction of rotation allow to keep the salt slag inside the trommel, continuing their cooling down, or to discharge the salt slag emptying of the trommel once the target temperature



is achieved. This fact allows this design to be 100% free of any water infiltration, the salt slag never comes in direct contact with the cooling water, which makes this system completely safe.

Once the cooling cycle is completed, at the output of the trommel, the salt slag passes through a screen which based on their size are discharged on two different conveyors, one for dust and fines that transports them to the storage silos and other for coarse items, which convey them for its final storage on bins and recovery of any aluminium content.

Finally, the storage silos are provided with a fully automated vibratory discharging system including a telescopic discharge protection sleeve with level sensors to minimise the formation of dust during the loading of the trucks for its further processing in the external salt slag processing plant.

In addition, in order to control the dust emissions, a complete air treatment system with several suction nozzles is installed in critical points, such as in the cooling output screening, conveyors and storage silo discharge.

#### Ensuring the aluminium quality

The plants are also equipped with reverberatory furnaces, specifically designed for receiving, holding, alloying and preparing molten aluminium. The

open front of the furnaces, allows access to the entire chamber for cleaning and skimming operations, thus optimising finished product quality.

The furnaces have a bath agitation system by means of porous plugs that homogenize the temperature and the chemical composition of the bath, resulting in premium quality metal.

They are provided with automatic tilting systems for more efficient casting control, including a proportional valve in the hydraulic equipment, a tilt meter in the furnace and a laser system to monitor the level in the transfer channel next to each furnace.

#### Smart Plant integration

GHI offers a new concept of complete and intelligent plant with the highest performance in the market and a 4.0 solution that allows customers to move from data-driven insights to data-driven actions.

All the equipment is sensorised, the captured data is analysed in the Beyond 4.0 platform with tailor-made algorithms and big data systems under the most robust cyber security systems.

The dross recovery process is analysed by specialized GHI engineers to optimise the cycle time, improve the process control and provide predictive and preventive maintenance anywhere in the world. ■