

NEW DEVELOPMENTS IN THE PROPERZI INGOT CASTING LINES

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When you attend any seminar or symposium world-wide, you will see that there are, in all sector of industry, always technical papers dedicated to the innovation and to the sustainability of the growth. In fact, these two items represent the biggest concerns for the preparation of responsible future.

Often times, innovation and sustainability go hand-by-hand; as an example, we can consider the hybrid car where the genial idea, based on the simple concept of the recovery of the momentum of any moving mass, has allowed unimaginable fuel savings.

However, not very seldom, either voluntary or involuntary, the innovation is confused with the evolution, being the latter the methodic improvement of something that is already well tested and well proven.

Well, we have now sketched that innovation and evolution contend the podium one to the other in the natural cycle of the development of the technology.

The nonferrous sector, where Continuus-Properti has been operating for almost seven decades, is also characterized by few innovative solutions and several evolution of existing technology.

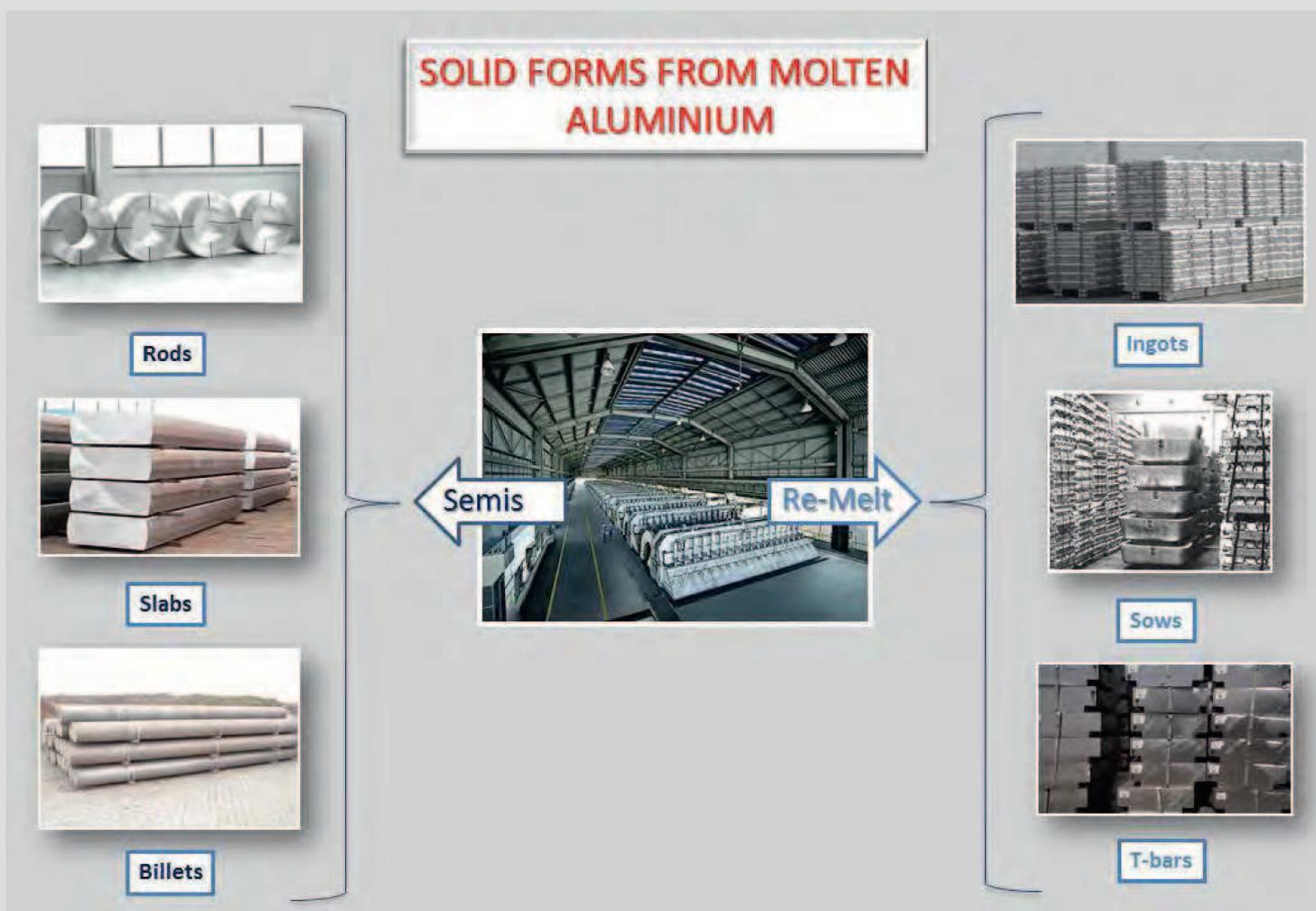
We talk now about Al ingots and see how innovation has completely changed the fashion and the achievable performances. Just to make a short summary, the liquid aluminium,

either coming from smelters cells or coming from scrap reclamation, is oftentimes transformed into semis and/or re-melt forms; we have attached a picture that is self-explanatory.

The re-melt forms include the tee-bars, the sows and the light ingots. The latter are in general packed in bundles having the nominal weight of 1 ton or so. The ingots are in general loaded into the furnace bundle-by-bundle or, in case of very small die caster, those are handled ingot-by-ingot by the user.

The old and consolidated open top ingot casting chains are, and have been, subject to infinite studies (evolution) for improving the overall performances. Such studies are addressed to the very little details like the optimization of the pouring star, the optimization of the wings shape etc. Despite the many improvements done during the years, there still remain some unsolved and unsolvable problems linked to the nature and to the concept design of the system. For those who are familiar with the operation of open top cast technology, the problems of off-size rejection, de-molding failure, dross and foam formation, are something which must be faced almost every day.

Giulio Properti, President of Continuus-Properti and inventor of several patented innovative solutions, tried to find a solution to such problems applying, maybe, the suggestion given by Marcus Aurelius, which translated from Latin to English says more or less: of each individual things ask what is its nature and what does it serve.





Example of traceability data –
by courtesy of Raffmetal

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The ingots seen from the side of the ingot producer is the simplest way to transform the molten metal in solid form. It was therefore very important finding the way or reducing as much as possible the transformation losses in this stage of the process. Yet, the instability of traditional ingot bundles need the study of innovative solutions to achieve the minimization of transportation and storage costs. The attention to the re-melt efficiency was also on the “to do list”.

With these ideas in mind, Giulio Properzi sketched a system where a Continuous Cast Bar, cast into a continuous closed mold, was cut to the length through a dedicated Rotary Shear.

The ingots produced through this innovative system are characterized by:

- >> Repeatable shape and dimensions and, therefore, consistent weight. The length of each ingot is repeatable with a tolerance of $\pm 0.5\%$.
- >> Consistent weight and compact dimensions of the ingot bundles. Two or three straps are sufficient to secure each bundle; the space/cost saving in storage and transportation is a logic consequence and an additional economic advantage.
- >> Skimming is not required and the ingots produced are free of cavities and cracks.
- >> There is no rejection due to off size dimensions and the de-molding problems do not exist.
- >> The traceability codes (name of the producer, type of alloy and cast number), more and more required by the car makers to accomplish with their stringent quality requirements, are automatically carved on the ingots.

- >> The ingots having a standard weight of 8.5 kg, 10 kg or 13.6 kg are produced at a rate ranging from 1,000 up to 2,000 ingots per operating hour.

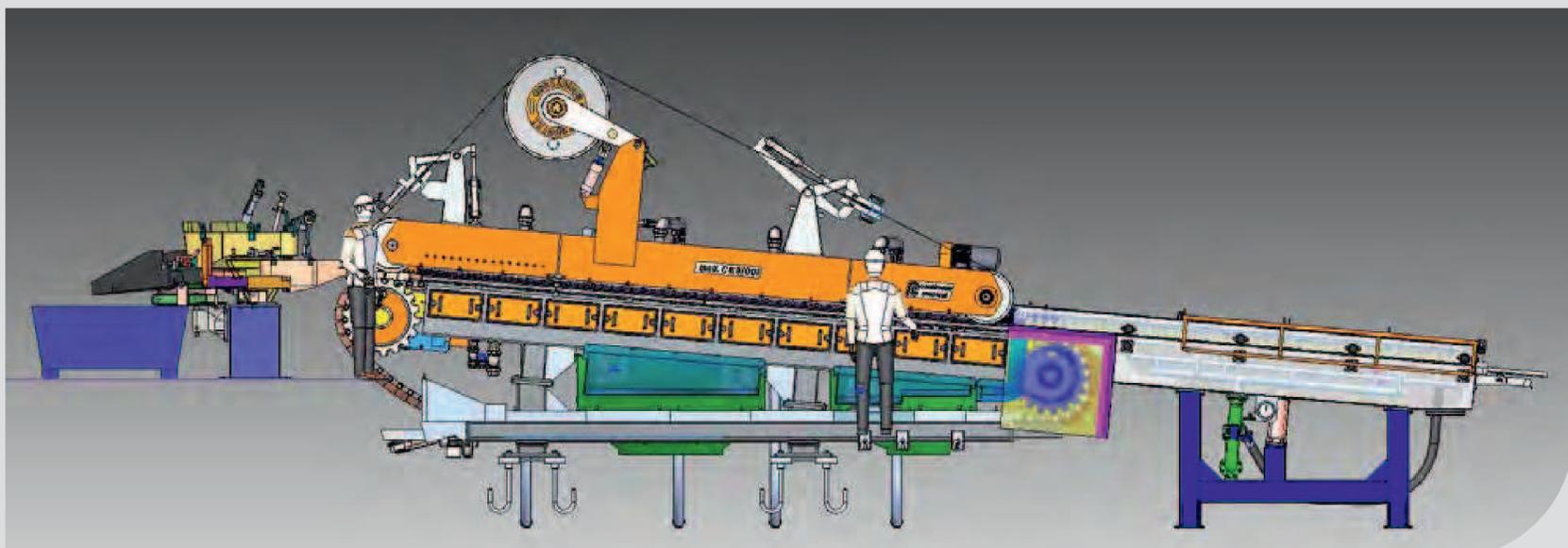
A special attention deserves the concept that “skimming is not required with Properzi Technology”. In fact, statistically, the manual operation of skimming removes from each ingot something like 0.3% in weight; 30,000 kg every 10,000 t of metal processed. A very big number!

The Properzi method of continuous casting and cut-to-length has been implemented in several plants so that millions of ton of ingots have been produced by the most important smelters such as Alba (Kingdom of Bahrain) and Dubal - now part of EGA in Dubai (UAE) and by the most important European secondary refinery such as Raffmetal, Vedani (now Intals), Sacal and Capra.

Sometime in 2014 the Properzi Ingot Casting Line Track & Belt has been further improved with the objective of reducing furthermore the OpEx and the CapEx. The principle of continuous casting and cut-to-length has been reconfirmed. The picture below displays a sketch in 3D showing the new Track & Belt Casting Machine characterized by even easier maintenance and compact dimensions, requiring less space for installation and operations.

The family of the producers of Properzi ingots is growing since we have recently finalized three new orders: one in Russia, one in Poland and one in China covering the supply of such extraordinary equipment.

By C.M.B.



Sketch of new Track & Belt Caster with Bar Cooler