

Through modernizing the sand recycling equipment, the foundry Olsberg Hermann Everken GmbH could double the amount of recycled sand

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Resource saving through material recycling

With an upgrade of the sand preparation equipment Olsberg markedly increases the capacity of the series production line

About 97 % of the moulding sand used in foundries can be recycled. Efficient sand recycling can reduce the amount of waste sand to a minimum and markedly improve the economy of moulding processes. With the objective in mind to enhance the

efficiency of its series production line, the foundry Olsberg Hermann Everken GmbH of Olsberg, Germany, has heavily invested in an upgrade of its sand recycling equipment. A new Eirich intensive mixer, designed for a production rate of 120 t/h ready-to-

use sand, can double the amount of recycled sand and effectively reduce the generation of foundry waste.

Production processes in the foundry industry set standards not only in raw material recycling. Also the avoidance and use of foundry wastes

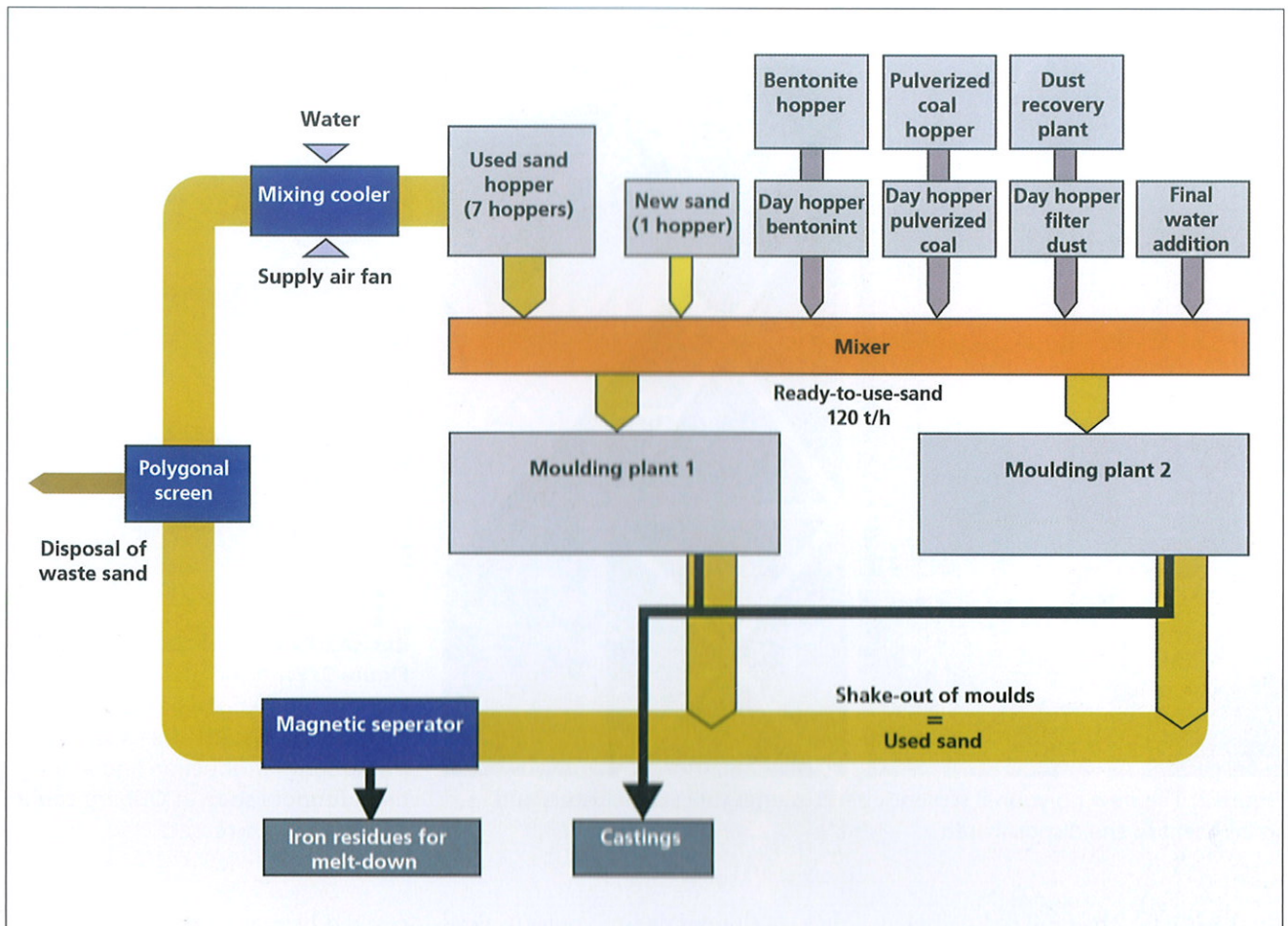


Figure 1: Optimized sand system at Olsberg Hermann Everken GmbH

is an excellent practical example of effective environmental protection. Here especially the conditioning and reuse of the moulding sand plays a key role. Sand is an excellent moulding material due to its extreme high-temperature resistance. Binders such as bentonite, a clay-containing mineral additive, give the sand the required mould strength. In core making, additionally synthetic resin binders are used.

In Germany the legal framework for the recycling of used sand is provided by the Recycling Management and Waste Law in effect since 1996. We are talking about a not to be underestimated magnitude here, as per tonne of casting between 5 and 6 t of moulding sand are required, depending on the casting design and core intensity. Provided that suitable equipment is used, on average some 97% of the sand used in a moulding process can be recycled.

The foundry Olsberg Hermann Everken GmbH has markedly improved the efficiency of its series production line through heavy investments in sand recycling equipment aimed at reducing the amount of foundry waste. This has boosted both economy and ecology of the foundry. The renewal of the equipment was triggered by the fact that the sand preparation plant, originally installed in 1969, was becoming an increasingly serious bottleneck, especially since earlier productivity enhancing investments made by Olsberg had taken effect. Now, as the sand preparation plant has been brought to the latest state of the art, it is possible to use both moulding plants available at the foundry in parallel for series casting. A tangible result of this project is that the amount of recycled sand could be doubled. Now sand preparation capacity is again in a perfect

match with the other manufacturing equipment.

Optimized sand management

After knocking out the castings in the moulding plants or at the hand moulding machines, the castings, return scrap and sand are separated at the shake-out stations. The used sand drops onto conveyor belts and is transported to the sand recycling equipment. A magnetic separator is arranged at the transfer belt for removing any iron residues from the used sand. The iron residues are sent to the melt shop together with the returns. The used sand runs through a polygonal screen, where unusable clusters are separated from the sand and disposed of. Then the screened and recyclable sand is conveyed to an intermediate hopper and from there to the sand cooler, where it is pre-moisturized with water. Following



Figure 2: The new polygonal screen separates unusable sand clusters and sends them to the disposal area

this treatment, the sand is distributed among the used-sand hoppers.

The used sand is removed from the various hoppers by a delivery conveyor in equal quantities to achieve a homogeneous sand quality. To make up for the unusable, disposed of sand, new sand is added to the sand system. The sand management cycle closes at the mixer, where the additives bentonite and pulverized coal as well as water are added in exactly dosed quantities. From there the ready-to-use sand is delivered to the moulding plants (Figure 1).

Modern plant technology

The comprehensive modernization measures at Olsberg in the sand preparation area were realized in two steps starting already in the summer of 2006. The first step involved the installation of a new used-sand cooler. The cooler brings down the temperature of the hot foundry sand. This is an important process, as besides the homogeneity of the moulding sand the sand temperature is a decisive factor for the casting quality – especially for the surface quality. The

new continuous mixing cooler features two stirrers which ensure that the used sand is also homogenized, i.e. mixed and broken up, while being in the cooling chamber. At the same time the sand is moisturized and aerated. When the recycled sand is stored in the used-sand hopper, it features a constant moisture and temperature. The capacity of the used-sand preparation equipment was increased, among others, by installation of new covered belt conveyors, a new polygonal screen (Figure 2) and a new intermediate hopper.

The centerpiece of the new sand preparation plant is a new Eirich intensive mixer (Figure 3) which can process up to 120 t/h ready-to-use sand. The mixer was installed in 2007. Thanks to the new turbo-mixer, the moulding plants for the series casting line can now be efficiently and speedily supplied with batches of sand mixes (containing used sand, new sand and additives) weighing up to 4500 kg and having a temperature around 30 °C. Additionally all critical plant components such as the



Figure 3: With the new turbo-mixer being the backbone of the sand preparation system, the capacity of the series production line in the main foundry shop at Olsberg could be markedly increased.

covered belt conveyors, flexible sand hoppers, delivery conveyors, bucket conveyors and weighing equipment were renewed, complete with the control systems for the sand preparation plant.

Conclusions

The upgrade of the sand preparation equipment was the final step of a comprehensive modernization project that has brought the series production activities at the main foundry shop of Olsberg Hermann Everken GmbH to the latest state of the art. The bottom line of the project is a markedly improved overall productivity, combined with an enhanced surface quality of the cast products. In addition, the company's efficient avoidance of foundry wastes is an excellent practical example of effective environmental protection.

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