



PROTECTING MAN AND ENVIRONMENT

Foundry Sand Valorisation for Use in the Construction Sector

Abstract

A Catalan Technological Centre has deep expertise and know-how on how to manage the valorisation of the by-products produced in the foundry industry, which have become a growing environmental issue in recent times and its control is far from being easy. The centre is offering an Environmental Ecology solution, turning a problem for one industry into a solution for another. The methodology can be transferred through a joint project with foundries and/or consulting companies.

Description

The foundry industry generates a number of by-products, the largest volume of which is spent sand. Spent sand consists of silica sand with residuals of phenolic resin (grey) or clay (green). The developer technological centre has the experience in how to manage the valorisation of this material for other uses.

Sand casting involves making a pattern of the component to be cast, and packing sand around the pattern to produce a hollow mould. It is standard practice to reuse moulding and coremaking sands. Residual sand is routinely screened and returned to the system for reuse. As the sands are repeatedly used, the particles eventually become too fine for the moulding process and "spent" foundry sand must be replaced with fresh sand. This "spent sand" is typically black in colour, and contains a large amount of fines (particles of 100 sieve size or less).

Disposing of foundry sand in landfills is a long-term environmental liability. Control of this liability is not easy because it is subject to landfill operations, construction practices, characteristics of all other waste deposited in the landfill, and escalation of cleanup costs for remediation of sites.

Adequate know-how can identify recycle and reuse options, implement the key activities necessary to

develop a valorisation program, and develop existing and potential market opportunities.

Valorisation has positive effects on the reduction of energy use and of CO2 emission, as the processes needed to obtain industrial sand are avoided (mining - often including blasting and crushing - washing, processing to remove impurities, draining, drying, and sometimes grinding).

Experienced gained from the different projects undertaken with foundries has allowed the developer technological centre to formulate a methodology for the valorisation of both green and grey spent sand taking into account different technical, logistic, economical and environmental aspects.

At the same time, investigation is being carried out in order to find a valorisation alternative for the fine fraction of foundry sand, which is not appropriate for the majority of construction applications due to its physical characteristics (low granulometry).

For this type of waste, the main possibilities which have been considered are: use in ceramic materials, application in rubber industry and application in glass fiber industries and similar. The technical viability of each alternative is being evaluated by the analytical characterisation of the fine fraction of the sand (physical and chemical properties analysis) and different pilot experiences in some interested industries. Afterwards, it will also be necessary to verify the economic viability of the project as well as the receptor environmental, logistic and legal requirements.

Innovations and advantages of the offer

Preliminary experiences has been carried out in some world regions but the sand valorisation procedure, not patentable, is far to be established as a standardized industrial process yet.

The aim of the technological centre is to bring their expertise to as many partners as possible in order to



pursue a more normalized sand valorisation process.

The main advantages of the technology are:

- Converts a substance that is waste for one industry into raw material for another
- Helps to reduce the amount of material dumped in landfills
- Saves foundry money as their waste disposal costs are cut
- Saves the receiver industry money as they pay less for their raw material
- Reduces CO2 emissions that would be generated by extracting the sand at source, with the corresponding social and environmental benefits

Current and Potential Domain of Application

Mainly foundry and road construction sectors.

The valorisation of the sand fine fraction can also be applied in the rubber and ceramic industries.

For further information (including IPR status)

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