

THE STATE OF ART OF THE MECHANICAL RECLAMATION OF USED FOUNDRY SANDS

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1. Introduction

In foundry processes a considerable amount of solid and liquid waste is formed, along with toxic gases emitted to the environment. The solid waste is the best for recycling. The recycling of used moulding sand is now being considered by the Polish foundry industry as a means to solve the technical, economic and, last but not least, ecological problems. And so [1-5]:

- recycling is the factor which creates the advanced technologies of sand recovery from the used moulding and core sand,
- recycling reduces the hazards that the foundry industry creates to its environment,
- in foundry industry recycling is the source of material savings,
- recycling may be great in economical importance.

2. Experimental

Low effectiveness of the classic mechanical reclamation of used sands, especially sands with water-glass requires looking for new, more intensive processes to improve effects of the reclamation procedures. A new 'rotary reclamation - USR' has been developed, this system relies on a sand-to-sand 'rubbing'. Primary disintegrate sand enters the chamber where it falls under gravity on a fast rotating disc. The sand when in contact with the disc is immediately thrown to the outside due to centrifugal force. The sand is retained in the peripheral wall of the disc by a retaining ring allowing a tumbling/rubbing action to take place as further sand enters the chamber.

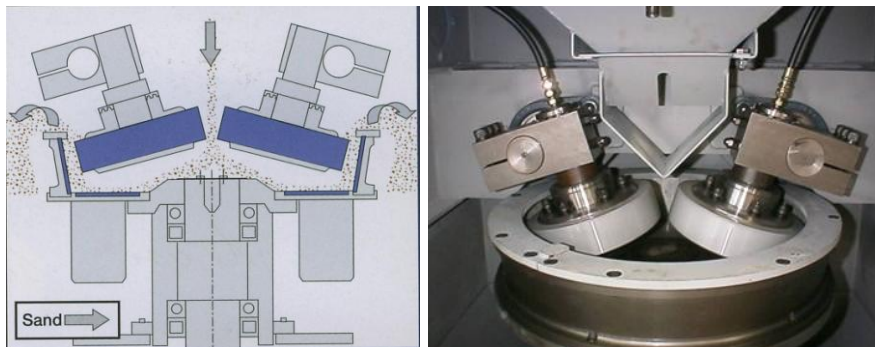


Fig. 1. USR Type reclaimer attrition cell with ceramic intensifying wheels a – general view, b – scheme

Preliminary tests were performed in USR reclaimer. The used sand with a alkaline phenolic resin, characterized by loss of ignition of 2.2% and Potassium content of 0.16% was subjected to the two cycles of reclamation. The result of this tests are presented on figures 2-4.

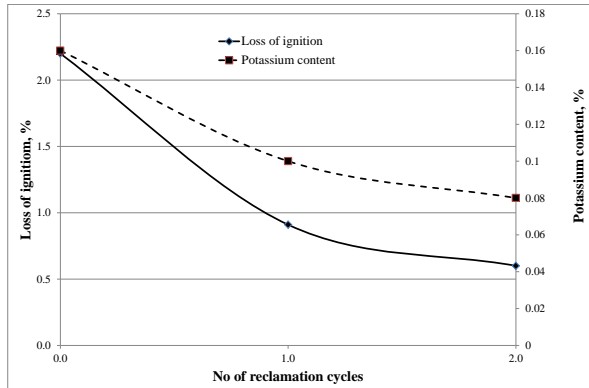


Figure 2. Loss of ignition and potassium content in reclaim after reclamation in USR reclaimer

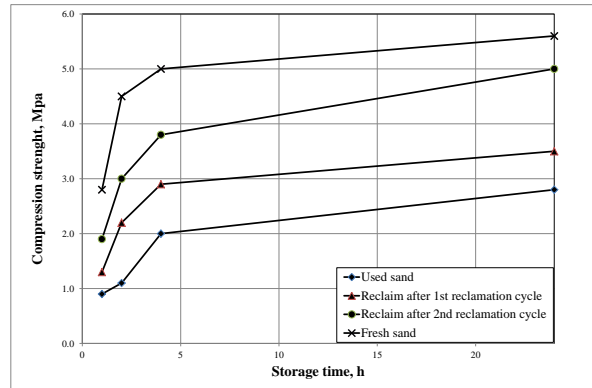


Figure 3. Compression strength of the mouldind sand prepared with reclaim after different reclamation treatment

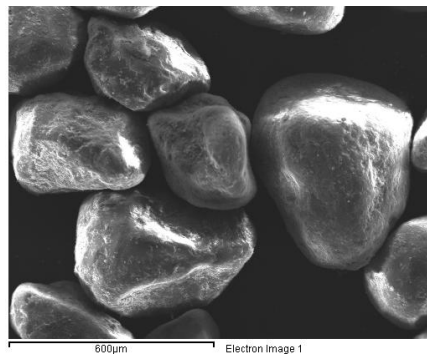
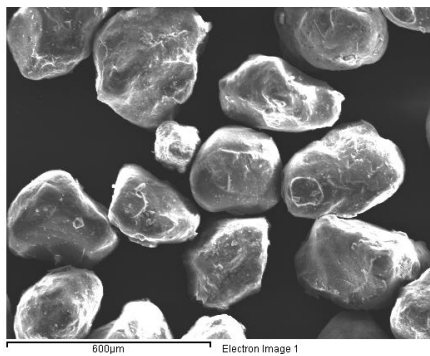


Fig 3. Used sand before and after the reclamation treatment

4. Conclusions

The use of this type of reclamation offers the foundry an affordable opportunity to maximize the reclamation levels to that approaching thermal yet with a much lower capital investment and subsequent running costs. Also due to the fact that there is no thermal calcination of the binder means that hard to reclaim inorganic or semi-inorganic binder systems can be effectively reclaimed using this method.

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