

Reclamation of Molding Sand: A Chemical Approach to Recycle Waste Foundry Sand

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Abstract : Waste foundry sand (total clay content 15%) contains toxic heavy metals and particulate matter which make dumping of waste sand an environmental and health hazard. Disposal of waste foundry sand (WFS) remains one of the substantial challenges faced by Indian foundries nowadays. To cope up with this issue, the chemical method was used to reclaim WFS. A stirrer tank reactor was used for chemical reclamation. Experiments were performed to reduce the total clay content from 15% to as low as 0.9% in chemical reclamation. This method, although found to be effective for WFS reclamation, it may face a challenge due to the possibly high operating cost. Reclaimed sand was found to be satisfactory in terms of sand qualities such as total clay (0.9%), active clay (0.3%), acid demand value (ADV) (2.6%), loss on igniting (LOI) (3 %), grain fineness number (GFN) (56), and compressive strength (60 kPa). The experimental data generated on chemical reactor under different conditions is further used to optimize the design and operating parameters (rotation speed, sand to acidic solution ratio, acid concentration, temperature and time) for the best performance. The use of reclaimed sand within the foundry would improve the economics and efficiency of the process and reduce environmental concerns.

Keywords : chemical reclamation, clay content, environmental concerns, recycle, waste foundry sand

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