

A
Project Report
On
Dezincification from Blast Furnace Sludge/Dust

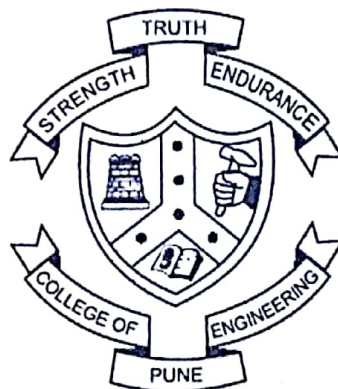
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By

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Abstract

Process waste management and recycling is a big challenge faced by Iron and Steel industry. Contamination of process wastes with material such as zinc, lead etc is the most common problem existing retarding effective realization of valuable minerals from wastes for reuse and recycling.

The steel plant wastes consists of sludges and dusts which have iron valuables which can be recycled helping conservation of natural resources. The contamination of iron ore dust by zinc is one of the common problems faced in BF, SMS. The Zn during smelting operations is evaporated as zinc oxide (ZnO_2) and deposits on the fine iron ore particles which exit through top gases. In order to recycle these material and to reduce the recirculation of the Zn into the process, treatment of these material for separation of zn coated particles is a must.

The Zn coating on the fine iron particles is in micron level and removal of Zn by chemical or thermal processes is uneconomical due to the high volume of such mass. Therefore, the most common treatment adopted is hydro cycloning of the material. However, since the Zn coated iron particle and pure iron particles are near gravity material and their drag force response in the cyclone is similar and hence separation is difficult. To make the separation efficient, the drag force response of Zn coated and other material is manipulated through pressure drop by optimizing the spigot, vortex ratio. The pressure drop is also a function of particle sizes in the feed. A two stage cyclone process has been developed to process the feed with an optimized spigot to vortex ratio in the range of 1.6-2.

The optimized process has been extensively tested in the lab. The separation efficiency of > 80 % has been achieved. The present paper deals with the salient features of mechanism, forces acting on the particles and the measures taken for optimizing the cyclone parameters. The above measures help in effective recovery of iron valuables from process waste and cost effectiveness and mitigating environmental issues of waste management.

Keywords: Process waste, Zn contaminated iron ore particles, cyclone, parameter optimization