

Installation of shot blast machine in cupola based foundry unit

Tags

Type: Unit case study

Sub-sector: Foundry

Location: Kolhapur

Partners: GEF, World Bank, SIDBI, BEE, TERI, IIF–Kolhapur chapter, Kolhapur Engineering Association

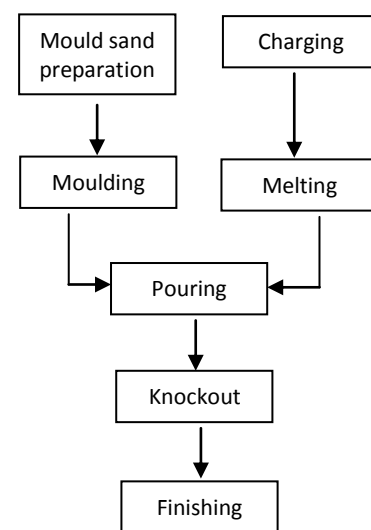
Year: 2012–14

Cluster background

Kolhapur (Maharashtra) is one of the important foundry clusters in India. The cluster has around 300 MSME foundries producing about 600,000 tonne of castings annually, primarily ferrous (iron) castings for the automotive sector, and accounting for about 7–8% of India's total castings production. The production capacity of these units varies from less than 1000 tonnes to over 10,000 tonnes per annum (tpa).

Unit profile

The MSME foundry unit **K11** manufactures graded cast iron (CI) castings. The production is about 1010 tonnes per annum (tpa). The annual energy bill of the unit was Rs 82 lakhs, which was around 22% of total turnover. The major process steps involved in the production of castings include mould preparation, melting, pouring, knockout and finishing. Green sand is prepared using sand mixer and the moulding is done manually. The charge material is melted in a coke-based cupola melting furnace. The molten metal is poured into moulds, which are cooled down and knocked out manually to remove the castings. The castings are subjected to finishing operations such as shotblasting and machining. The sand from the moulds is sent for reuse in moulding process.



Production process in a foundry

Energy consumption

The major energy consuming equipment included the coke-fired cupola melting furnace and electrical motors associated with process equipment such as air compressor, fan, and pump. The annual energy consumption was around 161 tonnes of oil equivalent (toe), comprising coke 97% (157 toe) and grid electricity 3% (4 toe).

Intervention

During the energy audit, it was observed that 25–30% of the material charged in the cupola was made up of runners and risers (foundry returns), which had not been shot-blasted to remove the sand particles and other materials adhering to their surfaces. The presence of these materials increased energy consumption in the melting process.

The unit installed a shot/tum blast machine to remove sand and other materials from foundry returns

As recommended by the energy audit, the unit installed a shot/tum blast machine to remove sand and other adhering materials from the runners and risers. This investment of Rs 9.2 lakhs is saving coke worth Rs 1.6 lakhs annually, with a simple payback period of 6 years. The estimated annual greenhouse gas (GHG) reductions are 18 tonnes of CO₂.

