MSME foundry unit invests in energy efficiency measures—and recovers investment in 8 months

Background

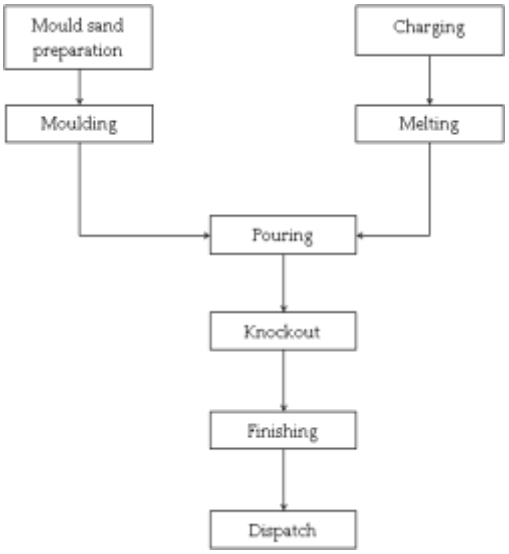
Kolhapur, in Maharashtra, is a foundry cluster. It has around 300 MSME foundries producing about 600,000 tonnes of castings annually, accounting for about 7–8% of India's total castings production. The production capacity of these units varies from less than 1000 tonnes to over 10,000 tonnes per annum (tpa).

Unit profile

M/s **K24** is an MSME unit manufacturing graded cast iron (CI) castings. The annual production is about 467 tonnes. The total annual energy bill of the unit was about INR 63 lakhs. The total annual energy consumption was about 319 tonnes of oil equivalent (toe), in the form of grid electricity.

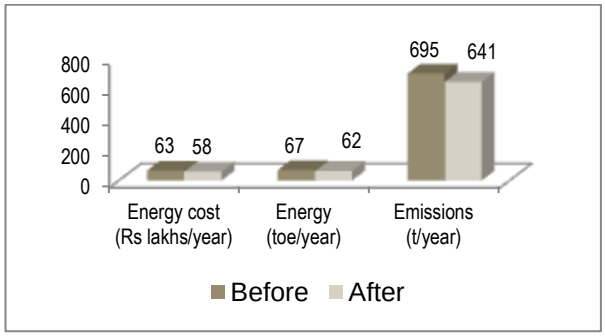
Process description

The major process steps are mould preparation, melting, pouring, knockout and finishing. Green sand is prepared using sand mixer and manually moulded. The charge is melted in an electrical induction furnace. The liquid metal is poured into moulds, which are left to cool and then 'knocked out' manually to yield the castings. The sand is reused, and the castings are subjected to shot blasting and machining to give the finished products.



The major energy consuming equipments used were the electrical induction furnace and electrical motors associated with process equipment such as reaction vessels, pumps, etc.

Overall Impact: post- implementation



Overall Impact

8% reduction in total energy bill (i.e. annual savings of INR 5 lakhs) with a simple payback of 0.6 year

This case study has been prepared under WB GEF Project titled "Financing Energy Efficiency at MSMEs in India". The project aims to identify, design & implement Energy Efficiency (EE) solutions in 500 MSMEs in 5 clusters with potential of EE investment of more than Rs. 100 crore and reduction in GHG emissions equivalent to 1.2 million tonne CO_2. This project is being co-implemented by Small Industries Development Bank of India (SIDBI) and Bureau of Energy Efficiency

INTERVENTIONS

Lid mechanism for induction furnace crucible

Baseline Scenario

The unit's induction furnace had an opening of 400 mm diameter. In the absence of a lid, convection and radiation losses of about 24.85 kWh were occurring.

Recommendation

The unit was advised to install a lid mechanism for the induction furnace.

Implemented Scenario

As advised, the unit installed a lid mechanism for the induction furnace to avoid heat losses.

This investment of INR 2.8 lakhs is saving 19,455 kWh annually, equivalent to INR 1.6 lakhs. The simple payback period is 1.8 years.

Automation in metal pouring system

The molten metal from induction furnace was being poured into moulds manually, using 30– 40 kg ladles. This practice took time and led to higher temperature drops; consequently, molten metal was being heated to higher temperature than required. As advised, the unit automated the pouring system by installing a crane mechanism. This investment of INR 5.3 lakhs is saving 27,619 kWh annually, equivalent to INR 2.3 lakhs. The simple payback period is 2.3 years.

Utilizing small air compressor instead of bigger one

The unit had three air compressors (I, II and III), two of which had a capacity of 100 cfm, and the third, 40.9 cfm. The loading of air compressor I & II was only 4%, where the loading of third air compressor III was 42% (III). As advised, the unit is utilizing only the small air compressor instead of the bigger air compressors. This investment of INR 0.1 lakh is saving 6378 kWh annually, equivalent to INR 0.5 lakh. The simple payback period is 0.2 year.

Reduction in rejections by improving process response study

The rejection level was about 6%. As advised, the unit studied the various reasons for rejections and then identified and adopted better operating practices to cut down on rejections. At no cost, this measure has brought down the rejection level to about 5%, saving about 6676 kWh annually, equivalent to INR 0.6 lakh.

Support provided under the project

- Walk-through & Detailed energy audit
- Identification of energy efficiency interventions in the unit
- Finalization of specifications for the energy efficiency interventions
- Identification of technology providers/vendors
- Facilitation for interactions between unit and technology providers;
- Technical support during commissioning
- Monitoring & Verification

For further information please contact:

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