

Relining of forging furnace to reduce surface heat losses

Tags

Type: Unit case study

Sub-sector: Forging

Location: Pune

Partners: GEF, World Bank, SIDBI, BEE, TERI, Association of Indian Forging Industry (AIFI)

Year: 2012–14

Cluster background

Pune (Maharashtra) is one of the important forging industry clusters located in India. There are more than 50 MSMEs in the cluster involved in the production of forged components, with 20 heat treatment MSMEs functioning as their vendors. The production capacity of MSME units is in the range of 500–3500 tonnes per annum (tpa). Large forging units account for about 65–70% of total production in the cluster, while MSMEs account for about 30–35%.

Unit profile

The MSME forging unit **P3** manufactures forged auto components like axles, gear blanks, flanges and elbows. The average production of the unit is about 3600 tpa. The total annual energy bill of the unit was Rs 128 lakhs, which was about 68% of the total turnover. The first step in the manufacturing process in the forging unit involves cutting of steel rods in the form of billets. The billets are heated in the furnace, forged with hammers and presses, trimmed, and subjected to heat treatment to give the final products.

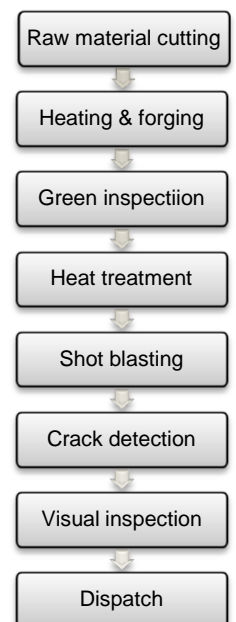
Energy consumption

The main energy consuming equipment used in the unit were three furnace oil (FO)-fired forging furnaces. Other equipment included hammer, press, air compressor, pump, cooling tower, etc. The annual energy consumption was around 224 tonnes of oil equivalent (toe), of which furnace oil (FO) accounted for 91% (203toe) and grid electricity 9% (21 toe).

Intervention

One of the forging furnaces having a capacity of 200 kg/hr and associated with one tonne hammer, had damages in the refractory linings leading to higher surface heat losses.

As a result, this forging furnace showed high surface heat losses, calculated at about 13,100 kCal/hour. As recommended by the energy audit, the unit undertook relining of the forging furnace to reduce surface heat losses.



The unit undertook relining of one of its forging furnaces to reduce surface heat losses

This investment of Rs 0.9 lakhs is saving about 5600 standard cubic metres (SCM) of NG annually, equivalent to Rs 2.2 lakhs. The simple payback period is 0.4 years. The GHG reductions with veneering of the forging furnace are about 4.8 tonnes CO₂per year.