

Successful Implementation – Energy Conservation Measure

Measure
Reduction in Power Consumption in Centrifugal Air Fan by pulley arrangement
Equipment
Centrifugal Air Blower
Industry / Sector
Glass Industry
Year of Implementation
March 2003
Cost Benefit Analysis
☐ Type of Measure : Long Term
☐ Annual Energy Saving : 3.45 lacs Kwh
☐ Actual Cost Saving : Rs 16 lacs
☐ Actual Investment : Rs 0.15 lacs
☐ Payback : Only 7 days
Implementation Highlights
Implementation of measures has resulted into significant benefits
Measure
Can be executed in all types of centrifugal air fans.

Summary

Matching of process air parameters requirement by throttling the air damper results into more power wastages. Power wastages can be avoided by reducing the speed of air fan by pulley arrangement. There is no need of installing the AC drive if process requirement is fixed.

Background

The leading TV glass manufacturing company has two nos of Block Cooling fans (200 kw Centrifugal Air Fan) for cooling the outer surface (Refractories) of glass melting furnace. At a time only one blowers remain in line & other serve as standby. Blowers are operated to meet the pressure requirement of cooling air for Glass melting furnace at 6.5 cmH₂O & was drawing 300 amp current.

It was observed that process air pressure requirement was less then the designed capacity of centrifugal blower 9.5 cm H₂O & about 35 % of air damper was throttled to match cooling air pressure requirement. This indicates that there was no need of operating the blower at full capacity.

Immediate measures were taken to reduce power wastage & it was found that air pressure requirement can be met by reducing the blower speed by 10%. For reducing the speed of blower, pulley of motor was replaced from 15" dia to 13.5"

After reducing the fan speed by pulley arrangement it was observed that blower was able to meet process requirement with 240 amp current.

Air Blower detail - Before implementation

<i>Air Blower particulars</i>	<i>Unit</i>	<i>Details</i>
Centrifugal Air Fan	No	2
Motor Power	kw	200
Rated Flow	CMH	270000
Rated Pressure	cmH ₂ O	9.5
Actual Power	kw	200
Actual Pressure requirement	cmH ₂ O	6.5
Air damper throttling	%age	60

Details of techno-economics

Particulars	Actual energy savings
Present power consumption by air blower	200Kw
Proposed air consumption by pulley arrangement	160kw
Power saving	40kw
Annual Energy Saving @ 8600 hrs	3.45 lacs Kwh
Annual Energy Saving @ Rs 4.65 /-	Rs 16 lacs
Investment	Rs 0.20 lacs
Payback Period	7 Days

Principle

Throttling of air damper results into power wastages. It is to be ensured to flow the air to sections of plant at the fan design capacity. If we are not operating our equipment at rated capacity, then it is better to reduce the load at the motor by reducing the speed according to process requirement.

Implementation issues

In every industrial units there is lot of opportunities for energy saving in centrifugal fan if it running less than its design capacity. A detail systematic study is essential to identify actual process requirement & fan design capacity.

Contact

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