

Successful Implementation – Energy Conservation Measure

Measure
Use of one 50HP chiller pump instead of 4nos of 20HP pumps
Equipment
Centralised Air Conditioning System
Industry / Sector
M/s. Ramco Systems Ltd / Software Industry
Year of Implementation
2003
Cost Benefit Analysis
<input type="checkbox"/> Type of Measure : Medium Investment
<input type="checkbox"/> Annual Energy Saving : 1.23 Lakh Units
<input type="checkbox"/> Annual Cost Saving : Rs. 6.37 Lakh
<input type="checkbox"/> Actual Investment : Rs. 3.70 Lakh (for purchasing two sets of 50HP pump and motor and complete erection including labour charge)
<input type="checkbox"/> Payback: 7 months
Implementation Highlights
<p>Implementation of the measure has resulted in</p> <ul style="list-style-type: none"> ▪ Reduction in energy ▪ Reduction in demand ▪ Increase in power factor ▪ Reduction in maintenance and down time ▪ Easy operation and ▪ Increase in cooling effect about 5%

Summary

It is normal practice to have many smaller pumps connected in parallel to pump chiller water to different air handling units installed in different floors. Since, it a closed loop, we have observed the suction head as zero and maximum delivery head as 30 Mtr against designed head of 43.75 Mtr. Excessive head resulted to throttle the delivery valve of pumps which in turn leads to waste electrical energy

Background

M/s. Ramco system ltd. had five nos. of 20 HP pump operating in parallel and one as standby to cater the entire complex cooling load requirements.

Observations

- Out of five pumps installed, four numbers of pumps are running continuously in parallel.
- Each pump is rated for 20.5 LPS @ 43.75 M Head.
- The suction and delivery pressure was measured by using new calibrated pressure gauges. It has been observed that the suction side pressure was zero and delivery line pressure varies from 27 to 30 M with valve throttling varying from 60 to 100%.

Comments

- It is known that flow is indirectly proportional to the head. Since, the actual system head requirement is only 30M and pumps are designed for 43.75M, each pump will deliver more flow than the required flow. It leads the operator to throttle the delivery valve to avoid pump tripping. Valve throttling can control the flow but it will not control the energy required for 43.75 M head.
- In order to avoid this throttling losses, we suggest M/s. Ramco to go in for one big size 50 HP motor with suitable energy efficient pump.
- Details on Power consumption & delivery line pressures of chiller pumps are given in the following table.

Details of techno-economics:

Particulars	Actual energy savings
Power consumption before implementation	65.22 kW
Power consumption after implementation	36.05 kW
Actual power saving	29.17 kW
Operating hours	14 hrs/day
Annual energy savings @ 300 days	1.23 lakh kWh
Annual cost saving	Rs. 6.37 lakh
Investment for two sets of pump & 50HP motor	Rs. 2.0 lakh
Additional investment for valves, fitting, erection and labours	Rs. 1.7 lakh
Total investment	Rs. 3.70 lakh
Simple payback period, Year	7 months

Present status of implementation

M/s. Ramco systems ltd., Chennai has implemented with the technical support of CSIR, Chennai.

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