Indian Acrylics Limited Sangrur

2003-04

INSTALLATION OF 1.025 MW BACK PRESSURE TURBINE FOR POWER GENERATION USING PROCESS STEAM

Back ground of project: -
Plant requires about 18-20 MT of 5.5 Kg/cm2 steam for heating purposes in the process. From the boilers, the steam generation is at a pressure of about 18 Kg/cm2. After fulfilling the steam requirement at high temperature and pressure, remaining about 18-20 MT of steam is converted to 5.5 Kg/cm2 using a desuperheater system.

Observation made: -
It was observed as the pressure of steam is being reduced from 18 Kg/cm2 to 5.5 Kg/cm2 and the quantity of steam is about 18-20 MT, it is possible to generate power. Steam was being generated at a temperature of 225 deg C whereas the requirement of turbine was at a temperature of 350 deg C that could be done in the boiler superheater. Although this would require some additional fuel but much less in quantity as compared to the generated power. If this power is made available, requirement of power from 6.5 MW turbine will reduce by the same amount and hence less quantity of steam and husk will be required for 6.5 MW turbine.

Technical and financial analysis: -
Whole of the process steam required in plant at a pressure of 5.5 Kg/cm2 is supplied from this turbine and this process steam generates about 550 units from this turbine every hour. So there was a nett reduction in power demand from 6.5 MW by 550 units.

Reduction in requirement of steam at 6.5 MW turbine = 550*40000/6500 = 3385 Kg/hr

Reduction in requirement of husk at 6.5 MW turbine = 3385/4.3 =787 Kg/hr

Increase in consumption of husk due to increase in temperature requirement of 18 MT steam from 225 deg C to 350 deg C	= 18000*0.25*(350-225)/3500/0.8 = 200 Kg/hr
Nett hourly Husk savings	= 587 Kg/hr
Annual savings	= 4696 MT

Annual Energy Savings @ 3500 Kcal per Kg of husk = 16436 MKCal

Annual Cost Savings @ Rs. 1537 per MT	= Rs. 72.2 Lakh
Cost of installation of turbine	= Rs 170 Lakh
Simple pay back period	= 2.35 Years

Implementation: -
The project was commissioned in July, 2003.

INSTALLATION OF ADDITIONAL BAG HOUSE AT BOILER TO REDUCE POWER CONSUMPTION.

Back ground of project: -
In Rice Husk Fired boiler no 3 being used for generation of process steam, an ID fan was being run using 110 kW motor which was running at a load of 50% only i.e. drawing about 55 kW.

Observation made: -
Moreover the pressure drop across the filter was high which was leading to high power consumption. So it was found that it is possible to reduce the resistance in the bag filter so as to reduce power consumption. It was further checked that it might be possible to replace the motor with lower size motor to operate it at higher loading point.

Technical and financial analysis: -
Addition of bag filter was expected to increase the filtration area and hence reduce the resistance to flow of air that shall reduce the power consumption in motor. So after installing the additional bag house, power consumption reduced to 28 kW and the motor was also replaced with 30kW motor instead of 110kW.

Power Consumption in the original system:	55 kW
Power Consumption in the modified system:	28kW
Power savings:	27 kW
Annual power savings:	27*8000
	=216000 kWh
Annual Cost Savings:	=Rs 5.72 lakh
Investment incurred:	= Rs. 7.0 lakhs
Simple pay back period	=1.22 Years

Implementation: -
The project was commissioned in May 2003.

REMOVAL OF DM WATER FEED TANK FROM WASH DRAW MACHINE ALONG WITH ITS PUMPS.

Back ground of project: -
DM water is required for processing of spun tow at Wash Draw machine. It was being received from a heat exchanger in a DM water storage tank and then pumped from the storage tank to Wash Draw machine. using a pump coupled with 2.2 kW motor.

Observation made: -
It was observed that the energy is supplied to Water twice i.e. while transferring it from utility to DM water tank and then from DM water tank to WD machine. For delivering the water to WD machine, two pumps coupled with 2.2kW motor were being used. So it was decided to look into the possibility of removing the tank and give supply of water to wash draw machine directly from the heat exchanger instead of feeding it through DM water tank. It could reduce the connected load of two motors of 2.2 kW along with their running load, the tank, piping and valves.

Technical and financial analysis: -

Power Consumption in the original system:	1.32 kW
Power Consumption in the modified system:	nil kW
Power savings:	1.32 kW
Annual power savings:	1.32*8000
	=10560 kWh
Annual Cost Savings:	=Rs 0.28 lakh
Investment incurred:	= Rs. Nil lakhs
Simple pay back period	= IMMEDIATE

Implementation: -
The project was commissioned in Sept 2003.

PROVISION OF INVERTER FOR REACTOR AGITATOR MOTOR

Back ground of project: -
Polymerisation reactor used for the polymerization of monomers is equipped with an agitator which is required to rotate at a speed of 90 rpm and 140 rpm. So it was provided with a motor of 1450 rpm and a gearbox of reduction ratio as 9.25 along with a fluid coupling between motor and gearbox.

Observation made: -
Speed of agitator is required 140 rpm for the maximum time, which means the rpm of shaft before gearbox shall be about 1295 rpm where as the motor has 1450 rpm and it is reduced using a fluid coupling. As the coupling wastes powers for its own running, it was checked that it could be replaced by inverter drive owing to the reason of affordability of inverter drives.

Technical and financial analysis: -

Power Consumption in the original system:	91.5 kW
Power Consumption in the modified system:	77.4 kW
Power savings:	14.1 kW
Annual power savings:	14.1*8000
	= 1,12,800 kWh
Annual Cost Savings:	=Rs 2.99 lakh
Investment incurred:	= Rs.4.5 lakhs
Simple pay back period	= 1.51 Years

Implementation: -
The project was commissioned in March 2004.

REPLACEMENT OF PIV DRIVE WITH INVERTER FOR MAIN CONVEYER MOTORS OF BOTH POLYMER DRYERS

Back ground of project: -
As per the original system, main conveyer belt of the polymer dryers are running with PIV drive, which has a power consumption of about 1.1 kWh on each installation.

Observation made: -
Because of possibility of reducing power consumption, it was considered to replace the PIVs with the inverters due to the availability of inverter at an affordable price in the market.

Technical and financial analysis: -

Power Consumption in the original system (for two dryers):	1.1 kW*2 =2.2 kW
Power Consumption in the modified system (for two dryers):	0.86 kW
Power savings:	1.34 kW
Annual power savings:	1.34*8000
	= 10720 kWh
Annual Cost Savings:	=Rs 0.28 lakh
Investment incurred:	= Rs.0.60 lakhs
Simple pay back period	= 2.11 Years

Implementation: -
The project was commissioned in Nov 2003.

REMOVAL OF BATCH SOLVENT PUMP

Back ground of project: -
Solvent, Dimethyl Formamide is being fed to Marco Mixer and Waste Solution Batch preparation system separately using two different pumps and different piping system.

Observation made: -
As both the consumers of Dimethyl Formamide were near to each other, possibility of feeding both the system from a single piping system and pump was explored and found its possible to do so. So it was decided to remove batch solvent pump and related piping.

Technical and financial analysis: -

Power Consumption in the original system:	4.15 kW
Power Consumption in the modified system:	0 kW
Power savings:	4.15 kW
Annual power savings:	4.15*8000
	= 33200 kWh
Annual Cost Savings:	=Rs 0.88 lakh
Investment incurred:	= 0
Simple pay back period	= IMMEDIATE

Implementation: -
The project was commissioned in Feb 2004.

PROVISION OF ENERGY SAVER AT WELDING SETS

Back ground of project: -
The plant uses 4 no welding sets in mechanical workshop, R&D workshop, recovery area and Can repair area. Using these sets, welding is done at remote areas also through junction box system.

Observation made: -
Due to higher distance between the welding point and the welding set location, these welding sets were seen running even when there was no welding going on. Moreover there existed the availability of energy savers in the market, which can switch off the power supply during non-usage period.

Technical and financial analysis: -

Annual power savings:	= 40431 kWh
Annual Cost Savings:	=Rs. 1.01 lakh
Investment incurred:	=Rs. 35,000/-
Simple pay back period	= 0.35 Years

Implementation: -
The project was commissioned in February, 2004.

PROVISION OF ENERGY EFFICIENT TUBE LIGHTS IN PLANT

Back ground of project: -
Plant has about 125 fixtures of lights in different areas of operation like polymerization, spinnerette lab, inverter rooms, PCC rooms etc. These areas were provided with 2X40 W double tube light fixtures each of which consumes about 110 W.

Observation made: -
It was found that there are energy efficient lights available in the market, which can be used to replace old energy inefficient tube lights. The power consumption in these energy efficient lights is 28 W. So every tube light could save about 82 W for every running hour.

Technical and financial analysis: -

Power Consumption in the original system:	1,18,000 kW
Power Consumption in the modified system:	30,240 kW
Annual power savings:	= 88,560 kWh
Annual Cost Savings:	=Rs 2.35 lakh
Investment incurred:	=Rs.0.94 lakh
Simple pay back period	= 0.4 Years

Implementation: -
The project was commissioned in January, 2004.