

Excel Industries Limited, Roha

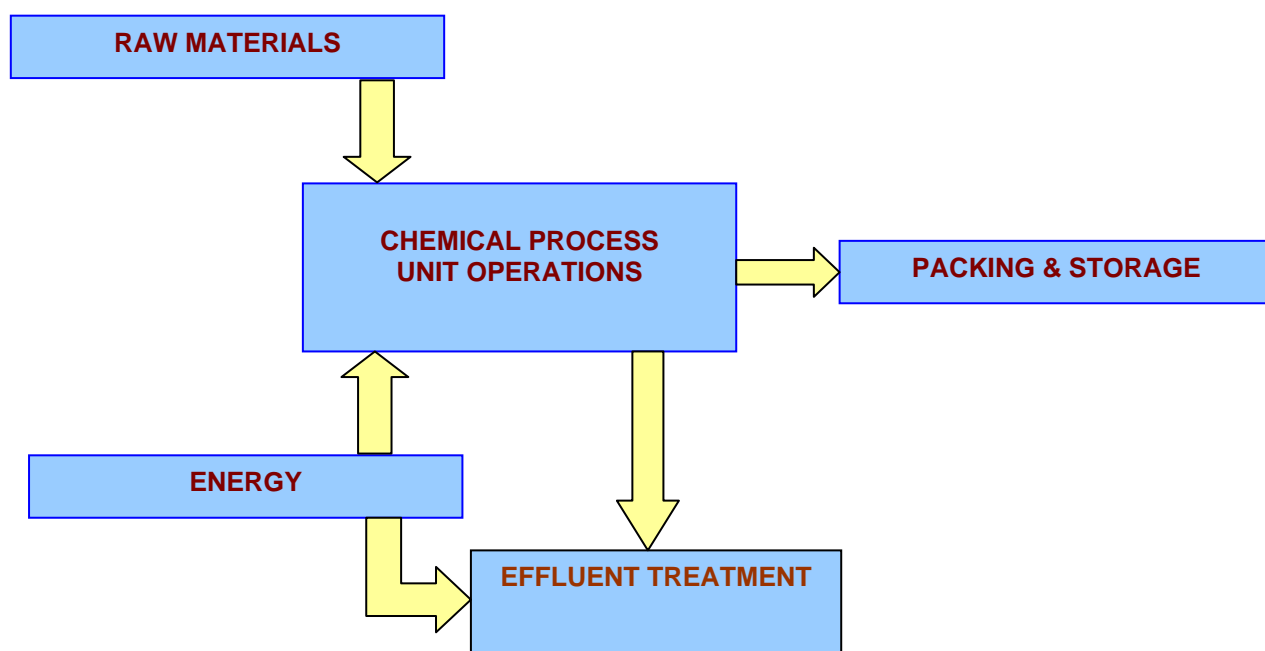
Unit Profile

Excel Industries Limited, Roha is a pioneer in the field of manufacturing industrial chemicals, intermediates, speciality chemicals and agricultural chemicals and leading global manufacturer of Di-ethyl Thiophosphoryl Chloride, Phosphorous Pentasulphide and Glyphosate. Although Excel has a very diversified range in chemicals manufacturing, our main strength lies in chlorine & phosphorous based chemicals.

Excel Industries Limited, Roha unit was started in 1975 with the production of Phosphorous Trichloride. Since then several expansions were carried out with increase in the product range. Presently twelve industrial & agrochemicals are being manufactured at Roha unit. With this utility installations also underwent major expansions.

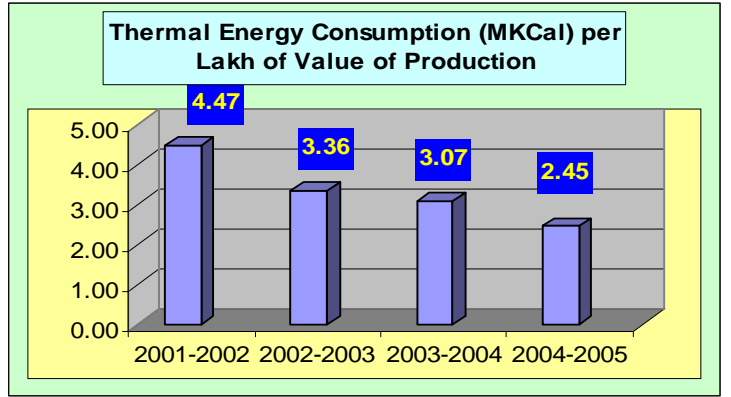
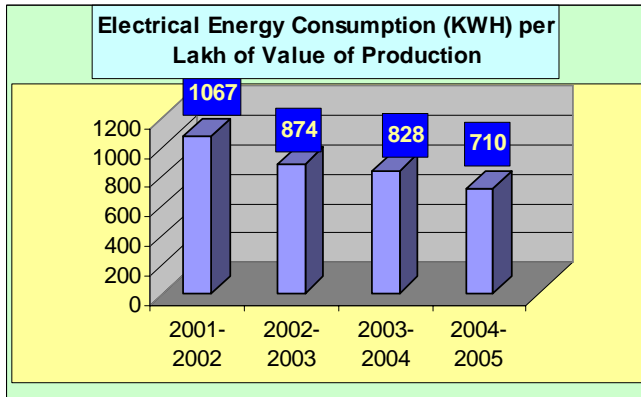
Presently, Roha unit is IS/ISO 9001:2000 and IS/ISO 14001 certified unit.

PROCESS FLOW CHART



Energy Consumption

Decsription	Unit	2001-2002	2002-2003	2003-2004	2004-2005
Value of Production	Rs Lakhs	10875	13154	14366	19336
Electrical Energy	Lakhs KWH	116	115	119	137.35
Thermal Energy	MKcal	48581	44205	44171	47445
Total Energy Bill	Rs. Lakhs	931	947	921	1033
Energy expenses per lakh of VOP	Rs.	8560	7195	6413	5340
Energy expenses as a % of Value of Production	%	8.56	7.19	6.41	5.34
Reduction in energy expenses compared to previous year	Rs Lakhs	-	195	111.6	206.8



Energy Conservation commitment, Policy & Set up

Excel considers Energy Conservation as a measure not only to increase the productivity, but also a tool to deliver our responsibilities towards society and a nation. This, as our policy statement suggests, can be made possible through the involvement of all the members of Excel family as well as active participation & support from the top management.

Energy consumption against the target values is reviewed by top management every month. Energy conservation measures planned, its progress are discussed and reviewed. Quarterly ENCON meeting is conducted in which cross-functional teams from all our sites, including corporate representatives participate. Past performance & future course of actions are decided in these meetings.

Energy Policy

EXCEL INDUSTRIES LIMITED

ENERGY MANAGEMENT POLICY

We, at Excel Industries Limited, are committed to conserving energy and natural resources in all our processes and activities:

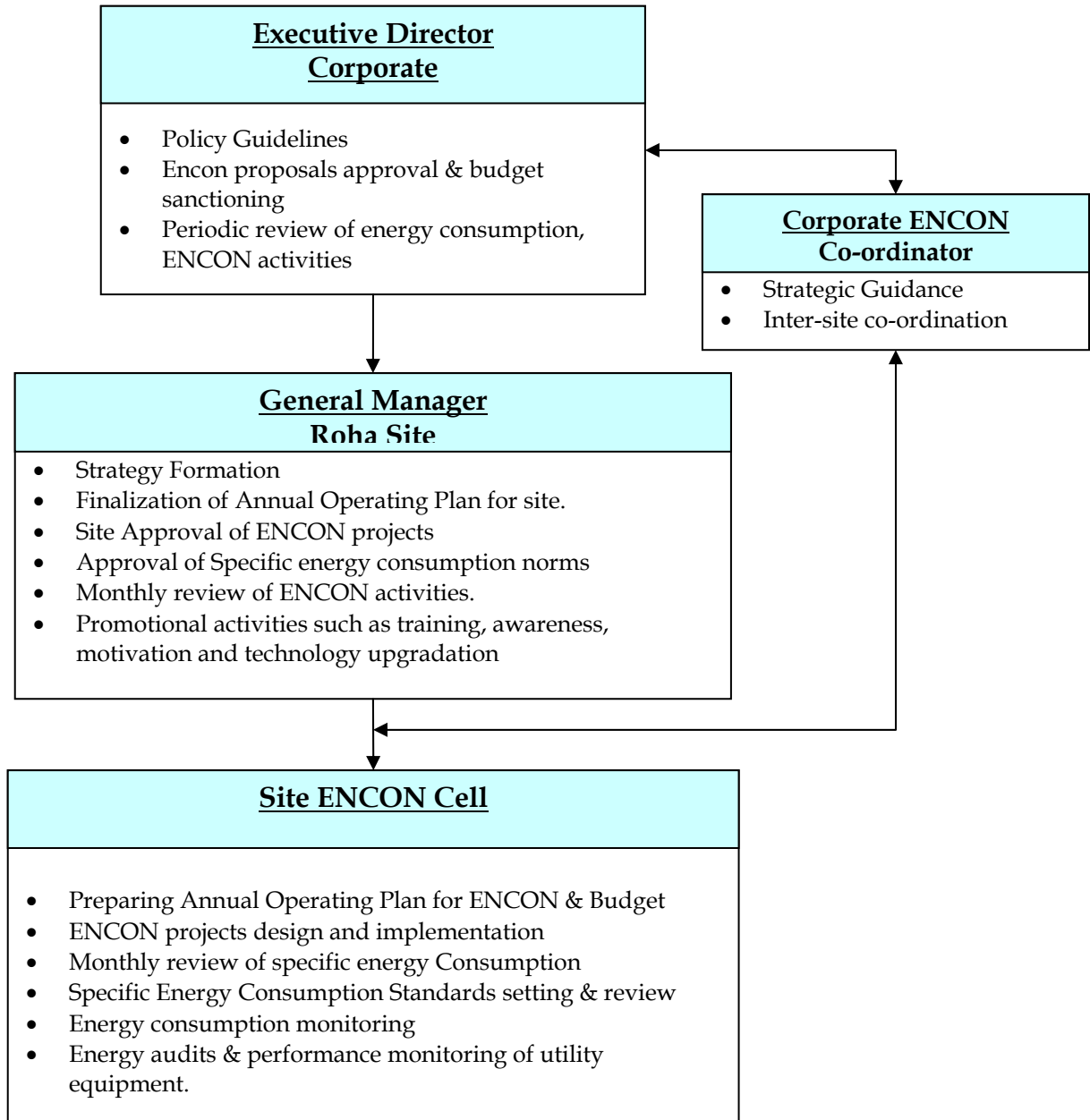
We shall accomplish it through:

- Enhancing awareness of all members of Excel family towards energy and resource conservation and building competence to conserve through appropriate training.
- Maintaining Energy Conservation Cell to coordinate Encon activities:
 - Through review of monitoring and reporting systems and modifications.
 - Providing common platform for information sharing, comparing energy consumption norms within the organisation, with neighbours and with international norms.
 - Considering substitution with renewable energy sources where appropriate.
 - Ensuring management participation and budgetary support to energy management activities.
- Setting targets for reduction in specific energy consumption and developing action plans to achieve them.
- Seeking and exploring energy conservation opportunities through activities like energy balance studies, monitoring of utility equipments, evaluation of specific energy consumption of processes and experimental changes in energy sources.

04 September 2004

S. R. POTDAR
EXECUTIVE DIRECTOR

Our Energy Management Organization is as follows:



Energy Conservation Achievements in 2004-2005

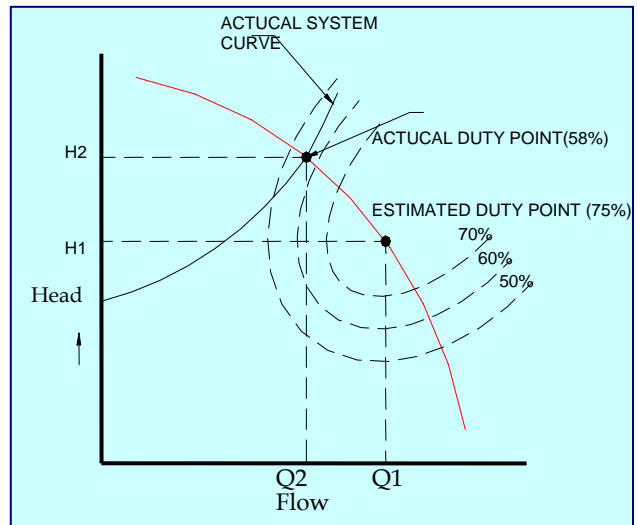
Optimization of Power Consumption in Pumping Systems

After careful study & audit of our cooling water systems, it was observed that the centrifugal pumps were not operated at the desired efficiency levels.

Typical graphical demonstration of actual & estimated efficiencies is shown along with.

After auditing the system, it was observed that estimated duty point defers from the actual duty point in most of the cases. This might have happened due to one of the following reasons:

- Either system curve is not plotted or there are substantial errors in the system curve calculations.
- Actual cooling water circuit is altered from the time of system curve calculations. This may be due to addition / deletion of equipment in the circuit or throttling of valves for process requirement.



To optimize our pumping system, we adopted following strategy:

- Acquire actual duty point by measurement of flow & head
- Calculate the present pump efficiency
- Procure & Install the pump having highest possible efficiency for the given duty point.

Pump Description	KW Before pump replacement	KW after pump replacement	Savings in KW
CW Pump for 160 TR Ref Unit	33.75	30.26	3.3
CW Pump for VAR Unit	34.90	34.90	0
CW Pump for OPA Plant	31.00	11.60	19.4
CW Pump for Aqueous Reboiler	68.09	27.35	20.5
CW Pump for Codex Plant	11.05	04.94	6.1
CW Pump for HCl Scrubber	18.16	10.99	7.2
CW Pump for 76 TR Ref Unit	18.00	11.64	6.4
Chilled Water Circ Pump for DETC-I	24.40	21.50	2.9
Total Savings in KW			65.8

Net Annualized Saving = Rs. 18,23,976/-

Investment Made = Rs. 2,20,853

Payback = 1.5 Months

Boiler Efficiency Improvement

The losses on which any Energy manager has a direct control are Stack Loss & Blowdown loss. We carefully studied the extent of these losses and reduced them as under:

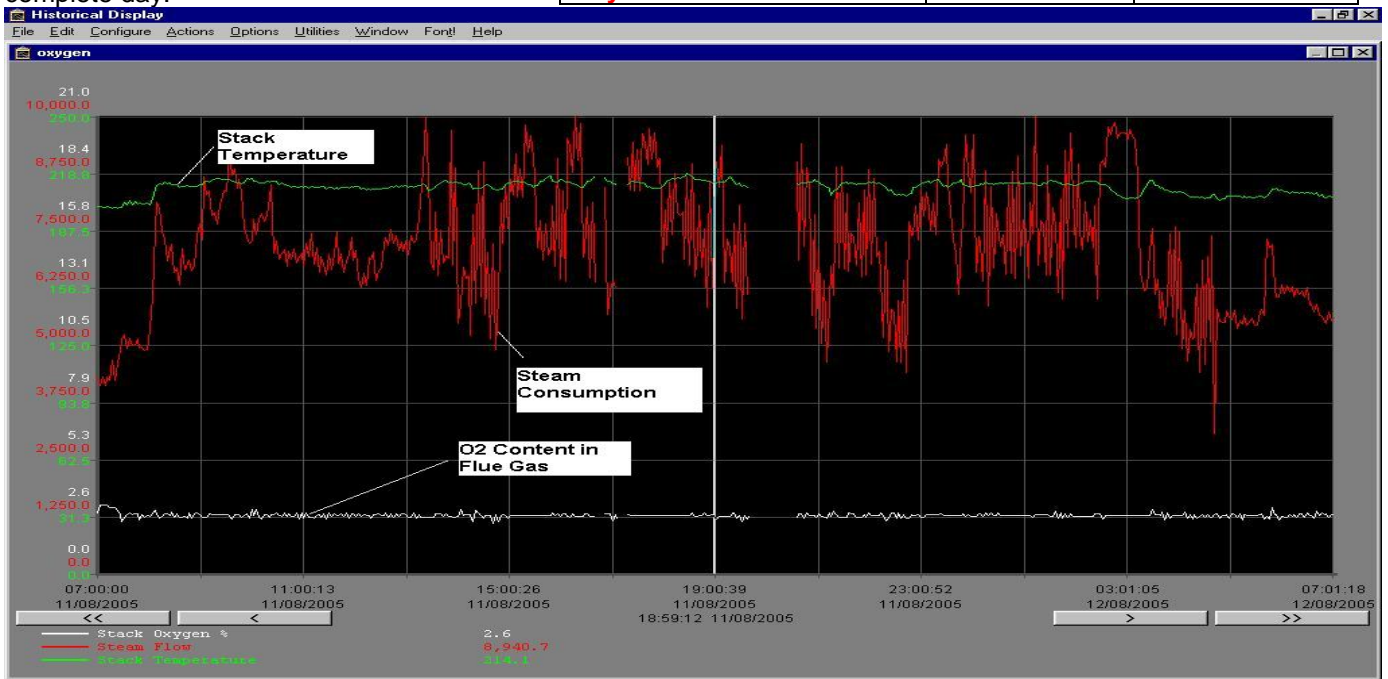
Stack Loss: It was observed that amount of excess air varies from 20% to 55% at various stages of boiler loading. FD Fan damper, although controlling the air flow according to a burner position, has insufficient control over excess air.

The system was installed to directly control the excess air by measuring the oxygen content in the flue gas (which is a direct indicator to amount of excess air), thereby controlling the amount of combustion air electronically through variable frequency drive attached to the FD Fan motor.

Blow-down loss was controlled through improving feed water quality by installing DM water plant and avoiding excess blow-down by on-line pH measurement of boiler water.

	2003-2004	2004-2005
Steam Generation (MT)	32191	42536
Fuel Consumption (KL)	2455628	3139956
Steam to Fuel Ratio	13.11	13.55
Savings in Fuel	Nil	149 KL
Savings in Rs.	Ref	Rs. 16,95,083
Investment Made		Rs. 6,00,000
Payback		4 Months

Actual logged parameters of boiler for one complete day:



Load Side Management to result in reduction in Effective Electricity Rate

The objectives of power supply utilities behind introducing incentives in present tariff structure are to promote efficient utilization as well as avoiding surges in demand in peak hours. In accordance with this, we have taken continuous efforts in this regard, thereby earning the incentives which resulted into reduction in effective tariff rate from Rs. 3.52 per unit in 2003-3004 to Rs. 3.42 per unit in 2004-2005.

Some of the efforts taken are as follows:

- Proper production scheduling (Eliminating certain plant operations in the peak hours)

- Carrying out less energy intensive routine operations (e.g. Filter cleaning, washing, packaging, etc) during peak hours.
- Maintaining the power factor at unity.
- Rescheduling & co-ordinating certain activities to reduce Maximum Demand
- Optimizing the load of plant & street-lighting.

The result of this co-ordination has been reflected in a adjoining table.

Description	Unit	2001-02	2002-03	2003-04	2004-05
Value of Production	Rs. Lakhs	10875	13154	14366	19336
Average M.D.	KVA	2128	2085	2050	2305
Average Loading	KVA	0.623	0.632	0.663	0.684
Electrical Consumption	KWh	116,09,070	115,39,185	119,11,252	13,73,5600
Consumption per Lakh of VOP	KWh	1068	877	829	710
Electricity Bill	Rs	460,85,313	427,42,624	419,83,493	46910836
Electricity Charges per lakh of VOP	Rs	4238	3249	2922	2426
Average Rate of Electricity	Rs/KWh	3.97	3.7	3.52	3.42
Annual Savings	Rs	Reference	31,15,580	21,44,025	76,19496

Savings as compared to previous year = Rs. 13,73,560

Investment = Nil

Energy Conservation through Optimizing Reaction Parameters

The process of one of our important product, PEEB, was optimized using differential diagnosis technique. After detailed diagnosis, following changes were made:

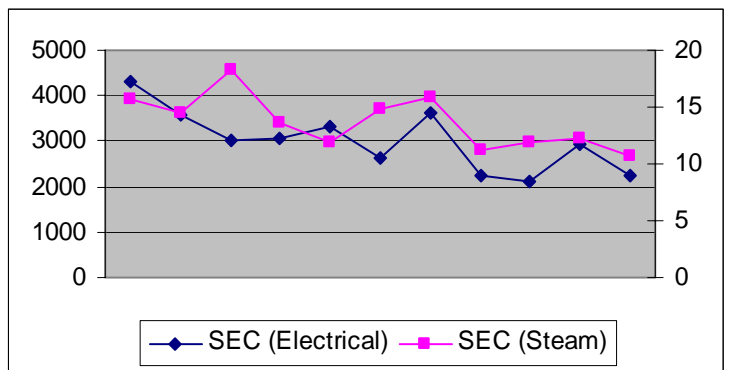
- Reaction temperature range, which was 65° C to 70°C earlier, narrowed down to 67°C to 69°C.
- Quantity of one of the raw material optimized.
- Optimized final distillation method by making changes in output rate and reflux rate.

Due to this optimization, following results were achieved:

- Product yield improved from 82% to 87%.
- Effluent quantity reduced.
- Distillation capacity improved from 15 TPM to 22 TPM with same energy inputs.

This has resulted in substantial reduction in specific energy consumption of that product.

The adjoining graph shows the reduction in specific energy consumption (SEC) of electrical energy (KWH/MT of product) and Steam (MT of steam per Metric Ton of Product).



	2003-2004	2004-2005
Total Production (MT)	73	135
Specific Electrical Consumption (KWH/MT)	4312	2870
Specific Steam Consumption (MT/MT)	15.62	13.42
Saving in Electrical Consumption (Rs.)	Reference	Rs. 6,63,825/-
Savings in Steam Consumption (Rs.)	Reference	Rs. 2,82,150/-
Total Savings (Rs.)		Rs. 9,45,975/-
Investment		Nil
Payback		Immediate

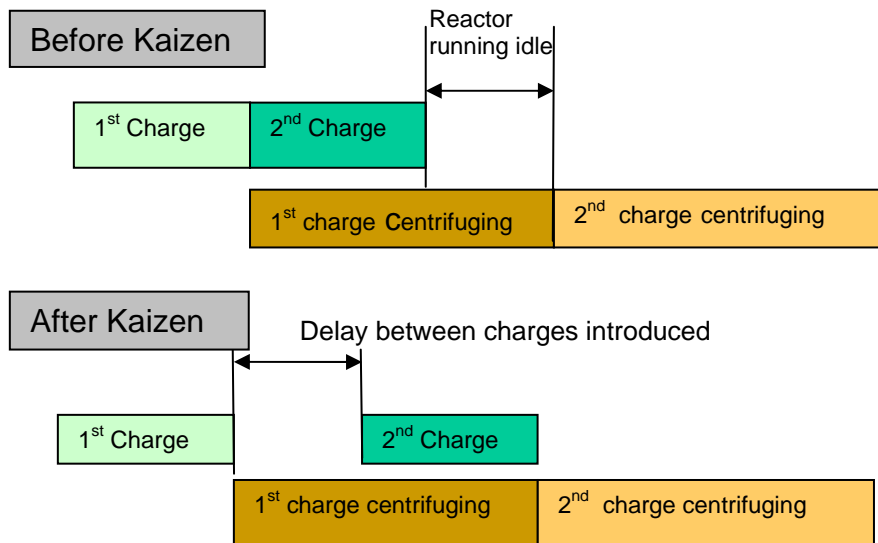
Using KAIZEN Technique for Energy Conservation

Recently, we had employed KAIZEN technique for various purposes like improving productivity, product quality improvement and elimination of inconsistencies.

One of the important feature of KAIZEN is elimination / reduction of wasteful activities.

Our Glytech plant, when studied the process with KAIZEN technique, found that the method can be employed for energy conservation in plant, by elimination of energy wastage.

A **simplified** version of the actual technique used is demonstrated below:

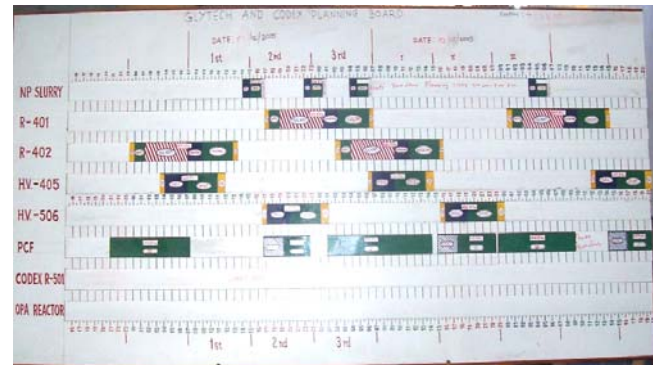
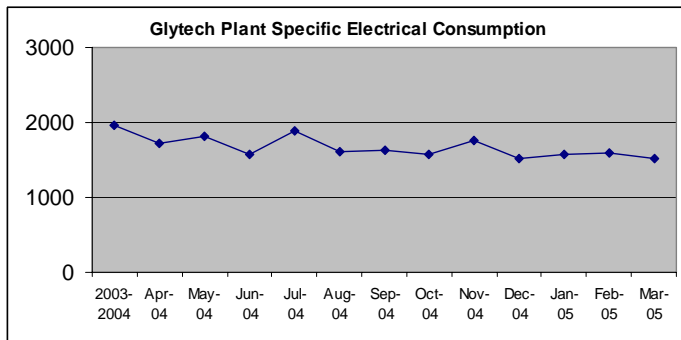


Although, the process seems to be simple, lot of input was involved as there are 3 reactors running at various stages and two centrifuges of different capacities & time cycle.

Main job was the co-ordination of all these equipment for elimination of wastages.

This was achieved through daily planning of activities by KAIZEN technique.

Actual Planning Board in Glytech Plant



Specific electrical consumption of a product reduced from 1954 KWH/MT in 2003-2004 to 1633 KWH/MT in 2004-2005

Actual savings for 867 MT production in 2004-2005 = Rs. 9,50,000 / -

Reduction in Steam Losses

In continuation with our efforts to reduce the steam losses, several measures were taken for reduction in wastages, such as:

- Auditing of steam distribution system by competent authorities & verifying the suitability of installed types of steam trap for the said duty. (About 40 TD type steam traps replaced with Float type traps)
- Regular monitoring of insulation condition of steam headers.
- Improving the insulation of condensate recovery lines, thereby increasing condensate temperature at the boiler feed water tank.
- Audit of steam traps to take corrective action on faulty steam traps (As on today 43 faulty traps identified & corrected)
- Daily monitoring of HP steam headers for any leakages, keeping data on leakages and taking corrective actions as early as possible. (246 leakages identified and corrected)
- Eliminating flange joints with butt welded joints wherever possible (So far, 56 flange joints eliminated)
- Replacement of conventional asbestos gland packings of steam valves with extruded PTFE packings (Gland Packings of 36 valves replaced).

The results of these measure as are follows:

Month	Steam Consumption (MT)	Losses (MT)	% of Total Steam
2002-2003	39,747	6,257	15.7
2003-2004	51,961	6,453	12.4
2004-2005	60,031	4,972	8.28

Savings in steam losses = $60,031 \times (0.157 - 0.0828)$
= 2472 MT (As compared to previous year)

Savings in Rs. = Rs. 24,72,000 per annum

Investment during 04-05 = Rs. 2,86,000

Payback = 1.5 Months

Fuel Substitution

Our Thermic Fluid Heater was designed to run on Light Diesel Oil. LDO being a costlier fuel than furnace oil, it was decided to switch over to FO from LDO.

With little changes in the equipment, such as addition of Oil Preheater and modifications in burner nozzle, the same equipment was able to function on Furnace oil.

This change was made in August 05.

Total fuel consumed in 2004-2005	69553 Ltrs
LDO consumed up to Aug 05	21253 Ltrs
Furnace oil Consumed in 2004-05	48300 Ltrs

Savings achieved in 2004-05	Rs. 2,91,732/-
Investment	Rs. 45,000/-
Payback	2 Months

Optimizing Electricity Consumption in Lighting System.

Several steps are taken to optimize the power consumed by a lighting system such as:

1. Use of natural day lighting

In several departments such as Engineering Stores, Godowns, Refrigeration plant, where it was a common practice to have lights on for 24 hours a day, steps taken to utilize the natural day lighting. Using FRP sheets, substantial improvement in the natural light of the area has been achieved.

About 32 numbers of 2X40 Watts light fixtures eliminated this way.

2. Use of Electronic Ballasts

In administrative & plant office sections, several fluorescent lighting fixtures with conventional magnetic ballasts were used. These were replaced with Electronic ballasts which consume about 35% less energy than conventional ballasts.

3. Replacement of HPMV lamps with Compact Fluorescent Lamps (CFL)

Most of the production units are fitted with 80W/160W HPMV lamps in the Flameproof fixture. With little modifications, we were able to use 23W CFL lamps without hampering luminance level significantly. About 300 such lamps have been replaced, amounting to 23 KW saving in lighting power consumption.

Total estimated Savings (Annualized) = Rs. 3,70,000/-
Investment = Rs. 1,25,000/-
Payback = 6 Months



Fulfilling Our Commitment towards National Campaign on Energy Conservation

A. Energy Conservation at Domestic level



operative Multi-purpose society to give basis to every employee at the nominal purchase of these appliances. We had from our 200 employees for the same lamps, 79 Electronic Chokes and 110 was booked.

With the purpose of creating awareness among our employees about the energy conservation opportunities at domestic level, an exhibition was arranged demonstrating several energy efficient appliances such as compact florescent lamps, electronic chokes, magnetic LPG saving device .



Accordingly, the joint program was finalized by the ENCON Cell & Excel Employees Co-upto Rs.1000 on loan interest rate for the got very good response & order for 450 CFL LPG gas saver units

Our Chairman & Managing Director himself distributed these appliances from his auspicious hands on 18.01.2005.

distributed these

B. Creating awareness



Interactive program was conducted at Excel, Roha on 27.12.2004 with the purpose of creating awareness among employees of Excel & nearby industries in Roha about various energy conservation practices being followed. General Manager (Engg) of M/s Gharda Chemicals shared their experiences with the members of Roha Industries Association.

member industries of Roha Industries plant engineers / departmental heads from attended the program.

Excel is determined to take this activity leading role in creating more interaction in benefit of RIA members & our employees, Group in RIA & conducting activities like other industries, auditors, manufacturers of new technology.



About 38 people including 22 participants from Association and 16 our organization have

further by taking a this field for the mutual by forming an Energy training, interaction with

C. Energy Conservation Awareness Programme for School Children



Excel Industries Ltd., Roha and Maharashtra Energy Development Agency jointly organized the Energy Conservation Awareness programme for students of 10th & 12th standard of local school. About 180 students actively participated in the programme. Students were explained the importance of energy conservation at every level.

After the programme, a quiz competition related to the subject was conducted. Five top scoring students were felicitated.



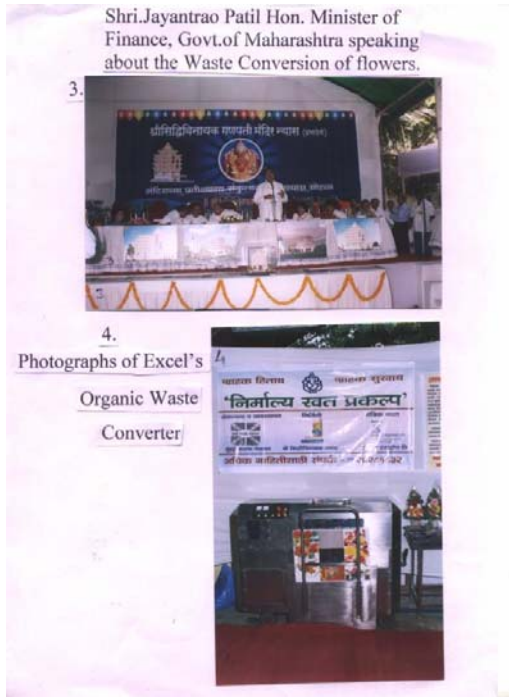
D. ORGANIC WASTE CONVERTER

Excel has developed a device that treats useful organic materials from canteen / kitchen waste thereby avoid severe disposal problem at dump site. Excel's device helps faster bio-conversion of waste into Organic Manure or fuel pellets. This device offers valuable source of Bio-manure for Kitchen

Garden, landscaping or crop cultivation needs. It also offers valuable source of Bio-energy for Industrial / domestic heating needs.

IMPORTANT WASTE CONVERTER

- Eliminates nuisance animal.
- Eliminates bad odour of
- Controls leachate and contamination.
- Controls generation of methane, ammonia,
- Saves the valuable of organic waste. resource such as Bio-Bio-Energy for heating
- Bio-Manure helps to irrigation needs for soil fertility
- Fuel Pellets offers Energy source for heating needs Fuel Pellets replaces wood based energy source thereby saving national forest wealth.



ADVANTAGES OF ORGANIC

- from birds, dogs and
- decaying organic waste.
- ground water
- polluting gases like and hydrogen sulphide.
- land used for land filling Recovery of valuable Manure for Gardening or needs.
- reduce nutrients & gardening and improve
- alternate Renewable
- heating needs

E. RAIN WATER HARVESTING :



Roha, where our plant is situated, lies in the Konkan region of Maharashtra which is famous for heavy rain fall during the monsoon season. Considering this it was decided to harvest this rain water for our industrial use. Accordingly a system was installed to collect the rain water from our Administrative building which has around 500 M2 of floor area. During this monsoon season, about 5 Lacs Ltrs. of rain water was collected and used for industrial purpose.