

COMPANY PROFILE



INFRASTRUCTURE



- ◆ In KBL KOV, all facilities under one roof inclusive of R & D, 4 - Foundries, 7- Manufacturing Shops, Assembly and Testing labs.
- ◆ One of the largest Pump Testing Laboratory in in Asia having capacity to test the pumps upto 3500 kW.

CAPABILITIES



- ◆ Manufacturer of various types of Pumps, Turbines, Valves and Anti-Corrosion Coating Materials.
- ◆ Known for Canned Motor, Sodium & Concrete Volute Pumps.
- ◆ Known for complete solution for pumping.

COMPANY PROFILE



CERTIFICATES

- ◆ ISO 14000 From 2001.
- ◆ ISO 9001 From 1991.



AWARDS

- ◆ **"Energy Efficient Unit" - CII National Award for year 2002**
- ◆ 1st prize for ENCON in Kirloskar Group Company for the year 2001-02.
- ◆ MKRC Energy Management Award in 1991 & 1994.
- ◆ Export Excellence Award for 12 times.
- ◆ National Productivity Award in 1993-94.



CUSTOMERS

- ◆ NPCIL , NTPC , ONGC , L & T , BHEL, LLOYDS, BECHTEL-- USA , EIL etc.
- ◆ Large Scale Exporter of Pumps to 36 Countries.
- ◆ Awarded World's Largest Irrigation Project Order of "Sardar Sarovar Narmada Nigam Ltd." -- Value Rs.450 Crores.





KIRLOSKAR BROTHERS LIMITED



KIRLOSKARVADI

ENERGY POLICY

We, at Kirloskar Brothers Limited, Kirloskarvadi, involved in manufacture of Pumps, Pumping Systems, Valves, Turbines and manufacturing and application of Anti-corrosion Coating Materials, are committed to optimize use of energy in our operations & bring about improvement in the energy efficiency of our processes & products. We will fulfill our commitment by,

- Striving to reduce specific energy consumption by continuously taking energy efficiency improvement measures & minimizing energy wastages.
- Using energy efficient processes & equipments.
- Involvement of employees at all levels in the energy conservation efforts.
- Effective dissemination of information related to energy management to all employees.
- Establishing the energy consumption norms & initiating programs to achieve these norms.
- Increase the use of renewable energy resources like wind power, solar, bio-mass etc.

We shall utilize the knowledge & expertise available from various sources including sister concerns, collaborators & outside experts to bring about continuous improvement in the energy efficiency of our processes & products.

Date:15.08.2004



[R.K.Srivastava]

Director & Occupier



Certification

Awarded to

KIRLOSKAR BROTHERS LIMITED

Kirloskarwadi – 416 308, Maharashtra, INDIA.

BVQI certify that the Management System of the above organisation has been audited and found to be in accordance with the requirements of the management system standards detailed below

STANDARD

ISO 14001:1996

SCOPE OF SUPPLY

DESIGN, DEVELOPMENT, MANUFACTURE AND SUPPLY OF CENTRIFUGAL PUMPS AND PUMP-SETS, HYDEL TURBINES AND MACHINE TOOLS, SPARES. MANUFACTURE OF FERROUS, NON-FERROUS AND ALLOY STEEL CASTINGS. MANUFACTURE AND APPLICATION OF ANTI-CORROSION COATING PRODUCTS. ADMINISTRATION, HOUSEKEEPING AND MAINTENANCE OF KIRLOSKARWADI TOWNSHIP.

Original Approval Date: **07 September 2001**

Subject to the continued satisfactory operation of the organisation's Management System, this certificate is valid until: **06 September 2004**

To check this certificate validity please call : + 91 22 56956300

Further clarifications regarding the scope of this certificate and the applicability of the management system requirements may be obtained by consulting the organisation

Date: **09 October 2003**

Certificate Number: **87873**



BVQI (Holding) S.A. using the accreditation certificate number 008

008

MANAGING/ISSUING OFFICE: BVQI (India) Pvt. Ltd., The Leela Galleria, 5th Floor, Andheri-Kurla Road, Andheri (East), Mumbai – 400 059, India





National Award for Excellence in Energy Management

This is to certify that

Kirloskar Brothers Ltd, Kirloskarwadi

is an "Energy Efficient Unit".

*This is being given on completion of the National Competition for Excellence
in Energy Management held on 2 & 3 December 2002 at Chennai.*

Handwritten signature of K Vasudevan in black ink.

K VASUDEVAN
Chairman
Energy & Power Sub-committee, CII (SR)

Handwritten signature of T Kannan in black ink.

T KANNAN
Chairman
CII (SR)

Handwritten signature of G Jayaraman in black ink.

G JAYARAMAN
Chairman
Award Scheme



**INNOVATING PROJECT
NEW TECHNOLOGY – SURFACE CORROCOATING**

**Energy Conservation in Pumps
A Case Study of the use of energy efficiency enhancement services in pumps**

KIRLOSKAR CORROCOAT EFFICIENCY IMPROVEMENT SOLUTIONS.

Kirloskar Corrocoat high technology composite resin system can be used to restore the hydraulic passages of the pump. These hydraulic passages can be applied with the specially formulated “Fluiglidle range ” of products to overcome above-mentioned challenges.

The Fluiglidle system has very low surface roughness amplitude as compared to original metal substrate. With this not only performance is improved over the existing one but the life of the equipment also increases.

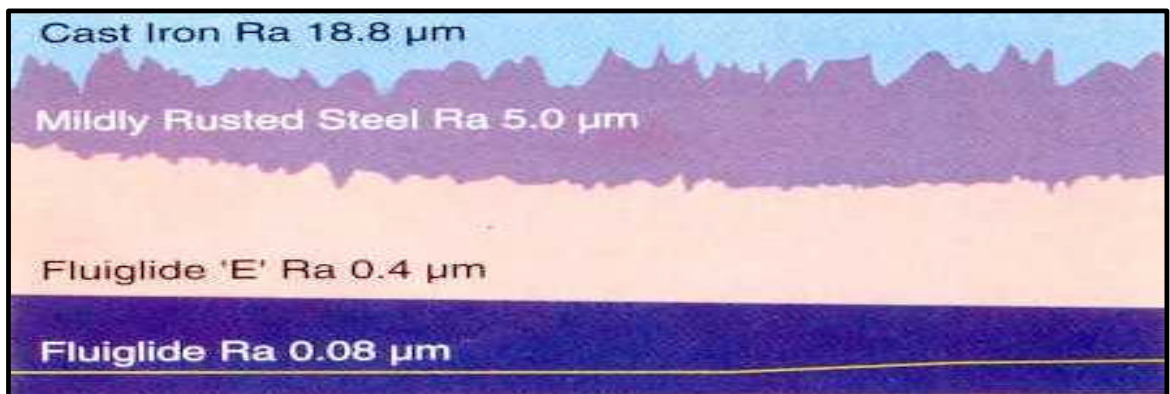
The application of “Fluiglidle” system has shown efficiency gain of 8 to 20% in the pumps coated. These savings translate into savings of millions of Rupees for minimal initial outlays.

These coatings are known to be effective by two established characteristics:

- a. The reduction of surface roughness.
- b. The hydrophobic nature of the surface.

a. The reduction of surface roughness:-

It is well known that surface roughness has substantial bearing on flow characteristics. A rough surface introduces micro or even macro turbulence and eddies in the boundary layer causing an increase in velocity gradient and effective reduction in cross sectional area for laminar flow.





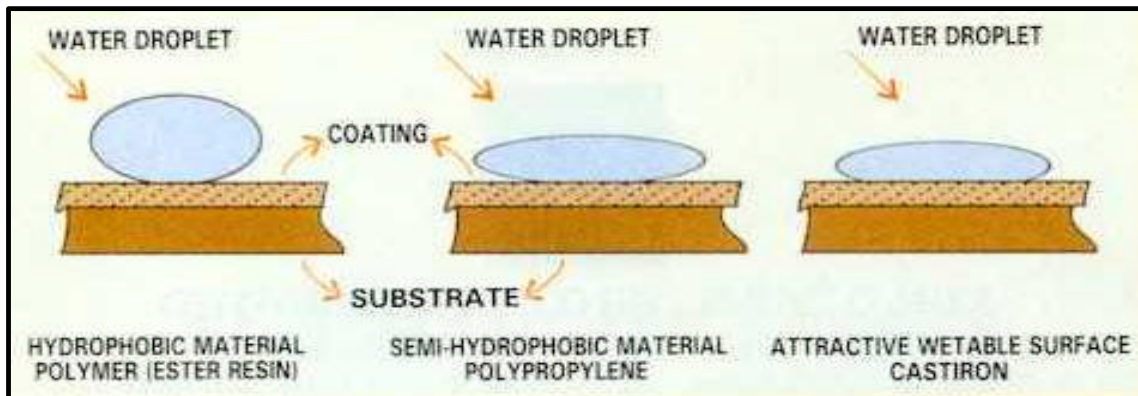
INNOVATING PROJECT NEW TECHNOLOGY – SURFACE CORROCOATING

“Fluiglide” coating with roughness amplitude significantly lower than that of Cast Iron offers a smooth passage for fluid flow thus reducing the frictional losses and directly contributing to enhancement of efficiency.

b. The hydrophobic nature of the surface:-

When the force of attraction between the substrate and the water molecules exceed the cohesive forces in the liquid, then the water or other media will spread across the surface until a state of equilibrium is reached between the two. Therefore, where the surface energy is high, low contact angles will be achieved and where surface energy or attraction is low, the high contact angles will result in larger gradients in velocity between the mainstream flow and the boundary layer. In the case of aqueous media, materials which have low surface attraction or are hydrophobic and repel water, thus result in lower friction losses than surfaces which are highly attractive to water molecules.

As all common untreated metals have relatively high attraction energies wetting out of the surface with aqueous media and the consequent low contact angle is readily achieved. A substantial reduction in boundary layer friction can therefore be achieved by utilizing a coating, which is hydrophobic. The effects of this are illustrated in Figure below.



It has been observed that efficiency gains from coating for pumping systems are presented in two different ways:

1. An increase in flow (water output) for the same input energy (electrical consumption).
2. A reduction in input energy for the same water output.



**INNOVATING PROJECT
NEW TECHNOLOGY – SURFACE CORROCOATING**

It is possible to obtain the combination of these two extremes and this is usually the case. The actual improvements achieved depend on various factors including the specific speed of the pump.

Optimum Solution :

Our approach in carrying out this job is to provide a solution that will ensure the projected improvement in efficiency and saving in energy cost. We use a combination of coating technology and our experience in the design and manufacturing of pumps to achieve the desired results. A successful execution of a job of this nature requires engineering inputs and it can not be limited to just the application of the coating system.

Case Study – I :

REFURBISHMENT AND EFFICIENCY IMPROVEMENT OF 20 " x 24 " HORIZONTAL SPLITCASE PUMP FOR A FERTILISER PLANT IN MAHARASTRA

BACKGROUND

In this plant, 20" x 24" horizontal split case pumps are working for supplying cooling water. These pumps were designed for 55 meter head and 3900 M³ / Hr. flow at 90% efficiency. During the course of operation Customer observed that these pumps were operating at lower efficiency. Hence it was decided based on earlier experience that they will carry out the efficiency improvement job from Kirloskar Brothers Limited. At this point Customer approached Kirloskar Brothers Limited. A proposal was put forward by KBL to increase the efficiency to higher level by modification to the casing and application of energy efficient Fluiglide system

Customer placed an order for refurbishment and coating of pump.

Observation and Remarks:

Parameters	Performance Testing in as it is condition before coating	Performance Testing after coating
Flow in m3/hr	3962	3886
Head in Meters	54.91	55.24
Power in kW	748.79	681.52
Efficiency %	79.13	85.79



**INNOVATING PROJECT
NEW TECHNOLOGY – SURFACE CORROCOATING**

Results:

Saving in Power	67.27 k
Saving in Energy	589285 kWh
Saving in Rs. Per annum	26,51,783/-

Case Study II :

Type of the pump: Horizontal Split Case Pump.

No of Years of use: More than 10 Years

Application: Cooling water

Results:

Parameters	Parameters Before Application of Coating System	Parameters After Application of Coating System
Flow in LPS	1024	1027
Head In Meters	44	44
Input Power in Kw	540	510
Efficiency at BEP	81.80%	86.89%

Saving in Rs.: 11,82,600/--

Case Study III

Type of the pump: Horizontal Split Case Pumps.

No of Years of use: 10 Years

Application: Cooling Water

Results:

Parameters	Pump A	Pump B
Flow in LPS		
Head In Meters		
Increase in Efficiency	9%	5.5%
Decrease in current	7.67 %	5.65 %
Power before coating	1192.8 kW	1202.2 kW
Power after coating	1101 kW	1134.24 kW



**INNOVATING PROJECT
NEW TECHNOLOGY – SURFACE CORROCOATING**

Conclusion:

Parameters	Pump A	Pump B
Saving in kWh/annum	804168	595330
Saving in Rs.	3618756.00	2678985.00

Case Study IV

Model of the pump: 8" x 10" Horizontal Split case Pump.

No of Years of use: 7 Years

Application: Cooling Tower

Results:

Parameters	Original Specifications	Parameters Before Application of Coating System	Parameters After Application of Coating System
Flow in LPS	208	210	209.7
Head In Meters	60	57.58	60.12
Input Power in kW	143	148.9	141.45
Efficiency at BEP	86.5 %	79.9 %	87.39 %

Efficiency rise in Points: 7.49 and it is more than the duty point efficiency at the time of procurement.

Saving in Rs: 2,93,679/- Per year.



**INNOVATING PROJECT
CAST IRON FOUNDRY**

1. IMPROVEMENT IN YIELD OF CI FOUNDRY

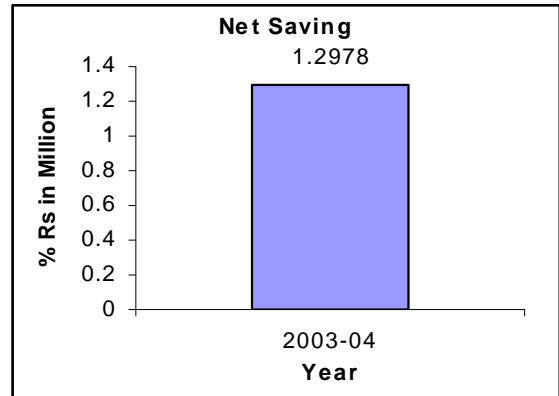
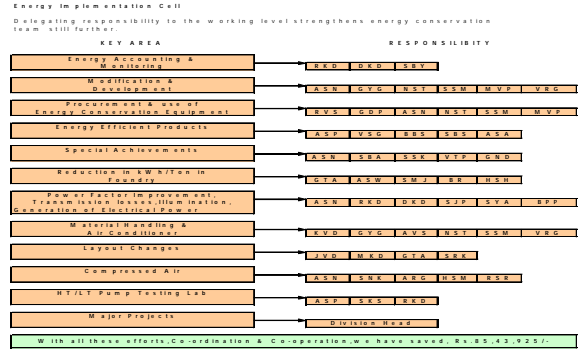
Good Casting :

2002-2003 – 2882 TON

2003-2004 – 3500 TON

Action Taken :

- *Multiple patterns on single match plate
- *Improvement in gating system
- *Less Pigging



2. REDUCTION IN ADDITIVES FOR CUPOLA FURNACE IN CI FOUNDRY

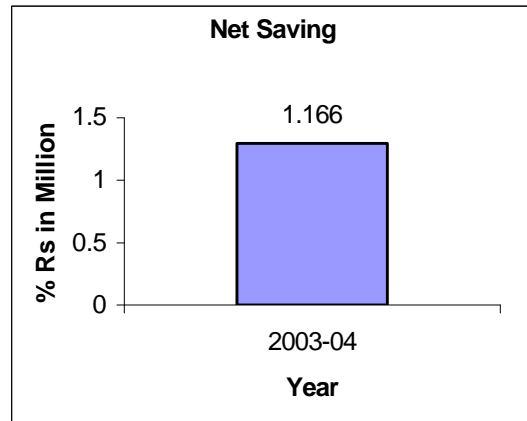
Silicon Consumption:

2002-2003 – 48.0 TON

2003-2004 – 26.4 TON

Action Taken :

- *Silicon recovery acceptance standard increased to 75% minimum in Ferro-Silicon
- *Silicon % in pig iron is changed from 1.7% to 2% minimum
- *Silicon losses due to oxidation by improving cupola operation



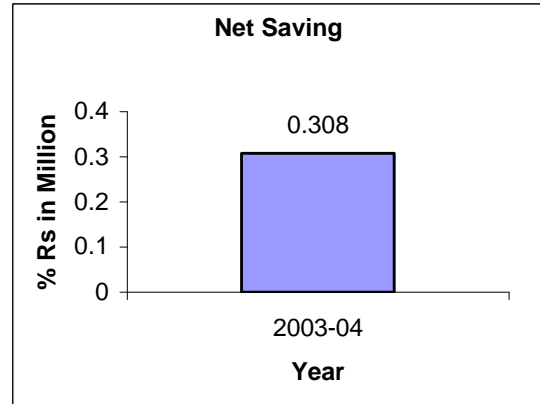
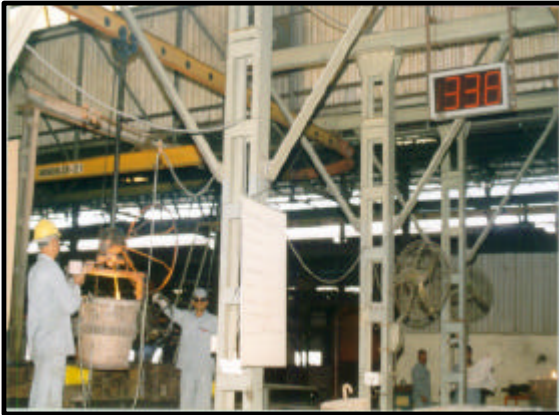
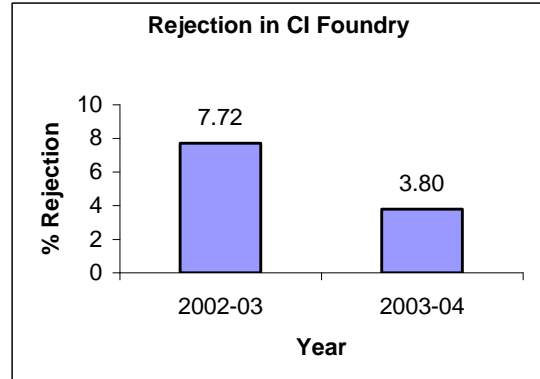


**INNOVATING PROJECT
CAST IRON FOUNDRY**

3. REDUCTION IN CASTING REJECTION OF CI FOUNDRY

Action Taken :

- *Temperature of metal is controlled between 1350 – 1400 degree
- *Chemistry of metal is well controlled.
- *Mould boxes are re-machined for proper resting qty 75 nos
- *Use in-house core baking facility
- *Adoption of Andon monitoring System to reduce plant breakdown.



4. REDUCTION IN COKE CONSUMPTION IN C.I. FOUNDRY

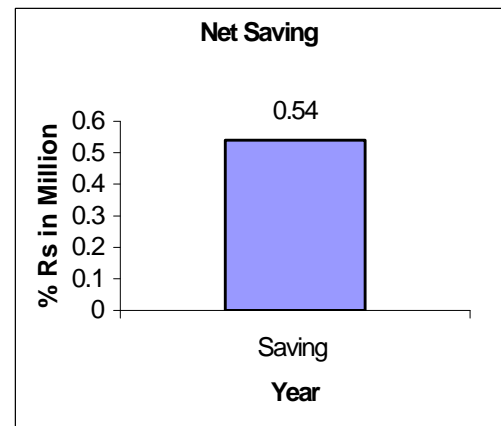
40 Kg. Coke was required for 500 kg charge during year 2002-2003.

Now 35 kg coke is required for 500 kg charge for year 2003-2004.

No. of charges during this year = 9000.

Action Taken :

Trials were carried out by reducing coke step by step to obtain metal temperature to 1400 deg. Finally consumption reduced to 5 kg per charge





EXTENT OF TEAM WORK IN ENCON

We have Energy Conservation team of ten members comprising energy manager. The team changes every year. Team members are selected from various departments like Maintenance, Production, Foundry, Account, Purchase, Design, & Ind.Engg.Division etc.

There is monthly meeting and in this meeting, we discuss various new techniques about Energy Conservation, review of last meeting etc. We make future plan for every year and accordingly budgetary sanction is to be taken from top Management. Every member conducts brainstorming with his work force and takes out suggestion for Encon and he presents collected data during monthly meeting, which enables us to prepare future plan. The Encon project is decided by energy committee and put for sanction in front of top management. Supervisor and workman do implementation of this project. This Encon is a totally team work. Yearly Goals are also taken from various departments, which are given by middle management.

Following data sheets are enclosed for more information.

1. Energy Policy
2. Approach to Encon.
3. Encon process
4. Training & awareness.
5. Norms & Encon implementation cell.
6. Future plans.
7. Encon Team



EXTENT OF TEAM WORK IN ENCON

Energy Policy



KIRLOSKAR BROTHERS LIMITED



ENERGY POLICY

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Date:15.08.2004



[R.K.Srivastava]
Director & Occupier

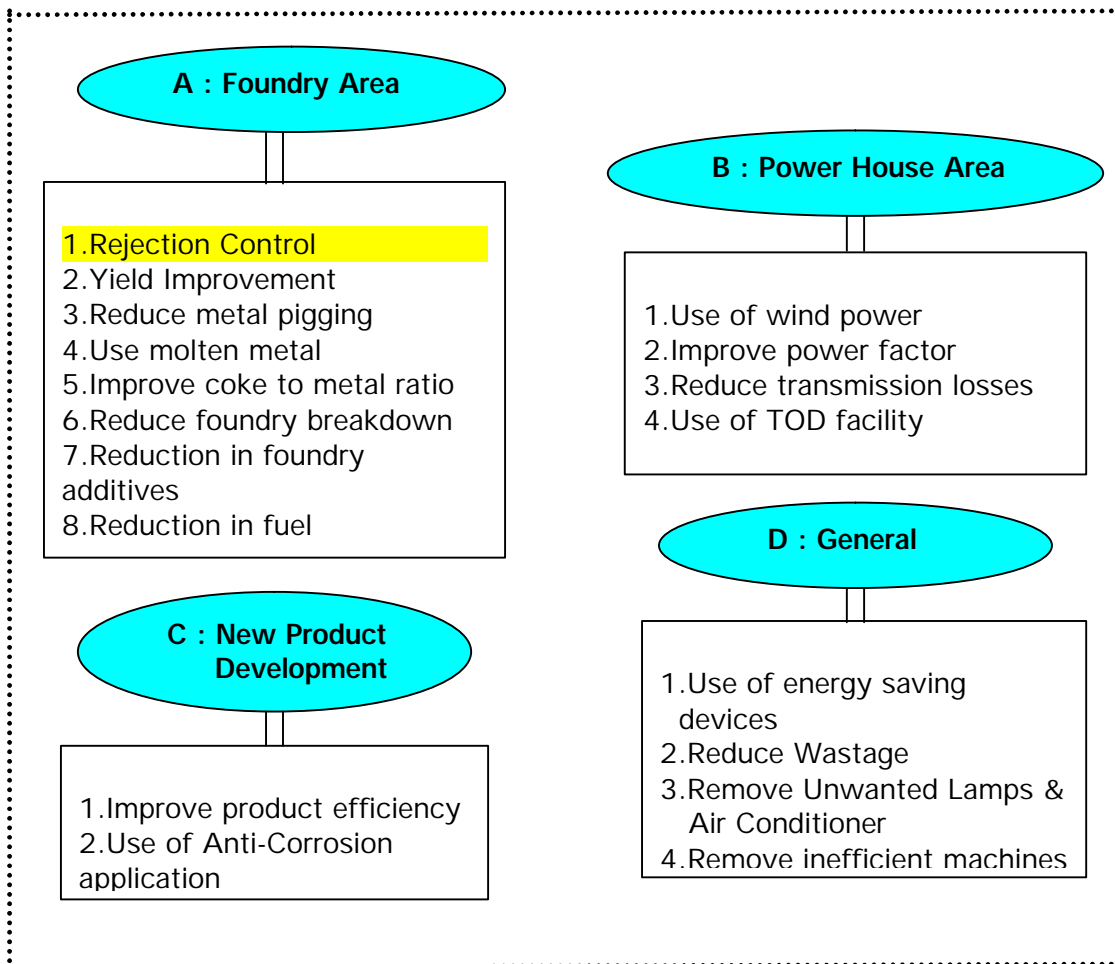


EXTENT OF TEAM WORK IN ENCON

Approach to Energy Conservation Activities in KBL Kirloskarvadi

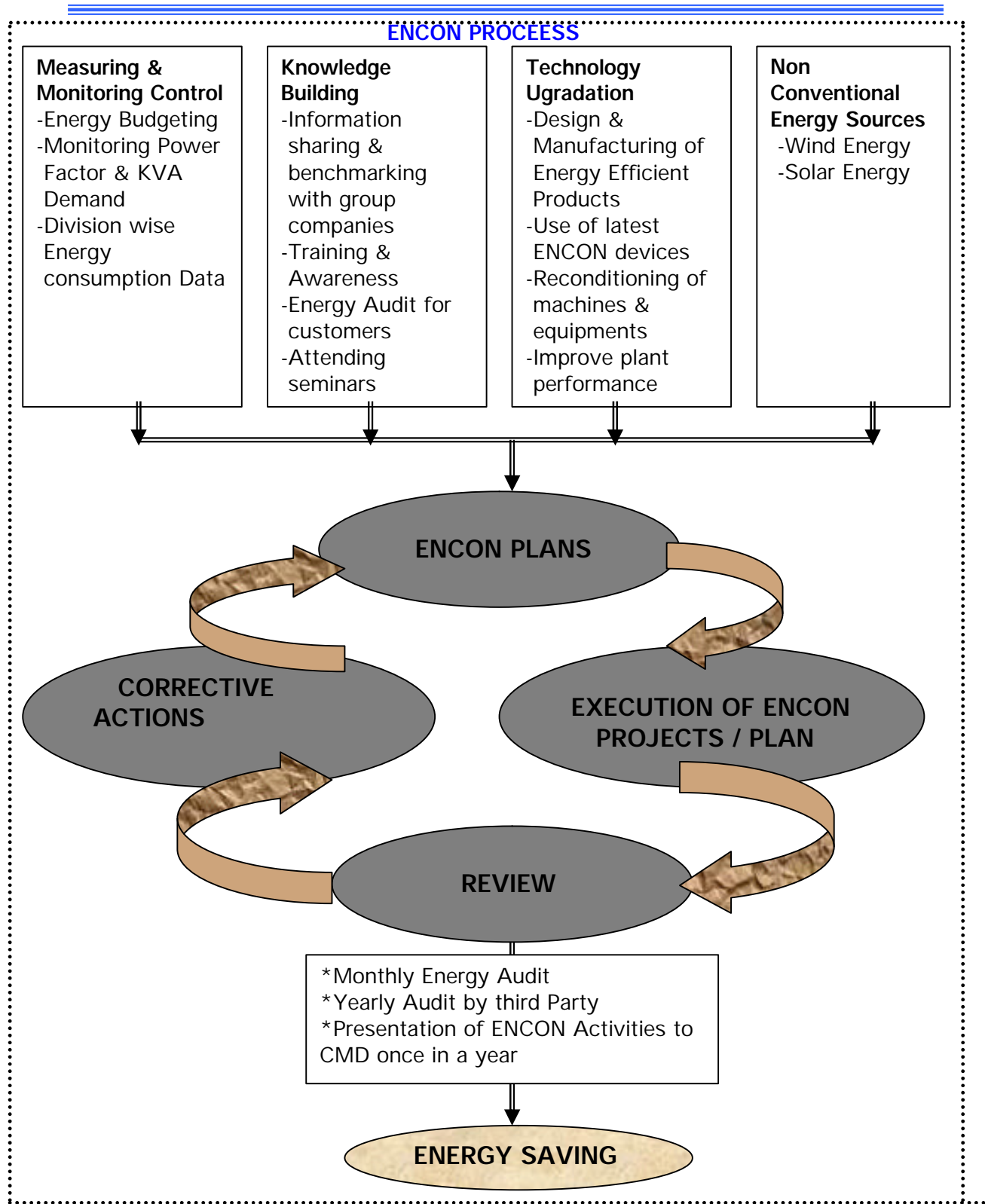
Being a continuous process we are working on ENCON since Last 18 Years .KBL, Kirloskarvadi is operating Different size of Machine shops; Foundry activities & maintaining Colony.

Through our different interactions with Energy Conservation Organization, feedback from Yearly Energy Conservation Audit reports, visits at various organisations & because of increase in general awareness regarding Energy Conservation it is observed that, large amount of potential is there for Energy Conservation. To achieve maximum benefit from Energy Conservation following focus areas were decided by our Team at the beginning of the year.





EXTENT OF TEAM WORK IN ENCON





EXTENT OF TEAM WORK IN ENCON

TRAINING & AWARENESS :

Following are in house & outstation training program or learning on energy conservation.

- 1) ENCON Policy is reviewed by involving all level of employees.
- 2) Implementation of Kaizen activities at all sections.
- 3) Mr. A. S. Nilpankar, Mgr.(Plant Engineering Division) is certified Energy Manager by FICCI.
- 4) Mr.A.S.Nilpankar, Mgr. ,A.S. Wagh AM & B. S. Patil AM had visited M/s. KOEL & M/s. KCL karad.
- 5) KBL participated in CII, All India Energy Competition. KBL has got National level “Energy Efficient Unit” award.
- 6) Foundry team visited various foundries like Ashok Iron ,KOEL Solapur for Interaction about Encon activities.
- 7) Energy efficient Motors.
- 8) Energy efficient devices like V/F Drive, Beblec, soft start.
- 9) Study of Bio-gas as renewal energy.

AWARENESS :

Energy awareness is a continuous process & hence helps to compare the energy with no investment.

- 1) Energy conservation program was conducted for workmen. There was good interaction between workers & members of committee.
- 2) ENCON week was celebrated & activities done by departments were communicated to all sections.
- 3) Display boards are displayed in various shops.
- 4) There is sufficient interaction between department, staff & ENCON team for controlling energy consumption & to reduce the wastages.

There was a meeting conducted by S.C.Kirloskar (CMD) about ENCON. He appreciated about ENCON team efforts & gave congratulations for getting national award as “Energy Efficient Unit”. He has also advised for sharing this information among Kirloskar group so as to increase the ENCON activities not only on Kirloskarwadi, but at national level.

**EXTENT OF TEAM WORK IN ENCON****NORMS & ENCON IMPELEMENTATION CELL**

For effective energy conservation moment yearly norms are finalised & implementation cell is formed & is as under.

- 1) Norms
- 2) Implementation Cell

Norms :

The Norms are taken in various sections to reduce the energy Consumption.

Following are the actual results found in various Dept.

Sr. No.	Name of Dept.	Norms taken	Actual results for 2002 – 2003
1	C.I Foundry Cupola	1:6 Coke to Metal Ratio	1:6 Coke to Metal Ratio
2	Power House D. G set	3.2 kWh/Ltr (HSD)	3.18 kWh/Ltr (HSD)
3	Heavy Foundry Furnace	620/640 kWh/Ton melting at 1400 °C	702 kWh/Tons
4	A.C.S Foundry Furnace	750-775 kWh/Ton melting at 1650 °C	762 kWh/Ton melting at 1650 °C
5	Non Ferrous Foundry	3.50 Kg/Ltr LDO melting at 1550 °C	4.2 Kg/Ltr LDO melting at 1550 °C
6	Material Handling Dept.	Fork-lift 1.50 Ltr/Hours Auto 0.5 Ltr/Hours	Fork-lift 1.5 Ltr/Hours Auto 0.5 Ltr/Hours
7	Power Factor Improvement (Power House)	0.99 & Above	Unity



EXTENT OF TEAM WORK IN ENCON

Energy Implementation Cell

Delegating responsibility to the working level strengthens energy conservation team still further.

KEY AREA	RESPONSIBILITY
Energy Accounting & Monitoring	RKD DKD SBY
Modification & Development	ASN GYG NST SSM MVP VRG
Procurement & use of Energy Conservation Equipment	RVS GDP ASN NST SSM MVP
Energy Efficient Products	ASP VSG BBS SBS ASA
Special Achievements	ASN SBA SSK VTP GND
Reduction in kWh/Ton in Foundry	GTA ASW SMJ BR HSH
Power Factor Improvement, Transmission losses, Illumination, Generation of Electrical Power	ASN RKD DKD SJP SYA BPP
Material Handling & Air Conditioner	KVD GYG AVS NST SSM VRG
Layout Changes	JVD MKD GTA SRK
Compressed Air	ASN SNK ARG HSM RSR
HT/LT Pump Testing Lab	ASP SKS RKD
Major Projects	Division Head

With all these efforts, Co-ordination & Co-operation, we have saved, Rs.85,43,925/-



KIRLOSKAR BROTHERS LIMITED

Kirloskarvadi, Dist –Sangli, Maharashtra.

Annexure C



EXTENT OF TEAM WORK IN ENCON

FUTURE PLANS FOR YEAR 2004-2005

Sr. No.	Activity	Investment Rs. In Mil.	Payback Year	Responsible Person
1	Solar water heater for Hospital and houses	0.30	2.5	GJB / BSP
2	Solar distilled water plants	0.03	2.0	KVD/MLS
3	Adoption of high frequency tools in ACS & NF Foundry	0.12	2.5	HHH/AND
4	Installation of power capacitors at H.T. side with switch gear	0.25	2.0	ASN /RKD
5	Wind mill agreement	Nil	N.A.	BAGCHI/ASN
6	O/H of compressors and high / low pressures piping	0.30	2.0	ASN/SNK /ARG
7	Adoption of ENCON devices	0.0225	2.5	ASN/NST/ /MVP/SSM
8	Adoption of V/F DRIVES	0.25	2.5	MVP/NST /SSM
9	Reduction in T & D losses	0.125	2.0	ASN/RKD
10	Adoption of FRM sheet	0.03	2.5	GJB/BSP
11	Process improvement	0.10	2.00	SBA/SSK
12	Conservation of water in colony And factory	0.15	1.5	GJB/BSP
13	To maintain power factor to unity	0.125	N.A	ASN / RKD
14	Gober gas plant for canteen	0.30	2	BSP/GJB
15	Adoption of wind ventilators	0.25	2.5	BSP/GJB/ASN
16	Low power consumption Air conditioners in K –House	0.40	5	ASN/GYG



EXTENT OF TEAM WORK IN ENCON

ENCON COMMITTEE 2004-2005

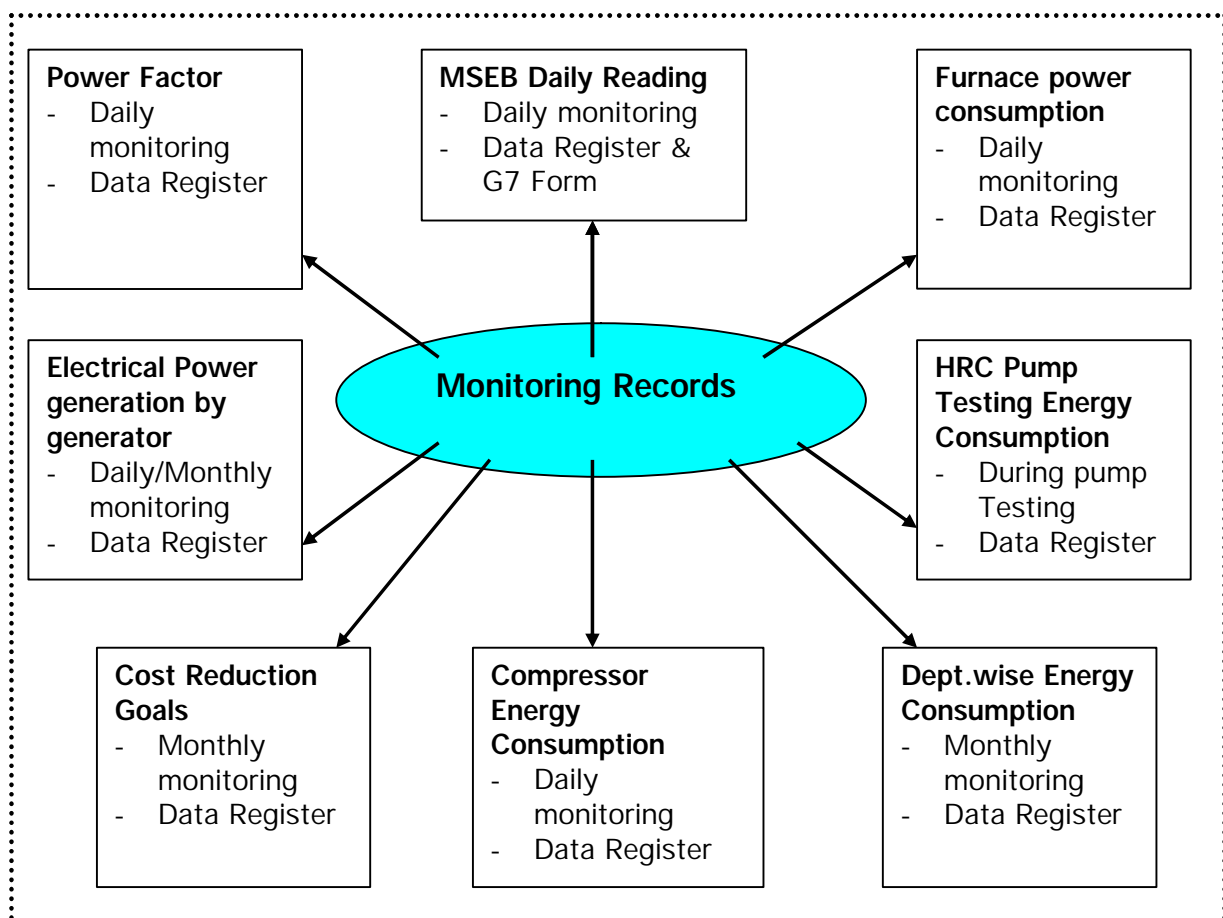


1	Mr. A.S.NILPANKAR	LEADER (CERTIFIED ENERGY MANAGER)
2	Mr. S.M.BALLULAYA	MEMBER
3	Mr. R.G.PUJARI	MEMBER
4	Mr. H.H.HAWALDAR	MEMBER
5	Mr. S.S.KULKARNI	MEMBER
6	Mr. A.S.PUJARI	MEMBER
7	Mr. G.Y.GAIKWAD	MEMBER
8	Mr. N.N.DESAI	MEMBER
9	Mr. A.S.WAGH	MEMBER
10	Mr. P.B.RANGANEKAR	MEMBER



Monitoring & Reporting System

The static energy meters (50 nos) are interfaced at various departments to monitor the Energy Consumption & accordingly we can take corrective action to conserve the energy. We take monthly reading along with MSEB reading & data sheet is prepared. This data sheet is then circulated to concern Departments for feedback & accordingly it is compared with targets given to them.



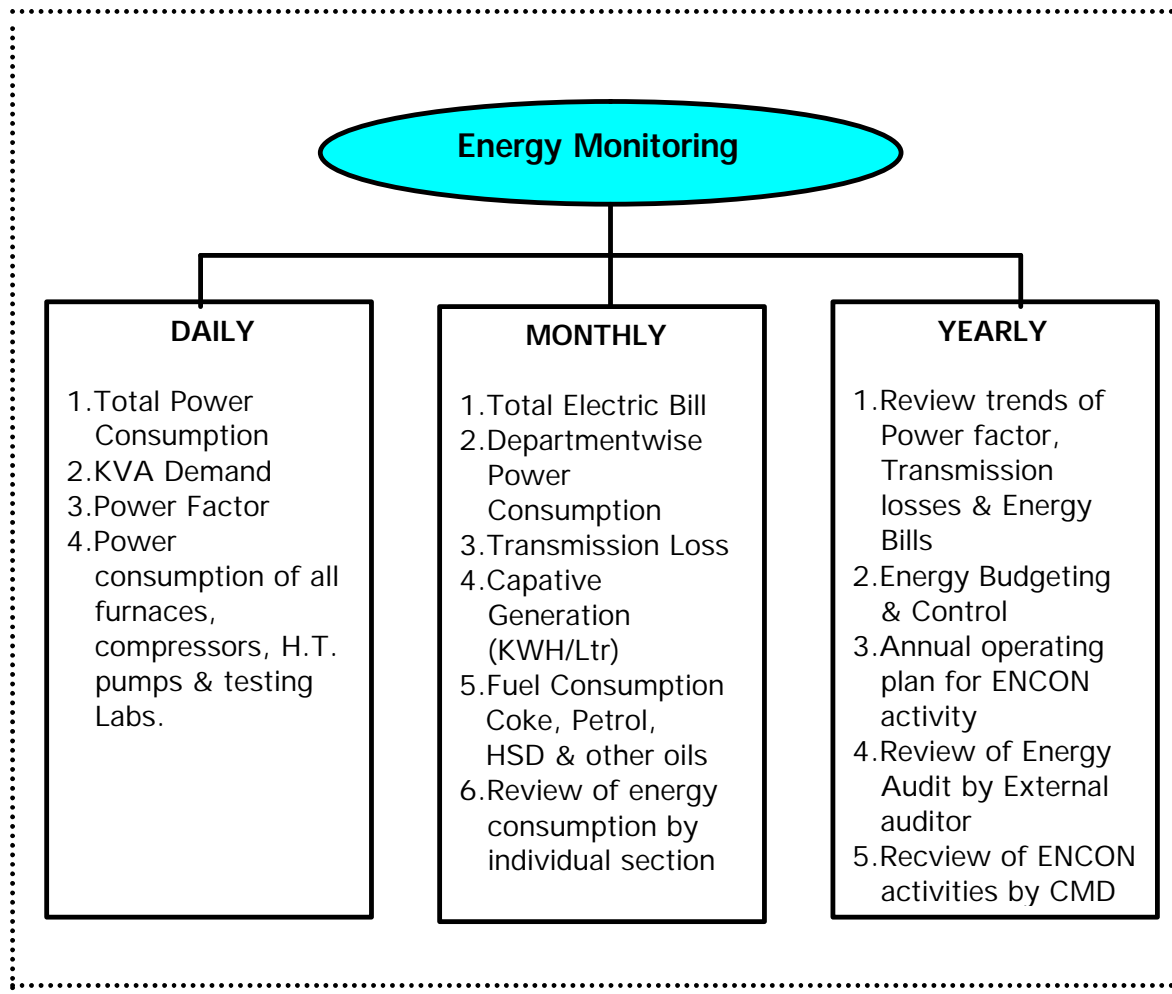


Monitoring & Reporting System

Review of Energy consumption & Energy Conservation projects, goals is done on monthly basis. Encon Committee Leader who is Manager conducts review Meeting.

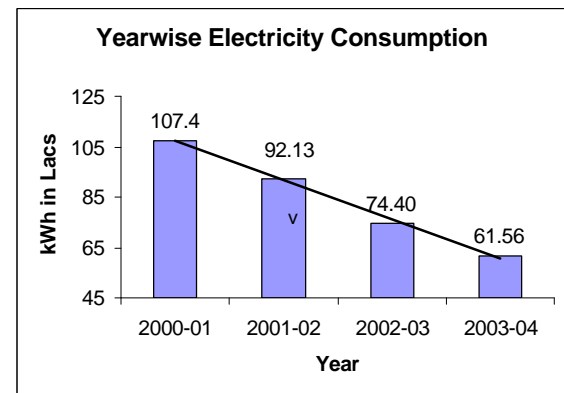
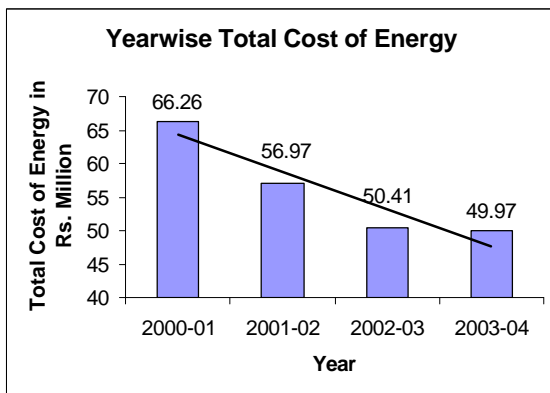
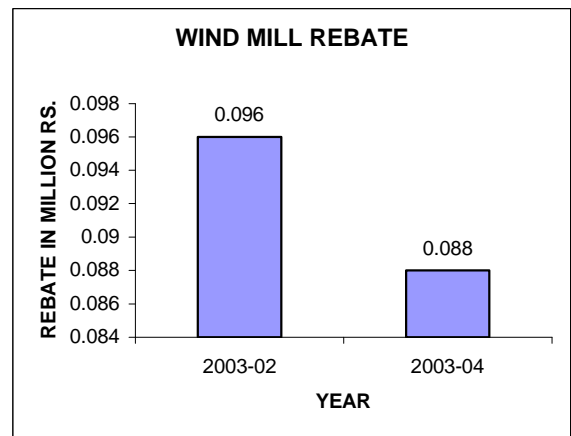
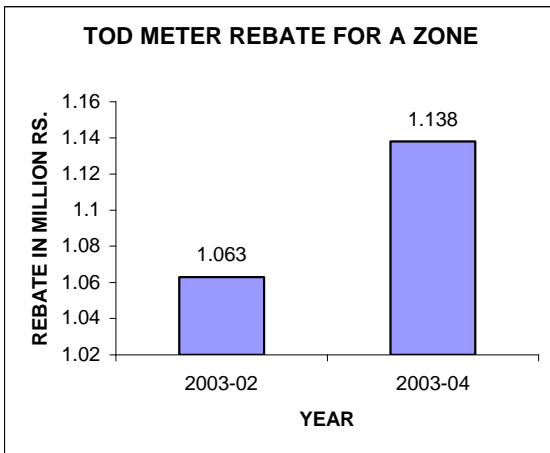
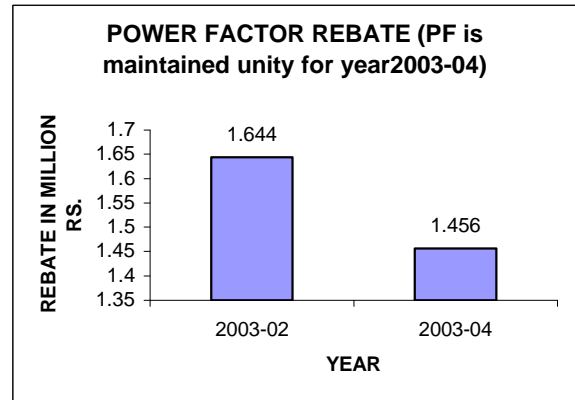
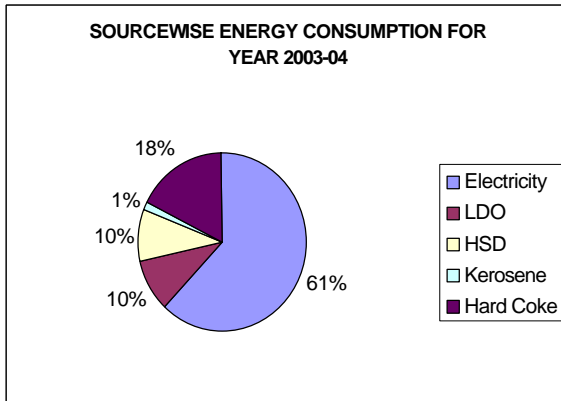
For more details data sheets are enclosed.

1. Energy monitoring.
2. Energy Consumption data sheet to individual departments.
3. Department wise statement for electrical energy consumption for all factory.
4. Graphical presentation.



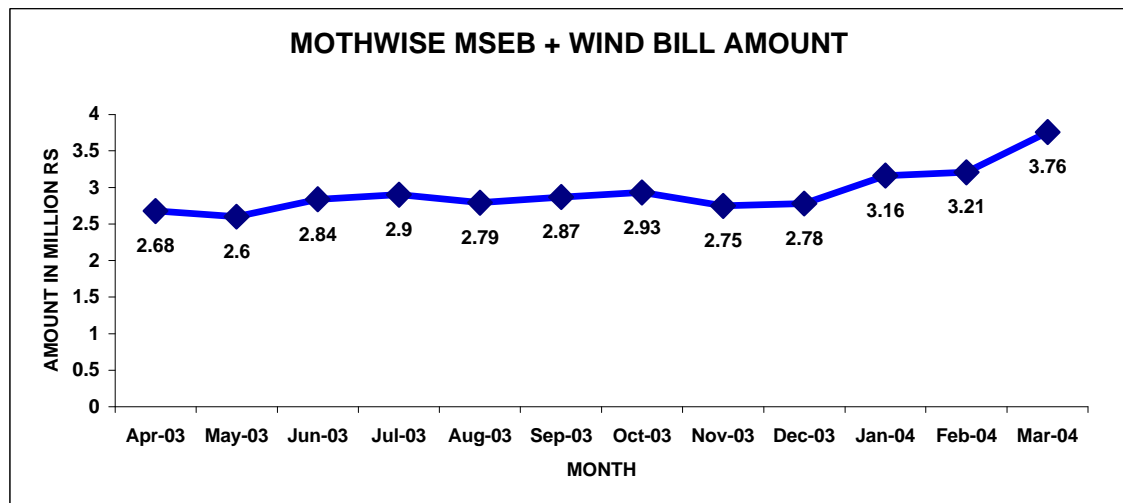
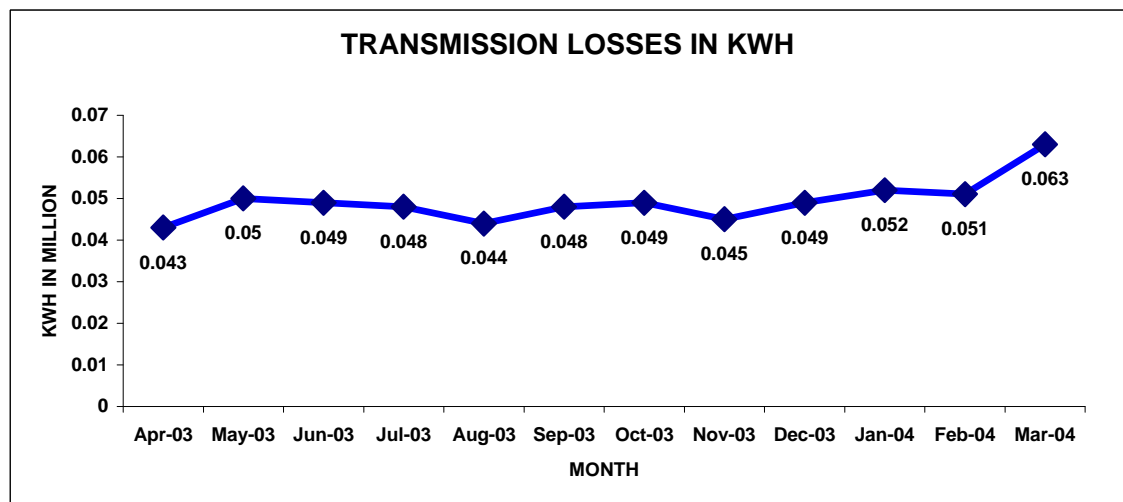
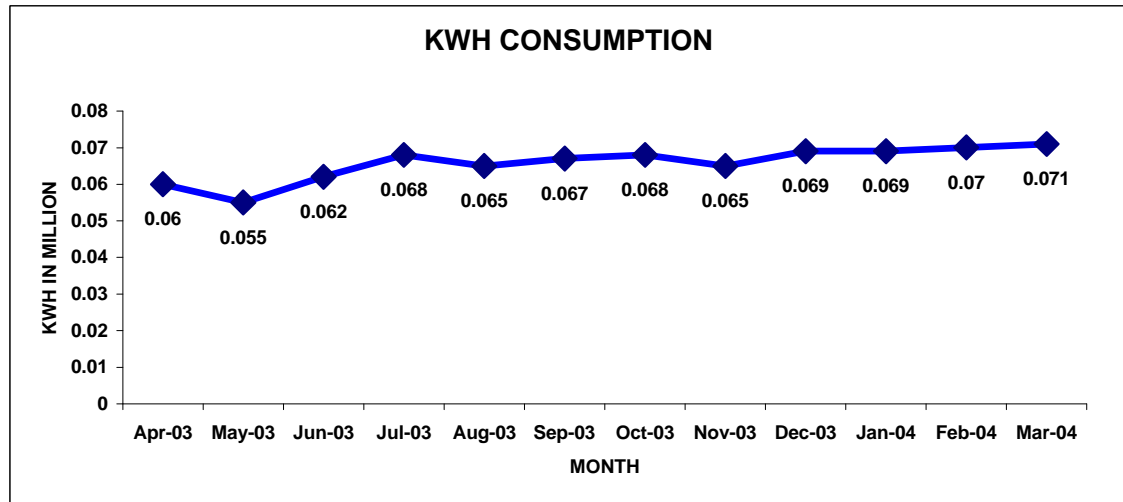


Monitoring & Reporting System





Monitoring & Reporting System





ROLE OF ENERGY MANAGER

Yes, we have a certified Energy Manager. He has successfully completed this course.

Responsibilities of Energy Manager :

- 1.Prepare an annual activity plan and present to management concerning financially attractive investments to reduce energy costs
- 2.Establish an energy conservation cell within the firm with management's consent about the mandate and task of the cell
- 3.Initiate activities to improve monitoring and process control to reduce energy costs
- 4.Analyze equipment performance with respect to energy efficiency
- 5.Ensure proper functioning and calibration of instrumentation required to assess level of energy consumption directly or indirectly
- 6.Prepare information material and conduct internal workshops about the topic for other staff
- 7.Improve dis-aggregating of energy consumption data down to shop level or profit center of a firm
- 8.Establish a methodology how to accurately calculate the specific energy consumption of various products/services or activity of the firm
- 9.Develop and manage training programme for energy efficiency at operating levels
- 10.Co-ordinate nomination of management personnel to external programs
- 11.Create knowledge bank on sectoral, national and international development on energy efficiency technology and management system and information denomination
- 12.Develop integrated system of energy efficiency and environmental upgradation
13. Wide internal & external networking
- 14.Co-ordinate implementation of energy audit/efficiency improvement projects through external agencies
- 15.Establish and/or participate in information exchange with other energy managers of the same sector through association



ROLE OF ENERGY MANAGER

Duties of Energy Manager:

- 1.The information with regard to the energy consumed and action taken in the recommendation of the accredited energy auditor.
- 2.Establish an improved data recording, collection and analysis system to keep track of energy consumption.
- 3.Provide support to Accredited Energy Audit Firm retained by the company for the conduct of energy audit.
- 4.Provide information to CMD with respect to the tasks given by a mandate, and the job description.
- 5.Prepare a scheme for efficient use of energy and its conservation and implement such scheme.



**LIST OF MAJOR ENVIRONMENTAL IMPROVEMENTS MADE
DURING 2001-2004**

- 1.To reduce particulate matter from Cupola Wet arrested system installed, which has reduced air-pollution and improved work environment. (CIF-434-02)
- 2.Reduction in coke consumption for melting in cupola by increasing metal to coke ratio the savings of Rs. 6.10 lack per annum achieved without any investment. (CIF-434-03)
- 3.The dust level at old foundry shakeout reduced below legal & safety norms. (CIF-434-04)
- 4.The emission of dust from super-tumblast machine is reduced well below legal norms. (CIF-434-05)
- 5.The emission of dust from wheelabrator machine is reduced below legal norms. (CIF-434-06)
- 6.Stack height of Cupola increased. (CIF-434-08)
- 7.Reduction in smoke and fume emission from oil fired furnace.(NFF-434-01).
- 8.Fine sand consumption reduced from 54 MT/month to 44MT/month net savings Rs. 3.13 lack per annum.(NFF-434-02)
- 9.Proper storage room facility provided to storage of acids and chemicals to prevent major accident and consequence to environment. (QCD-434-01).
10. New dust collector installed on continuous sand mixer to reduce generation of dust during handling of sand in sand plant hopper. (HFE-434-01)
- 11.Eliminate spillage of resin/harder at Continuous and batch type sand mixer. (HFE-434-02)
- 12.The emission (SPM) from Oil fired furnace is reduced. (HTE-434-01)



**LIST OF MAJOR ENVIRONMENTAL IMPROVEMENTS MADE
DURING 2001-2004**

- 13.To reduce extent of fire hazard due to common storage of paint and packing material, separate storage facilities are provided.
(CMP-434-01and CME-434-01)
- 14.New paint booth for painting of large products is installed in Composite Section SBU2 to reduce air pollution and improve work environment.
(CME-434-02)
- 15.Erection and commissioning of solvent recovery system for disposal of waste coming out from pot cleaning, testing, diaphragm pump & tin cleaning. (ACD-434-03).
- 16.Constructed specified pits for deep burial of human anatomical waste to control land contamination. (HRM-434-01)
- 17.Reduction of plastic cup consumption by discontinuing use of disposable type plastic cups. Savings of Rs. 1.46 Lacks per Annum achieved.
(BLD-434-02)
- 18.Handling and use of LPG cylinders improved to avoid leakage and explosions. (BLD-434-04)
- 19.Upgradation of Storage and Handling HSD/LDO (total area, pump house and tanks) to avoid land contamination. (GST-434-01)
- 20.Upgradation of Spirit Storage, Empty Chemical Barrels storage, Waste oil barrels, Kerosene and Castrol Oil. (GST-434-02, GST-434-04, GST-434-05, GST-434-07, GST-434-09).
- 21.Upgradation of storage pit for paint sludge and cyanide waste in scrap yard.
(GST-434-09).
- 22.To increase height of D.G. Sets stacks to meet legal requirements.
(PLD-434-01)



**LIST OF MAJOR ENVIRONMENTAL IMPROVEMENTS MADE
DURING 2001-2004**

23. Effluent Treatment Plant installed for proper disposal of industrial effluent.
(PLD-434-03)
24. Consumption of oil reduced by 5% through process improvement/
alternative methods. (PLD-434-05)
25. Incinerator commissioned for proper disposal industrial hazardous wastes
(Trials in process) [PLD-434-06]
26. Power factor improved from 0.97 to 0.99. (PLD-434-07)
27. Consumption of wood reduced by 5% i.e. Rs.4.8 lacks per Annum.
(PUR-434-01)



KIRLOSKAR BROTHERS LIMITED

Kirloskarwadi, Dist –Sangli, Maharashtra.

Annexure C



LIST OF CERTIFICATIONS (ISO9001/14000), ENCON, ENVIRONMENT, QUALITY, PRODUCTIVITY & OTHER AWARDS WON DURING 2001-2004

1. ISO 9001 – 1991

Certification by BVQI for **Quality Management System as per 1994** Standard.

2. **FICCI Award** for year 1998-99 for Outstanding achievement in family welfare.

3. Ravi Kirloskar Quality Prize

2nd Prize for 1999-2000 among K-Group Companies For TQC.

4. **NK Joshi Productivity Award** for 2000

5. We have certified for certification of **ISO 14001** on 7th September 2001.

6. **Vishwakarma Rashtriya Puraskar** to Mr.H.S.Magar Plant Engg. Division given by Ministry of Labour ;Govt. of India for Year 2000.

7. **Gunwant Kamgar Puraskar** to 18 Workers of Kirloskarwadi from Govt. of Maharashtra.

8. First Prize in **Energy Conservation** in Kirloskar group for Year 2001-02.

9 First prize in **Energy Conservation in Kirloskar group** for year 2002-2003

10. **Energy Efficient Unit** - " National Award" from CII for year 2002.

11.First price for **Safety** in engineering industry -11 March 2003 Sangli District.

12.**Gunwant Kamgar Puraskar** to Mr.V.V.Londhe, Worker (IED) of Kirloskarwadi from Govt. of Maharashtra(Year-2003-04).



KIRLOSKAR BROTHERS LIMITED

Kirloskarvadi, Dist –Sangli, Maharashtra.

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ENCON ACHIEVEMENTS FOR YEAR : 2003-04

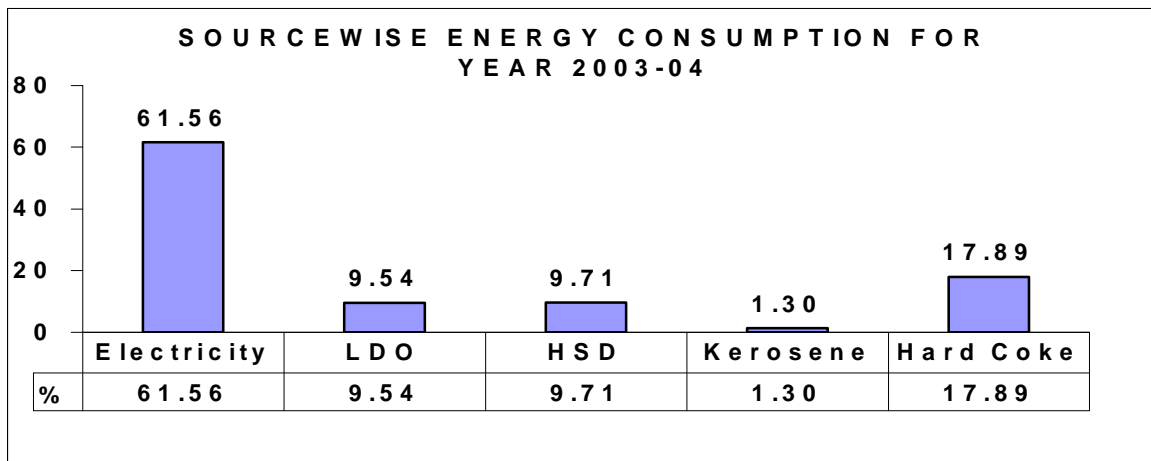
ENERGY AT A GLANCE –2003-04

Total Energy Consumption: 47850 Giga Joules

Total Cost of Energy : Rs. 499.71 Lakhs

ENERGY SPLIT UP

SOURCE	UNIT	CONSUMPTION	ENERGY IN GJ	% OF TOTAL ENERGY	COST IN Rs LAKHS
Electricity from MSEB	kWh	8182177	29446	61.56	35.420
Light Diesel Oil (LDO)	KLtrs	119.410	4564	9.54	1.955
High Speed Diesel (HSD)	KLtrs	121.308	4646	9.71	2.918
Kerosene	KL	16645	624	1.30	0.319
Hard Coke	TON	882.430	8560	17.89	9.357
Total			47850	100.00	499.71





KIRLOSKAR BROTHERS LIMITED

Kirloskarvadi, Dist –Sangli, Maharashtra.

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ENCON ACHIEVEMENTS FOR YEAR : 2003-04

A. SAVINGS AT KBL, KIRLOSKARVADI WORKS -

Sr. No.	Name of Activity	Key Area	Investment In Rs.	Net Saving In Rs.
1	Improvement in Yield of CI Foundry	Development	Nil	12,97,800
2	Reduction in kVA demand	kVA Demand	10,000	2,82,660
3	Power factor improvement	Rebate	7000	14,68,282
4	M.S.E.B. TOD meter rebate A zone	Rebate	Nil	11,37,947
5	Energy conservation in compressor division	Compressed air	70000	5,32,296
6	To reduce T & D losses	T & D losses	Nil	3,17,754
7	Reduction in casting rejection in C.I. Foundry	Rejection	Nil	3,08,700
8	Wind energy	Wind energy	Nil	7,51,836
9	Energy conservation through chilling unit	Development	5000	86,112
10	Installation of FRP Sheet	Illumination	16800	15,127
11	To reduce LDO consumption in NF Foundry	Fuel	N.A.	1,32,978
12	Fuel saving through complete overhauling of Fork lift	Fuel	N.A.	17,820
13	Reduction in melting cost in ACS Foundry	MELTING	Nil	98,214
14	Reduction in rejection of casting in ACS & Heavy Foundry	Rejection	Nil	58,255
15	Modification in control circuit of OMEGA sand mixture	Modification	7000	76,744



KIRLOSKAR BROTHERS LIMITED

Kirloskarvadi, Dist –Sangli, Maharashtra.

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ENCON ACHIEVEMENTS FOR YEAR : 2003-04

16	Adoption of temp. controller in 3 ton furnace	Modification	1200	1805
17	Reduction of Coke consumption in CI Foundry	Fuel	Nil	54,000
18	Reduction in LDO consumption for ladle pre-heater	Modification	35000	15905
19	Prevention of idle running of induction motors	Idle running	2000	17,828
20	Energy saving in cooling for CAN Motor Pump	Cooling System	N.A.	16,896
21	Adoption of electronic ballast and fan regulators	Illumination	50,000	26,083
22	Reduction in fuel consumption in C.I. Foundry	Fuel	Nil	1,20,000
23	Reduction in additives for cupola	Melting	2000	11.66,400
24	Energy saving through removing water lifting pump	Modification	Nil	16,499
25	Improvement of yield in Heavy Foundry	Yield	Nil	87,906
26	Process improvement	Process Improvement	Nil	38,078
TOTAL				81,43,925

Note:- When demand charges are not considered then saving will be Rs.78,24,700/- Per year.



KIRLOSKAR BROTHERS LIMITED

Kirloskarvadi, Dist –Sangli, Maharashtra.

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ENCON ACHIEVEMENTS FOR YEAR : 2003-04

B. Savings at National level & Customer end.

Sr. No.	Name of Activity	Key Area	Investment	Net Saving In Rs.
1	Use of Corrocoating material for various products	Efficiency improvement Coating	N.A	1,04,25,803
2	Energy efficient pump	Energy efficient product	N.A	55,62,328
Total				1,59,88,131



ENCON ACHIEVEMENTS FOR YEAR : 2003-04

1) IMPROVEMENT IN YIELD OF CI FOUNDRY

Improvement in yield is important area of ENCON in Foundry section .It is continuous effect of Team efforts.

Yield 2002-2003 = 56 %

Yield 2003-2004 = 68 %

Actions taken to improve yield.

1. Multiple patterns on single match plate.
2. Improvement in gating system.
3. Less pigging.

Saving:-

Current year good casting = 3500 TON

Yield = 68%

For 56% yield , good casting = 2882 TON

Saving:-

$$= (3500-2882) \times 1000 \times 2.10$$

Net Saving = 12,97,800 Rs/year



KIRLOSKAR BROTHERS LIMITED

Kirloskarvadi, Dist –Sangli, Maharashtra.

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ENCON ACHIEVEMENTS FOR YEAR : 2003-04

2) REDUCTION IN kVA DEMAND

Reduction in kVA Demand also saves money.

Actions taken to reduce kVA Demand,

1. Inhouse designing of Reactors are done and used for starting higher capacity motors
2. H.T. capacitors 6.6 Kv , 600 Kvar are to be connected as per requirement for H.T. pump testing.
3. High tension , high rating pump testing has been arranged after 10 p.m. to get TOD benefit.
4. Demand monitor is used to put off the load whenever is required.
5. P.F. is maintained unity throughout the year .
6. D.G. sets are running whenever there is H.T. testing above 800kW.

Saving :-Last Year Average kVA DEMAND 3052 kVA

MONTH	kVA DEMAND	REDUCED kVA	SAVINGS DUE
APR.03	2826	226	67800
MAY.03	2874	178	53400
JUN.03	2970	82	24600
JUL.03	2874	178	53400
AUG.03	3102	Nil	Nil
SEPT.03	3006	46	13800
OCT.03	3006	46	13800
NOV.03	3054	Nil	Nil
DEC.03	3000	52	15600
JAN.04	2934	118	38940
FEB.04	3048	04	13200
MAR.04	3336	Nil	Nil

Total Saving due to kVA reduction = Rs.2,82,660/- Rs/year

? Investment:- Rs.10,000/-

Payback:- Less than One Month



ENCON ACHIEVEMENTS FOR YEAR : 2003-04

3) POWER FACTOR IMPROVEMENT

To improve the efficiency of electrical system, Power Factor should be improved by Adopting power capacitor in electrical system.

Advantages of power factor improvement ,

- 1.Reduction in electricity bill
- 2.Improved voltage level in system
- 3.Reduction in system losses.

Following actions were taken,

- 1.50 kVAR capacitor is connected near to the load in Project Division ,
Canned motor pump testing.
- 2.6.6 kV , 600 kVAR H.T.capacitors are putting on / off as per requirement .
- 3.Precise control of 11 kV Supply through OLTC 33/11 kV System.
- 4.Daily monitoring of power factor at Koyana room , at M.S.E.B. meter and
accordingly actions are taken.

Savings:-

MONTH	BY IMPROVED P.F.
APR.03	135329
MAY.03	116376
JUN.03	126686
JUL.03	132934
AUG.03	115845
SEPT.03	131023
OCT.03	121557
NOV.03	121838
DEC.03	89251
JAN.04	111810
FEB.04	114776
MAR.04	138855

Total Saving Due to Power Factor Improvement - Rs.14,68,282/- per year

Investment = Rs. 7000/-

Payback = Less than 1 Month



ENCON ACHIEVEMENTS FOR YEAR : 2003-04

4) MSEB TOD METER REBATE FOR A ZONE

There is no investment required for TOD Rebate.

MSEB has given an opportunity to Industries that they will get rebate during off load period i.e.A Zone.

Actions implemented,

- ? H.T. pump testing is scheduled during A zone.
- ? Heat treatment furnaces putting off during D zone.
- ? All Induction furnaces maximum melting is scheduled during A zone.

MSEB Rebate in Rs. for A zone -

Net Saving = 11,37,947 Rs/year

5) ENERGY CONSERVATION IN COMPRESSOR DIVISION

After continuous efforts, the air leakage's has come down to 235 cfm.

For reducing air consumption following actions are taken.

Action taken:-

- 1 Put off air supply in concerned production Division during lunch time.
- 2 Use of 542 locktite sealing to reduce leakage though threading.
- 3 Continuos monitoring of leakage's & accordingly corrective action are taken.
- 4 Main motor of compressor no.8 is automatically connected to star when it is under load condition .
- 5 Awareness among user is created about importance of compressed air .

Saving :-

Last year power consumption = 820370 kWh

Current year power consumption = 699398 kWh

Saving = (820370 - 699398)

= 120972 kWh



ENCON ACHIEVEMENTS FOR YEAR : 2003-04

Net Saving = 5,32,296/- Rs per Year

Investment:- Rs.70,000/- Payback :- 1.5 month approx.

6) TO REDUCE TRANSMISSION LOSSES -

Electrical Transmission losses is an important area, where Encon has wide scope.

1. Energy reactors are used for high rating induction motors.
2. Put off the power distribution transformers during weekly off & holidays.
3. Precisely setting of 11 kV voltage input to the factory load through OLTC Control system.
4. Improvement in power factor to unity.

Net saving: -

Transmission losses during 2002-03 = 668797 kWh

Transmission losses during 2003-04 = 596580 kWh

Net saving in Rs: -

= (668797 - 596580)

= 72217 kWh

Net Saving = Rs 3,17,754/- Rs/year



ENCON ACHIEVEMENTS FOR YEAR : 2003-04

7) REDUCTION IN CASTING REJECTION OF CIF

Rejection is also one of the important area from which we can reduce the cost of the product.

Last year total rejection was - 7.72%

Current year total rejection is - 3.80%

Action taken for reduction in casting rejection

1. Temperature of metal is controlled between 1350 – 1400 deg.
2. Chemistry of metal is well controlled.
3. Mould boxes are re-machined for proper resting qty 75 nos.
4. Use of In-house core baking facility.
5. Adoption of Andon monitoring System to reduce plant breakdown.

Saving :-

Re-melting of rejected casting is reduced from 280 TONS To 133 TONS per year.

$$\text{Saving} = (280 - 133) \times 1000 \times 2.10$$

Net Saving = 3,08,700/- Rs per year



ENCON ACHIEVEMENTS FOR YEAR : 2003-04

8) WIND ENERGY



a) Agreement with third PARTY

There is agreement with M/s Patankar Wind Farm Pvt.Ltd to supply electrical Power to M/s KBL. The capacity of Wind Mill is 0.350 MW.

During 2003-04 M/S Patankar wind farm has supplied the wind power to M/S KBL

= 525259 kWh

Windmill rebate = Rs.88679/- Per Year

b) Differal for Wind Mill from KCL

Differal means ,

- 1.We collect sale tax from customer from each invoice and the same must be deposited to Govt. within 25 days .
- 2.According to differal terms we collect tax and need to deposit to Govt. after 10 years , every year installment is 20 % for 5 years after 10 th year .

Total differal Rs.1,05 ,76,666 (April 2003 - March 2004)

KBL differal 55 % = 58,17,166 Rs.

Net saving per year = 6,68,974 Rs. / Year

We pay 11.40% interest on cash credit to bank which is saved.

Approx.saving = Rs.6,63,157/- Per Year

Total Net Saving = 7,51,836/- Rs/year



ENCON ACHIEVEMENTS FOR YEAR : 2003-04

9) ENERGY SAVING THROUGH OIL CHILLING UNIT

1.5 TON capacity oil chiller was used for MCPH 250 (HELLER) machine for cooling the hydraulic oil. The hydraulic power pack tank capacity was 150 litres and tank was inside the guards . After studying the heat generation rate and ventilation we have increased the tank size to 300 litres and the tank is placed outside the machine guards.

Saving :-

$$= (3.9 \times 2 \times 8 \times 300) \text{ kWh} = 18720 \text{ kWh}$$

Net Saving = 82,368/- Rs/year

Investment

= Rs. 5000/-.

Pay back Period

= Less than one month

10) INSTALLATION OF TRANSPARENT SHEETS FOR NATURAL ILLUMINATION IN VARIOUS SHOPS

Total 14 Nos Transparent sheets are fitted in following area .

1. Composite Section (SBU 1)

Total no.of tubes putting off during day time = 27 nos.

Total no.of HPMV (250 Watts) putting off during day time = 2 nos.

Net Saving = Rs.15,127/- Per Year

Investment = Rs 16800/

Payback = Approx. 1 Year



ENCON ACHIEVEMENTS FOR YEAR : 2003-04

11) TO REDUCE LDO CONSUMPTION IN NON FERROUS FOUNDRY

In Non Ferrous Foundry, Oil Fired Furnaces are used for melting. These furnaces require LDO for melting the metal. Following actions were taken to reduce LDO consumption.

1. Daily monitoring of all foundry parameters.
2. Use of pyrometer for checking metal temperature.
3. Awareness created among all employees.
4. Daily meeting about rejection and fuel consumption.

Saving :-

Last year LDO consumption per Kg = 3.80 Kg/Ltrs.

Current year LDO consumption per Kg = 4.20 Kg/Ltrs.

Last year melting cost = 4.39 Rs / kg

Current year melting cost = 3.97 Rs. / kg

Net Saving = (4.39 – 3.97) x 316616

Net Saving = 1,32,978/- Rs/year

12) FUEL SAVING THROUGH COMPLETE OVERHAULING OF FORK LIFT

Voltas make 3 ton Diesel Operated Fork lift truck were having high fuel consumption due to,

1. Excessive wear and tear of all sub assemblies and system.
2. Wornout all moving parts of engine.
3. Wornout piston rings and liner of engine
4. Damaged all parts of fuel injection pump and nozzle.
5. Heavy leakages in fuel feed system and tanks.



ENCON ACHIEVEMENTS FOR YEAR : 2003-04

Savings:-

Fuel consumption before O/H = 275 Litrs / month

Fuel consumption after O/H = 220 Litrs / month

Net saving in Rs. = (275-220) X 27 X 12
= 17820 Rs / Year

13) REDUCTION IN MELTING COST OF ACS FOUNDRY

Melting cost has been reduced in ACS foundry for Year 2003-04 by taking following actions,

- 1.Closed monitoring of melting
- 2.Minimisation of super heating.
- 3.Awareness among melting employees.
- 4.Proper schedule of moulds for pouring.

Saving:-

kWh / ton for 2002-2003 = 787.72

kWh / ton for 2003-2004 = 760.00

Net saving = (787.72-760.00) X 805.25
= 22321.5 kWh

Net saving = 98214 Rs / Year

14) REDUCTION IN REJECTION OF CASTING AT ACS & HEAVY FOUNDRY

Reduction in rejection of casting is a continuous process, but every year we have to plan actions and implement the same immediately. Following are the actions taken,

- 1.Improvement in methodology.
- 2.Very close monitoring on all foundry parameter.
- 3.Daily rejection meeting at morning.
- 4.Improvement in mould quality because of cool water from cooling system for OMEGA sand mixture .



ENCON ACHIEVEMENTS FOR YEAR : 2003-04

a) ACS foundry

Rejection 2002-2003 = 17.400 ton (3.45 %)

Rejection 2003-2004 = 10.580 ton (2.69 %)

Net saving = (17.400 -10.580) X 1577 Rs./Ton

= 10755 kWh

= 47322 Rs./ Year

b) Heavy Foundry :-

Rejection 2002-2003 = 3.65 %

Rejection 2003-2004 = 3.39 %

Net saving = (3.65 - 3.39) % of 1404 X 3115

= 10933 Rs./ Year

Total saving (a + b) = 58255 Rs. / Year

15) MODIFICATION IN CONTROL CIRCUIT OF OMEGA SAND MIXTURE

Inhouse control circuit modification is done in sand mixture , sand cooling pump will operate only when inlet sand temp. goes to 32 deg.

Pump motor capacity = 11 kW (Measured power 10.2 kW)

Pump running hours before = 455 for two months

Pump running hours after = 170 for two months

Saving = (455-170) X 6 X 10.2

= 17442 kWh

= 76744 Rs./ Year

Investment = Rs.7000/-

Payback = Approx. 1 Month



ENCON ACHIEVEMENTS FOR YEAR : 2003-04

16) ADOPTION OF TEMPERATURE CONTROLLER IN 3 TON FURNACE

Capacitors are placed in closed room & temperature is maintained by cooling tower.

Cooling pump will operate only when capacitor room temperature goes to 35. Control circuit modification is done by using temperature controller.

$$\begin{aligned}\text{Saving} &= 2.2 \times 2 \times 90 \\ &= 396 \text{ kWh} \\ &= 1805 \text{ Rs. / Year}\end{aligned}$$

$$\text{Investment} = \text{Rs.1200/-}$$

17) REDUCTION IN COKE CONSUMPTION IN C.I. FOUNDRY

40 Kg. Coke was required for 500 kg charge during year 2002-2003.

Now 35 kg coke is required for 500 kg charge for year 2003-2004.

No. of charges during this year = 9000.

Following actions were taken.

Trials were carried out by reducing coke step by step to obtain metal temperature to 1400 deg.

Finally consumption reduced to 5 kg per charge.

$$\begin{aligned}\text{Saving} &= 9000 \times 5 \times 12 \\ &= 5,40,000 \text{ Rs. / Year}\end{aligned}$$

18) REDUCTION IN LDO CONSUMPTION FOR LADDLE PRE-HEATER

LDO consumption before modification = 4 ltrs / day

LDO consumption after modification = 0.2 ltrs / day

Activities ,

- 1.Indegenious pump is adopted .
- 2.Total modification in electrical circuit .



ENCON ACHIEVEMENTS FOR YEAR : 2003-04

$$\text{Saving} = (4.00 - 0.20) \times 19 \times 300$$

$$= 21660 \text{ Rs. / year}$$

$$\text{Investment} = \text{Rs. } 35,000/- \quad \text{Payback} = 2.25 \text{ Years.}$$

19) PREVENTION OF IDLE RUNNING OF INDUCTION MOTORS

Rapid motor of vertical turret lathe in split case pump division (5 HP) and HMT milling in KPD Division (3 HP) were continuously running .Modified the electrical circuit so that these gets on only when it is required.

$$\text{a) VTL -- Net saving} = 2.5 \times 300 \times 3$$

$$= 2250 \text{ kWh}$$

$$= 9900 \text{ Rs./ Year}$$

$$\text{b) HMT milling – Net saving} = 1.8 \times 300 \times 3$$

$$= 1620 \text{ kWh}$$

$$= 7128 \text{ Rs /Year}$$

$$\text{Total saving (a + b)} = 17028 \text{ Rs. /Year}$$

$$\text{Investment} = \text{Rs } 20,000/-$$

$$\text{Payback} = 1.5 \text{ Months.}$$

20) ENERGY SAVING IN COOLING WATER SYSTEM FOR CANNED MOTOR PUMP

There was endurance test for 500 hours keeping test loop water temperature in between 65 – 70 deg. for which cooling water system is required. For cooling the pumped liquid and pump jacket cooling, 60 TR cooling tower is installed. Then for circulation of cooling water from storage tank to close loop tank and pump jacket pump motor unit is required to maintain the flow of 75 LPM to motor jacket and 200 to closed loop tank cooling .Earlier 11 kW 2 pole motor was used , however at present considering the low head requirement motor used is 3.7 kW , 4 pole.



ENCON ACHIEVEMENTS FOR YEAR : 2003-04

The trial is successfully completed and also the endurance test of 500 hours. In addition to that 3 more pumps with continuous running with 24 hours is also completed.

$$\begin{aligned}\text{Net saving} &= (9.3-2.9) \times 600 \\ &= 3840 \text{ kWh} \\ &= 16896 \text{ Rs./Year}\end{aligned}$$

21) ADOPTION OF ELECTRONIC BALLAST AND FAN REGULATORS.

a) Total no. of ballast used = 148

Saving per choke = 15 watt

$$\begin{aligned}\text{Net saving} &= 148 \times 0.015 \times 8 \times 300 \\ &= 5328 \text{ kWh} \\ &= 23443 \text{ Rs. / Year}\end{aligned}$$

b) Electronic fan regulators adopted = 50

Saving per regulator = 10 watt

$$\begin{aligned}\text{Net saving} &= 15 \times 0.010 \times 6 \times 200 \\ &= 600 \text{ kWh} \\ &= 2640 \text{ Rs. / Year}\end{aligned}$$

Total saving (a + b) = 26083 Rs./ Year

Investment = Rs.50,000/-

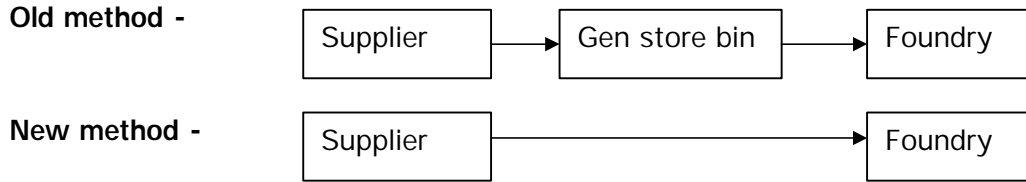
Payback Period = 2 Years

22) REDUCTION OF FUEL CONSUMPTION IN C.I.FOUNDRY.

Purchased raw material was kept in General Store area & then it was supplied to foundry as & when required. Now this purchased raw material is directly unloaded at cupola charging area. Hence material handling is reduced.



ENCON ACHIEVEMENTS FOR YEAR : 2003-04



Saving = Monthly 600 tons of material hauling X 16 Rs/ton
= Rs.9600/- Per month

Net saving = 1,15,200 Rs. / Year

23) REDUCTION IN ADDITIVES FOR CUPOLA.

Last year Silicon consumption = 4 ton / Month

Current year Silicon consumption = 2.2 ton / Month

(This consumption is refereed to same melting)

Following actions were taken ,

- 1.Silicon recovery in acceptance standard increased to 75 % minimum in Ferro-Silicon.
- 2.Silicon % in pig iron is changed from 1.7 % to 2 % min.
- 3.Silicon losses due to oxidation is reduced by improving cupola operation.

Net saving = (4 - 2.2) X 12 X 54 X1000
= 11, 66,400 Rs. / Year

24) ENERGY SAVING THROUGH REMOVING THE LIFTING WATER PUMP MOTOR

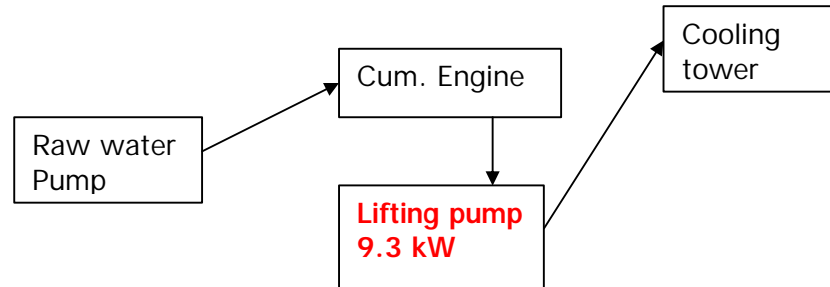
Oven lifting pump & two raw water pumps were used for cooling purpose to Cummins Engines. After modification in piping, output of raw water pump is directly taken on cooling tower & effective cooling is done.

Lifting pump is isolated from the circuit.

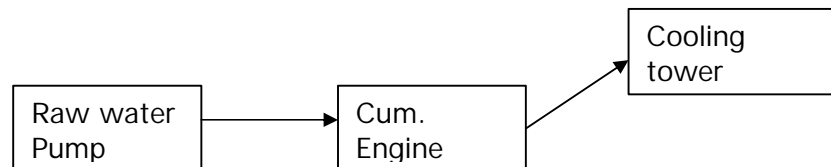


ENCON ACHIEVEMENTS FOR YEAR : 2003-04

Old method -



New method -



$$\begin{aligned} \text{Net saving} &= 7.1 \times 528 \\ &= 3748 \text{ kWh} \\ &= 16494 \text{ Rs./ Year} \end{aligned}$$

25) IMPROVEMENT OF YIELD IN HEAVY FOUNDRY.

Last year yield = 65.68 %

Current year yield = 67.69 %

Following action are taken.

- 1.Improvement in methoding.
- 2.Close monitoring of all foundry parameters.

$$\begin{aligned} \text{Net saving} &= (67.69 - 65.68) \% \text{ of } 1404 \times 3115 \\ &= 87906 \text{ Rs. / Year} \end{aligned}$$



ENCON ACHIEVEMENTS FOR YEAR : 2003-04

ENERGY EFFICIENT PRODUCTS

? KBL'S SERVICES TO NATION FOR ENCON:-

- ? KBL is in the business of fluid handling through pumps. Pumps are largely used in all process industries like Sugar, Cement, Paper etc.
- ? It is the major responsibility of KBL to produce energy efficient products. There is always a potential to increase the efficiency of pumps. The obvious benefits to individuals/organizations around the world from improving the efficiency of pumps are lower operating costs and higher savings. KBL looks forward to future examples of efficiency improvement/innovations that this attempt may inspire and that may lead us all toward a more efficient, productive and sustainable world.
- ? KBL is also conducting energy audits for customers.

A) EFFICIENCY IMPROVEMENT BY CORROCOATING:

To narrow the prospective gap between energy demand and supply, we are taking up the project of efficiency improvement in existing products and developing new energy efficient pumps to replace old pumps. Recently KBL has improved the efficiency in the models as per attached table by corrocoating based on Energy Audit results.

B) ENERGY AUDITS:

In order to share the benefit of energy saving with customer, KBL is visiting outside factories to conduct energy audits as per request from customer. During the energy audits, it is proposed to study existing pumps in operation with its operating point, system layout, duty point for which pumps are offered originally and power consumption for existing pumps. Based on this study proposal will be made for improvement in system layout or replacement of pumps. Power consumption with modifications implemented will be monitored.



KIRLOSKAR BROTHERS LIMITED

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Annexure C



ENCON ACHIEVEMENTS FOR YEAR : 2003-04

C) NEW PRODUCT DEVELOPMENT:

In order to offer the pumps with best efficiency, KBL is undertaking development of new pumps/modifications in existing pumps continuously as and when required.

The list of new products developed to improve the efficiency of the products is enclosed.



ENCON ACHIEVEMENTS FOR YEAR : 2003-04

SPECIAL ACHIEVEMENTS

Modification in Impeller For Energy Conservation at M/s Hundai

- Pump - BHR 50 single stage .
Application - Hundai Heavy Industries Co.Ltd.
Duty point - Discharge –1233 m³ / Hr
Head-- 64.65 mtr.
Bowl input - 239.76 kW
Motor - 275 kW
Speed - 1485 RPM

Customer has ask KBL to modify the pump impeller so as to get 1113 m³/ H, 5481m . So impeller was modified and fitted at customer's end.

Saving:-

Actual power measured with old pump = 268 kW

Actual power measured with modified impeller = 212 kW

Energy Saved = (268 - 212) x 16 x 365 x 4.60 .

Energy Saved = Rs.15,04,384/- Per year



ENCON ACHIEVEMENTS FOR YEAR : 2003-04

COST REDCUTION GOALS

1.Reduction in Coke Consumption in C.I.Foundry

Objective: To reduce coke consumption in cupola of C.I.Foundry

Target : Coke to metal ratio 1:6

Activities :

- 1.Use of pyrometer for temperature measurement at cupola.
- 2.Trials to be carried out for various combinations of coke for temperature 1300-1350 deg.
- 3.Proper scheduling of moulds before pouring.
- 4.Andon monitoring system to reduce breakdowns.

Achievement :

- 1.Coke to metal ratio achieved 1:6
- 2.Saving (9000 X 5 X 12) = Rs. 5,40,000/-

Team Members :-

- 1.G.T.Andhare
- 2.A.S.Wagh
- 3.S.S.Duke
- 4.S.H.Shinde



ENCON ACHIEVEMENTS FOR YEAR : 2003-04

2.Reduction of Foundry Rejection and Improvement of Yield % in Heavy Foundry

Objective : To reduce foundry casting rejection and yield improvement

Target : Rejection from 3.65 % to 3.50 % and yield from 65 % to 68 %

Activities :

- 1.Daily rejection meeting along with concerned employees for finding the reasons for rejection.
- 2.Based upon the findings , corrective actions are to be taken.
- 3.Logical planning for mould readiness.

Achievement :

- a) Rejection - Achieved 3.39 %
- b) Yield - Achieved 67.69 %

Total saving = Rs. 98,839/- Per Year

Team Members :-

- 1.SM Jadhav
- 2.BA Ramesh
- 3.SJ Pawar
- 4.Deshapande



ENCON ACHIEVEMENTS FOR YEAR : 2003-04

PRODUCTIVITY IMPROVEMENT

CASE –I

AREA: DB/UNI/INTER/Euro Pump Casing in Sump Pump Section.

ACTIVITY: Development of Eurostream 13,16,20 series Pump casings on HELLER Horizontal machining center.(MCPH 250) – Fixture TA Nos. – TA 03-125,TA03-130,TA02-250,TA2K-091/E

COMPONENTS: 13,16,20 Eurostream Pump Casings. (Total 13 Types of Casings.)

<u>PREVIOUS SETUP</u>	<u>NEW SETUP</u>
1. Total Machines required to perform Milling, Drilling & Tapping operations. i) Horizontal Milling Machine. ii) Multispindle Drilling Machine. iii) Radial Drilling Machine.	3. Milling, Drilling & Tapping Operations are performed in one set up on Horizontal Machining Center.
2. Machine time per job= 0.48 hrs avg.	2. Machine time per job= 0.22 hrs. avg.

CASE –II

AREA: DB/UNI/INTER/Euro Pump Casing in Sump Pump Section.

ACTIVITY: Introduction of Common Hard Jaws for DB/UNI/INTER 13,16,20,26,32,40 series Impeller on Retrofitted CNC Lathe. TA no- TA03-177/M

COMPONENTS: DB/UNI/INTER DB/UNI/INTER 13,16,20,26,32,40 series Impeller. (Total 60 Types of Impellers.)



ENCON ACHIEVEMENTS FOR YEAR : 2003-04

<u>PREVIOUS SETUP</u>	<u>NEW SETUP</u>
1. Setting time was more as the Jaws are required to set for respective diameters. Setting time = 0.3 hrs per lot.	1. No setting of Jaws hence Setting time is zero.

CASE –III

AREA: DSM 100/36 Pump Machining in Split Case Pump Section.

ACTIVITY: Introduction of Special Design Fixture for milling operation of DSM 100/36 Upper Half Casing on VMC . (Fixture No.-TA 03-107)

COMPONENTS: DSM 100/36 Upper Half Casings.172 30 AP 001 (Avg. 25 Pumps per month.)

<u>PREVIOUS SETUP</u>	<u>NEW SETUP</u>
1. Previously there is common fixture used for all DSM & Splitcase Upper Half Casings. This fixture requires setting of Casing in adjustable jaws. This consumes around 30 min. setting time.	1.This Sp. Designed fixture do not require setting . hence setting time is totally avoided.
2.This Fixture set up requires 15 min. setting on machine Table.	2.Fixture setting on Machine takes only 5 min.
3. Upper Half casing Casting is required for setting of fixture.	3. No need of Upper Half casing Casting for setting of fixture.



ENCON ACHIEVEMENTS FOR YEAR : 2003-04

CASE –IV

AREA: MF 25/25 Bend Machining .

ACTIVITY: Development of MF 25/25 Bend Machining on Heller Horizontal Machining Center.

COMPONENTS: MF 25/25 Bend.

<u>PREVIOUS SETUP</u>	<u>NEW SETUP</u>
1.Total Machines required to perform Milling , Drilling & OD turning operations. Horizontal Milling Machine. Radial Drilling Machine.	1. Milling, Drilling & OD Turning Operations are performed in one set up on Horizontal Machining Center.
2. Machine time per job= 3 hrs avg.	2. Machine time per job= 0.33 hrs. avg.
3. No. off setups required = 2 – Milling, 3 – Drilling. Total 5 Setups.	3.Only one Setup is required.

CASE –V

AREA: UP (M) INSERT Angle hole drilling .

ACTIVITY: Reduction in no. off Angles & standardization of Insert Hole drilling operation by Quick setting Drilling jig.

COMPONENTS: ALL UP (M) INSERT.



ENCON ACHIEVEMENTS FOR YEAR : 2003-04

<u>PREVIOUS SETUP</u>	<u>NEW SETUP</u>
1. No. off angles in Insert lub. Hole = 8	1. No. off angles in Insert lub. Hole = 2 The angles are redesigned & standardized.
2. No fixed drilling jig. Although various Angle blocks are available which requires more setting Time. Around 25 min. Setting time.	Fixed Drilling jigs with only two angle blocks. Also setting time is reduced up to 10 min.
3. As skill is involved in Drilling the components, the operation is performed in Machine shop only.	3. Vendor is developed for drilling Std. Angle Holes.

CASE –VI

AREA: BHA 5S Propeller boss Machining.

ACTIVITY: Process improvement of BHA 5S Propeller boss Machining by introducing Indexing arrangement.

COMPONENTS: BHA 5S Propeller boss.

<u>PREVIOUS SETUP</u>	<u>NEW SETUP</u>
1. Boring of 4 bores are carried out on HBM individually. Hence dimensions are controlled manually.	1. With the use of Indexing Table , the bores are exactly at 90 deg. Also the diamensions are controlled through CNC programming. This operation is developed on CNC lathe.
2. Operation Time = 12 Hrs. per Job.	2. operation time 2 hrs per job.

**ENCON ACHIEVEMENTS FOR YEAR : 2003-04****CASE –VII**

AREA: Guide Vane machining of Francis turbine.

ACTIVITY: Process improvement of Guide Vane machining of Francis turbine.

COMPONENTS: Guide Vane of Francis turbine.

<u>PREVIOUS SETUP</u>	<u>NEW SETUP</u>
1. Adjustable stopper is used to hold the Shutter surface true. Hence more Setting time. Time required = 10 min per Vane.	No setting is required as Fix locations are provided on Fixture. No setting Time.
2. Inferior quality as machining carried out taking reference of the area to be machined and Keyway is performed by taking ref. of Level bottle.	2. Reference of complete guide profile is taken for the machining hence quality is improved.

ENERGY SAVING:

SR. NO.	AREA	Time saving In Hrs.	Measured kWh	SAVING IN Rs / year
1.	Development of Eurostream 13,16,20 series Pump casings on HELLER Horizontal machining center.(MCPH 250) – Fixture TA Nos. – TA 03-125,TA03-130,TA02-250,TA2K-091/E	0.26 hrs. Per job.	3.69	Rs. 1624 /-
2.	Introduction of Common Hard Jaws for DB/UNI/INTER 13,16,20,26,32,40 series Impeller on Retrofitted CNC Lathe. TA no- TA03-177/M	0.3 hrs. Per lot.	5.55	Rs. 5860 /-
3.	Introduction of Special Design Fixture for milling operation of DSM 100/36 Upper Half Casing on VMC . (Fixture No.-TA 03-107)	0.66 hrs.	5.33	Rs. 1407/-
4.	Development of MF 25/25 Bend machining on Heller Horizontal Machining Center.	2.67 hrs.	19.78	Rs. 26109 /-



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ENCON ACHIEVEMENTS FOR YEAR : 2003-04

5.	Reduction in no. off Angles & standardization of Insert Hole drilling operation by Quick setting Drilling jig.	0.25 hrs.	0.92	Rs. 971/-
6.	Process improvement of BHA 5S Propeller boss Machining by introducing Indexing arrangement.	10 hrs per job.	8.3	Rs. 1826/-
7.	Process improvement of Guide Vane machining of Francis turbine.	0.16 hrs.	2	Rs. 281/-
			TOTAL SAVINGS	Rs.38078/-

Team Members :-

- 1) C G Koparde
- 2) SS Kulkarni
- 3) SB Agarkar
- 4) VT Patil
- 5) GN Dhongade



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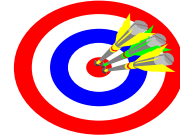
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ENCON ACHIEVEMENTS FOR YEAR : 2003-04

PLANNED MAINTENANCE FOR ENCON



Main aim of maintenance department is to keep the machine always in operation without any problem, healthy conditions & more availability of machine/equipment Always helps to conserve the energy.

To maintain the healthy conditions of machine following things are done.

- 1) ANDON Monitoring System.
- 2) Preventative Maintenance of Machines.
- 3) Reconditioning Of the Machines for better results.
- 4) TPM (In Process)

As a result of these things the breakdown % is drastically reduced. The results are enclosed.

- a) Choice of Retrofitment Devices.
- b) Trends of Breakdown



ENCON ACHIEVEMENTS FOR YEAR : 2003-04

MAJOR PROJECTS

Complete reconditioning of Voltas Make Diesel Operated forklift truck–3 Ton.

We have a forklift purchased in the year of 1990. Nowadays, the breakdowns, repairs & consumption of fuel were increased to that level, the manufacturer recommended to replace it with new one.

But instead of going for the replacement we decided to recondition the same at our works. This will reduce the cost and time.

Causes of reconditioning:-

- 1) High breakdown - 11% due to excessive wear & tear of all moving parts, hence repetitive breakdowns, low availability of vehicle for production & despatch sections.
- 2) High fuel – 2 Ltr/Hre & Oil – 1 Ltr/Day consumption because damaged fuel feed pump, injectors, heavy leakage from fuel feed lines, tanks, wear out engine piston rings, cylinder liner, all moving parts.
- 3) Leakages of hydraulic oil because damaged seals of tilt, hoist, steering cylinders, leakage from high-pressure hoses, nipples, o rings, damaged threads of nipples etc.
- 4) Very low efficiency of lifting, tilting & movement of material with load due to worn-out & damaged all linkages, bushes, sub-assemblies, so its direct effect on engine load, transmission & main chassis & all systems.
- 5) Cut & damaged engine mounting foundations, Engine supports etc. Oblong wear out chassis & mast end pieces. There is no alignment of chassis, engine & transmission.



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Annexure C



ENCON ACHIEVEMENTS FOR YEAR : 2003-04

Achievement

? Vehicle Location: SBI II – Composite section – 297 – Cost center – 11022970

? Vehicle details: -

? Vehicle: -- Diesel forklift truck

? Make: -- Voltas Ltd. Thane.

? Model: -- DV-30-FC-PDD

? Year of purchase -- 1990

? Value of purchase -- Rs.6,34,303 /-

? Present value of same Model of forklift truck - Rs. 8,70,000 /- A

? Resale value of damaged forklift truck(83814069) -Rs. 1,75,000 /- B

? Expenses for reconditioning

? Spare parts (Voltas Ltd.) - Rs.3,30,000 /- C

? Machining charges - Rs.15,000 /- D

? Welding, Machining, Drilling, Tapping, Cutting etc.

? Labor charges if this job given to out-side party Rs.25,000 /-

? In-house labor charges

? a. Skilled 1 mandayX15 daysX Rate Rs.300/day Rs.4,500 /-

? b. Semi-skilled 2 mandaysX 15 daysX Rate Rs.200/day Rs.6,000 /-

? c. Un-skilled 2 mandaysX 15 days X Rate Rs.100/day Rs.4,500 /-

? d. Supervision 1 manday X 15 days X Rate Rs.300/ day Rs.4,500 /-

? Total Rs.18,000 /- E

? Saving= A – (B + C + D + E)

? i.e = 870000 - (175000+ 330000+ 15000+ 18000) =Rs.3.32,000 /-

Fuel Saving For Year 2003-04= Rs.17,820/-

? Vehicle was inspected by M/s Voltas Ltd. Mr. J.P.Divakar – MHBD.



ENCON ACHIEVEMENTS FOR YEAR : 2003-04

BEFORE RE-CONDITIONING



AFTER RE-CONDITIONING



DISMENTLE STAGE



OUR TEAM





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ENCON ACHIEVEMENTS FOR YEAR : 2003-04

RECONDITIONING OF MACHINES

SR.No.	Machine	Major problems	Major activities	Investment
1	CNC 65	Uneven taper for Z axis	1.Guide way grinding & scrapping	1 Lac
2	SPM	Concentricity problem	1.Guide way grinding & scrapping 2.Head stock o/h	1.50 Lac
3.	ECONO	Crack in X axis slide	Replacement of saddle	1.50 Lac
4	C-600	X axis taper problem	Guide way grinding & scrapping	1.00 Lac
5	72 " blasting machine	1.Shot conveying problem 2.Heavy sleeve noise	1.Replacement of conveyor 2.O/H of sleeve	0.40 Lac
6	3 ton fork lift	1.More fuel consumption	1. Complete o/h	



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ENCON ACHIEVEMENTS FOR YEAR : 2002-03

A. Savings at KBL Works -

Sr. No.	Name of Activity	Key Area	Investment In Rs.	Net Saving In Rs.
1	Improvement in yield of CIF	Modification	Nil	420000
2	Adoption of metallic circular plate against wooden plunger for cupola plugging system	Modification	Nil	25000
3	Adoption of In-house temperature recorder in core baking oven in CIF	Modification	35000	480000
4	Reduction in KVA Demand	KVA Demand	-	1500000
5	Power factor Rebate from MSEB	Power Factor	250000	1643000
6	Reduction in metal pigging in CI Foundry	Modification	32000	1360800
7	MSEB TOD meter rebate	MSEB Rebate	Nil	1062885
8	Eight offices are shifted under one roof	Logical planning	20000	85072
9	Use of Beblec energy saver	Energy Saver	Nil	15513
10	Energy conservation in compressed air system	Compressor air	30000	369707
11	Reduction of power consumption in H.F furnace by using molten metal from cupola	Logical planning	Nil	598583
12	To reduce transmission losses	Power transmission	Nil	1515152
13	Reduction in casting rejection in C.I foundry	Process improvement	40000	525000



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ENCON ACHIEVEMENTS FOR YEAR : 2002-03

Sr. No.	Name of Activity	Key Area	Investment In Rs.	Net Saving In Rs.
14	Use of waste packing wood instead of firing wood in cupola	Wastage	Nil	50000
15	Wind mill agreement	Wind power	Nil	96295
16	Use of special coating to pump	New technology	95000	282763
17	Reduction in electrical power consumption in CIF	Modification & logical planning	35000	31657
18	Installation of FRP cooling tower in ACS foundry	FRP cooling tower	125000	9384
19	Under loaded motors are connected in star	Under loaded Motor	Nil	34776
20	Energy conservation through air conditioning	Air conditioning	5000	86112
21	Use of FRP sheet in various shops	Natural Illumination	100800	161464
22	Saving through productivity improvement	Productivity Improvement	10000	41984
23	Reduction in LDO consumption in NFF	Oil	5000	288701
24	Removal of unwanted tubes, HPSV/HPMV lamps	Illumination	71564	100217
25	Use of V/F Drive	Energy Saver	62000	30732
TOTAL			916364	10814797



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ENCON ACHIEVEMENTS FOR YEAR : 2002-03

B. Savings at National level & Customer end.

Sr. No.	Name of Activity	Key Area	Investment	Net Saving In Rs.
1	Use of Corrocoating material for various products	Efficiency improvement Coating	N.A	13310816
2	Energy efficient pump	Energy efficient product	N.A	7957986
3	Efficiency Improvement in BHR 50 Pump	Pump Impeller Modification	N.A.	1504384
Total				2,27,73,186