

ENERGY MANAGEMENT AND CONSERVATION AT LANKA CERAMIC LIMITED

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Introduction

Lanka Ceramic Limited operates energy management and energy conservation programmes for optimum efficiency and at optimum economic viability in order to reduce the production costs and to obtain higher profits. The top management's commitment had motivated knowledgeable middle management and supervisors to initiate energy cost reduction programmes, periodical reviews and energy audits. In 1990, Lanka Ceramic Limited was awarded most prestigious Professor Mohan Munasinghe award for the outstanding work on Energy conservation and substitution completed with that year.

Several energy conservation projects were implemented in 1992 and two successful projects are listed below.

ELECTRICAL LOAD MANAGEMENT IN THE PILIYANDALA FACTORY

In the Piliyandala factory, electricity costs represent a sizable proportion of running cost and varies between Rs. 726,612 and Rs. 995,635 per month.

The efforts to conserve electrical energy and achieve savings in electricity cost was possible due to the introduction of Time and Day tariff in April 1989. The carefully planned operational changes without hindering the production targets ensured substantial savings as shown below.

<u>Year</u>	<u>Saving</u>
1989	Rs. 311,603
1990	Rs. 298,720
1991	Rs. 414,933
1992	Rs. 432,454

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The change over was further viable when production operations were shifted from peak hours in order to reduce the unit consumption between 6.00 pm to 9 pm. The factory employees were motivated to reduce electrical energy consumption, specially during peak hours. In this connection, booklets in Sinhala Language giving out valuable information were distributed among employees, analysing the magnitude of electrical energy consumption in each department. The economics of the operations and savings that could be achieved were also analysed in these booklets. At the production meetings, the managers were briefed on the importance of shifting the electrical load from peak hours to avoid superimposition of rise in kVA demand.

ELECTRICAL KILN

The detailed study of the operational pattern of the two electrical kilns each of 100 kW revealed that substantial savings could be achieved. The Production Manager initiated planned operations of these kilns maintaining the same production targets. This programme consists of

- (a) Avoiding the operations of two electrical kilns between 6 pm to 9 pm
- (b) The reduction of refractory mass used for setting the ware for firing.
- (c) Introduction of low mass tripod stand to set the wares instead of cranks.

Previously 16 cars per day were fired and this reduced to 12 cars per day maintaining the same daily production level. Figures 1 and 2 show the reduction in peak hour cost and peak hour units against the tonnage. The monthly savings achieved are shown in table 2. The weight of cranks in each car previously was 36 kg and this was reduced to 10 kg per car.

Furthermore, due to the elimination of cranks, more space is available in kiln car for loading.

Reduction in Electricity usage

As shown in table 2, the consumptive figures for 3 months prior to implementation and after implementation shows a reduction of Rs. 426,368.

1992 month	Peak hour units consumption	Cost in Rs.
January	23592	110882 No fuel adjustment charge
February	29196	137221 No fuel adjustment charge
March	19302	113399 Fuel adjustment charge operative (Billed for less days)
April	24816	145794
May	26868	157850
June	29250	171844
July	25176	147909
August	28536	167649
September	23412	157545
October	16362	96126
November	20100	118087
December	16164	94964

Table 1- Peak period consumption and costs

1992 Month	Cost in Rs.	Total for 3 months
July	900109	
August	876154	2771898
September	995635	
October	751761	
November	867157	2345536
December	726612	

Table 2- Total electricity costs for six months

IMPROVING THE EFFICIENCY OF BELT DRYER AT KAOLIN REFINERY BORALES GAMUWA

Introduction

At the Kaolin Refinery Plant in Boralessgamuwa, a hot water boiler is utilised for thermal drying of clay. The hot water under the pressure of 6.5 to 7.5 psi. is first passed through pipe lines to the belt dryers and then across the 18 sets of horizontal radiators

positioned at different places in the dryer. Heat transfer takes place through these radiators and the circulation fans fixed on the roof of the dryers at different positions transfer heat by convection to dry wet clay material.

Comprehensive Energy Audit

In order to improve the efficiency of the dryer, complete measurements were done and the magnitude of heat losses were analysed. The preliminary studies revealed that the Dryer efficiency was as low as 49.5%. The historical data shows that the dryer required 9880 to 10450 kJ per kg of water for evaporation, which is high compared with belt dryers of this type. This was brought down to 5800 kJ/per kg of water.

In order to improve the performance efficiency of the Dryer, a team consisting of Energy Manager, Chief Engineer, Engineer (R/Material), Research Officer (C.R.D.C.), Factory Manager (Kaolin Refinery) and the maintenance staff carried out remedial measures.

Exhaust Ducts No 1 and 2

To reduce the heat losses through the exhaust ducts, temperature measurements and air flow rates were measured. The temperatures of exhaust ducts No. 1 and 2 were as high as 94°C and 81.3°C. The duct No. 1 heat losses were 3741 kJ/h. The adjustments of dampers in the two exhaust ducts were done in relation to feeding rate, moisture content at the exist of the dryer. As varying damper positions, drying time was controlled and exhaust duct losses were reduced.

Capacity of the Dryer

With the repairs to the shredder, it was possible to increase the input capacity, and an even concentration of the shredded clay layers. The output was increased from 8 tons per shift to 9.5 to 10 tons per shift.

Heat Losses at the Entrance

It was noted that hot air above 80°C comes out from the Dryers near the entrance to the dryer. This untapped hot air was utilised by changing the original design of the dryer. The two sides were closed using chip boards to prevent heat losses to the outside and hot air was allowed to pass across the clay bed.

Specific Energy Consumption Index

With the implementation of dryer adjustments in September 1992, it was possible to reduce the specific Energy Consumption and costs, as shown in table 3.

Month	Oil Consumption Per Metric Ton	Cost per Metric Ton
June	516	Rs. 3545
July	565	Rs. 3882
August	569	Rs. 3909
September	470	Rs. 3229
October	430	Rs. 2954
November	407	Rs. 2796
December	440	Rs. 3023

Table 3- Oil consumption at Kaolin Refinery.

Figure 1- Peak time elect. costs 1992

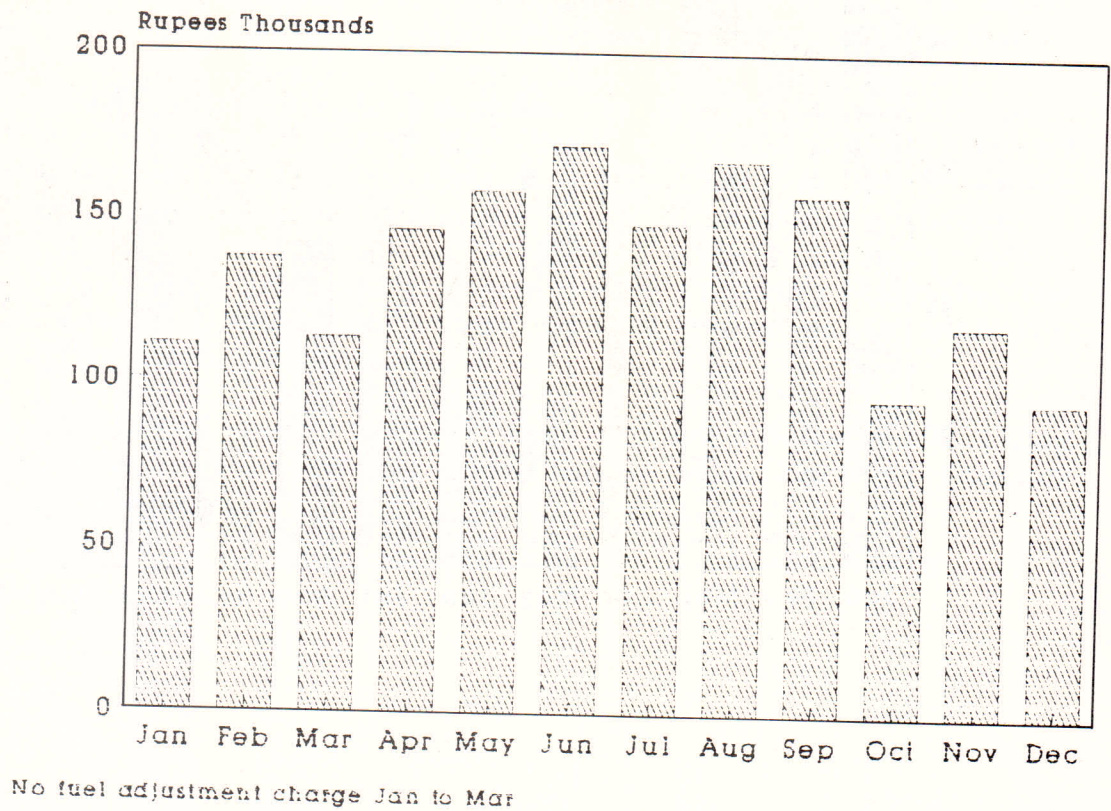


Figure 2- Peak time elect. use 1992

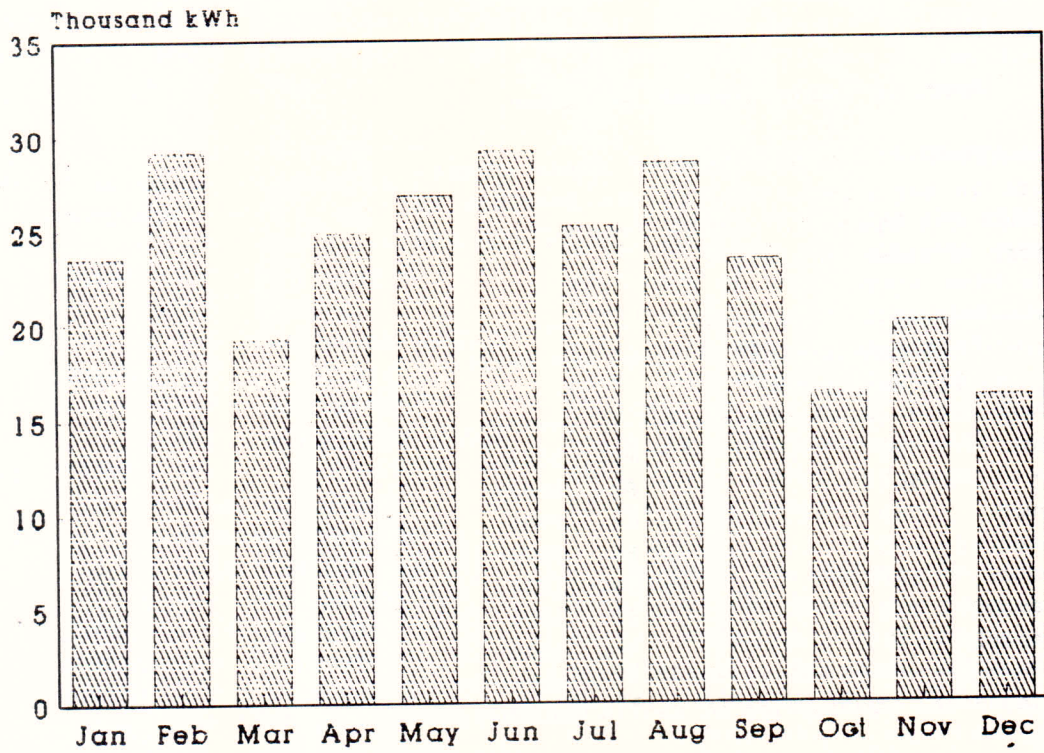
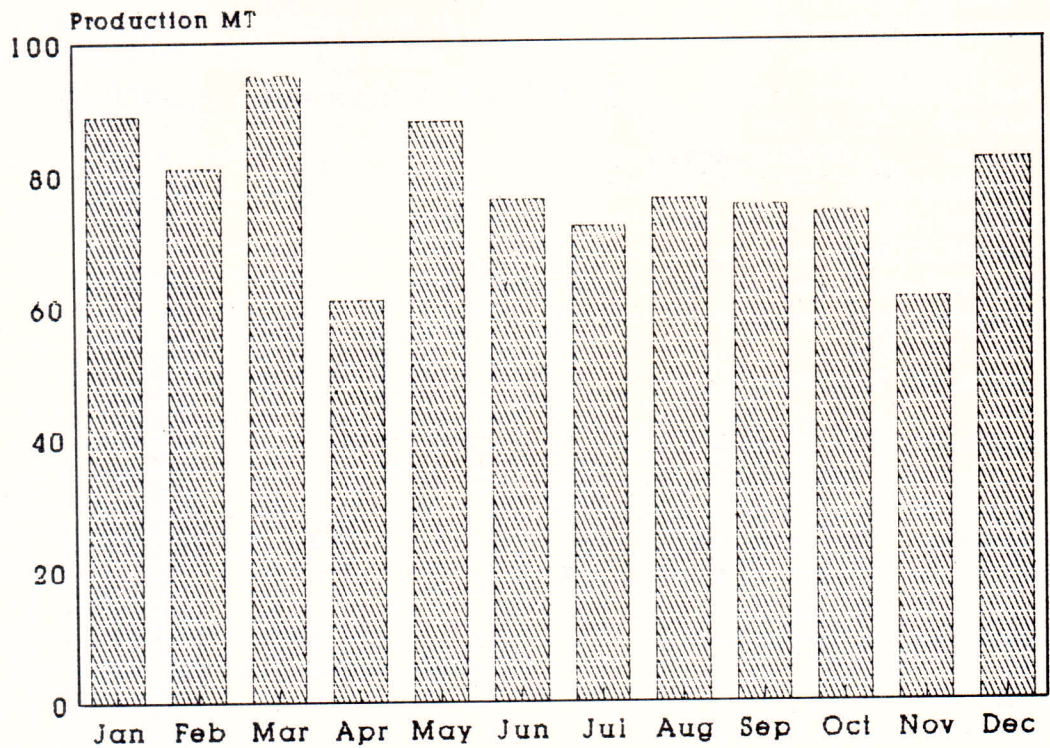


Figure 3- Factory production 1992



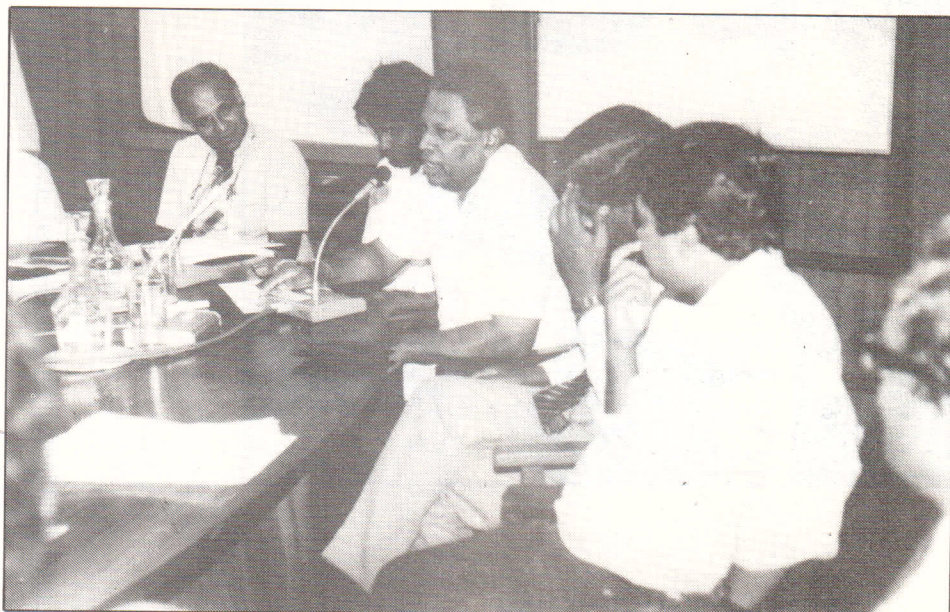
SLEMA NEWS

- * The Act of Incorporation of SLEMA has been presented in Parliament. It is now in Committee stage and is expected to be adopted shortly.
- * In January 1993, SLEMA coordinated the visit of Mr M Labrouse, Consultant to ADEME (French Agency for Energy and the Environment) who was on a mission to identify priority areas for further work on Energy Management and Conservation. The need to strengthen the Institutional Infrastructure, advisory and backup services to the industry and commercial users was identified as a major requirement. On 26th January, a seminar was held by SLEMA where senior officials from the Energy supply and consuming institutions, and from Research and Regulatory bodies expressed their views about the proposal. The final mission report has been received and SLEMA is working with Ministry of Energy Conservation to finalise the proposal and to follow it up for implementation.
- * The 6-day Training Course on Steam Generation for Boiler Technicians was over 6 Saturdays from 9th January 1993. Forty one participants followed the course. (see following pages for photonews).
- * A public lecture on "Challenges Facing the Energy Sector" was delivered by Prof Mohan Munasinghe, President Emeritus, SLEMA on 30th December 1992.
- * SLEMA conducted an Energy Audit for Ceylon Biscuits Ltd at their factory. Dr Nalin Walpita (Vice President), Mr D V S A Piya-tilake (member) and Mrs R Nissanka (member) conducted the Audit.
- * In 1989, SLEMA originated a proposal to establish a Link programme between University of Moratuwa and the University of Twente, The Netherlands. The idea was to establish an academic programme at University of Moratuwa on Energy Studies through a Link Programme in which SLEMA would play a catalytic role. After several delays, the proposal is now under consideration by the University Grants Commission and hopefully donor assistance can be obtained to commence work in 1994.
- * Upon a request from James Finlays Ltd., SLEMA conducted a 1-day training course on furnace and dryer operations for Tea Factory staff of the Company.

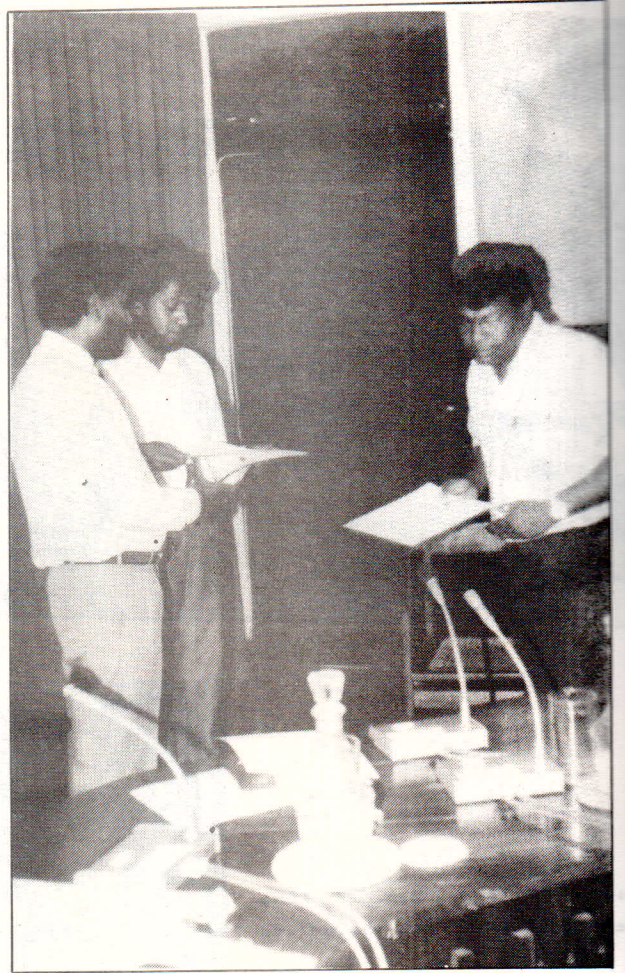


A section of the group of 41 participants.

Mr Shavi Fernando, Senior Vice President conducted the evaluation of the course.



Mr W R B Rajakaruna, Secretary Ministry of Energy Conservation (third from the left) was the Chief Guest at the Concluding Session. Other in the picture are Past President Mr G T Fernando, Course Director Mr Upali Daranagama, President Mr Ananda Munasinghe and Senior Vice President Mr Shavi Fernando.



A participant receives his certificate from Mr Rajakaruna.

A participant receiving his certificate from the President, Mr Ananda Munasinghe. Mr Upali Daranagama, Course Director is also in the picture.



Mr G T Fernando, Immediate Past President proposed the Vote of Thanks.