

## Shriram Cement Works - Kota, Rajasthan

### UNIT PROFILE

Shriram Cement Works (SCW) is a unit of DCM Shriram Consolidated Limited (DSCL), a company engaged in the manufacture of Urea, PVC, Caustic Soda, Sugar, Cement and Textiles. Besides its own products, it also markets hybrid seeds, POP and DAP. DSCL's annual turnover in 2004-05 was 1905 crores out of which SCW's contribution was 83 crores.

SCW is an **unconventional wet process cement plant** based on waste calcium hydroxide sludge of sister calcium carbide plant, located in the same complex.

SCW was commissioned in 1987 with the technical know-how from M/s. Lafarge Coppee Lavelin, France. Products of the plant are OPC-53 grade and PPC. The **plant is certified for ISO 9001, 14001 and OHSAS 18001** for its effective Quality, Environment, and Occupational Health and Safety Management Systems.

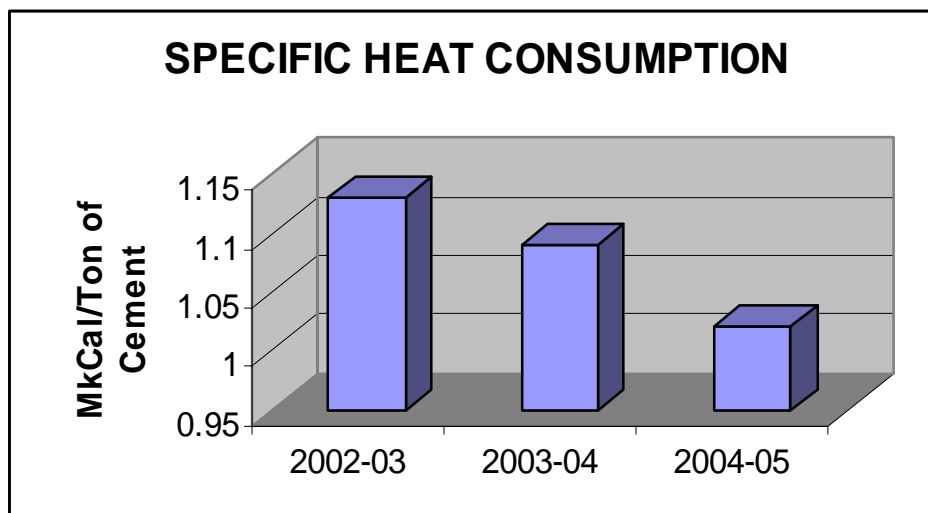
Installed capacity of SCW is 2.0 lakh tons cement per annum, which is expanded to 4.0 lakh tons with effect from December 2004. However, its capacity utilisation is consistently above 100% and in 2004-05, it was 120%.

### ENERGY CONSUMPTION

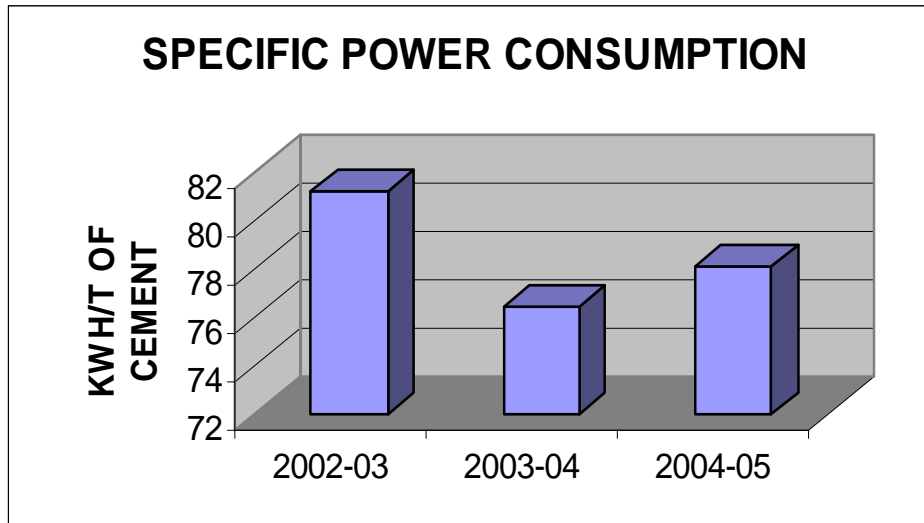
There is steady decline of specific energy consumption due to implementation of various energy conservation measures.

Total electrical energy consumption of the plant in 2004-05 was 250.4 lakh kwh, which is fully met from sister fertiliser plant's captive power plant, located in the same complex. Thermal energy requirements of the plant were met by coal, pet coke and small quantity of furnace oil. In 2004-05, 0.55 lakh tones of coal, 0.07 lakh tons of pet coke and 38 KL of furnace oil were consumed. Specific energy consumption figures for 2004-05 are 78 kwh/t of cement and 1018 Kcal/kg of cement. Cost of the energy is 45% of Ex-works cost.

### Specific Heat Consumption Trend



### Specific Power Consumption Trend



### ENERGY CONSERVATION COMMITMENT, POLICY AND SET UP

In order to meet company's cost reduction objective and also with an objective to conserve natural resources, special attention is given in reducing energy consumption in various sections of the plant.

To focus the attention on energy conservation, Energy Conservation Cell (EC) was created which is coordinated by energy manager and guided by the top management. It consists of Section-in-charges of production, maintenance and quality.

Energy policy of Shriram Cement Works is enclosed which shows the commitment of top management towards energy conservation.

EC prepares energy performance of the plant on daily and monthly as well as yearly basis. The reports thus prepared are reviewed at different levels of management as given below:

- Daily review in production meeting where weak areas are identified and corrective measures are taken immediately.
- Monthly review by Vice President
- Yearly review for setting up energy targets for next year.

Shriram Cement Works believes in team work and plant optimisation. With the suggestions given by the employees and with modest investments, considerable energy savings were achieved over the years. SCW not only implements latest energy conservation techniques but also sustains it by regular maintenance and by providing adequate training.

### ENERGY CONSERVATION ACHIEVEMENTS

During the period 2001-02 to 2004-05, SCW has implemented number of energy conservation measures, which has resulted in **3.9 % saving in sp.elect. energy consumption** and **9.8 % in sp.heat consumption**. A brief description of major projects implemented during the year 2004 -05 is given below:

**1. Wet process Cement rotary kiln zone modification:**



Existing wet process rotary kiln was modified by introducing tumblers and dam in pre calcination area and entire chain zone was redesigned to improve the heat transfer. This modification also increased kiln output by 13%.

Investment : Rs/lakhs 260  
Annual savings : 1120 Mkcals  
Rs/lakhs/year 25 (5.9 in 2004-05 due to project implementation in Dec 2004)

**2. Use of higher quantity pozzolona in cement:**

Pozzolana is used in the manufacture of Portland pozzolana cement(PPC). The quantity of pozzolana addition is based on clinker quality and final quality of cement. At Shriram Cement Works, by process optimization, clinker quality is improved which has enabled production of larger quantity of PPC and larger pozzolana addition. Suitable dosing equipment is installed for this purpose.

Investment : Rs/lakhs 58  
Annual savings : 26397 Mkcals  
Rs/lakhs 127.7

**3. Installation of Vertical shaft impactor:**

Feed size reduction at cement mill was achieved by installing energy efficient Vertical shaft impactor. This equipment is capable of not only reducing cement mill sp. power consumption but also increase cement mill output. Overall, 1 kWh/MT of cement power is saved.

Investment : Rs/lakhs 100  
Annual savings : Rs/lakhs 10.6



**4. Installation of Electronic packer:**

Previously used mechanical cement packer is energy inefficient and its productivity is low. Hence, energy efficient and high productive Electronic packer is installed.

Investment : Rs/Lakhs 100  
Annual savings : 2.0 lakh kWh  
Rs/ Lakhs 5.3

**5. Efficient burning of coal through fine coal residue control:**

Based on volatiles and type of fuel, it is to be ground at different fineness for optimum burning with no generation of CO. At Shriram Cement works, fuel fineness and power consumption in grinding is optimised to maximise energy saving.

Investment : Rs/lakhs/year: 10.6 (operating expenditure)  
 Annual savings : Rs/lakhs 5.2

**6. Close circuiting of tertiary crusher:**

Feed size control is achieved by close circuiting of tertiary crusher and feed size reduction was achieved 95 % passing 16 mm. which has improved the raw mill output.

Investment : Rs/lakhs 12  
 Annual savings : 4.0 Lakhs kWh  
 Rs/Lakhs 10.6

**ENERGY CONSERVATION PLANS AND TARGETS**

At SCW, several schemes for energy conservation are planned. Major schemes are as follows:

Energy Conservation Measures	Year of implementation	Yearly savings			Investment (Rs/Lacs)
		Electrical (Lacs Kwh)	Thermal (Million Kcal)	(Rs/Lacs)	
1. Production of larger quantity of PPC	2005	Nil	11000	52.0	68
2. Retrofitting of grate cooler	2006	2.0	10000	54.0	150
3. High efficiency Burner	2006	0	3000	15.0	30
4. Dry process conversion	2007	40.0	130000	750	5000

Our energy conservation targets are to reduce specific power consumption by 10.5% in next 3 years and heat consumption by 8.6% by implementing latest energy conservation schemes and making higher quantity of PPC and increasing the quantity of fly ash in PPC.

## **Shriram Cement Works : Kota**

### **Energy Efficiency Projects (2004-05)**

#### **1. Wet process Cement rotary kiln chain modification**

##### a) Background of project

Heat transfer is poor in wet process rotary kiln and it is intended to improve the heat efficiency by chains modification inside kiln and introduction of tumblers and dam in precalcination zone.

##### b) Observations made

Kiln used to consume 1262 Kcal/kg clinker heat before modification at 820 MT/day clinker production.

##### c) Technical and financial analysis made

Chains were modified with the help of consultant to get better heat transfer.

Investment	:	260 lakhs
Savings	:	1120 mKcal/year
		Rs.5.9 lakhs/year (scheme is implemented in Dec.2004, hence low savings in 2004-05)

##### d) Impact of implementation : Better heat transfer in kiln

#### **2. Use of higher quantity of pozzolona in cement**

##### a) Background of project

Pozzolonic materials are used in the manufacture of portland pozzolona cement (PPC). By making efforts to improve the quality of clinker, it is possible to use larger quantity of pozzolona in PPC.

##### b) Observations made

Fly ash dosing system was installed to feed fly ash (pozzolona) in uniform quantity. At the same time, clinker quality was improved and it enabled to absorb 20,950 MT of extra pozzolona in 2004-05.

##### c) Technical and financial analysis made

Investment	:	58 lakhs
Savings	:	26397 mKcal/year
		127.7 lakhs/year

##### d) Impact of implementation : Savings in coal and power

#### **3. Installation of Electronic Packer**

##### a) Background of project

Presently used mechanical packer is energy inefficient and its productivity is low.

##### b) Observations made

By installing electronic packer, in addition to reduction in weight variation of packed bags, savings in power are possible to the extent of 0.5 Kwh/t of cement.

c) Technical and financial analysis

Investment	:	Rs. 100 lakhs
Savings	:	2.0 lakh Kwh in power 5.3 lakhs/year

d) Impact of implementation : High productivity and savings in power.

**4. Efficiency burning of coal through fine coal residue control**

a) Background of project

Petcoke and coal are different fuels and require different levels of grinding to burn efficiently. By adjusting fuel size (fineness) CO generation can be reduced.

b) Observations made

It is possible to reduce 5 Kcal/kg clinker heat by properly grinding the fuel.

c) Technical and financial analysis made

Investment	:	Rs. 10.6 lakhs (operating expenditure)
Savings	:	Rs. 5.2 lakhs/year

d) Impact of implementation : Efficient burning of fuel

**5. Close circuiting of tertiary crusher**

a) Background of project

Feed size to raw mill was varying due to inefficiency functioning of tertiary crusher.

b) Observations made

In open circuit, feed size to raw mill used to vary between 16 – 25 mm. In close circuit the size is 95% passing 16 mm.

c) Technical and Financial analysis

Reduction in feed size, improved the raw mill output by about 4 – 5%.

Investment	:	Rs. 12.0 lakhs
Savings	:	Rs. 10.6 lakhs per year 4.0 lakhs Kwh power saving/year

d) Impact of implementation : Savings in raw mill power and stable operation

**6. Expansion of cement mill dust collector**

a) Background of project

With the expansion of cement mill capacity, dust collector pressure drop was increased. By adding 2 chambers to existing dust collector, pressure drop was reduced and dust collector become efficient.

b) Observations made

Pressure at the inlet of dust collector exhaust fan was reduced by 50 mm WG.

c) Technical and financial analysis

Reduction in power consumption of dust collector fan was achieved.

Investment	:	Rs. 3 lakhs
Savings	:	2.0 lakhs kwh in power Rs. 5.3 lakhs/year

d) Impact of implementation : Savings in power and control of dust emissions at cement mill.

**7. Installation of vertical shaft impactor to reduce feed size to cement mill**

a) Background of project

To increase the capacity of cement mill, a pregrinder (vertical shaft impactor) was installed before mill. It is supposed to increase not only mill output but also reduce sp. energy consumption of cement mill.

b) Observations made

Feed size to cement mill was reduced from 25 mm to 4 mm

c) Technical and financial analysis

Cement mill sp.power consumption was reduced by 1 Kwh/t

Investment	:	Rs. 100 lakhs
Savings	:	Rs. 10.6 lakhs/year

d) Impact of implementation : Increase in mill output and reduction in sp.power of mill.