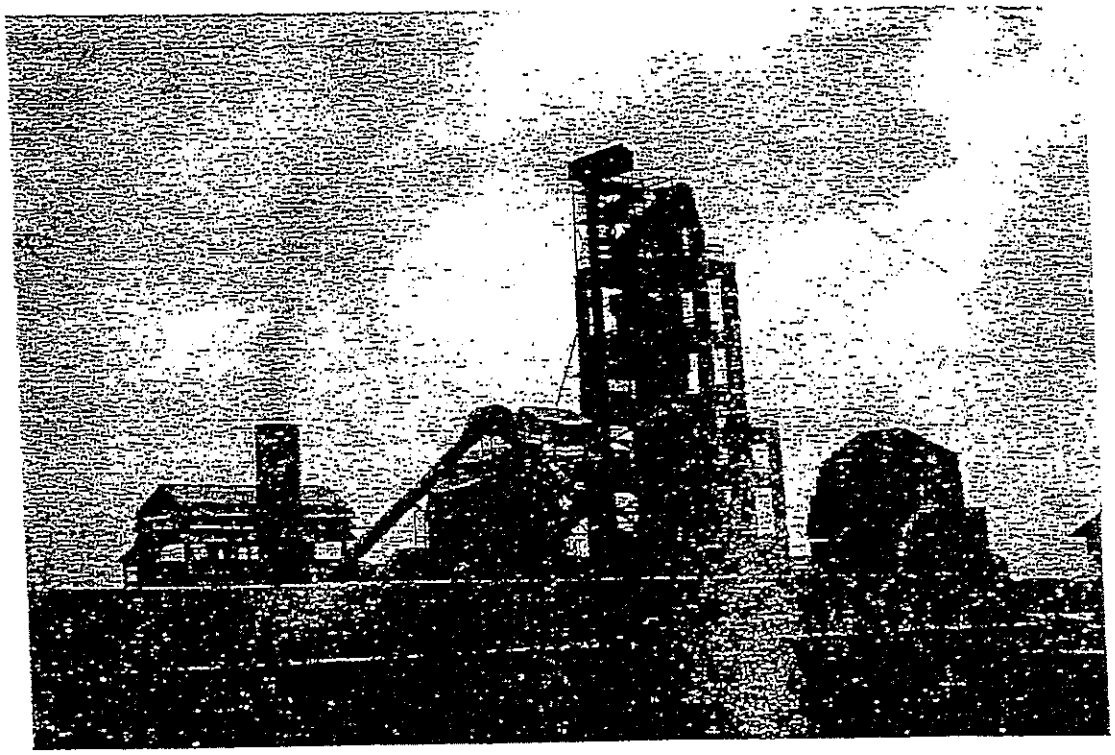
Project Report For Expansion of cement Plant

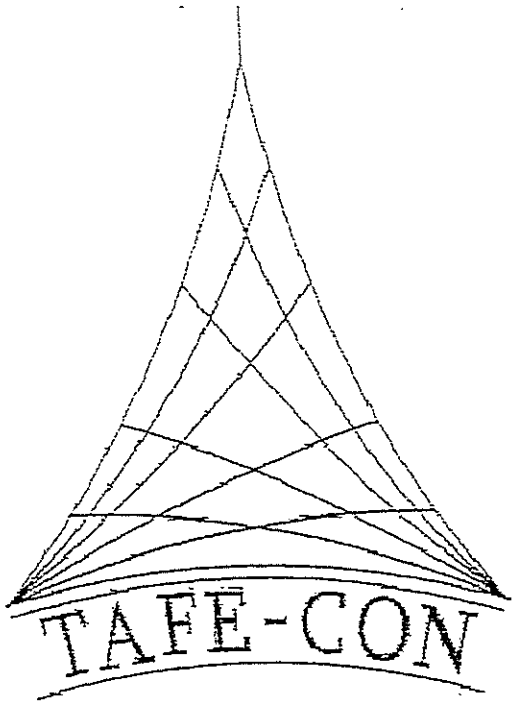
of M/s Khyber Industries (P) Limited,

Tulpow khonmoh Srinagar.



M/S TAFE-CON PRIVATE LIMITED,

CHENNAI



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PROJECT REPORT FOR EXPANSION PROGRAMME OF
KHYBER INDUSTRIES (P) LTD, SRINAGAR

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PROJECT HIGHLIGHTS OF EXPANSION OF CEMENT PLANT OF M/S KHYBER INDUSTRIES (P) LTD. SRINAGAR.

Particulars	Existing	Proposed
1. Installed Capacity	1080 TPD	500 TPD
2. Item of Manufacture	Portland Cement	Portland Cement
3. Project Cost	Rs. 10987.89 lacs	Rs. 3496.00 lacs
4. Land and Building	Rs. 3526.64 lacs	Rs. 665.00 lacs
5. Plant & Machinery	Rs. 6131.31 lacs	Rs. 2806.00 lacs
6. Misc. fixed assets etc	Rs. 1329.94 lacs	Rs. 25.00 lacs
7. Power requirement	10MVA+3100HP	3.5 MVA
8. Employment potential	576	50
9. Land requirement	320 Kanals	105 Kanals
10. Location	Tulpow Khunmoh Srinagar	Tulpow Khunmoh Srinagar

Means of Finance **(Rs.in lacs)**

Internal generations of the units Rs.3496.00

The Board of Directors of the Company comprise of the following:

1. Haji Mohammad Maqbool Tramboo Chairman.
2. Mr. Abdul Quayoom Tramboo Managing Director.
3. Mr. Riaz Ahmed Tramboo Director.
4. Mr. Umar Khursheed Tramboo Director.

Pay Back Period

The pay back period of the expansion project has been estimated at Two years.

CHAPTER 1.0 INTRODUCTION

M/s Khyber Industries Private Limited was promoted by Dr. G. R. Tramboo and Mr. Haji Mohd. Maqbool Tramboo. The Company was incorporated on 31–03–1982.

They have installed and commissioned a Cement Manufacturing plant of 100 Tons per day capacity with Vertical Shaft Kiln Technology during October 1987.

The Capacity of the VSK plant was increased from time to time to 280 TPD. With the rich experience gained in the manufacturing and marketing of Cement and with the view to maintain their premier position in the field the Company carried out substantial expansion in 2003 and increased the capacity to 1080 TPD by setting up 800TPD Rotary Plant.

M/s Khyber Industries Private Ltd. had engaged M/s TAFE-CON Private Limited, Chennai, a Consultancy firm which is managed by a team of Technocrats of more than 40 years of experience in Cement Industry for the Project Consultancy and Execution of 800 TPD Rotary cement plant. The project was completed in 2006. They are regarded as foremost in this field in this part of the country.

The rated annual Cement capacity of VSK plant is

280 (TPD) x 330 (No. of days working per annum) x 0.95 (Efficiency) = 0.88 LTPA

The rated annual Cement capacity of Rotary Kiln plant is

800 (TPD) x 330 (No. of days working per annum) x 0.95 (Efficiency) = 2.51 LTPA

The Rotary Kiln Cement Plant has also achieved 100% efficiency.

It was also decided to carryout improvements / alterations in the VSK plant to increase the capacity of cement from 280 TPD to 380 TPD.

Before taking up the up gradation project, we took some trial runs on the kiln in order to see the potential of the Rotary kiln. We have run the Kiln with higher output for certain hours and we have noted down the various observations.

We would also like to mention that various plants in India with same Kiln size have upgraded their plants from 300 TPD to 1800 TPD.

Based on the above it is decided to enhance the capacity to 1200 TPD of cement by carrying out the required alterations / improvements from the crusher department to packing department in Rotary kiln plant.

It was also decided to carryout improvements / alterations in theVSK plant to increase the capacity of cement from 280 TPD to 380 TPD

The annual cement capacity after expansion will be

(380+1200) (TPD) x 330 (No. of days working per annum) x 0.95 (Efficiency) = 4.95LTPA

On Summary the Cement Capacity will be Enhanced from 3,39,000 Tons per annum to 4,95,330 Tons per annum

M/s Khyber Industries Private Ltd. has engaged M/s TAFE-CON Private Limited, Chennai, for the study and preparation of Detailed Project Report for the enhancement of capacity.

CHAPTER 2.0 PLANT DESCRIPTION AND PRESENT CONDITION

2.1 MINING

Mining of limestone is carried out by drilling of 100 mm dia hole to a depth of 10 m by a crawler mounted rock drill using compressed air. The blasted lime stone is loaded in 15 T dumpers by hydraulic excavators and transported to crushing plant.

The deposit is not covered by any overburden.

2.2 CRUSHING

2.2.1 Limestone crushing: (High grade and Cement grade combined crushing)

The crushing plant is located adjacent to mines.

The crushing system consists of Apron Feeder, Wobbler feeder and Hammer crusher. The capacity of the crushing system is 350 TPH.

The underflow of wobbler feeder (0 to 50 mm) is conveyed to screen house for segregation of -10mm material. The rejected -10mm material is stored in a reject hopper.

The screen overflow(10 to 50mm) is diverted back to the crusher.

The crusher crushes the material from the size of 1000 x 800 x 600 mm to 95% less than 25mm, with a maximum size of 30 mm.

Bag Filters are provided for dedusting of Crusher and Screen house. Crushing Plant is operated only in day shift.

2.2.2 Silica stone crushing:

The silica stone crushing plant is located near to the limestone crushing plant. The Crushing capacity is 30 TPH

It is a three stage crushing system in close circuit with vibrating screen. The primary and secondary crushers are Jaw type crushers. The tertiary crusher is a Double Roll crusher. This crushing system crushes the material from the size of 400 mm max to 80% less than 25mm, with a maximum size of 30mm.

Bag Filters are provided for dedusting of Crushers and Screen. Silica Crushing Plant is operated for two shifts in a day.

2.3 CRUSHED LIMESTONE STORE

A covered storage yard of size 16 m x 100 m is used for storage & pre-blending of high grade and low grade limestone. The capacity of the pile is 16500 tons. The stacking of material is done by shuttle reversible belt conveyor. The crushed material is distributed to the full length of the yard by operating the shuttle conveyor while stacking in two piles.

RCC Tunnel is provided below storage yard with 10 nos. of Vibro feeder at 10 m interval for withdrawal of crushed limestone for feeding to raw mill hoppers.

2.4 HANDLING OF ADDITIVES AND FUEL

A Covered storage yard of size 15 m wide and 98 m long is used for storage of additives viz., Iron ore and fuel Viz. Coal and Coke.

The crushed silica stone or river sand is also piled in the same yard in the place allocated for clay. At present clay is not being used as a raw material.

There is one EOT Crane of 10 tons capacity with 3 M^3 bucket volume in the yard for storing and feeding of additives and fuel to respective feed hoppers for onward transport.

A Truck unloader is provided for unloading of coal.

2.5 CRUSHING OF COAL

Coal lumps are fed to a Jaw crusher where it is crushed to less than 30 mm and product from crusher are fed to coal mill hoppers.

2.6 CRUSHING OF COKE

As the size of coke is less than 25 mm it is directly fed to coal mill hoppers without crushing.

2.7 RAW MILL FEEDING

There are 2 nos. of RCC hoppers, for blended limestone, being fed by belt conveyors from crushed limestone store.

Crushed limestone from these two hoppers and Silica Stone, Iron ore & river sand from its respective hoppers in the crane yard are being transported to raw mill by a common belt conveyor.

The existing clay hopper in the crane yard is used for river sand. 4nos of Weigh feeders and 1 no. of belt feeder are used for control feeding of respective material to mill

2.8 RAW MATERIAL DRYING AND GRINDING

A closed circuit ball mill of size 3.5 m dia with a length of 12.5 m including integral drying chamber of 3.0 m long is used for drying and grinding of raw materials.

The capacity of the mill is 80 TPH.

The ground material from the mill is fed to a high efficiency separator by means of a bucket elevator.

The coarse material from the separator is fed back to the mill and the fines are collected by a cyclone and fed to the blending silo by means of another bucket elevator.

2.9 HOMOGENISATION OF RAW MEAL

A Concrete silo of 14 m dia. and 45 m high with an inverted cone at bottom is installed to store and blend the raw meal on continuous basis. The capacity of the silo is 5000 Tons. Silo is divided into six segments and provided with aeration pads and air pipelines in such a way that individual segments can be aerated independently. Material is extracted by aerating the pads of individual segments as per the computerized programme.

2.10 KILN FEED

The raw meal drawn from silo is fed to a bin on load cells where it is further blended by aeration and fed to preheater by means of solid flow feeder. Solid flow feeder controls the rate of feed as per operation requirement. Bucket Elevator is used to lift the material to preheater.

2.11 COAL / COKE DRYING AND GRINDING

Coke / Crushed coal from the respective hoppers is extracted by weigh feeder and fed to a closed circuit Air Swept ball mill of 10 TPH. The size of the mill is 2.6 m dia x 4.4 m long with a drying chamber of 2.4 m dia x 2.4 m long.

The hot gas for drying is drawn from Kiln Preheater. The Material is fed to the grinding chamber and ground by grinding media and drawn by the mill fan via the Grit Separator where the grits are separated and fed back to the mill. The ground material is collected by the bag filter and stored in bins.

2.12 FINE COAL / COKE FEEDING

The fine coal and fine coke are being stored in their respective bins. They are fed to Calciner and kiln. Fine coal is being used for precalciner and the fine coke is being used for kiln firing.

The transport of fine coal and coke are by means of separate screw pumps.

2.13 PYRO PROCESS

There is a 5 Stage Cyclone Preheater with Inline Calciner, Rotary Kiln and Grate cooler. The 5 stage cyclone preheater is of size 4.3 m dia in stages 1 & 2 and 4.6 m dia in stages 3 to 5. The Inline calciner size is 5.2 m dia x 22 m height. The size of Kiln is 3.0 m dia x 45 m long with 3 supports. The Grate area of the grate cooler is 20.16 m^2.

Raw meal extracted from blending silo on a gravimetric basis is fed at the raiser duct leading to the top cyclone of preheater. Material thus fed is kept in suspension raising the temperature from 35°C to 800°C and enters the calciner. Fine Coal from the bin is pumped to the calciner and the raw meal temperature is further increased to 900 - 1000°C.

At this temperature, material enters the kiln and further heated by the firing done at the other end of the kiln. Fine coal from bin is fed to the kiln by burner system for burning. Clinker is formed due to burning of raw material to 1400 - 1500°C. The temperature of the clinker at the discharge end of the kiln is around 110°C and the same is dropped into grate cooler.

Hot clinker is cooled in the cooler by quenching in atmospheric air supplied by high pressure fans. 50% of the hot air generated in the cooler is drawn to the kiln by the preheater fan. Balance air is vented through ESP. After cooling in the grate cooler, clinker is discharged into single Deep pan conveyor and transported to clinker silo.

2.14 VENTING OF KILN GASES AND RAW MILL

Reverse air bag house is used for venting of hot gases from preheater & raw mill. Part of the kiln exit gas from preheater is being used for drying of raw materials in raw mill.
The balance gases or the total gas from kiln circuit when the raw or coal mills are not in operation are vented through this bag house where all the dust will be collected and fed back to kiln feed system.

The clean gas with less than 50 mg/Nm^3 of solid particulate matter is let to the atmosphere.

2.15 CLINKER SILO

A RCC silo with steel roof of 25 m dia x 44 m Ht is used for storing of 15,000 Tons of clinker. A RCC tunnel below silo with 3 no openings are provided for the extraction of

Clinker. Flow control gate is provided for the regulated extraction of Clinker.

Provision is made to divert the Clinker dust during Kiln upset conditions. The diverted Clinker dust is being fed to the RCC Clinker dust silo of 4m Dia x 16m Ht of 200 T capacity. The stored Clinker dust is being fed proportionately along with the Clinker extracted from the main Silo. A Vibro feeder is provided for extraction of Clinker dust.

2.16 CEMENT GRINDING

Clinker from clinker silo is drawn and conveyed to cement mill hopper by means of belt conveyors. Similarly gypsum is conveyed from store to respective hoppers of mill.

These materials are fed to the cement mill on gravimetric basis by weigh feeders.

A closed circuit cement grinding mill of size 3.5 m dia x 11 m long with high efficiency separator is used for cement grinding. The capacity of the mill is 45 TPH.

In Separator. the coarse materials are segregated and sent back to mill for grinding.

2.17 CEMENT STORAGE AND PACKING

One Concrete silo of 6000 tons capacity is used for storing cement. This silo is provided with aeration pads. By aerating the pads, cement is extracted, which is then elevated and stored in a bin. From this bin through one rotary packer, cement is packed in 50 kg bags at the rate of 150 tons / hour.

The bagged cement is then transported by belt conveyors to trucks by two nos. of truck loading conveyors.

CHAPTER 3.0 PROPOSED ALTERATIONS

3.1 INTRODUCTION

It is proposed to increase the capacity of plant with required alterations to existing

production departments.

On analyzing the operating parameters of the kiln and other departments while running at higher capacity, it was found that the following areas need capacity enhancement / alterations

1) Raw Mill Capacity
2) Cooler Capacity
3) Cement Mill Capacity

The Mass flow for 1225 TPD expansion is attached vide Annexure – 1..

3.1.1 RAW MILL CAPACITY:

The following raw materials are ground in the Raw Mill.

- Limestone
- Silica Stone
- Additive - Iron ore, Clay, River sand

At present the maximum feed size to the raw mill is 25 mm.

The ratio of feed to mill is 80 - 84% Limestone, 14 – 16 % Clay, 2 - 4% Silica stone and 0.5 - 1% Iron ore.

The increase in the capacity of the raw mill can be achieved by reducing the feed size to the raw mill.

The size of Lime stone from the crusher is 25 mm. It is proposed to introduce a Tertiary crusher with a screen in close circuit, to reduce the size of the crushed lime stone to 100% less than 8 mm.

Similarly the Silica stone crushing department needs alterations to achieve the final product size of minus 8 mm.

By reducing the feed size from 25 mm to 8 mm it is envisaged that the increase in capacity of raw grinding will be around 25% i.e. 100 TPH from its present capacity of 80 TPH

3.1.2 COOLER CAPACITY:

The cooler grate area is 20.16 m². The loading on the cooler after enhancement will be 62.25 T/D/m2 which is very high compared to the acceptable norms of 45 T/D/m2. The cooler grate area will be increased by suitable alteration to cooler.

3.1.3 CEMENT MILL CAPACITY:

The present feed size to the cement mill is 25 mm.

The capacity of the cement mill can be increased by reducing the feed size to the mill.

It is proposed to introduce a crusher with a screen in close circuit, to maintain the size of the crushed clinker to 100% less than 10 mm.

By reducing the feed size from 25 mm to 10 mm, it is envisaged that the increase in capacity of cement mill will be around 20%

The alterations proposed in all the departments are detailed in the following chapters.

3.2 DETAILS OF THE PROPOSED ALTERATIONS

3.2.1 LIMESTONE CRUSHING SYSTEM

To increase the throughput of existing Raw material drying and grinding department. it is proposed to reduce the size of product from existing crusher by employing Tertiary crusher in close circuit with a screen. At present the limestone crusher is being operated at a lesser capacity than rated.

The size of product will be 100% less than 8 mm, by which the throughput of raw mill will increase from 80TPH to 110 TPH.

Department	Operating TPH	Proposed TPH
Limestone Crushing	253.3 at 98% < 25mm	350 at 100% < 8mm.

The Mass flow, Flow sheet and Layout & sections for the Limestone crushing system is attached vide annexure 2.

3.2.2 SILICA STONE CRUSHING SYSTEM

The requirement of Silica stone after enhancement of capacity will be 520 Tons per day. To avail the uninterrupted machine availability, it is proposed to replace the existing 2 nos. Jaw crusher (Primary and secondary and screen) as these are maintenance prone with new Jaw crushers and screen.

The foundations of the existing equipment will be altered to suit the new equipment.

The Double roll crusher in the existing system will be retained as it is installed recently.

The final crushed product 0~8mm will be stored in an open area. Pay loaders and dumpers will be deployed for transporting the final product to Crane yard.

The operating capacity of the crushing system will be 70 TPH.

This system will be working for 8 hrs/ day

Department	Operating TPH	Proposed TPH
Silica stone Crushing	28 at 98% < 25mm	70 at 100 % < 8mm

The Mass flow and Flow sheet for the Silica stone crushing system is attached vide annexure 3.

3.2.3 RAW MATERIAL DRYING AND GRINDING DEPARTMENT.

The Output of the raw mill will be enhanced from 80TPH to 105 TPH by consistently feeding material of (-) 8mm size which will be achieved after the alteration in crusher department.

Alterations / Replacements proposed to be carried out in the Raw Mill Department

- Weigh feeders below the blended limestone hoppers will be increased.
- Belt feeder for additive will be replaced by a weigh feeder
- The grinding media composition will be altered to suit the finer feed.
- Mill recirculation elevator will be increased from 240 to 300 TPH.
- Solid flow feeder for grits return will be increased.
- Mill circuit fan impeller will be tipped and the motor will be replaced.
- Blending silo feed elevator will be increased and a new stand by elevator will be installed.
- The duct circuit will be altered to maintain the velocity.

Department	Operating TPH	Proposed TPH
Raw material drying and grinding	80	105

3.2.4 PYROPROCESSING

The capacity of pyro processing will increase from 800 TPD to 1200 TPD after the following alterations.

3.2.4.1 Blending silo and Kiln feed

- The 2 nos. Kiln feed solid flow feeders will be increased.
- The kiln feed bucket elevator will be increased from 80 TPH to 120 TPH. A new elevator for kiln feed will also be installed with capacity of 120 TPH.

3.2.4.2 Preheater:

- There is no constraint in the size of preheater cyclone for 1200 TPD level during the trial runs. We donot envisage any change in cyclone.
- Water spraying will be introduced in top cyclone of the preheater.
- Down comer duct diameter will be increased to maintain the velocity.
- During the trials we observed the preheater fan is getting loaded fully. Hance we decided to upgrade the preheater fan with a new impeller in the same casing with a new moor.
- The temperature profile of the preheater cyclone will remain same , the additional heat input will be utilized by additional feed inputs.

3.2.4.3 Kiln:

Kiln drive:

- Kiln drive was designed for a higher capacity during the initial project stage.

- Kiln gear box reduction ration is 18 : 1 and the pinion girth gear is 10.52:1 and the gear box is designed for a service factor of 2.46
- Bases on the above the kiln can run at maximum speed of 5.2 RPM.
- The installed KW of the drive motor is 130 KW and at present the motor is taking a load of 75 KW only.
- The existing drive arrangement will meet the requirement.

Kiln Burner

- The existing Duoflex burner capacity is 21.8 Mkcal/hr.
- For 1200 TPD Production, considering Thermal energy consumption as 800 Kcal/kg of clinker. Considering 40% firing in kiln the heat is 16.7 Mkcal/hr.

3.2.4.4 Cooler:

- Cooler grate area is 20.16 m^2. The grate loading of cooler @ 800 TPD production is 39.68 tpd/m^2. It is proposed to increase the cooler grate area by extending the length so that the grate loading shall be maintained at 47~48 tpd/m^2. It is also proposed to introduce the controlled flow grate (CFG) and Reduced fall through (RFT) for existing conventional zones.
- The fans will be tipped for increasing the capacity.
- The capacity of deep bucket conveyor will be increased. The chain, chain segments. drive, motor etc will be altered suitably in order to increase the conveying speed and filling factor

Department	Operating TPD	Proposed TPD
Pyro processing	800	1200

The Flow sheets for Raw mill and pyro processing system is attached vide annexure 4.

3.2.5 VENTING OF KILN GASES AND RAW MILL

The capacity of Common bag house and Bag house fan will be revised as the volume of exhaust gas through the Common bag house will be increased due to enhancement in production in both the raw mill and Pyro department.

Two more compartments will be added to the existing eight compartments in RABH and bag house fan will be replaced along with the motor. The duct profile will be altered accordingly.

Description	Existing	Proposed
RABH		
Volume in m^3/hr	2,88,000	3,43,800
Number of compartments	8	10
Number of bags / compartment	156	156
Total number of bags	1248	1560
RABH Fan		

Volume in m^3/hr	3,02,400	4,35,600
Relative inlet pressure (mm Wg)	-340	-296

3.2.6 COAL GRINDING DEPARTMENT

The rated capacity of existing coal mill is 10 TPH.

The capacity of the mill was arrived based on Indian coal of calorific value 4500 Kcal/Kg. The size of feed to mill is 80% passing 25mm.

At present KIPL is using imported coal of calorific value 6000 Kcal/kg which means the requirement of coal will be lesser for a given throughput of kiln compared to lower calorific value coal.

As the size of imported coal is less and also uniform, the mill is giving an output of 14 TPH.

This will meet the requirement of Kiln at an increased capacity of 1200 TPD.

Department	Operating TPH	Proposed TPH
Coal grinding	11	14

Alterations / Replacements proposed to be carried out in the Coal Mill Department

- 4 Nos. of Weigh feeder for fine coal / coke feeding has to be increased

3.2.7 CEMENT GRINDING DEPARTMENT – ROTARY PLANT

The Output of the cement mill will be enhanced from 45 TPH to 60 TPH by consistently feeding material of (-) 10mm size which will be achieved after the installation of pre crushing system for clinker.

The ratio of feed to mill will be 97% Clinker and 3% Gypsum

Alterations / Replacements proposed to be carried out in the Cement Mill department

- Weigh feeder below the clinker hopper will be increased.
- The grinding media composition in the mill will be altered to suit finer feed.
- Mill recirculation elevator capacity will be increased from 135 TPH to 175 TPH. The main drive of the elevator will be replaced.
- The existing O-sepa separator will be replaced by next higher size of N-1500 which will be identical to the existing Raw mill separator.
- A new cyclone of higher diameter will be installed in place of existing cyclone.
- Cement mill circuit fan will be replaced by a new one.
- The filtration area of separator venting bag filter will be increased. The separator venting bag filter fan impeller will be tipped and motor will be replaced.
- The exiting capacity of cement silo feed bucket elevator is 55 TPH. This will be increased to 75 TPH. The main drive of the elevator will also be replaced.

A new stand by elevator for Cement silo feeding will be installed.

Department	Operating TPH	Proposed TPH
Cement grinding	45	60

3.2.8 CEMENT SILO

A cement silo of 6000 Tons storage capacity is available.

Construction work of No.2 Cement silo will be completed. Necessary feeding and extraction equipment will also be installed.

Department	Present	Proposed
Cement storage	1 X 6000 T	2 X 6000 T

3.2.9 PACKING AND DISPATCH – ROTARY PLANT

The rotary packer installed at KIPL is a 12 spout machine. At present they are operating with 10 spouts to capacity of 150TPH.

They are packing and loading 800 Tons of cement by operating the packing machine for about 6 hrs in a day.

It is proposed to add two more spouts and operate the machine for 8 hrs in a day to meet the enhanced capacity.

With 12 spout machine, the capacity will be 200 tons per hour.

Department	Operating TPH	Proposed TPH
Packing and Dispatch	150 (@ 10 spout)	200 (@ 12 spout)

The Mass flow, Flow sheets and Layout & sections for Clinker crushing, Improvements in Cement grinding, Storage and packing is attached vide annexure 5.

3.3 ADDITIONAL FACILITIES IN ROTARY KILN PLANT

3.3.1 Handling of Rotary Kiln plant clinker when silo is full:

Presently when the clinker silo is full. the clinker from Rotary kiln plant is transported to the covered yard of VSK plant.

It is proposed to provide a dump hopper at VSK Plant to transport the excess clinker directly to cement mill by belt conveyors thereby reducing the distance of intercarting. This belt conveyor is extension of conveyor below the proposed clinker silo for VSK Plant.

3.3. VSK Plant

The present operating production capacity of 5 nos of existing Vertical shaft kiln is 280 TPD. The capacity will be enhanced to 380 TPD by carrying out the following modification / alterations.

- Replacing the existing flat grate with Stepped Grate.
- Increasing the capacity of existing blowers.
- By providing hot air connection tapping from the exhaust of rotary kiln cooler to the raw mills, it is expected to increase the throughput of the raw mills which eill meet the additional requirement.

3.4 ADDITIONAL FACILITIES IN VSK PLANT AND GRINDING UNIT

3.4.1 Clinker stores and Handling for VSK plant clinker:

The existing clinker store of VSK plant is a covered yard. The capacity of this yard is 1000 Tons. The clinker is being stored in open space whenever the covered yard is full, thereby causing rehandling and environment pollution.

In order to protect environment from pollution, it is proposed to construct a storage silo of 5000 Tons capacity in VSK plant. The clinker extracted from this silo will be conveyed to Rotary kiln plant cement mills and VSK plant cement mill through a set of belt conveyors.

CHAPTER 4.0 REVISED CAPACTY CALCULATION

4.1 LIME STONE CRUSHING DEPARTMENT

Total requirement of Limestone will be 350 TPH @ 100 % (-) 8mm.
(6 days per week @ 6 hrs per day)

Based on the sieve analysis of Limestone, the capacity of new two deck vibrating screen and Tertiary crusher works out to 750 TPH and 350 TPH respectively.

The new tertiary crushing system will be operated in line with the main crushing system. The final output from the system will be 100% (-) 8mm @ 350 TPH.

4.2 SILICA STONE CRUSHING DEPARTMENT

The Requirement of Silica stone will be 520 Tons per day

New Primary Jaw Crusher Capacity
(8 hrs per day of operation) - 70 TPH

New Secondary Jaw Crusher Capacity
(8 hrs per day of operation) - 70 TPH

New Vibrating screen capacity
(8 hrs per day of operation) - 70 TPH

4.3 RAW MILL DEPARTMENT

Kiln Capacity	-	1190 TPD
Raw Meal Required	-	1190 x 1.6 = 1904 TPD
Raw Mill Revised Capacity	-	1904 / 20 hrs = 96 TPH
		OR SAY 100 TPH

By reducing the feed size from 25 mm to 8 mm the same mill can give an output of 105 TPH.(Max.)

4.4 COAL MILL DEPARTMENT

Kiln Capacity	-	1190 TPD
Calorific value of coal (Net)	-	5400 Kcal/Kg
Specific heat consumption in Kiln	-	824 Kcal / kg
Fine coal required	-	0.15 kg/kg of cl.
Fine Coal Required	-	1190 x 0.15 = 180 Tons per day
Coal Mill Capacity reqd.	-	180 / 20 hrs = 9 TPH

There is no alteration in the coal mill circuit as the plant is already achieving 12 TPH Capacity.

4.5 PYRO DEPARTMENT

Kiln Capacity - 1190 TPD

The capacities of auxiliaries and main machineries involved in the department will be suitably enhanced to meet the 1200 TPD kiln production.

4.6 CEMENT MILL DEPARTMENT

Rotary Kiln Plant Cement Capacity	-	1200 TPD
VSK Plant Cement Capacity	-	380 TPD
Total Cement Capacity	-	1580 TPD
Rotary Cement mill capacity after expansion	-	60 TPH
VSK cement mill capacity at present	-	9 TPH
VSK Cement mill capacity after expansion	-	12 TPH

CHAPTER 5.0 DESCRIPTION OF THE PROPOSED NEW ADDITIONS

5.1 LIMESTONE CRUSHING PLANT

The proposed system will have a tertiary crusher and vibrating screens in close circuit to get -8 mm product.

The product from existing hammer crusher will be fed to new vibrating screen and new tertiary crusher to obtain -8 mm product.

The tertiary crusher will be a reversible impactor and screen will be a two module type.

In existing system, the underflow material of 0 ~ 50mm from Wobbler feeder is being fed to the vibrating screen house. The vibrating screen screens the (-) 10mm material and the remaining 10 ~ 50 mm is being fed back to the Hammer crusher.

The description of the proposed scheme is as follows

- The Wobbler feeder will be replaced by a plain push feeder. The 100% of material from mines will be fed through the main crusher.
- The belt conveyor for wobbler underflow material connected (211 BC1) to the existing vibrating screen (211 VS1) will be disconnected thereby the screen house will not be in operation.
- The belt conveyor (211 BC5) conveying the crushed product to stock pile will be bifurcated to 211 BC5A and 211 BC5B.

- The 211 BC5A conveyor will collect the crushed material (0 ~ 30mm) of 400 TPH to the new belt conveyor (211 BC7) of 1000mm. The 211 BC7 will feed to the hopper of 30 T. There will be a vibro feeder (211 VF2) below the hopper to feed the new vibrating screen. The underflow material (-) 8 mm will be conveyed to the stock pile through new belt conveyor (211BCA) & 211BC5B. The capacity of vibrating screen will be 750 TPH.

- The overflow from new screen will be collected in a belt conveyor (211 BC8) for feeding to tertiary crusher (211 IM2) located in separate building. The overflow material (8 ~ 50mm) from the new screen has been estimated based on sieve analysis as 350 TPH and hence the capacity of tertiary crusher will be 350 TPH.

- The tertiary crusher discharge will be directly fed to 211 BC5A belt conveyor. The rated capacity of existing 211 BC5A (800 mm) conveyor is 500 TPH and to convey 750 TPH the belt will be replaced by 1000 mm.

- The existing Vibro feeders and tunnel belt conveyor (311 BC1) will extract the 0 ~ 8mm limestone from the stock pile and feed to the Limestone feed hopper.

5.2 SILICA STONE CRUSHING PLANT

In existing system, the silica stone is being crushed by a four stage crushing system. The tertiary double roll crusher in the existing system is close circuited with the vibrating screen to get product below 22mm. The existing system is designed for a feed size of 250mm Max.

In the existing system, only tertiary crusher will be retained. The existing foundations of crusher and screen will be altered to suit new requirement

The deck opening of new screen will be 10mm. The final product at underflow of screen will be 0~8mm. The Overflow material of size 8~30mm will be fed to the tertiary screen for close circuiting.

The product (0 – 8 mm) from screen will be fed to Rotary screen where 0-6 mm & 6-8 mm materials will be segregated to form two separate piles. Both these materials will be used as additive in Rotary and VSK Plants

5.3 CLINKER PRECRUSHING FOR RORATY KILN CEMENT MILL:

It is proposed to install a pre crushing system for clinker before feeding to cement mills. The proposed system will be in close circuit to get a product of 100% below 10mm. The description of the system are as follows,

- The clinker silo extraction belt conveyor(511 BC1) will be bifurcated. The tail portion of 511 BC1 shall be used for transporting the clinker to new pre-crusher building.

- The bucket elevator (511 BE1) will be deployed for transporting the clinker to new vibrating screen (511 VS1). The overflow of screen (above 10mm) will be fed to the double roll crusher(511 CR1).

- The crushed product will be conveyed to the vibrating screen for close circuiting through belt conveyor (511 BC3) and bucket elevator (511 BE1).

- The underflow of screen i.e. below 10mm will be conveyed to the clinker hopper through the head portion of 511 BC1 conveyor.(i.e. 511 BC1B)

5.4 CLINKER STORAGE, HANDLING AND CRUSHING FOR VSK PLANT

It is proposed to introduce a 5000 Tons silo near vertical shaft kilns. The clinker extracted from the new silo will be conveyed either to the Rotary plant Cement mill or VSK cement mill.

- The DBC at the bottom of Vertical shaft Kilns will be reversed
- The existing Jaw crusher before the VSK clinker yard will be located near the new clinker silo.
- The clinker from DBC will be crushed by the jaw crusher and the crushed clinker will be fed to the silo by the chain elevator and belt conveyor.
- The extraction of silo will be by pin gates and flow control gate.
- The extracted clinker will be conveyed either to a VSK clinker yard or Rotary plant clinker silo tunnel through a set of belt conveyors.
- In order to achieve the capacity increase in VSK cement mill, it is proposed to install a double roll crusher for clinker diverted to VSK clinker shed. The final product will be below 10mm.
- There will be a dump hopper with feeder provided near the new silo to transport the excess clinker from VSK shed directly to Rotary cement mills.

The Flow sheets and Layout & sections for Clinker storage, crushing and handling for VSK plant is attached vide annexure 6

5.5 PRECRUSHING OF CLINKER- CEMENT MILL:

It is proposed to install a crushing system for clinker feeding to the mill hoppers. The clinker feeding tunnel belt will be suitably altered to feed the clinker to the new belt conveyor. The new belt conveyor and the new chain elevator will be feeding the clinker to the double roll crusher through vibro feeder. The crushed product will be conveyed through another belt conveyor and will be feeding to the mill feed hoppers.

The crushed clinker will be fed to the mill through the weigh feeders located under the hoppers.

CHAPTER 6.0 ELECTRICAL SYSTEM

M/s Khyber is receiving power supply from J&K State Electricity board substation at Khunmoh which is 3 Km from the Factory Site. The plant is drawing power through overhead conductor lines at 33 KV. 3 Phase. 50 Cycles. At present the plant is availing a Maximum demand of 10MVA + 3100 HP which is expected to increase by 3.5 MVA.

The 33 kV is stepped down using two nos. of 6300 KVA. 33 / 6.6 KV HT Transformers and further reduced to 415V using LT Transformers. All the HT motors are of 6.6 KV.

6.1 ADDITIONAL LOAD DETAILS IN ROTARY KILN PLANT

6.1.1 Power Transformer loading

The details of additional loads due to expansion are furnished below.

	KW
Lime Stone Crushing Section	1200
Silica Stone Crushing Section	300
Raw mill and Pyro processing	1250
Clinker pre crushing, Improvements in Cement grinding. Storage and packing	1400
	4150

Extra load	=	4150 KW
DiV. factor X Utility factor	=	0.80 x 0.80
Power Factor	=	0.85
Drive Efficiency	=	0.90
KV A Calculation	=	(4150 x0.80x0.80)/(0.85 x 0.90)= 3471 KVA

The existing HT Transformer will be able to meet the additional load requirement due to capacity enhancement.

6.1.2 HT Switchboard 1 (Located in the Main Substation)

The power requirement for Limestone reclaiming to Clinker silo feed is distributed from HT switch board- 1. The following are the alterations proposed in HT switch board-1 Power distribution system.

Type of Circuit Breaker	Existing	Remarks
Type of Circuit Breaker	Vacuum	
Incoming Feeders	630 A-2Nos.	
Outgoing Feeders	630 A-2Nos.	
Transformer Feeders	630 A-3 Nos.	
Motor Feeders	630 A-3 Nos	Raw Mill Fan Motor KW changed from 480 to 600 KW
Bus Coupler Feeders	630 A--2 Nos.	
Bus Riser cum Bus PT	630 A--2Nos.	

Converter Duty Transformer Capacity Calculation

	Existing	Proposed
Preheater Fan	400 KW	600KW
RABH Fan	450KW	550KW
Total Load	850KW	1150 KW
Division Factor	0.80	0.80
Utility Factor	0.80	0.80
Power Factor	0.85	0.85
Drive Efficiency	0.90	0.90
KV A Calculation	711 KVA	962 KVA
Existing Transformer Capacity	1250 KVA	1250 KVA

The existing converter duty Transformers will be able to meet the additional load requirement.

All the Cooler Fans Feeders in the PCC-3 will be increased for the revised motor KW. The required alteration in the existing MCC's will be carried out for the additional load requirement of Raw mill and Pyro processing departments.

6.1.3 HT Switchboard 2(Located in the Crusher Area)

Type of Circuit Breaker	Existing	Additional	Remarks
Type of circuit	Vacumm		
Breaker	630 A- 1 No.		
Incoming Feeders	630 A- 1 No.		Transformer capacity will be revised from 500KVA to 1500 KVA
Motor feeders	630 A- 1 No.		
Motor feeders		630A-1 No.	For 550 kW Tertiary Crusher motor

Distribution Transformer Capacity Calculation

Existing PMCC Load		350 KW
New L.S. Tertiary Crushing MCC		400 KW
Silica Crushing MCC		300KW
Total Connected Load		1050 KW
Division factor X Utility factor	=	0.80 x 0.80
Power Factor	=	0.85
Drive Efficiency	=	0.90
KVA Calculation	=	(870 x 0.80x0.80) / (0.85 x 0.90) = 878 KVA

Based on the above calculation, it is found that the existing 500 KVA Transformer cannot handle the additional load. It is proposed to install a new 1500 KVA Distribution Transformer replacing the existing 500 KV A Transformer.

New Transformer Capacity = 1500 KVA

New PCC will be installed to receive 415 V power from the new Transformer and it will be distributed to the existing PMCC. New L.S. Tertiary crushing MCC and New Silica Crushing MCC.

6.1.4 HT Switchboard 3 (Located in the Cement Mill Area)

Type of Circuit Breaker	Existing	Additional	Remarks
Type of Circuit Breaker	Vacumm		
Incoming Feeders	630 A-1 No.		
Transformer Feeders	630A-1No.		
Motor Feeders	630 A- 1No		

Distribution Transformer Capacity Calculation

Existing Load	-	866 KW
Additional Load	-	300 KW
Revised Load	-	1166 KW
Load factor	-	0.80
Power Factor	-	0.85
Drive Efficiency	-	0.90
KVA Calculation	-	(1166 x 0.80) / (0.85 x 0.90) = 1219 KVA
Existing Transformer Capacity	-	1500 KVA

The existing distribution Transformers will be able to meet the additional load requirement.

The Spare feeder available in the PCC will be utilized for connecting to the New Clinker Pre Crushing MCC. The Separator Feeder and the Cyclone Fan Feeder in the PCC will be increased for the revised KW.

The required alteration in the existing MCC's will be carried out for the additional load requirement of Cement grinding. storage and Packing departments.

The Existing and proposed alterations in the HT Switch boards are shown in the drawing which is enclosed as annexure 9.

6.2 ADDITIONAL CONNECTED LOAD FOR VSK PLANT.

The detail of additional loads due to proposed alterations isfurnished below.

Clinker storage, handling & Crushing for VSK plant (200 KVA)	171 kW
	171 kW

The required alteration in the existing MCC's will be carried out for the additional load requirement of VSK plant.

The total requirement of power for expanded capacity has been worked out at 4321KW equivalent to about 3.5 MVA

CHAPTER 7.0POLLUTION CONTROL MEASURES

7.1 AIR POLLUTION - EMISSION OF SOLID PARTICULATE MATTER

The Government of India and the State Pollution Control Board stipulates that the emission levels of solid particulate matter form the exhausts of industries should not exceed 50 mgm/Nm3

The plant is equipped with essential pollution control equipments viz. Bag house, Electro static precipitators. Bag filters and Nuisance dust collectors.

Reverse Air Bag House is provided for main process machinery Viz., Rotary kiln and Raw grinding system.

For Grate cooler, the venting of hot gases is being done by an Electrostatic Precipitator as Bag Type Dust Collector is not suitable due to High Abrasive nature of clinker dust.

Bag filters are provided for venting of Limestone crusher, Cement mill, Coal mill and Cement mill separator.

Nuisance dust collectors are deployed for Auxiliaries, Belt conveyor transfer points, Hoppers, Storage bins and Silos.

The filtration area of Reverse Air Bag House will be increased in order to handle the additional exhaust process gases from Raw mill and Kiln after the production enhancement. We have proposed to introduce two more compartments in addition to the existing eight nos. compartment.

The separator venting bag filter in cement mill department will be increased, in order to suit the new higher size separator.

We have not envisaged any alteration / expansion for Grate cooler electrostatic precipitator and Coal mill bag filter. The existing ESP can handle the excess volume of gases after the proposed expansion. The existing production of the coal mill unit and dust emission is well within the requirement and requires no alteration.

We have proposed new bag filters for the upcoming Limestone Tertiary crushing plant, Screen house and Clinker crushing system. The outlet air from the filter will contain less than 50 mgm/Nm^3 of air.

Nuisance Bag Filters will be installed for New Clinker storage silo. Transfer houses and Hoppers to contain dust emission below 50 mgm/Nm^3 of air.

7.2 LIST OF POLLUTION CONTROL EQUIPMENTS

The Location, Type of Dust and Volume of Gases handled are furnished below:

Sl.No	Location	Type of Dust	Gas Volume & Temp. Existing	Gas Volume & Temp. Proposed	Pollution control eqpt. Type	Status of bag filter	Remarks
1	Limestone crusher house	Lime Stone dust	30000 m3/hr @ 35° C	-	Bag Filter	Existing	-
2	Limestone screen house	Lime Stone dust	10000 m3/hr @ 35° C	-	Bag Filter	Existing	This screen house will not be in operation
3	Limestone crusher – New Vibrating screen house	Lime Stone	-	10000 m³/hr @ 35° C	Bag Filter	New	-
4	Tertiary L.S. crusher house	Lime Stone	-	20000 m³/hr @ 35° C	Bag Filter	New	-
5	L.S.Belt conveyor Transfer point	Lime Stone	6000 m³/hr @ 35° C	-	Bag Filter	Existing	The existing bag filter at screen house will be used
6	Silica stone crushing plant	Silica stone dust	10000 m3/hr @ 35° C	-	Bag Filter	Existing	-
7	Raw mill feed hoppers	Limestone / Additive dust	5000 m3/hr @ 35° C	-	Bag Filter	Existing	-
8	Raw mill and Kiln v	Raw meal / Calcined dust	2,88,000 m³/hr @ 240° C	3,43,800 m³/hr @ 240° C	RABH	Existing will be increased	Two more compartments will be added
9	Raw mill auxiliaries	Raw meal dust	4910 m3/hr @ 60° C	-	Bag Filter	Existing	-
10	Raw meal transporting air slides and elevator	Raw meal dust	3000 m3/hr @ 120° C	-	Bag Filter	Existing	-
11	Blending silo	Raw meal dust	3840 m3/hr @ 120° C	-	Bag Filter	Existing	-
12	Bag house area, Chain conveyors and screw conveyors	Raw meal / Calcined dust	2700 m3/hr @ 120° C	-	Bag Filter	Existing	-
13	Kiln feed bin	Raw meal	1609 m3/hr @ 120° C	-	Bag Filter	Existing	-
Sl.No	Location	Type of Dust	Gas Volume & Temp. Existing	Gas Volume & Temp. Proposed	Pollution control eqpt. Type	Status of bag filter	Remarks

14	Kiln feed air slides & elevator bottom	Raw meal	3000 m3/hr @ 60° C	-	Bag Filter	Existing	-
15	Kiln feed elevator - top and air slides	Raw meal	2500 m3/hr @ 60° C	-	Bag Filter	Existing	-
16	Coal mill	Coal dust	39,600 m³/hr @ 79° C	-	Bag Filter	Existing	No alteration
17	Raw coal hoppers	Coal dust	880 m3/hr @ 60° C	-	Bag Filter	Existing	-
18	Fine coal hoppers & coal dosing area	Coal dust	2000 m3/hr @ 60° C	-	Bag Filter	Existing	-
19	Grate cooler	Clinker dust	1,54,000 m³/hr @ 259° C	-	ESP	Existing	No alteration
20	Cooler area - DBC tail end	Clinker dust	1920 m3/hr @ 120° C	-	Bag Filter	Existing	-
21	Clinker silo feed	Clinker dust	1000 m3/hr @ 120° C	-	Bag Filter	Existing	-
22	Clinker silo extraction	Clinker dust	5000 m3/hr @ 120° C	-	Bag Filter	Existing	-
23	Clinker crushing house	Clinker dust	-	25,000 m³/hr @ 130° C -	Bag Filter	New	For rotary plant
24	Cement mill	Cement dust	22,320 m³/hr @ 100° C	-	Bag Filter	Existing	-
25	Cement mill O-Sepa separator	Cement dust	21,960 m³/hr @ 100° C	24,480 m³/hr @ 100° C	Bag Filter	Existing will be increased	-
26	Cement silos venting	Cement dust	3000 m3/hr @ 60° C	-	Bag Filter	Existing	-
27	Cement silo extraction air slides	Cement dust	3840 m3/hr @ 60° C	-	Bag Filter	Existing	-
28	Packing plant	Cement dust	30000 m3/hr @ 60° C	-	Bag Filter	Existing	-
29	Clinker silo	Clinker dust	-	4000 m3/hr @ 120° C	Bag Filter	New	For VSK plant
30	Clinker crushing house	Clinker dust	-	6,000 m³/hr @ 130° C	Bag Filter	New	For VSK plant
31	Clinker belt conveyor transfer tower-1	Clinker dust	-	4,000 m³/hr @ 130° C	Bag Filter	New	For VSK plant
32	Clinker crushing house	Clinker dust	-	7,000 m³/hr @ 130° C	Bag Filter	New	For Grinding unit Cement mills

Flow Sheet showing the Location of Existing and Proposed Pollution control equipments is attached vide annexure 10

CHAPTER 8.0 PROJECT COST ESTIMATE

Project Cost for the Expansion of the Cement plant is estimated at Rs. 3496.00 Lakhs

The estimate is made on the basis of Budgetary Offers received from equipment suppliers. For Civil works, preliminary drawings for the various buildings have been prepared and based on the size of the building, the civil cost is estimated. For other items, we have taken figures from the prevailing market.

S.No	\ Description	Rs. In Lakhs
1	Land and Site Development	5.00
2	Buildings	641.00
3	Plant and Machinery	2676.00
4	Erection / Installation Charges	50.00
5	Pre-Operative Expenses	25.00
6	Contingencies	99.00
	Total project cost estimate	*3496.00*

or SAY Rs.3496.00 Lakhs

The break up details for the above items has been dealt in the following

8.1	LAND & SITE DEVELOPMENT		Rs. in Lakhs	Rs. in Lakhs
	1	Land and site development cost	5.00	
		Total for Land and Site development	5.00	5.00
8.2	BUILDINGS		Rs. in Lakhs	Rs. in Lakhs
8.2.1	Factory Buildings (Civil and Structural)			
	1	Lime stone crushing system	220.00	
	2	Silica stone crushing system	11.00	
	3	Raw mill and Pyro department	95.00	
	4	Pre crushing of Clinker and Improvements in Cement grinding, Storage and Packing for Rotary plant	150.00	
	5	Clinker storage and handling for VSK plant	85.00	
	6	Pre crushing of Clinker for VSK Cement mill	65.00	
	7	Miscellaneous works	15.00	
		Total for Factory Buildings	641.00	641.00
8.3	PLANT & MACHINERY			
8.3.1	Mechanical Equipment (Cost given is the Basic cost only)		Rs. in Lakhs	Rs. in Lakhs
	1	Lime stone crushing system	253.00	
	2	Silica stone crushing system	100.00	
	3	Raw mill and Pyro department	694.00	
	4	Pre crushing of clinker and Improvements in Cement grinding, Storage and Packing for Rotary plant	548.00	
	5	Clinker storage and handling for VSK plant	139.00	
	6	Pre crushing of Clinker for VSK Cement mill	102.00	
	7	Miscellaneous items	15.00	

		Total for mechanical Equipments	1851.00	1851.00
8.3.2	Electrical and Control equipments (Cost given is the Basic cost only)		Rs. in Lakhs	Rs. in Lakhs
	1	Lime stone crushing system	100.00	
	2	Silica stone crushing system	30.00	
	3	Raw mill and Pyro department	163.00	
	4	Pre crushing of clinker and Improvements in Cement grinding, Storage and Packing for Rotary plant	37.00	
	5	Clinker storage and handling for VSK plant	8.00	
	6	Pre crushing of Clinker for Grinding unit Cement mills and VSK Cement mill	6.00	
	7	Automation - (Lump sum for all departments)	10.00	
	8	Miscellaneous items	5.00	
		Total for Electrical and Control Equipments	359.00	359.00
		(8.3.1 + 8.3.2)		2210.00
8.3.3	Taxes and Duties		Rs. in Lakhs	Rs. in Lakhs
	1	Taxes & duties on Indigenous Items at 21.09 %	466.00	466.00
	a	Basic Cost = 100		
	b	Add. Packing and forwarding (2%) = 100 + 2 = 102		
	c	Add. Excise Duty (10.3%) = 102 + 10.506 = 18.506		
	d	Add. Central Sales tax (2%) = 18.51 + 2.25 = 114.76		
	e	Add. Transport (5 %) = 114.76 + 5.73 = 120.49		
	f	Add. Insurance (0.5 %) = 120.49 + 0.6 = 121.09		
		Landed Cost of Indigenous is 1.21 Times of basic price		
		Total for Plant and Machinery (A) + (B)		
		Total for Plant and Machinery (8.3.1 + 8.3.2 + 8.3.3)	2676.00	2676.00

8.4	ERECTION / INSTALLATION CHARGES		Rs. in Lakhs	Rs. in Lakhs
	1	Lime stone crushing system	10.00	
	2	Silica stone crushing system	9.00	
	3	Raw mill and Pyro department	10.00	
	4	Pre crushing of clinker and Improvements in Cement grinding, Storage and Packing for Rotary plant	9.00	
	5	Clinker storage and handling for VSK plant	8.00	
	6	Pre crushing of Clinker for VSK Cement mill	4.00	
			50.00	50.00
8.5	PRELIMINARY & CAPITAL ISSUE EXPENSES			
8.5.1	Preoperative Expenses		Rs. in Lakhs	Rs. in Lakhs
	1	Engineering Consultancy	20.00	
	2	Travel expenses	5.00	
			25.00	25.00
8.5.2	Contingencies		Rs. in Lakhs	Rs. in Lakhs
	1	For Buildings	19.00	
	2	For Plant & Machinery	80.00	
			99.00	99.00
		TOTAL PROJECT COST		3496.00
		OR SAY 3496.00 Lakhs		

CHAPTER 9.0 COST OF PRODUCTION AND VIABILITY

9.1 ADDITIONAL CLINKER CAPACITY

The plant is consistently achieving 800 TPD in rotary plant and 280 TPD in VSK Plant.

The additional cement capacity after the expansion will be 500 TPD.

Stabilized cement production	-	1080 TPD.
Cement capacity after expansion	-	1580 TPD.
Additional cement capacity	-	500 TPD.

9.2 CAPACITY UTILIZATION

The capacity utilization of cement after the expansion will be as follows,

Year	Add. Capacity	Days / Annum	Capacity Utilization %	Production Lakh TPA
I year	500	330	75	1.24
II year	500	330	85	1.40
III year (onwards)	500	330	95	1.56

9.3 CONSUMPTION OF RAW MATERIALS

Based on the Raw mix design and Industry norms, the pattern of consumption of Raw Materials, Fuels, Spares and Consumables and power will be as follows:

Ratio of Raw Material Vs Clinker	-	1.54: 1
Ratio of limestone, Clay, Silica stone and Iron ore	-	82:14:3:1
% of Gypsum in cement	-	3%
% of coal consumed	-	15 %

9.4 RAW MATERIAL AND FUEL COST

S.No	Raw material, Fuel and Power	Rs/T
1	Limestone	250
2	Silica stone	250
3	Iron ore	5000
4	Clay	150
5	Gypsum	1200
6	Coal (@ 5400 Kcal/kg cl)	12000
7	Power Rs/KVAh	3.16

9.5 OTHER ASSUMPTIONS

1. Proposed Project Cost - Rs. 3496.00 Lakhs

9.6 VARIABLE COST OF PRODUCTION

9.6.1 Variable cost of production per ton of Clinker

S.No	Description	T/T of Clinker	Rs/T of Material	Rs/T of Clinker.
1	Limestone	1.26	250	315.00
2	Silica stone	0.05	250	13.00
3	Iron ore	0.02	5000	100.00
5	Clay	0.22	150	33.00
6	Fuel - Coal	0.15	12000	1875.00
7	Power in KWH	85	3.16	269.00
8	Stores & spares and Repair & Maintenance	-	250	250.00
	Total			2855.00

9.6.2 Variable cost of production per Ton of Cement

S.No	Description	T/T of OPC	Rs/T of Material	Rs/T of OPC.
1	Clinker	0.97	2855	2770.00
2	Gypsum	0.03	1200	36.00
3	Power in KVAH	40.00	3.16	126.00
4	Stores & spares and Repair & Maintenance	0.00	30	30.00
5	Packed bags in nos.	20.00	10	200.00
6	Loading charges	0	15.00	15.00
	Total			3177.00

9.6.3 Variable cost of production per Annum after expansion

S.No	Description	Unit	I year	II year	III year
1	Variable cost of cement/ T	Rs /T	3177		
2	Additional cement capacity after expansion	Lakh TPA	1.24	1.40	1.56
	Variable cost of production	Rs. Lakhs	3939.00	4448.00	4956.00

9.7 FIXED COST OF PRODUCTION PER ANNUM AFTER EXPANSION

S.No	Description	Rs/T of OPC	I year Rs in Lakhs / Annum	II year Rs in Lakhs / Annum	III year Rs in Lakhs / Annum
1	Salaries and wages	-	270.00	284.00	300.00
2	Administrative expenses	100	124.00	140.00	156.00
3	Factory overheads	25	29.00	37.00	39.00
4	Selling and distribution overheads	250	310.00	350.00	390.00
5	Depreciation (Refer Annexure-11)		171.00	171.00	171.00
	Fixed cost of production		904.00	982.00	1056.00

9.8 TOTAL EXPENDITURE PER ANNUM AFTER EXPANSION

S.No	Description	I year Rs in Lakhs / Annum	II year Rs in Lakhs / Annum	III year Rs in Lakhs / Annum
1	Variable cost of production	3939.00	4448.00	4956.00
2	Fixed cost of production	904.00	982.00	1056.00
	Total expenditure	4843.00	5430.00	6012.00

9.9 REALISATION AFTER EXPANSION

9.9.1 Realisation per ton

S.No	Description	Unit	Value
1	Selling price / bag	Rs	275.00
2	Less Excise duty	Rs	10.00
3	Realisation	Rs/bag	265.00
	Realisation per ton	Rs / Ton	5300.00

9.9.2 Realisation per annum

S.No	Description	Unit	I year	II year	III year
1	Realisation per ton of cement	Rs /T	5300.00		
2	Additional cement capacity after expansion	Lakh TPA	1.24	1.40	1.56
	Total Realisation	Rs. Lakhs	6572.00	7420.00	8268.00

9.10 PROFIT PER ANNUM

S.No	Description	Unit	I year	II year	III year
1	Sale realization per annum	Rs. Lakhs	6572.00	7420.00	8268.00
2	Total expenditure per annum	Rs. Lakhs	4843.00	5430.00	6012.00
3	Profit per annum	Rs. Lakhs	1729.00	1990.00	2256.00

9.11 PAYBACK

The estimated payback period is 2 years after the construction period. The construction period for the proposed expansion will be 1 year. The pay back period is calculated as under.

S.No	Description	I year	II year	III year
1	Profit per annum	1729.00	1990.00	2256.00
2	Depreciation per annum (Refer Annexure 13)	171.00	171.00	171.00
3	Margin + Depreciation	1900.00	2161.00	2427.00

Cost profit of first two years = 4061.00
Investment = 3496.00
Pay back period = 2 years

CHAPTER 10.0 PROJECT IMPLEMENTATION SCHEDULE

The following activities have to be completed before starting the civil construction.

- Release of Orders for New equipments and other auxiliaries.
- Receipt of Equipment drawings with Load data from Main equipment supplier.

It will take around 20 days to start releasing the Excavation and Foundation drawings for New Factory buildings from the date of receipt of input drawings from the Main equipment supplier.

The construction activity can be completed with in a period of 7 to 8 months.

The Erection of Mechanical equipment will be started from 8th month and will be completed within 12th month.

The Erection of Electrical equipment will be completed during 10th month

A trial run will be made during the end of 12th month.

The regular production will be taken from 13th month onwards.

The activities, duration and the period are furnished below:

Sl.No.	Activity	Months
1.	Ordering of New Equipment ,auxiliaries an others	0 ~ 1
2.	Receipt of Equipment Drawings, load data and specifications for electrical and control equipments from Suppliers	2~3

3.	Receipt of Structural Drawings from Structural Designer	3 ~ 6
4.	Placement of Orders Electrical and Control Equipment	1 ~ 2
5.	Civil Construction	4 ~ 9
6.	Receipt of Equipment and Site Fabrication of Parts	8 ~ 9
7.	Erection of Mechanical Equipment	9 ~12
8.	Receipt of Electrical and Control Equipment	9 ~ 11
9.	Erection of Electrical and Control Equipmen	9 ~ 12
10.	Trail Run / Commissioning of new departments	12
11.	Enhanced Production started from	13

The above details are also annexed in the form of a bar chart-Annexure 12.

CHAPTER 11.0 SPECIFICATION OF THE PROPOSED NEW EQUIMENT

11.1 LIMESTONE TERTIARY CRUSHING SYSTEM

211 PF1 Push feeder for Limestone crushing

Capacity	-	8 TPH
Size	-	2.1m W x 3.5m Lg/ 5 deg inclined
Motor rating	-	15 Kw

211 BC7 Belt Conveyor for Transport to New Screen House

Capacity	-	750 TPH
Width	-	1000 mm
C/c	-	36 m
Lift	-	11.7 M
Motor rating	-	30 kw

211 HP3 Feed hopper for screen

Capacity	-	20 cu.m
Construction	-	RCC.
Size	-	5m X 5m X 4.5m

211 PX1 Pin gate under 211 HP3

Size	-	0.6M x 0.6M
Type	-	Manually operated

211 VF2 Vibrofeeder below 211 HP3

Capacity	-	750 TPH
Trough size	-	1.6m X 2.7m
Size	-	5m X 5m X 4.5m
Motor rating	-	6 kw

211 VS2 Vibrating Screen

Capacity	-	750 TPH
Size	-	8' X 15' X 2modules
Number of decks	-	2
Feed Size	-	0 – 50 mm
Final Product	-	0 – 8 mm
Motor rating	-	4 nos X 15 kw.

211 BF3 Dedusting bagfilter for screen house

Volume	-	25000 M^3/Hr
St.Pressure	-	200mm WG
Temperature	-	Ambient
Dust at Inlet	-	50gms/M^3
Dust emission level	-	20mg/Nm^3

211 FN3 Bagfilter fan for 211 BF3

Volume	-	27500M^3/Hr
St.Pressure	-	300mm WG
Temperature	-	Ambient
Motor rating	-	22 Kw

211 RA3 Rotary feeder below BF discharge

Size	-	200mm dia
Motor rating	-	1.5 Kw

211 BC8 Belt Conveyor from Screen House to Tertiary Crusher

Capacity	-	350 TPH
Width	-	800 mm
C/c	-	16.8 M
Lift	-	5.2 M
Motor rating	-	11 kw

211 IM2 Reversible Impactor

Capacity	-	350 TPH
Feed Size	-	8 – 50 mm
Product Size	-	80 % of 0 – 8 mm.
Size	-	48" x 60"
Motor rating	-	550 Kw

211 BF4 Dedusting Bagfilter for crusher house

Volume	-	25000 M^3/Hr
St.Pressure	-	200mm WG
Temperature	-	Ambient
Dust at Inlet	-	50gms/M^3
Dust emission level	-	20mg/Nm^3

211 FN4 Bagfilter fan for 211 BF4

Volume	-	27500M^3/Hr
St.Pressure	-	300mm WG
Temperature	-	Ambient
Motor rating	-	22 Kw

211 RA4 Rotary feeder below BF discharge

Size	-	200mm dia
Motor rating	-	1.5 Kw

211 BC9 Belt Conveyor for crusher product

Capacity	-	350 TPH
Width	-	800 mm
C/c	-	50 M
Lift	-	11.2 M
Motor rating	-	30 kw

211 BCA Belt Conveyor from Screen House to Stock Pile

Capacity	-	400 TPH
Width	-	800 mm
C/c	-	46.5 M
Lift	-	14.3 M
Motor rating	-	30 kw

11.2 SILICA STONE CRUSHING SYSTEM

231 CR1 Primary jaw crusher for Silica stone crushing

Capacity	-	30 TPH
Size	-	30" x 15"
Motor rating	-	30 kw

231 CR2 Secondary jaw crusher for Silica stone crushing

Capacity	-	30 TPH
Size	-	36" x 8"
Motor rating	-	37 kw

231 VS1 Vibrating screen for 8mm product

Capacity	-	50 TPH
Size	-	NA
Motor rating	-	7.5 kw

231 PF1 Push feeder for primary jaw crusher

Capacity	-	30 TPH
Size	-	NA
Motor rating	-	5.5 kw

11.3 RAW MATERIAL DRYING & GRINDING SYSTEM

361 FN6 RABH Fan

Volume	-	121M³/sec @ 269mm WG
St.Pressure	-	300mm WG
Temperature	-	240 deg C
Motor rating	-	475 Kw

371 BE2 Bucket Elevator for blending silo feed (Belt type) Stand by

Capacity	-	150 TPH
Lift	-	45.6M
Type	-	Belt
B.Width	-	400mm
Motor rating	-	30 Kw

11.4 BLENDING SILO AND KILN FEED

421 BE2 Kiln feed Bucket elevator stand by (New)

Capacity	-	100 TPH
Lift	-	89.5M
Type	-	Belt
B.Width	-	400mm
Motor rating	-	45 Kw

11.5. PYRO PROCESSING

441 FN1 Preheater Fan

Volume	-	69.4M³/sec @ 550mm WG
Temperature	-	330 deg C
Motor rating	-	550 Kw
Dust at Inlet	-	29gm/M³

11.6 CLINKER CRUSHING SYSTEM FOR ROTARY PLANT

511 BE1 Bucket Elevator for Feeding Screen

Capacity	-	150 TPH
Lift	-	14000 c/c
Type	-	Chain
B.Width	-	315 mm

511 VS1 Vibrating Screen

Capacity	-	150 TPH
Size	-	1.4m X 3.6 m
Feed Size	-	85% to 90% 25 mm, max 30 mm
Product separation	-	Below 10 mm at underflow.

511 CR1 Double Roll Crusher

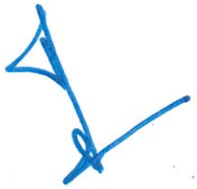
Capacity	-	75 TPH
Size	-	1200 X 1200 mm
Feed Size	-	85% to 90% 25 mm, max 30 mm
Product size	-	90 % below 10 mm
Motor rating	-	2 nos X 75 kw

511 BC3 Belt Conveyor

Capacity	-	100 TPH
Width	-	600 mm
C/c	-	11013 mm
Lift	-	2340 mm

511 BF1 Dedusting Bagfilter for Screen and Crusher house

Volume	-	25000M³/Hr
St.Pressure	-	200mm WG
Temperature	-	80 deg
Dust at Inlet	-	50gms/M³
Dust emission level	-	20mg/Nm³



511 FN1 Bagfilter fan for 511 BF1

Volume	-	27500M³/Hr
St.Pressure	-	300mm WG
Temperature	-	80 deg
Motor rating	-	22 Kw

511 RA1 Rotary feeder below BF discharge

Size	-	200mm dia
Motor rating	-	1.5 Kw

11. 7 CLINKER STORAGE AND HANDLING FOR VSK PLANT CLINKER

512 BE1 Clinker silo feed elevator (Chain type)

Capacity	-	50 TPH
Lift	-	40.5M
Type	-	Chain
B.Width	-	210 mm
Motor rating	-	11 Kw

512 BC1 Belt conveyor for Transport to new silo

Capacity	-	50 TPH
Width	-	600mm
C/C	-	9M Long
Motor rating	-	3.7Kw

512 BF1 Dedusting Bagfilter for New Clinker silo

Volume	-	4000M³/Hr
St.Pressure	-	200mm WG
Temperature	-	Ambient
Dust at Inlet	-	50gms/M³
Dust emission level	-	20mg/Nm³

512 FN1 Bagfilter fan for 512 BF1

Volume	-	4400M³/Hr
St.Pressure	-	300mm WG
Temperature	-	Ambient
Motor rating	-	3.7 Kw

512 FV1 Flap below BF discharge

Size	-	Later
Type	-	Gravity operated

512 PX 1-3 Pin gates at new silo extraction

Size	-	500mm X 500mm
Qty	-	3 Nos

512 FG1 Motorized flow control gate at extraction

Capacity	-	50 TPH
Motor rating	-	0.37 Kw

512 BC2 Belt conveyor for Transport clinker

Capacity	-	50 TPH
Width	-	600mm
C/C	-	32M Lg
Motor rating	-	7.5 Kw

512 BF2 Dedusting Bagfilter for New Transfer tower

Volume	-	4000M³/Hr
St.Pressure	-	200mm WG
Temperature	-	Ambient
Dust at Inlet	-	50gms/M³
Dust emission level	-	20mg/Nm³

512 FN2 Bagfilter fan for 512 BF2

Volume	-	4400M³/Hr
St.Pressure	-	300mm WG
Temperature	-	Ambient
Motor rating	-	3.7 Kw

512 FV2 Flap below BF discharge

Size	-	Later
Type	-	Gravity operated
Size	-	Later
Motor rating	-	0.37 Kw

512 BC3 Belt conveyor for Transport clinker to VSK Shed tunnel

Capacity	-	50 TPH
Width	-	600mm
C/C	-	70M Lg
Motor rating	-	11 Kw

512 BC4 Belt conveyor for Transport clinker to Rotary plant clinker silo tunnel

Capacity	-	50 TPH
Width	-	600mm
C/C	-	60.5M Lg
Motor rating	-	11 Kw

512 BF3 Dedusting Bagfilter for New Clinker silo

Volume	-	4000M³/Hr
St.Pressure	-	200mm WG
Temperature	-	Ambient
Dust at Inlet	-	50gms/M³
Dust emission level	-	20mg/Nm³

512 FN3 Bagfilter fan for 512 BF3

Volume	-	4400M³/Hr
St.Pressure	-	300mm WG
Temperature	-	Ambient
Motor rating	-	3.7 Kw

512 FV3 Flap below BF discharge

Size	-	Later
Type	-	Gravity operated

512 PX 4 Pin gate at Hopper extraction

Size	-	400mm X 400mm
Qty	-	1 No

11.8 PRECRUSHING OF CLINKER FOR CEMENT MILLS

513 BC3 Belt conveyor for Transport Clinker from tunnel belt to crusher house

Capacity	-	50 TPH
Width	-	600mm
C/C	-	25M Lg
Motor rating	-	3.7Kw

513 BE2 Crusher feed elevator (Chain type)

Capacity	-	50 TPH
Lift	-	11M
Type	-	Chain
B.Width	-	210 mm
Motor rating	-	5.5 Kw

513 BC4 Belt conveyor for Transport Clinker

Capacity	-	50 TPH
Width	-	600mm
C/C	-	4M Lg
Motor rating	-	2.2Kw

513 VF1 Vibrating feeder

Capacity	-	50 TPH
Size	-	1m W x 1.2m Lg
Motor rating	-	2 x 2.2 Kw

513 CR1 Roll crusher for cement mills

Capacity	-	30 TPH
Size	-	800 x 800 mm
Feed Size	-	Max 30 mm
Product size	-	below 10 mm
Motor rating	-	2 nos x 30 kw

513 BC5 Belt conveyor for Transport Clinker

Capacity	-	50 TPH
Width	-	600mm
C/C	-	31M Lg
Motor rating	-	5.5Kw