T E R R A T I L E
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I . D . P . V E L A C O D E
M U N D U R P . O .
T R I S S U R D I S T R I C T
K E R A L A

PROPOSAL FOR SETTING UP OF A COMMON FACILITY CENTRE UNDER SMALL INDUSTRIES CLUSTER DEVELOPMENT PROGRAMME SCHEME OF OFFICE OF DC(SSI)

UNDER THE TECHNICAL GUIDANCE OF

REGIONAL RESEARCH LABORATORY

[COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH, GOVERNMENT OF INDIA]
THIRUVANANTHAPURAM – 695019

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EXECUTIVE SUMMARY

a. **Industries Department, Government of Kerala** has identified the Clay Based Tiles Cluster at Thrissur and Ernakulam districts under cluster development programme as **SIDO cluster**. There are 50 registered Clay based Tile industries functioning in Thrissur and Ernakulam districts under SSI sector. In this Cluster Development Programme presently 20 Clay based Tiles industries in Thrissur and Ernakulam Districts have formed a consortium under the name and style of **M/S. TERRA TILE CONSORTIUM PVT. LTD.** It is expected that the remaining Clay based Tiles industries will become members of this consortium. The Diagnostic Study conducted on this Cluster found some major issues and has recommended certain solutions. The immediate requirements of this cluster are

i. Common facility centre for blending different clay samples with non-clay earth and grinding of above mixture (clay, non-clay earth, clay waste products (chamotte)) and milled to a powder as fine as 0.5 mm in diameter, with high percentage of the material as low as 0.1 mm in diameter which will benefit the units by getting quality clay with consistent properties such as plasticity, fired colour & strength, water absorption and chemical composition.

So selective mining can be done to preserve as much as possible, the high quality clays for future and it is possible to adopt a systematic selection procedure for the clays, based on the products, which will be manufactured.

In this consolidated clay processing CFC fully supported by a quality control laboratory and trained man power will be able to screen the clays, and blend them depending on the properties required for the end products.

ii. A common Laboratory for testing the properties of clay The central laboratory will also function as a nodal facility to carry out analysis of blending and firing and therefore individual industry units need not establish independent laboratories and expertise.

By implementing the common facility centre, with testing facilities each unit of the cluster will get quality clay suitable for their purpose and optimizing plastic clay consumption with new attractive shades and better drying properties. Thus this CFC will improve the performance of this tiles cluster in total.

b. The total project cost is estimated to be Rs. 515 lakhs and 70% of the project cost Rs.360.50 lakhs can be obtained as grant from Government of India under**'Small Industries Cluster Development Programme'** scheme , 20% of the project cost Rs. 103 lakhs can be obtained as grant from Kerala state Government and balance 10% , Rs. 51.50 lakhs is to

be shared by the consortium. The operating capital for this CFC is Rs. 4.64 lakhs which is included in the project. This is not a commercial project.

c. The consortium has already invested Rs. 47.87 lakhs for purchase of 47.50 acres (1923 ares) of land at Pavaraty, Elavally village, just 11 kms away from the common facility centre for selective mining of plastic clay.

d. The active support for the project from the **Industries Department, Government of Kerala** in the form of implementing agency will benefit the tile industries at Trissur and Ernakulam Districts and especially those in consortium.

e. The cluster special purpose vehicle (Consortium) will provide the necessary land for setting up this common facility centre as their contribution and execute necessary agreements and undertakings with the implementing agency - Industries Department, Government of Kerala.

f. The day to day operating expense of the common facility centre in terms of electricity charges, labour charges,consumables etc. will be borne by the consortium and the required periodic maintenance, modernisation etc. will be met by the **corpus fund** raised from the surplus derived from the operation of the common facility centre. This fund is also utilised for future modernisation, upgradation etc. of the CFC.

g. The consortium will appoint necessary technical experts and skilled labours for running the common facility centre.

h. <u>Implementation Period</u>

Phase I : Collection of all information, data, preparation of drawings and inviting quotations, preparation of detailed project report etc. A detailed schedule in terms of bar charts is prepared for implementing the project. This will be carried out within a period of four months.

Phase II : Actual implementation of the project. This will take at least 20 months as supply period of the machines will take 10 to 13 months. Besides it will take around 9 to 13 months for land development and building construction. The tentative date of trial production will be August 2007 and commercial operation will be carried out within 45 days from the date of trial production.

ABSTRACT OF PROJECT

1. Project : **Proposal for setting up of a common facility centre for clay processing and testing** under small industries cluster development programme scheme of office of DC (SSI)
2. Name of the Project : Centralised Clay processing and testing unit under Cluster Development Project.
3. Implementing Agency : **Goverment of Kerala through Industries Department.**
4. a) Location of CFC : Industrial Development Plot, Velakode
   Mundur Post
   Thrissur Dist.
   b) Taluk : Thrissur
   c) Village : Velakode
   d) Panchayat : Kaiparambu
5. Capacity Utilisation : 1st Year - 60%
   2nd Year - 75%
   3rd Year - 85%
6. Man power requirements/ Employment Potential :

A. Administration :

General Manager	-	1
Accountant	-	2
Clerk	-	2
Office Attender	-	2
		7 Nos.

B. Production :

Chemist	-	2
Production Supervisor	-	3
Machine Operator	-	6
Skilled Workers	-	6
Unskilled Workers	-	12
Mechanic cum electrition	-	1
Drivers	-	4
Vehicle Assistant	-	4
Excavator Operator	-	2
		30 Nos.

7. Cost of Project:

		(Rs. In Lakhs)
Land	:	21.00
Technical Civil Work	:	67.50
Civil work for Laboratory & Office	:	9.00
Plant andMachinery	:	288.60
Supporting Equipments	:	
a) Laboratary & Equipment	:	10.00
b) Material handling equipments	:	53.91
c) Industrial Electrification	:	31.11
Contingency	:	19.18
Preliminary and Pre-operative expenses	:	10.06
Operating Capital	:	4.64
Total Project Cost		**515.00**

8. Means of Finance :

Contribution from consortium (10%)	:	51.50 Lakhs
Grant from DC (SSI) under small industries cluster development programme for setting up common facility centre (70%)	:	360.50 Lakhs
Grant from Kerala State Government (20%)	:	103.00 Lakhs
TOTAL	:	**515.00** Lakhs

9. Facilities Required :

a. Grant from DCSSI under small industries cluster development programme for setting common facility centre : **360.50 Lakhs**

b. Grant from Kerala State Government : **103.00 Lakhs**

SECTION - I INTRODUCTION

There are around 50 registered Clay based Tile Industries in organised sector functioning in Thrissur and Ernakulam districts under SSI sector. The capital investment of these industries varies from 45 to 300 lakhs. Total turn over per annum is about Rs. 150 Crores. Clay based Tile Industries in Thrissur and Ernakulam Districts are creating employment opportunities directly to 35000 persons and indirectly to 65000 persons. The electric power requirement per each unit is around 60 to 200 HP.

Presently around 20 small scale Clay based Tile Industries have formed a consortium under the name and style of **M/s. 'Terra Tile Consortium Pvt. Ltd.'** The remaining units will become members of this consortium immediately.

MAJOR ISSUES AND IMMEDIATE SOLUTION

Kerala State is endowed with rich secondary clay deposits in certain locations where the roofing tile and brick industry prospered for more than 150 years. Large number of roofing tile factories came up especially in the districts of Thrissur and Ernakulam. The clays mostly have high alumina silicate content, low sand compositions, high iron content, particle sizes less than 2 microns above 85% and low firing temperatures. However, the conventional processing methods, machinery and traditional mind set of the manufacturers continued over the years with out making any major changes.

Over the years, there has been phenomenal change in the attitudes of a few of the factory owners in line with the global developments and also what has happened in the other parts of the country. Constant efforts of the Regional Research Laboratory (CSIR) Trivandrum also has played certain role in this change. Frequent interaction with developed countries through mutual visits of representatives from industry and R&D organizations and participating in International Conferences also created a situation for this change. The awareness of quality of products, the increasing market demand and on the other hand, difficulty to mine the raw materials contributed considerably to this change.

The large scale exploitation of the clay resources by the industry in a not-so-phased manner has also created a grave situation with respect to non availability of raw materials and ecological concern. Unless a concerted effort is made for collection of the clays as per the requirements of the industry, this sector cannot survive. Improved and consistent quality is a must for international business. Hence a few progressive minded tile factory owners have jointly made an effort for cooperative working and the result is M/s Terra Tile Consortium.

A detailed diagnostic study was conducted in the clay based tile industries cluster at Trissur and Ernakulam Districts in Kerala and it was found

that the industries in this cluster need some serious rehauling. The earnest steps have to be taken for solving the following issues

1. Optimum utilisation of precious clay mineral.
2. Proper and judicious clay mining methods without disturbing the paddy crop and ecology.
3. Testing and analysis of properties of clay
4. Finding alternate sources of fuel.
5. Optimum level of mechanisation aimed at economy and quality of products.
6. Exploring new markets and new avenues for achieving value addition.

SPECIFIC ADVANTAGE OF COMMON FACILITY CENTRE

1. Testing of clay, non-clay earth, clay waste products can be done before processing. So a correct proportion of clay, non clay earth, clay wastes etc can be fixed as per the requirement of each product.
2. The above selected mix can be blended and grounded to powders as fine as 0.5 mm diameter with high percentage of material as low as 0.1 mm in diameter.
3. Consistency of properties such as plasticity, fired colour and strength, water absorption and chemical composition etc of the processed clay can be ensured.
4. Quality of finished products can be tested based on BIS specification which leads to standardization of products.

SPECIFIC ADVANTAGES OF CONSORTIUM APPROACH

There will be notable advantages for the consortium approach.

1. The clay required for the consortium members can be estimated in advance and a planned mining can be organized at specific locations and this will avoid the formation of deep mining ponds, which will result in ecological problems. Since controlled mining can be mechanized, the cost of procurment of clay can be considerably reduced. The consortium purchased 47.50 acres of land at Pavarty, Elavally village for plastic clay mining.
2. Selective mining can be done to preserve as much as possible, the high quality plastic clays for future, by adopting systematic selection procedure for the clays, based on the products manufactured. Presently in this cluster there is no selection of clay based on products requirements. Most of products are manufactured by using similar clay. Actually partition walls and bricks are manufactured by using clay with high plasticity, where as roofing tiles or extruded blocks are manufactured by using clay with coarse particles and lowclay content. Even though the industry uses high quality clays and energy for processing, the quality of the products is not very high.
3. A consolidated clay processing plant, fully supported by a quality control laboratory and trained man power will be able to screen the clays, and blend them depending on the property requirements of products. A well defined set of processing parameters will enable energy reduction in firing, as such mixtures can densify at low

temperatures. The central laboratory also will function as a nodal facility to carry out analysis and testing, there fore individual units need not establish independent laboratories and expertise.

5. Depending on the market demand, the central laboratory can suggest the range of products to be manufactured from time to time and facilitate the consortium, to plan the clay requirements in advance. A right processing schedule will considerably reduce wastage of raw materials and energy.
6. The consortium can be extremely helpful in channelling the market to individual units and thus avoiding unhealthy competition which leads to higher margin.
7. The most important requirement of the consortium will be a fully equipped laboratory and a Common Facility Centre for blending and processing of raw materials as per the product requirement. The Regional Research Laboratory (CSIR), Trivandrum will provide the laboratory support and technical training.
8. A portion of high quality clay which are non-judiciously consumed by these industries can be substituted by non clay earth by proper blending and size reduction in the common facility centre. So good quality clays can be conserved for longer years and thus maintaining excellent quality for their products.
9. High quality novel products with specific properties can be manufactured by right blending of raw material and controlling technical parameters by adopting apt processing methods. This leads to a revolutionary change in the production techniques and product quality.

COMMON LAB

The development and growth of any industry specialising in the production of a specific range of products greatly depends on Research and Development (R & D) without doubt. Basically speaking R & D deals with

1) Product Innovation
2) Technology upgradation
3) Cost Reduction
4) Wider Application

The world around us has seen many laudable achievements in Products and Services which are vital for modern man's needs whether it be health care, food, clothing, habitat, transport etc. The ultimate aim of R & D is to make life simpler and easier for human beings.

The above statement is true with our tile industry too. In the developed western countries more than 200 year old clay based tile industries has undergone tremendous change. Today this industry remains in the main stay like any other major industries. Even though tile industry came to India 150 years ago, it has hardly developed to the extent expected of it. The result, the industry is now facing the threat of extinction, we were too late in approaching this problem with a positive mind. Neither there was a conducive atmosphere

created by Government agencies, not a preparedness from the side of entrepreneurs.

In Kerala this industry has undergone many stages up heaves in the past. Even though belated it is heartening to notice a recent shift in the attitude of a few entrepreneurs who have initiated some serious steps to develop and explore new avenues and new products for new application. It is also note worthy that there is a marked change in the Government agencies also.

R & D in clay industry have to go a long way in easing the present constraints of the precious clay mining, consumption of forest fuel and improving the quality of finished products. The construction industry in India has expanded in a unprecedented manner and demand for various technically competent products are on the increase. Clay building blocks, roofing blocks, cladding bricks apart from roofing, flooring tiles are all in demand. Each of these products requires specific technical parameter as they are meant for specific application. Features other than colour and texture viz. water absorption, ferocity, thermal insulation, cold crushing strength are all pre determined. Conventional production method of bulk handling based in thumb rules will have to discarded. Instead, specific batches are to be prepared for specific areas.

All this can be facilitated only by setting up a modern laboratory and testing center in a common place. It is common knowledge that each smaller units can not have this facility individually. In today's world, only tested and certified products will find market. It is in this context that Terra Tile Consortium is planning to set up a modern laboratory and testing center with emphasis on heavy clay.

Samples from various clay deposits are to be laboratory tested for their plasticity fired colour and strength, water absorption and chemical composition. Blending different clay samples with non-clay earth will show positive results in optimising plastic clay consumption, new attractive shades and better drying properties. These primary tests of clay samples are also aimed at higher goals of reducing drying time and firing cycle, thus reducing the cost of production.

BACKGROUND OF CONSORTIUM

Overview of the Clay industry in Kerala.

There was a time when Kerala had the monopoly of tiles production in the country for a long time. Through the first tile factory in this region was established in Mangalore by Basel Missionary Society during the year 1865, Kerala became the home of the tile industry due to numerous rivers and backwaters providing cheap transport. Therefore it was quite natural that the number of tile factories had come up in Calicut, Quilon, Trichur & Alwaye and in some other districts. Availability of suitable clay, labour, fire wood and suitable climatic condition were the main factors for the rapid growth tile industry in Kerala. By the end of 19th century, this pioneer industry was established in Calicut & Quilon and in the beginning of the 20th century it was

set up in Trichur and Alwaye. But Mangalore pattern tiles became popular very soon because of their intrinsic superiority over the existing patterns.

The clay industry in Kerala mostly consist of enterprises with low capital investments. These are labour intensive, seasonal and contribute substantially to the economic development by integrating local raw material resources with employment generation through small and medium size of processing units spread over widely in rural and urban areas.

The total quantity of clay consumed by the industry per annum is established at 12 lakhs tones. The total number of work force employed is estimated at 1 lakh. If these employees and their dependents are considered, clay industry in Kerala is the means of livelihood of 4 lakhs people.

The annual turn over of the industry is Rs. 90 crores approximately.

BENEFITS FOR MEMBERS.

The common facility centre with consolidated clay processing plant fully supported by a quality control laboratory and trained man power will be able to screen the clays, and blend them depending on the properties required for the end products. So the clay based industries in this cluster can process their clay required for production in common facility center. The CFC will levy a nominal amount from users for meeting operational expenses and making corpus fund for future modernisation, up gradation and sustenance . The remaining clay based tile industries which are presently not a member of the consortium can also utilise this common facility centre. So there is no under capacity utilisation of common facility centre.

SECTION - II

TECHNICAL ASPECTS

PRODUCT RANGES

1. Powder pressed (semi-dry pressed) decorative roof tiles of various designs and shades for the sloped R.C.C roof.
2. Floor tiles with well defined edges, accurate sizes and very good surface finish in different dimension and shapes.
3. Floral facade tiles.
4. Jallies and air filters.
5. Balusters and hand rails.
6. Hollow bricks for partitioning, hollow blocks for walls and hollow blocks for the roof .
7. Artifacts and pottery.
8. Terra-cotta murals.
9. High strength, wear resistant pavement materials / industial flooring.

MANUFACTURING PROCESS OF TILE INDUSTRY

Clays are blended in carefully controlled stocks to improve plasticity and strength. The tiles are then machined or hand moulded and dried fired in gas fired tunnel kilns. This all forms part of an advanced controlled handling process and firing system. It ensures that the products are made to exact tolerances in shape, colour and strength.

Raw Materials.

The clay industry is a “material oriented” undertaking with a large throughput of raw material. The value and quality of the end products are largely determined by the primary raw material. The raw materials used for bricks and tiles are weathering products of crystalline and sedimentary rocks. As a result of the normal mechanical and associated chemical effects on rocks containing clay, particularly feldspar, clay minerals were produced in the course of the different geological ages. As the process happening in different areas differ with change in minerals contained in that areas and the conditions, there will be different types of clay.

Following various steps are involved in the manufacturing process of various clay products.

1. Preparation.

The clay as extracted from the quarry is not normally in suitable state for shaping. They have to undergo various processes of preparation viz. crushing and grinding, mixing and separating or screening.

2. Shaping.

The ceramic clay receives its shape and design characteristics, by the shaping processes viz. hand moulding, extrusions, pressing etc.

3. Cutting, conveying and setting of the unfired products.

The endless clay column emerging from the extruder dies is cut into the required lengths by the cutter. The cut products are then placed on slates or pallets for transport to driers.

4. Drying

The products on extrusion are normally soft with little intrinsic strength. The water added for shaping purposes has to be removed again from the products by drying.

5. Firing

Ceramic products are fired in order to convert the previously water soluble clay materials to an insoluble state and also to confer on them strength to withstand mechanical and chemical agencies.

6. Sorting

Sorting and quality control are usually by individual inspection and according to work standards.

QUALITY LABORATORY

In-plant quality control is an integral activity of the production process in any manufacturing concern. The application process being direct, if practiced regularly, it can derive best results in controlling the production aspects. The testing exercise should be continuous and the results must be implemented in the production process. Documentation of the test results and raw material codes has to be maintained regularly so as to enable the right assessment of the raw material mix and product quality. The selection of quality control methods and its co-ordination is absolutely necessary for this cluster. The following factors can be analysed.

a. Identification of actual condition.
b. Identification of error sources
c. Defect evaluation
d. Laboratory level studies.

Detailed laboratory analysis and trials will have to be conducted on various deposits of common red clay available in and around the captive area before finalizing the choice of one particular clay or two or more different clays for any project.

In the event of one particular clay processing excessive plasticity, blending the same with another lean clay becomes imperative.

Information on the grain size distribution in the raw material can be derived from sieve analysis. In this analysis, the type of raw material must be taken into consideration. The presence of clayey substance will be more in fat clay and less in clean clay. Dry and wet sieving for grain size determination consists of drying the sample at 110^{o}C, suspending it in water and elutriating it through a test sieve. The material held back can be further fractioned by dry sieving. The method yields quick results that are of practice at value.

Table .1 gives the standard test sieve sizes, commonly used in sieve analysis.

Table 1. Standard Sieve Data.

Mesh No.	Aperture in mm
30	500
60	250
100	150
200	75
300	53
350	45

(The data presented are of the most commonly used ones in a qualitative analysis)

Plasticity is the property of a body to change its shape on the application of external force and retain the new shape on the removal of the force. The finer the raw material, the more plastic it is. One of the important properties of the raw material which will be investigated in a quality laboratory is the plasticity index. This indicates the fineness as well as the working range of the clay. Manual methods, such as making an impression, rolling out a standard etc. does not provide exact numerical data. In plant laboratory test for plasticity is made using a deformation test apparatus. A cylindrical sample of known weight and dimensions is formed out of the sample raw material. The plasticity index number is calculated from the residual height of the cylindrical sample after being compressed by the falling weight of the apparatus.

During the drying process, the individual clay particles floating in the moisture network in the green body will contract together, resulting in drying shrinkage. The amount of shrinkage depends on the quality of water present in the green body. Linear shrinkage is represented as the length by which the dimensions change during the drying process and is more commonly reported than the volume shrinkage.

$$\% \text{ linear shrinkage (LS)} = \frac{ds}{Sa} \times 100$$

Where ds = decrease in length and Sa = initial length.

Volume shrinkage is indicated as the total change of the volume of the whole body during drying.

$$\% \text{ volume shrinkage (Vs)} = \frac{dv}{V} \times 100$$

Where dv = decrease in volume and V = initial volume.

Drying in shrinkage is dependent on the fineness of the clay. Finer clays absorb more water to become plastic and shrink more on drying. They also show more dry or unfired strength. High content of fine-grained clay may show warpage and in extreme cases cracks may develop during drying. Adequate dry strength is necessary for handling green ware.

SECTION - III LAND AND BUILDING

LAND :

The common facility centre is proposed to set up in 397 Cents of land in Industrial Development Plot Velacode, Velacode Village in sy. No. 192/6 part, 192/8 part, 192/9 part, 192/10 part, Trissur Taluk, Trissur District. The cost of Land for common facility centre is Rs. 21.00 Lakhs including land developments.

TECHNICAL CIVIL WORK :

The proposed factory has a total plinth area of 5000 Sq.Mtrs. required for common facility centre. A building of plinth area 200 M^2 will be required for setting up laboratory and administrative block. The total construction cost of the proposed factory building including technical civil work is Rs. 76.50 lakhs.

The common facility centre is proposed to setup in the land possessed by the consortium under hire purchase from Industrial Department of Kerala. The consortium will execute necessary agreements and undertakings with the implementing agency.

SECTION - IV PLANT AND MACHINERY

The plant and machineries required for clay processing will be imported from Italy.

The following machineries are required.

PLANT & MACHINERY

1. P.I.G Hammer Mill
2. Heating System
3. Feeder LE 2092
4. High Efficiency Vibro Screen
5. Self - Cleaning System
6. Self - Open Device
7. Control Instrument
8. Finishing Hammer Mill
9. Heating System
10. Wetting System MS 2000
11. Conveyor Belt (45 Meter)
12. Bucket elevator (12 Meters)
13. Hopper

SUPPORTING EQUIPMENT

1. LABORATORY EQUIPMENT

1. Sieves (60,100,200,300,350 & 500 mesh)
2. Plasticity Index
3. Laboratory Grinder
4. Lab Extruder with Deairng Setup
5. Furnace - Up to 1450 Degree Centigrade (Size 12x12x10)
6. Lab oven - Up to 300 Degree Centigrade
7. Stainless steel water bath with water regulating setup
8. Stainless steel spatutlar and Stainless steel trays
9. Glassware (Desiccators, Glass trays, Beakers various sizes
10. Poly propylene beakers (1,2,5 Ltr etc)
11. Electronic Weighing Balance
12. Linear Brass mold and round brass mould with marker set up and releasing system
13. Table with marble top
14. Flexural strength checking machine
15. Compressive strength checking machine
16. High speed stirrer with high speed regulator

2. MATERIAL HANDLING EQUIPMENT

1. Escavator for clay loading
2. Trucks for clay transporting

3. INDUSTRIAL ELECTRIFICATION

DETAILS OF PLANT & MACHINERIES

P.I.G Hammer Mill

Generally used in the clay industry for the grinding of clay, china-clay, clay waste products (chamotte) and non clay earth. The material is milled to a powder as fine as 0.5 mm, in diameter, with high percentage of the material as low as 0.1 mm in diameter.

The grinding mesh can be interchanged with others, varying the degree to which the material can be milled. Easily put together and maintained.

P.I.G hammer mills can be used for the closed-cycle pre-crushing and milling of raw materials with a humidity content of up to 12-14%.

This possibility is granted by the application of a heating system on board the machine with automatic control of the electric and heat parameters, in order to optimise consumption and improve performance.

In some cases, the hammer mills of the P.I.G/Dryer type, thanks to their special heating system, eliminate the need to purchase a specific drying system.

Hammer mills of the P.I.G type are characterised by their considerable grain size reduction ratio. They are suitable for handling clay of any kind, ceramic mixtures with a high content of aggregates and raw materials with a low to medium hardness.

These machines are composed of a thick sheet metal casing, housing on the inside a set of circular and lateral armours coated with wear-proof material, a rotor carrying the grinding hammers that are made of a special long-life alloy, a lump crushing hammer unit and special steel sizing grids. The mill is ideal for the rough milling of raw material at the beginning of the raw material preparation process, but also suitable as finishing mills thanks to its low level of wear and above all its low consumption with respect to traditional mills, edge-runner mills and roller mills. Both in the field of pressed and extruded ceramic products, P.I.G hammers mills are appreciated for giving the ground product the right degree of refining. Furthermore the resulting shape of the ground product guarantees a better resistance of the finishing green piece.

Circular Moistering Machine (Wetting System MS 2000)

It is used to moisten different powdered materials with a constant percentage of water. It is particularly suitable to moisten materials, like clays, mixtures etc. previously grinded and graded. It is made in heavy gauge steelwork with inspection doors.

The water flow is regulated by a hand wheel control system and is automatically proportioned to the inlet quantity of powdered material.

The water spray is obtained by a rotating disc driven by an enclosed self-ventilated motor.

A series of rotating steel arms with bottom-scraper plates moved by an independent motor with transmission by “V” belts and by a conical wheel reduction gear, remix the moistened powders in order to obtain a uniform powder. The machine in easy to inspect and control, it works noiselessly and without dust, needing minimum maintenance and it does not need special overseeing as water is added in proportion to the weight of powdered materials, if there is no powder the feeding of water stops, thus avoiding all problems.

The percentage of water in the moistened materials may change from 2% to 10% according to the physical and chemical properties of powders. Apart from using traditional systems, our MS 200 circular moistening machine can be controlled by the automatic MS/MU 7685 instrument with microprocessor that activates a motor driven valve that in turn varies the moisture content.

As the material enters the moistening machine, it transmits motion to a drum with paddles which is turn activates the water supply cylinders. An adjustable water vessel collects the water from the cylinder and conveys is to the spraying disks that moisten the material coming into the moistening machine through the cone. A set of rotating blades are fitted to the bottom of the moistening machine to blend the material and forward it towards the outlet.

SECTION - V MAN POWER REQUIREMENTS

The consortium will arrange necessary technical experts and skilled operators for running this common facility centre.

According to organisational structure envisaged for the common facility centre, General Manager will be in charge of functions of the unit. He looks after the production, and finance. There will be three Production Supervisors, two chemists, six machine operators, one Mechanic cum electrician, two maintenance staff, six skilled workers, four drivers, four vehicle assistants, two excavator operators and twelve unskilled workers reporting to General Manager.

There will be two accountant in helping Managers in matters like accounting, book keeping, banking and other finance related affairs. There will be two Office Staff and two clerk in charge of office matters.

In total there will be 47 persons including Manager employed in the clay processing section of common facility centre. The monthly salary and benefits will come to Rs. 2,93,400/- shown in Annexure - VI.

SECTION - VI OTHER PROJECT DETAILS

A. UTILITIES :

1. Power :

Required power is available from Kerala State Electricity Board. The total connected load for common facility centre is 278.66 K.W. The annual electric charge is Rs. 56.88 lakhs at fully capacity utilisation. Details are given in Annexure - V. The consortium will pay this amount from the service charge obtained from its members.

B. MISCELLANEOUS EXPENSES :

These items includes repair and maintenance of building, plant and machineries, postage charges, cost of printing and stationary items, insurance charges etc. An amount of Rs. 22.18 lakhs per annum has to be incurred towards smooth operation of the unit. The details of estimation are given in Annexure - VIII.

C. PRELIMINARY AND PRE-OPERATIVE EXPENSES :

These items include company registration, project report preparation, building design and drawing, technical consultancy fees, trial production, liaison work etc. Thus the preliminary and pre operative expense required for implementing the proposed project is approximately Rs. 10.06 lakhs. The details of estimation are given in Annexure - IV.

SECTION - VII PROJECT PARTICULARS

PLANT CAPACITY AND CAPACITY UTILISATION

The clay pre processing section of common facility centre will have a processing capacity of 31.25 MT of clay per hour. The proposed CFC will operate 20 hours per day. Because of down time and other various reasons, the capacity may not be releasable and it is assumed that 60% of the capacity utilisation will be achieved during first year and 75% during second year 85% during third year, capacity utilisation will be achieved, third year onwards.

The clay processing section of common facility centre will levy the service charge of Rs. 150 for pre processing of 1 MT of clay.

The details are shown in Annexure IX.

Presently around 20 clay based tile industrial units are members of this consortium. The remaining clay based tile industries of the cluster will join this consortium immediately.

SECTION - VIII FINANCIAL ASPECTS

The estimated capital outlay of the project is Rs. 515 lakhs as shown in Annexure - XI. The capital expenditure is proposed to be raised as the contribution of consortium to the extent of Rs. 51.50 lakhs (10%) and the Grant from DC (SSI) under small industries cluster development programme for setting common facility centre is expected to Rs. 360.50 lakhs and Grant from Kerala State Government is expected to Rs. 103.00 lakhs.

Assumptions

1. The unit will process 31.25 MT of clay per hour and the unit will work 20 hours per day. The CFC will planing to operate atleast 300 days in year.
2. The installed processing capacity of the unit is 1,87,500 MT of clay per year.
3. The capacity utilisation is at 60% first year, 75% during second year and 85% third year onwards.
4. The main utilities is power, water etc. The total power requirement is 278.66 K.W. The power charge is calculated considering the tariff fixed by KSEB.
5. Repairs & Maintenance is provided @ 2% on building and 3% on Plant & Machineries and supporting equipments.
6. Details of computation of depreciation is attached as Annexure-XII & XIII. Straight line method of depreciation is applied for project purpose, however, for income tax purpose, written down value method is applied.
7. Administrative expenses is provided in the net revenue estimate. It includes rates & taxes travelling expenses, postage telephone & telegram, printing & stationery, other office expenses etc. The administrative expenses will be assumed to 1% of gross earnings from users levy.
8. Income tax is provided considering the rates applicable to private limited company. Computation of income tax is attached as Annexure - XV.
9. A corpus fund will be raised from the surplus derived from the operation of the common facility centre and it will be utilised for future modernisation, up gradation and sustenance of the common facility centre.
10. The internal rate of return of this project will be only 9% before tax and 4% after tax. So this is not a commercial project and there by Government assistance in terms of grant is required for implementing the project.

SECTION - IX

CONCLUSION AND RECOMMENDATION

CLAY BASED TILES CONSORTIUM at Trissur is planning to set up a common facility centre for processing of clay required for tile manufacturing under **Small Industries Cluster Development Programme** scheme. Presently about 20 clay based industrial units in Trissur and Ernakulam Districts have joined the consortium and remaining units will join subsequently. The proposed annual processing capacity of the common facility centre is 1,87,500 MT of clay per year. The required technical knowhow is indigenously available and machineries for processing is imported from Italy.

The implementation agency for the proposed common facility centre is **Government of Kerala (Industries Department).**

The clay based tile industrial units in this cluster will get clay with consistent properties, based on the product requirements by implementing this Common Facility Centre. They also enjoy the quality testing facility for both raw material and finished goods from this CFC.

This Common Facility Centre will not create any atmospheric pollution.

The estimated capital outlay of the project is Rs. 515 lakhs as is proposed to be financed as follows :

	(Rs. in Lakhs)	
Kerala State Government (including Land) 20%	103.00	
Terra Tile Consortium (Building) 10%		51.50
Grand from D.C.S.S.I 70%	360.50	
	515.00	

The projected net revenue estimate of the CFC for first 8 years are satisfactory. The project is technically feasible and provide a key role in the total development of clay based tiles cluster in Trissur and Ernakulam districts.

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