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FLY ASH BRICKS

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I. INTRODUCTION

FAL-G is not a brand name, but a product name like Ordinary Portland Cement(OPC). This name is given for easy identification of its ingredients. FAL-G stands for Fly-Ash-Lime-Gypsum. In recent days, Lime-Gypsum is being replaced by OPC cement as it is cheap and also quick setting. The process itself is concept development based on a cement theory called "Crystallo-Mineral Combination or setting behaviour" in technical jargon. In a recent development it was found that use of OPC in many places is not only economical but also it provides quick setting, faster curing, improved strength, and overall better quality (including strength).

II. NEED

Fly-Ash, an indispensable by-product of Thermal Power Plants, is an environmentalthreatacross the globe. Power plants are facing an ever increasing challenge disposal of this polluting agent. This unit is proposed to manufacture FAL-G Bricks & Blocks by consuming the Fly-Ash as one of the prime raw material. Secondly, it also helps environment by saving the invaluable top soil by not using them in brick making like conventional brick making. Thirdly, they need no burning, thus further enhancing their Eco-Friendly Brand. This is the reason these bricks are also referred as Eco Bricks or popularly Green Bricks, (though the colour is grey).

III. SCOPE

Fly-Ash Bricks and Blocks are largely used in various constructions, such as load bearing and pillar structure Buildings, Boundary walls, Roads, Culverts, Pavements, and wherever conventional bricks can be used. The general Fly ash bricks fall in the strength zone of 60-250 Kg/Cm2, thus is much stronger than conventional Bricks. These bricks gain strength over a period of time up to 2 years, whereas the conventional bricks tend to lose strength over a period of time. Because of this strength, the same mix can be also be used to make the Paver Blocks in the same casting machine with interchanging the moulds. These green bricks can attain very regular and uniform shapes. As no burning is involved, so the shape also remains unchanged. As a result, the final Brick work with these green bricks consumes less mortar to build, less mortar to plaster. Further, the FAL-G being artificial cement itself, it forms a more uniform bond with cement, giving almost a homogeneous structure. Not only this, even exposed brickwork (without plastering) is a good durable structure. So people prefer to leave the Green Bricks Brickworks in garages, boundary walls etc. un-plastered.

IV. ADVANTAGES OF USING FLY ASH BRICKS

The advantages are as follows

1. Environmental friendly: Consumes Fly ash
2. Environmental friendly: Saves invaluable top soil

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3. Environmental friendly: needs no burning/backing.
4. Strength: Higher Strength Bricks.
5. Uniform Shape: Easier and faster Brick working.
6. Uniform Shape: Less Mortar in Brick work.
7. Uniform Shape: Less Mortar in Plaster.
8. Artificial Cement: Gains strength over time.
9. Artificial Cement: Walls can be left exposed/un plastered.
10. Better heat & sound insulation compared to red Bricks
11. Far Lesser brakeage during handling & transportation.
12. Better Vibration resistance compared to red Bricks

V. MARKET

Shelter is third skin, according to a German Concept, which implies it's importance next to human Skin and Clothing. This also shows the attachment of human race to this fundamental requirement. Building Material accounts for major component of the construction cost. Depending on the location they can contribute to 60 - 70 % of the cost of construction. With the ever increasing population, the demand for housing increases. This directly creates demand for this prime commodity of building. Add to the above fact the area under discussion and its surrounding area is undergoing a major infrastructure revolution. As Residential, Commercial, IT companies, and Industrial establishments are coming in, we can conclude that the Bricks unit will prosper and flourish in this environment. There is a central government gadget notification mandating government departments and CPWD to use 100% Fly Ash Bricks in their all constructions- directly of through contractors. This factor will help the marketability of this product immensely. Fly Ash policy of the Government also mandates that 20% of Fly ash Generated by a power plant must be given free of cost to SME sector on a priority basis.

VI. CARBON CREDITS ESTIMATES

FAL-G Bricks have already qualified as a CDM projects in India for earning Carbon Credits since January 2004. But as the conventional FAL-G Bricks Units are very small in size, having a daily production of 3000 to 6000 Bricks per day, thus CDM Project for this industry has been designed as a bundled approach. Already two bundles of FAL-G: CDM projects have been registered and the third bundle is under process of registration. The first bundles have already received their first trench of payment in August-2007.

This Unit, unlike the above said units is a high capacity Bricks Production Plant.

Its production capacity is around 20 times higher than conventional units discussed as above. Thus this plant can be individually treated as a Single CDM project as well. Generally, the existing FAL-G:CDM project estimates a saving of 350 Tons of Carbon Credits for every Million of Bricks. Thus the Present Project of 24,000,000 will have an annual Carbon Credits Generation of Approximately 8400 CERs. In present day market it stands around EURO 17 per CER. (data as on 2012-June)

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VII. RAW MATERIALS, SOURCES AND AVAILABILITY

7.1 FLY-ASH

A lot has been said about this raw material in this Project Profile itself. But this Raw material is freely available in Thermal Power plants. There are no taxes on this item whatsoever. Transportation charges are only to be attended by the entrepreneur. However, the proposed Unit will get Fly Ash from locally available Thermal Powerplants, which is having best quality fly ash not only in the country, but also in the whole world.

7.2 LIME/OPC

Lime used in this process is known as Hydrated Lime, which can be obtained by Calcium Brunt Lime. One KG of Brunt Lime gives 2.2 Kg of Hydrated Lime after mixing calcium. Brunt Lime can be obtained from Andhra Pradesh where Lime Kilns a High Quality Brunt Lime are pettily available. Alternatively hydrated lime is available as an industrial by-product of Paper Mills this Project however aims to utilize OPC cement as a substitute for Lime. It will give faster strength to the bricks, besides giving improved consistent quality. It also ensures a better cost effectiveness for the same. Using OPC will be a standardized practice compared to Lime, as, unlike OPC, Lime quality changes widely across suppliers and across seasons. The other prime advantages of using OPC (compared to Lime) is it's easy availability locally through nationwide Retail Network of Cement Companies.

7.3. GYPSUM

This too is an industrial waste. This is available at Fertilizer Plant as in industrial wastes.

VIII. SAND / CRUSHER DUST

Sand is used as an economizer and to increase the strength of bricks to some extent. Sand is procured locally. Crusher dust can also be successfully used in place of sand.

IX. PROCESS

The Process of manufacture is simple and suitable to start. A mix of Fly Ash, Cement, Gypsum and Sand/Crusher Dust are automatically weigh batched in a batching plant.

9.1 Loading of Raw materials

Mini Loader Loads materials into batching plant

9.2 Automatic Batching

The Raw materials are automatically weighed as per thepre-set weights by means of Load cells and its control circuit. Cement, if it is available in Bulk, then silo and screw controller is used to auto weight. Otherwise, the batching is programmed as per 1 bag of cement.

9.3 Mixing

From the batching plant the mixture hopper pulls the materials and then themix is blended homogenously and intimately in a semi wet form in a Twin shaft mixture. The Water is automatically added as per time set. The TWIN SHAFT mixture ensures that a perfect mix is done in shortest possible time.

9.4 Carrying to Brick machine

The mix is carried to the casting machine by means of conveyor belt.

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9.5 Automatic Brick Making

There are a series of operations which is achived by automatic PLC system. Pallet is pulled into the Machine. The mix is then collected fed into the machine moulds. There is a T boggy which uniformly spreads the materials in the moulds. Automatic PLC controlled Vibration and hydraulic pressure is given for a while and bricks are cast on the pallets. The dual application of Pressure and vibration (in a patent pending micro-sequence application) ensures perfect compaction with best quality of bricks

9.6 Automatic Stacking

The pallets along with the freshly cast bricks are rolled on a roller platform to the pallet stacker. The Pallet stacker stacks the pallets along with the bricks automatically .

9.7 Fork lift shifting

The Final stack of 5 to 10 pallets and bricks are lifted with a ForkLifter and carried to the drying bay/room for 24 Hours for initial setting.

9.8 Curing

Soon after the initial setting, the Blocks/ Bricks are stacked for curing in layers. The layers are stacked in a way to enable water and air to go all around, to ensure proper curing and drying. The curing process is continued for 7 days. The blocks are allowed to normally dry for a day. Now they are ready for dispatch. Alternatively, the blocks/bricks can be steam cured for 8 hours or mist cured for 24 hours immediately after production, and made ready for dispatch immediately.

9.9**Dispatch**

The cured bricks can be dispatched to market. A Compressive strength of 80 to 250 Kg/Cm2 is generally obtained from the mix design, as suggested in the “Elaborated Details Page” of this Project Profile. The resulting bricks will have around 5 %water absorption and around 1.5 to 1.7 Gms/CC Density.

X. QUALITY CONTROL.

For Production of good Quality Fly Ash Bricks, The following precautions must be taken.

1. Moisture Content in Fly Ash should not be more than 5%
2. The colour of Fly Ash should be either Light Steel or Smoke Grey.
3. It should never contain un-burnt Carbon by not more than 5%
4. Phosphorous Gypsum should better be made acid free by washing, if it is acidic
5. Special emphasis should be given to curing.
6. Proper stacking and layering can greatly enhance the quality of Bricks & Blocks.
7. Fresh Laid bricks to be protected from rain showers by Polythene Sheets.
8. Fresh Laid bricks to be protected direct heavy sun drying by Polythene Sheets.
9. Controlled drying under PVC covers of Fresh Laid bricks is advisable.
10. Stacks should not be allowed to fully dry at any time (within first 6 days).

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