

Competent partners are invited for setting up of paver block producing units at various sites on Hindustan Zinc Limited namely, Dariba, Chanderiya, Debari on Build Own Operate Transfer (BOOT) for producing paver blocks using the raw material mix provided by Hindustan Zinc Limited.

1. Scope

1. Setting up of paver block producing units capable of producing paver blocks with the raw material mix provided by Hindustan Zinc and as per formulation/recipe suggested by Hindustan Zinc Limited (HZL)
2. Interested partners will have the option to sell the paver blocks so produced in the open market at a price determined by the interested partner based on market demand/supply and cost of producing. However, such sales proceeds shall be disclosed to HZL from time to time
3. HZL will render technical support on the formulation/ recipe for the initial set-up. However, the plant set up and cost towards setting the necessary infrastructure shall be to partner's account. (a brief on the technology developed by HZL is enclosed as per Annexure 1)
4. The raw materials shall be provided by HZL at a nominal and mutually agreed price. (The indicative list of such raw materials is given below.
5. All plant operation and maintenance services including raw material (except those mentioned in annexure 1), consumable, spares, services and manpower shall be arranged by the interested partner at its own cost.
6. Since, HZL already has significant requirement of bricks at its site, the bricks produced will first be used to meet HZL volumes. Remainder volumes can be sold in free markets

2. Plant Capacity: Minimum: 30,000 blocks/Day – Maximum: as per partner interest

3. Raw Material to provided by HZL

1. Jarosite (Fine Powder): Generation: 45000-60000 MT/Annum
2. Granulated Pyro Slag (- 5 mm) : **Generation: _____**
3. Flyash (dry powder) :
Chanderiya: Generation 750 MT/day
Dariba: Generation: 500 MT/ day
Zawar: Generation: 250 MT/day

4. Proposals to be submitted with the following commercial aspects

1. Proposed plant capacity
2. Conversion Charges: Rs/unit of paver block (towards converting raw materials provided by HZL to paver blocks. Should include all variable and fixed expenses towards, capex, operating cost, non HZL raw materials, consumables, manpower etc.)
3. The revenue generated out of the proposed plant shall be subjected to royalty to HZL based on mutual agreement
4. Break Up of total capital investment to be incurred

ANNEXURE 1

About Cement Concrete Paver Blocks Using By Products Of HZL

INTRODUCTION

Cement concrete paving blocks are precast solid products made out of cement concrete. The product is made in various sizes and shapes viz. rectangular, square, round, pentagon, I – shape etc with different dimensions with designs for interlocking of adjacent paver blocks. The conventional raw materials required for the manufacturing of paver blocks are Ordinary Portland Cement, Aggregates and Stone Dust which are available locally in every part of the country.

Central R&D Laboratory (CRDL) of Hindustan Zinc has worked with its wastes like Slag, Jarosite and Flyash generated from Pyro-smelting, Hydro-smelting and Captive Power Plant respectively. A suitable replacement of conventional raw materials has been validated for different grades of paver blocks from M-25 to M-40 grade. Typically 40 – 70% waste utilization was observed for the M-25 to M-35 grade paver blocks, which are preferably used for Pathways/ Pedestrian paths. More than 80,000 of M-25 grade paver blocks have been produced for internal consumption in Hindustan Zinc.

This project report comprises of estimated capital and recurring expenses with financial analysis for establishing new plant for paver block production with M-25 to M-35 grade paver blocks. Additionally, adding different mould types same plant & machinery set up can also be used for Bricks, Tiles and Hollow blocks. CRDL is currently working to establish design mix of these products.

MARKET POTENTIAL

Cement concrete paving blocks find applications in pavements, footpaths, gardens, passenger waiting sheds, bus-stops, industry and other public places. The product is commonly used in urban areas for the above applications. A lot of face-lift is being given to roads, footpaths along the roadside. Concrete paving blocks are ideal materials on the footpaths for easy laying, better look and finish, lots of these materials are also used in flooring in the open areas of public offices and commercial buildings and residential apartments. Typical paver blocks grade w.r.t. its applications can be identified from the following

Table; Paver Block grade	Purpose	Application
M25 – M30	Non-traffic	Pedestrian path, Building Premises, Landscapes, Public Gardens etc
M30 – M35	Light	Pedestrian Plazas, Shopping Complexes, Housing Colonies, Rural Roads, Farm Houses, Tourist Resorts etc
M35 – M45	Medium	City Streets, Service Stations, Car Parking etc
M45 – M59	Heavy	Bus Terminals, Industrial Complexes, Mandi Houses, Factory Floors etc
>M60	Very Heavy	Container Terminals, Ports, Dock Yards, Bulk Cargo Handling Areas, Airport, Pavements etc

TECHNICAL ASPECTS

In process of manufacturing paver blocks mixture of said materials is prepared in suitable composition and mixed in pan mixer for 15 minutes. Water with hardener is added in proportionate amount while mixing. Mixed material is transferred to main feeder hopper through conveyor belt. Feeder charges the material into molds and then hydraulic pressure is applied to pack the mixture in to the defined shape. The casting of these paver blocks is done on wooden pallets, which are placed in pallet feeder.

These pallets having paver blocks are dried as such for 24 days handling carefully. Afterwards, the pavers can be stacked separating from pallets and cured with water with intermittent sprinkling for 14 days and then left for air drying for next 14 days to gain sufficient physical strength. The concrete paving blocks gain some strength during the first 7 days of curing and maximum gains in strengths are secured in the first 14 days of curing. The product is ready for dispatch after 28 days of manufacturing.

The materials used for mixing are;

- Ordinary Portland Cement (OPC 43) Coarse Aggregate (- 5 mm)
- Stone Dust (Fine Powder)
- Coarse Aggregate
- Jarosite (Fine Powder) (HZL By Product)
- Granulated Pyro Slag (- 5 mm) (HZL By Product)
- Flyash (dry powder) (HZL By Product)

POLLUTION CONTROL

Dust collection unit may be required to be installed in RMH and mixing area. The cost for the same shall be taken additionally. The workers shall use suitable dusk masks in that area.

ENERGY CONSERVATION

General maintenance of the machine and drive system can be employed for saving energy.

QUALITY CONTROL AND STANDARDS

a) Paver Blocks Quality Test: IS 15658 shall be referred.

- Visual Inspection
- Dimension, Tolerance & Thickness
- Aspect Ratio
- 28 days compressive strength
- Moisture Absorption

b) Quality of Raw Materials:

- a. OPC – 43 quality shall be as per IS
- b. Coarse Aggregate & Stone dust shall be as per IS
- c. Water quality

c) Proportioning of raw materials, mixing, compacting, curing and drying are the important stages of manufacture.