

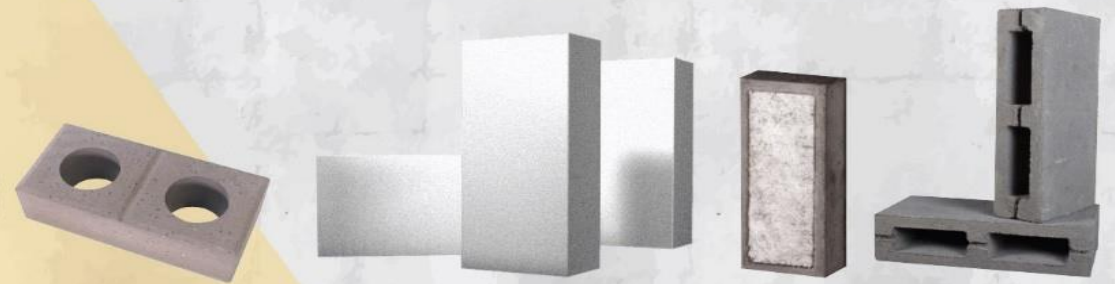


**HBRI at a glance :
ALTERNATIVE BUILDING MATERIALS AND
TECHNOLOGY SHOWCASE**

3rd Edition



HOUSING AND BUILDING RESEARCH INSTITUTE
MINISTRY OF HOUSING AND PUBLIC WORKS



2019

HBRI : AT A GLANCE

ALTERNATIVE BUILDING MATERIALS AND TECHNOLOGY SHOWCASE

3rd Edition

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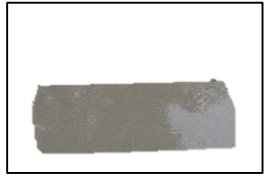
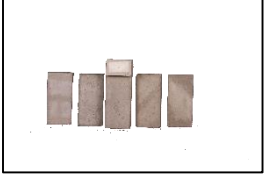
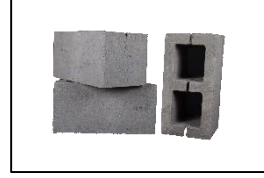
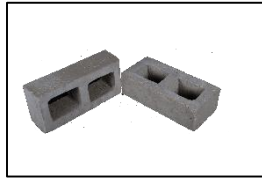
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Cover Design

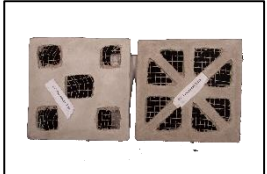
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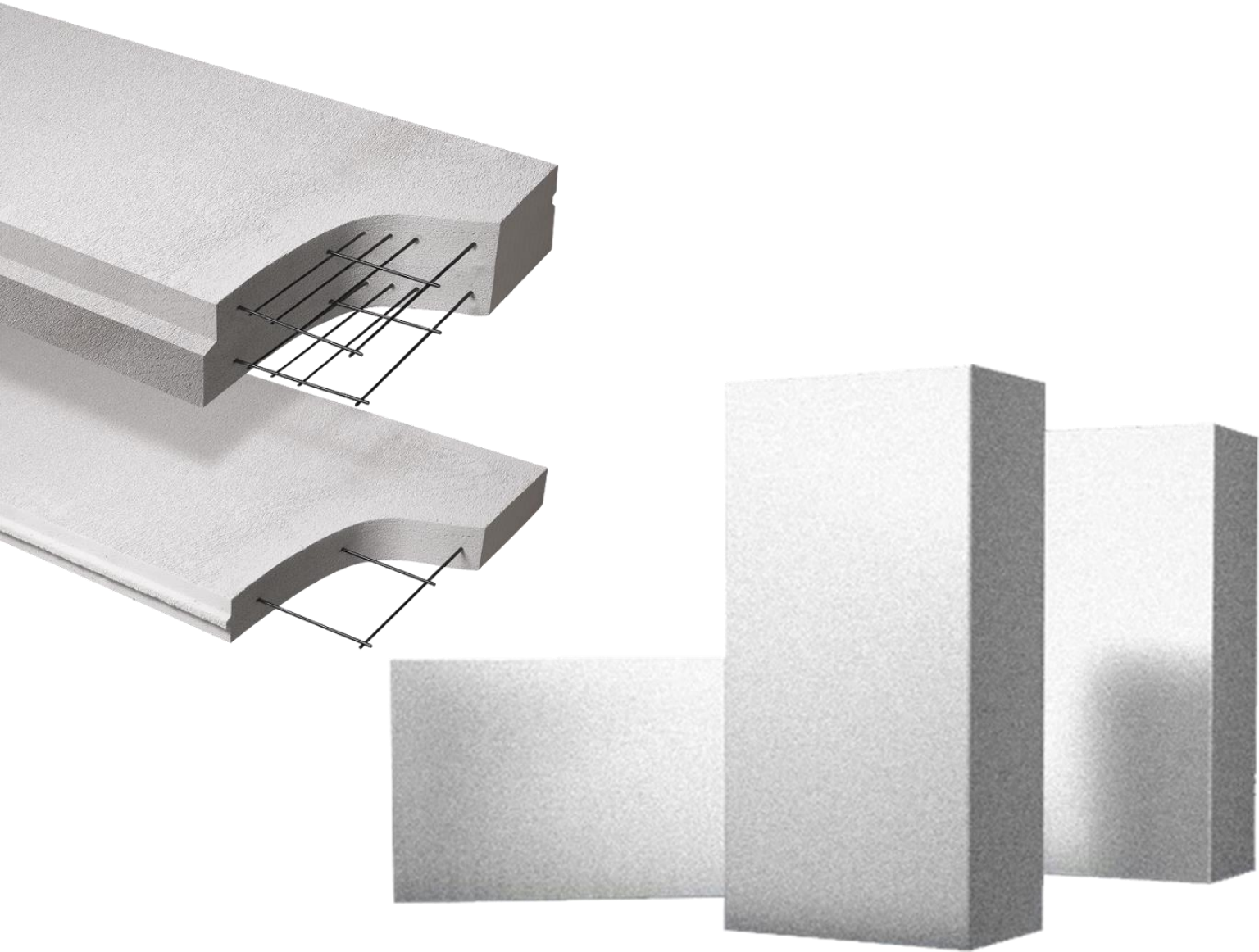
BLOCKS



APPLICATION OF ALTERNATIVE TECHNOLOGIES



AUTOCLAVED AERATED CONCRETE (AAC) BLOCK / PANEL



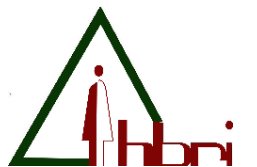
Salient Features:

A. Physical & Design Properties:

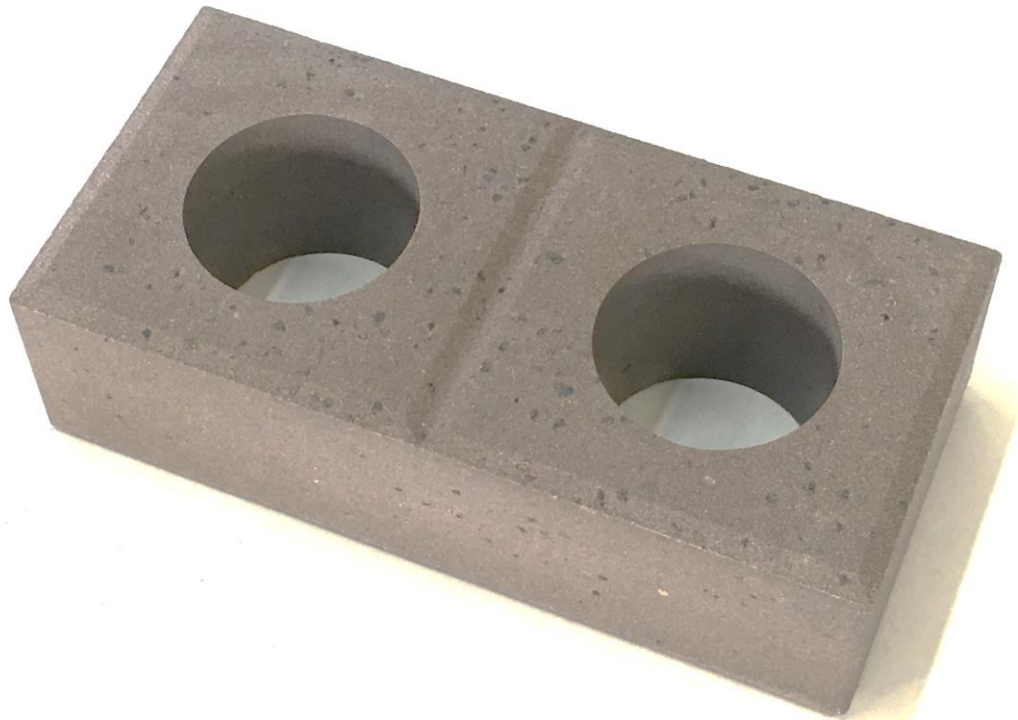
Characteristic	Unit	Strength Class	
		AAC - 4	AAC - 6
a. Compressive Strength	psi	580	870
b. Nominal Density	pcf	31	37
c. Design Weight	pcf	37	45
d. Thermal Conductivity	BTU-in/Ft ² h ^o F	0.9124	0.9811
e. Moisture Adsorption	% mass/vol.	2.90 1.47	2.87 1.73

B. Raw Material:

- a. Material - Sand, Cement, Lime, Gypsum & Aluminum Powder



NON FIRED SOLIDIFICATION BRICK



Salient Features: _____

A. Physical Properties:

- a. Size - 240 X 115 X 70 mm
- b. Weight - 2.9 kg
- c. Lightweight

B. Raw Material:

- a. Material - River dredged soil / sand, Cement & Ad Mixture
- b. Source - Meghna River
- c. Location - Gabtoli, Dhaka

C. Engineering Properties:

- a. Compressive Strength – 2133 PSI
- b. Water Absorption- < 8%.



SAND CEMENT BLOCK

Type I



Special Features:

A. Physical Properties:

- a. Size-400 X 200 X 100 mm
- b. Weight- 9.5 kg
- c. Lightweight

B. Raw Material:

- a. Material: River dredged soil/ sand
- b. Source – Brahmaputra River
- c. Location- Jamalpur

C. Engineering Properties:

- a. Compressive Strength- 6 Mpa.
- b. Water Absorption- <10%.

D. Engineering Economy:

Economic w.r.t Clay burn Brick

SAND CEMENT BLOCK

Type II : 3 hole block



Special Features:

A. Physical Properties:

- a. Size-240 X 175 X 70mm
- b. Weight- 3.1 kg
- c. Lightweight

B. Raw Material:

- a. Material - River dredged soil/ sand
- b. Source – Feni River
- c. Location- Chittagong

C. Engineering properties:

- a. Compressive Strength- 30 Mpa.
- b. Water Absorption- <5%.

D. Engineering Economy:

Economic w.r.t Clay burn Brick

SAND CEMENT BLOCK

Type III : 11 hole block



Special Features:

A. Physical Properties:

- a. Size-240 X 175 X 70mm
- b. Weight- 3.22 kg
- c. Lightweight

B. Raw Material:

- a. Material- River dredged soil/ sand
- b. Source – Feni River
- c. Location- Chittagong

C. Engineering properties:

- a. Compressive Strength- 30 Mpa.
- b. Water Absorption- <10%.

D. Engineering Economy:

Economic w.r.t Clay burn Brick

INTERLOCKING COMPRESSED STABILIZED SAND BLOCK



Special Features:

A. Physical Properties:

- a. Size-240 X 175 X 70mm
- b. Weight- 3.5 kg
- c. Lightweight

B. Raw Material:

- a. Materials : Cement 10%, Course sand 90%

C. Engineering properties:

- a. Compressive Strength- Mpa.
- b. Water Absorption- <10%.

D. Engineering Economy:

Economic w.r.t Clay burn Brick

INTERLOCKING COMPRESSED STABILIZED EARTH BLOCK Type I



Special Features:

A. Physical Properties:

- a. Size- 300 X 150 X 100mm
- b. Weight- 7.5 kg
- c. Lightweight

B. Raw Material:

- a. Materials – Cement 10%, River dredged soil 90%
- b. Source – Kopotakkho River
- c. Location- Jessore

C. Engineering properties:

- a. Compressive Strength -7.5 Mpa.
- b. Water Absorption- <10%.

D. Engineering Economy:

Economic w.r.t Clay burn Brick



INTERLOCKING COMPRESSED STABILIZED EARTH BLOCK

Type II



Special Features:

A. Physical Properties:

- a. Size- 300 X 150 X 100mm
- b. Weight- 7.5 kg
- c. Lightweight

B. Raw Material:

- a. Materials – Cement 10%, Dhaka Clay 90%
- b. Source- Dhaka Clay
- c. Location- Dhaka

C. Engineering properties:

- a. Compressive Strength- -8.6 Mpa.
- b. Water Absorption- <10%.

D. Engineering Economy:

Economic w.r.t Clay burn Brick



COMPRESSED STABILIZED EARTH BLOCK

Type I



Special Features:

A. Physical Properties:

- a. Size- 240 X 115 X 76 mm
- b. Weight- 3.95 kg

B. Raw Material:

- a. Material – Cement (10%), River Dredged Soil (90%)
- b. Source- Kopotakkho River
- c. Location- Jessore

C. Engineering properties:

- a. Compressive Strength- 4.4 Mpa.
- b. Water Absorption- <10%.

D. Engineering Economy:

Economic w.r.t Clay burn Brick

COMPRESSED STABILIZED EARTH BLOCK

Type II



Special Features:

A. Physical Properties:

- a. Size- 240 X 115 X 76 mm
- b. Weight- 4 kg

B. Raw Material:

- a. Material – Cement 10%, Dhaka Clay 90%
- b. Source- Dhaka Clay
- c. Location- Dhaka

C. Engineering properties:

- a. Compressive Strength- 5.1 Mpa.
- b. Water Absorption: <10%.

D. Engineering properties:

Economic w.r.t Clay burn Brick

COMPRESSED STABILIZED EARTH BLOCK

Type III



Special Features:

A. Physical Properties:

- a. Size- 240 X 115 X 76 mm
- b. Weight- 4 kg

B. Raw Material:

- a. Material – Cement (10%), River Dredged Soil (90%), Jute Fiber
- b. Source- Kopotakkho River
- c. Location- Jessore

C. Engineering Properties:

- a. Compressive Strength- 4.7 Mpa.
- b. Water Absorption- <10%.

D. Engineering Economy:

Economic w.r.t Clay burn Brick

COMPRESSED STABILIZED EARTH BLOCK

Type IV



Special Features:

A. Physical Properties:

- a. Size- 240 X 115 X 76 mm
- b. Weight- 3.95 kg

B. Raw Material:

- a. Material – Cement (10%), Rver Dredged Soil (90%), Micro Fiber
- b. Source- Kopotakkho River
- c. Location- Jessore

C. Engineering Properties:

- a. Compressive Strength- 4.7 Mpa.
- b. Water Absorption- <10%.

D. Engineering Economy:

Economic w.r.t Clay burn Brick

COMPRESSED STABILIZED BLOCK WITH FLY ASH



Special Features:

A. Physical Properties:

- a. Size- 240 X 115 X 76 mm
- b. Weight- 2.5 kg
- c. Lightweight

B. Raw Material:

- a. Materials – Cement 20%, Fly Ash 80%

C. Engineering properties:

- a. Compressive Strength- 3 Mpa.

D. Engineering Economy:

Economic w.r.t Clay burn Brick

THERMAL BLOCK (Two side mortar with key)



Special Features:

A. Physical Properties:

- a. Size-242 X 114 X 69mm
- b. Weight- 1.3 kg
- c. Lightweight

B. Raw Material:

- a. Material – Cement (25%), Expanded polystyrene sheet , Course sand (75%)
- b. Source- Local Market

C. Engineering Properties:

- a. Compressive Strength - 4.9 Mpa.
- b. Water Absorption- <5%.
- c. Sand- FM : 2.5

D. Engineering Economy:

Economic w.r.t Clay burn Brick

THERMAL BLOCK (Two side mortar without key)

Special Features:

A. Physical Properties:

- a. Size-242 X 114 X 69mm
- b. Weight- 1.025 kg
- c. Lightweight

B. Raw Material:

- a. Material – Cement (25%), Course sand (75%), Expanded polystyrene sheet
- b. Source- Local Market

C. Engineering properties:

- a. Compressive Strength- 4.9 Mpa.
- b. Water Absorption- <5%.

D. Engineering Economy:

Economic w.r.t Clay burn Brick



THERMAL BLOCK (Four side mortar)

Special Features:

A. Physical Properties:

- a. Size-242 X 114 X 69mm
- b. Weight- 1.22 kg
- c. Lightweight

B. Raw Material:

- a. Material – Cement (25%), Course sand (75%), Expanded polystyrene sheet
- b. Source- Local Market

C. Engineering properties:

- a. Compressive Strength- 4.9 Mpa.
- b. Water Absorption- <5%.

D. Engineering Economy:

Economic w.r.t Clay burn Brick



THERMAL BLOCK (Five side mortar)

Special Features:

A. Physical Properties:

- a. Size-242 X 114 X 69mm
- b. Weight- 2.25 kg
- c. Lightweight

B. Raw Material:

- a. Material – Cement (25%), Course sand (75%), Expanded polystyrene sheet
- b. Source- Local Market

C. Engineering properties:

- a. Compressive Strength- 5.1 Mpa.
- b. Water Absorption- <5%.

D. Engineering Economy:

Economic w.r.t Clay burn Brick



THERMAL BLOCK (Six side mortar)



Special Features:

A. Physical Properties:

- a. Size-242 X 114 X 69mm
- b. Weight- 2.42 kg
- c. Lightweight

B. Raw Material:

- a. Material – Cement (25%), Course sand (75%), Expanded polystyrene sheet
- b. Source- Local Market

C. Engineering properties:

- a. Compressive Strength- 5.1 Mpa.
- b. Water Absorption- <5%.

D. Engineering Economy:

Economic w.r.t Clay burn Brick

COCONUT COIR BOARD



Special Features:

A. Physical Properties:

- a. Size- 600X 300 X 25 mm
- b. Weight- kg
- c. Lightweight

B. Raw Material:

- a. Materials – Cement (70%), Coconut coir (30%)

C. Engineering properties:

- a. Compressive Strength- - Mpa.

D. Engineering Economy:

Economic w.r.t Clay burn Brick

SANDWICH PANEL WALL



Special Feature:

- Total thickness of the concrete (water: cement: sand=0.45:1:3) on interior and exterior faces = 25 mm
- Sylhet Sand having F.M 2.2- 2.6 is used as fine aggregate.
- W/C= 0.45
- Iron wire mesh= 18 BWG with ½ " opening.
- Thickness of expanded polystyrene sheet(density-15kg/m³)= 56.25 mm
- Total finishing thickness= 100 mm

FERROCEMENT WALL



Special Features:

Cast-In-Situ:

Cement :Sand=1:2.

Sylhet Sand having F.M 2.2- 2.6 is used as fine aggregate.

W/C=0.45.

Iron wire mesh= 2-layers of 18 BWG or 20 BWG with 1/2" opening.

Skeleton rod=8mm ϕ (both way) @2'c/c.

Pre-Cast:

Cement :Sand=1:2

Sylhet Sand having F.M 2.2- 2.6 is used as fine aggregate.

W/C=0.38-0.45

Iron wire mesh= 2-layers of 18 BWG or 20 BWG with 1/2" opening.

Skeleton rod=8mm ϕ (both way) @2'c/c.

SAND CEMENT PAVEMENT BLOCK



Special Features:

A. Physical Properties:

- a. Size-242 X 114 X 69mm
- b. Weight- 2.75 kg
- c. Lightweight

B. Raw Material:

- a. Materials – Cement 25%, coarse sand 75%

C. Engineering Economy:

Economic w.r.t Clay burn Brick

PRECAST FERROCEMENT MANHOLE COVER



Special Features:

A. Raw Material:

- a. Material – Cement, sand, wire mesh, ms bar

PRECAST FERROCEMENT FLOOR TILES



Special Features:

A. Physical Properties:

- a. Size- 600 X 600 X 25 mm

B. Raw Material:

- a. Material – Cement, sand , Wire mesh

PRECAST FERROCEMENT PALISADING PLATE



Special Features:

A. Physical Properties:

- a. Size- 1200 X 600 X 25 mm
- b. Lightweight

B. Raw Material:

- a. Material– Cement, sand, Wire mesh

C. Engineering Economy:

Economic w.r.t Conventional Work

PRECAST FERROCEMENT IRRIGATION DRAIN



Special Features:

A. Physical Properties:

- a. Size- 1500 X 600 X 600 mm

B. Raw Material:

- a. Material – Cement, sand, wire mesh, ms bar

PRECAST FERROCEMENT FOLDED PLATE



Special Features:

A. Physical Properties:

- a. Size- 3000 X 600 X 25 mm

B. Raw Material:

- a. Material – Cement, sand, wire mesh, ms bar

PRECAST FERROCEMENT L PANEL



Special Features:

A. Physical Properties:

- a. Size- 3000 X 600 X 25 mm

B. Raw Material:

- a. Material – Cement, sand, wire mesh, ms bar

FERROCEMENT LOUVER



Special Features:

A. Physical Properties:

- a. Size- 37.5X 100 X 2400 mm

B. Raw Material:

- a. Material – Cement, sand, wire mesh, ms bar

FERROCEMENT DOOR FRAME



Special Features:

A. Physical Properties:

- a. Size- 750 X 1900 mm

B. Raw Material:

- a. Material– Cement, sand, wire mesh, ms bar



FERROCEMENT PILE

Special Features:

A. Physical Properties:

- a. Size- 125 X 125 mm, length: 3000-3600 mm

B. Raw Material:

- a. Material – Cement, sand, wire mesh, ms bar,
4 nos. 6 mm longitudinal bar

FERROCEMENT HOLLOW COLUMN



Special Features:

A. Physical Properties:

- a. Size- 125 X 125 mm, length: 3000-3600 mm,
Hollow dia: 75 mm

B. Raw Material:

- a. Material – Cement, sand, wire mesh, ms bar,
4 nos. 6 mm longitudinal bar

FERROCEMENT TABLE



Special Features:

A. Physical Properties:

- a. Size-1200 x 1000 mm

B. Raw Material:

- a. Material – Cement, sand, wire mesh, ms bar,

C. Advantage:

Reduces Dependency on Natural Resources

FERROCEMENT BENCHES



Special Features:

A. Raw Material:

- a. Material – Cement, sand, wire mesh, ms bar,

B. Advantage:

Reduces Dependency on Natural Resources

FERROCEMENT OUTDOOR SEATING



Special Features:

A. Raw Material:

- a. Materials – Cement, sand, wire mesh, ms bar,

FERROCEMENT OUTDOOR BENCHES



Special Features:

A. Raw Material:

Material – Cement, sand, wire mesh, ms bar,

FERROCEMENT DUSTBIN



Special Features:

A. Raw Material:

Material – Cement, sand, wire mesh, ms bar,

FERROCEMENT FLOWER POT



Special Features:

A. Raw Material:

Material – Cement, sand, wire mesh, ms bar

FERROCEMENT WATER TANK



Special Features:

- Wall – Ferrocement
- Cover – Ferrocement
- Size – 1200x1200x1200 mm
- Capacity – 1800 liter

FERROCEMENT BOUNDARY WALL



Special Features:

- Footing (525x525 mm) – Ferrocement
- Column (150x150 mm) – Ferrocement
- Wall – Ferrocement Plate (600x2400 mm)

HBRI ENTRANCE



Special Features:

- Frame – RC
- Infill material – CSEB
- Lamination – Ferrocement
- Louver- Ferrocement
- Boundary Wall- Thermal Block
- Pole-Ferrocement

5-STOREY HOUSE (RURAL TYPE)



Special Features:

- Foundation – RC
- Beam & Column – RC
- Floor & Roof – Ferrocement Channel
- Ground Floor – Soil-Cement Stabilized
- Wall – Ferro-cement, 3D Panel & Sand-Cement Block
- Staircase – Ferro-cement
- Plinth Area – 130 sqm.

DISPLAY CENTRE



Special Features:

- Foundation – RC
- Beam & Column – RC
- Floor– Ferrocement Channel
- Roof – Ferrocement Folded Plate
- Ground Floor – Soil-Cement Stabilized
- Wall – 3D Panel & Thermal Block
- Floor Tiles – Ferrocement
- Plinth Area – 650 sqm.

TRAINING CENTRE



Special Features:

- Foundation – RC
- Beam & Column – RC
- Floor & Roof – Ferrocement Channel
- Ground Floor – Soil-Cement Stabilized
- Wall – CLC Block & Sandwich Panel
- Floor Tiles – Ferrocement
- Plinth Area – 375 sqm.

PRECAST PREFABRICATED STILT HOUSE FOR ETHNIC COMMUNITY



Special Features:

- Foundation – Ferrocement Pocket Footing
- Beam & Column – Ferrocement precast Beam and Column
- Floor – Ferrocement Channel
- Roof – Ferrocement Corrugated Sheet
- Plinth Area – 19 sqm.

EPS SHEET FLOATING HOUSE



Special Features:

- Wall – Expanded Polystyrene (EPS) with a Ferro-cement Cover.
- Pontoon – Expanded Polystyrene (EPS) with a Ferrocement Cover.
- Door – Ferrocement
- Window Frame – Ferrocement
- Plinth Area – 30 sqm.

FERROCEMENT FLOATING HOUSE



Special Features:

- Wall – Ferrocement
- Pontoon – Ferrocement
- Floor – Ferrocement Channel
- Roof – Ferrocement Corrugated Sheet
- Plinth Area – 15 sqm.

SINGLE STORIED SCHOOL BUILDING WITH FOUR STORIED FOUNDATION AT NALITABARI, SHERPUR



Special Features:

- Foundation – RC
- Column – RC
- Beam – RC
- Roof – Ferrocement channel
- Wall – Sand-Cement Block Type-1
- Floor – Soil-Cement Stabilized
- Plinth Area – 160 sqm.

FERROCEMENT BOAT



Special Features:

- Side wall – Ferrocement
- More durable than conventional wooden boats
- Environment friendly



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