

## CATEGORY BUILDING SYSTEMS



### PRODUCT / TECHNOLOGY



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Technology Detail

## COST EFFECTIVE TECHNOLOGY LIKE FERRO CEMENT WALLING AND ROOFING PANELS

*Alternate to conventional brick masonry wall and  
RCC Slab construction.*



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Video

### CONTACT DETAILS

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### BRIEF

M/s Tilothu Mahila Mandal (TMM) is a Building Centre established under Nirmithi Kendra Scheme of Government of India in 1995. Since then they have been promoting cost effective, eco-friendly housing using ferrocement utilizing local materials and skilled labour force. The Building Centre is also into skill development and empowerment, creating employment opportunity, developing local materials and skills and research & development.

The TMM Nirmithi Kendra has developed ferrocement based panels which can be used for walling as well as floor/roofing. Ferrocement is a system of construction using several layers of mortar (lime or cement, sand, and water) applied over welded wire mesh or closely spaced thin steel reinforcement.

Ferrocement is a type of thin-wall reinforced concrete of cement mortar reinforced with closely spaced layers of continuous and relatively small wire mesh. The mesh may be made of metallic or other suitable materials. Ferrocement has a very high tensile strength-to-weight ratio and superior cracking behaviour in comparison to conventional reinforced concrete. Unlike conventional concrete, ferrocement can be assembled into its final desired shape without the use of a form.

The ferrocement has an advantage over conventional RCC construction as the sections of building element produced are thin due to wire mesh giving high strength to weight ratio. The raw material used are cement, sand, mild steel wires and wire meshes.

The ferrocement panels can be used for variety of applications such as walling panels, roofing panels, domes, boundary walls, sun shades, staircases, doors & windows, toilet blocks, water tanks, manhole covers, cement benches, tree guards, etc.





## SALIENT FEATURES

- Ferrocement panel can be used as replacement of load bearing brick walls.
- Ferrocement panels can also be used as replacement of RCC slabs.
- Cost effective, durable, aesthetic, easy to produce and fast to install.
- No stone chips, bricks needed, hence less polluting & resource efficient.
- No heavy or expensive machinery needed.
- Easy to train workers, particularly women – leads to empowerment.
- Low consumption of cement, steel thereby reducing the carbon footprint
- Being lighter in weight, provides an excellent alternative towards earthquake resistance
- Structure can be shaped such that heavy winds causes little damage.
- Interchanging of components possible



## ECONOMIC ASPECTS

- Due to lighter weight, the dead load of building gets reduced thereby enabling economical cost effective design
- The panels can directly be used eliminating the need of plaster.
- Ferrocement is a cost effective technique and help local economy.
- Saving in shuttering and construction time.







## SUSTAINABILITY ASPECTS

- Energy efficient, waterproof, fire resistant, earthquake resistant.
- Reduces Carbon Footprints – lesser quantity of steel and cement required.
- Since the components are produced at the site, embodied energy is less and transportation cost is reduced thereby minimising fossil fuel and green house gas emission.
- Local manpower can be easily trained thereby leading to employment opportunities.
- Empowering Make in India concept.
- Enhanced durability.



## SUITABILITY AND AVAILABILITY

- Suits all climatic conditions except extreme hot conditions where insulation may be required.
- Ideally suited for beneficiary led construction under PMAY(Urban/Rural).
- Being light weight, suited for multi-hazard resistant construction.
- The technology is available in crude/nascent form in various parts of the country





## LIMITATIONS, IF ANY

- The ferrocement panels for structural applications can be used for low rise structures.
- The ferrocement panels need to be manufactured under strict quality control conditions.
- In high rise structures ferrocement panels can be used as infill walls.

## MARKET LINKAGES

- The ferrocement components can be locally cast near construction site.
- It can also be produced by small entrepreneurs and supplied to consumers at State/ Block/ village level.
- R&D labs such as CBRI have done considerable amount of R&D on ferrocement technology.

## MAJOR PROJECTS

- Folded Plate roofing for Roadways workshops at Azamgarh (1977), Faizabad (1978), Amethi (1978),
- Folded Plate roofing Khajuraho (1984),
- Indian Railway Gang Huts at Chunar 16 Nos (1991)
- Toilets in Andhra Pradesh
- Sahara Institute of Management, Lucknow
- Indraprasth Resort Lucknow
- Boundary wall at Mahabodhi Temple Bodh Gaya
- School at Shobhekhap, Bihar
- Samvad Kaksh for Community Policing near Rohtas Fort, Bihar
- FC Toilet Bank at ITC, Munger, Bihar
- Housing for Poor Workers, Kwath, Bihar
- Dwelling Units at Indrapuri, Bihar



## CERTIFICATION/INDIAN STANDARD/ ENDORSEMENT

- IS 13356 (1992) "Precast ferrocement water tanks" and Guide lines as per American Concrete Institute
- Certification from IIT Kanpur.
- Certification from IIT-BHU.

