

Use Ferrocement and Save the Earth... which is only one we have!!

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It is observed that both in traditional and modern constructions, natural resources are used directly as well as indirectly.

For example in stone, brick and mud constructions in rural areas quarried stone is used and the mud in the form of clay /clay blocks is used. All of this leads to depletion of natural resources.

Also most importantly the top soil which is the most important layer for agriculture gets sacrificed. Very few people except the farmers understand the real importance of loss of top soil.

In case of modern constructions of course huge consumption of natural stone such as basalt, for aggregates, river sands, cements and steel is used for the basic frame work of the structures. There is huge depletion of these natural resources which are not renewable.

The cost to benefit ratio, or the price we pay and are going to pay in the future for development is much skewed and highly dangerous.

The cement, steel, tiles, aluminum, paints, interiors also consume a large amount of energy to be manufactured. This high embodied energy is also a huge negative aspect of all these materials without which nothing nowadays can be constructed.

In such a scenario which is commonly seen and spread across the entire construction industry, “Ferrocement Technology” based construction comes as a wisp of fresh air and gives some hope and respite from the onslaught of rampant depletion of natural resources

Eco-friendly construction using Ferrocement technology reduces the depletion of natural resources to quite some extent. It’s a great green initiative. Calculations done on live examples have also proven, a lower carbon foot print and sustainable green credit ratings.

Firstly it does not have aggregate, and bricks as an ingredient at all. Secondly it has weld meshes and chicken meshes as the main reinforcement, which requires lesser energy for manufacture. Cements containing high fly ash content, or GGBS can also be used



Ferrocement House in Noida



Ferrocement House in Satara Maharashtra

The total steel usage is very limited and used as skeletal steel which offsets the need for formwork and Precious Timber and again structural steel used for formwork of modern RCC structures is majorly eliminated

And most importantly as the thickness of the Ferrocement being very low, consumption of cement, sand, (even manufactured sand can be used!!) gets reduced.

Today with the advent of Geopolymers in construction it is possible to have Ferro Geopolymer based construction. It has the greatest advantage of replacing cement and sand by 100%.

Fly Ash which is an environmental burden and a challenge for the safe disposal can be used and activated using simple chemicals and made to behave like cement!

It only requires sunlight (which is abundant in this country for almost 9 months of the year!) and a temperature of about 30 to 35C for curing and most importantly completely eliminates the need for water for curing, the most precious thing on this earth today. Ferro-geopolymers could be the game changer technology for the future.

Further from the material properties point of view most importantly the behavior of Ferrocement as a 2 phase, homogenous composite as against concrete which acts a heterogeneous composite makes ferrocement far more superior than RCC.

Its ability to take both tensile and compressive stresses almost equally very low crack widths, resistance to shrinkage and drying cracking, makes it a technology of choice for structural designers.

Further with the reduced self-weight, foundations can be smaller and kept on weaker soils having medium to poor bearing strength. The earth quake loads get considerably reduced though wind loads could be a matter that needs to be addressed but can be resolved by adding eco-friendly dead cost effective dead weights.

You will now be keen to ask me what ferrocement is? Right?

Ferrocement is nothing but a combination of cement, sand, weld mesh, chicken mesh pressed and filled with mortar. Skeletal steel in the form of 6mm/8mm bars are used for achieving form and shape to eliminate the use of formwork.

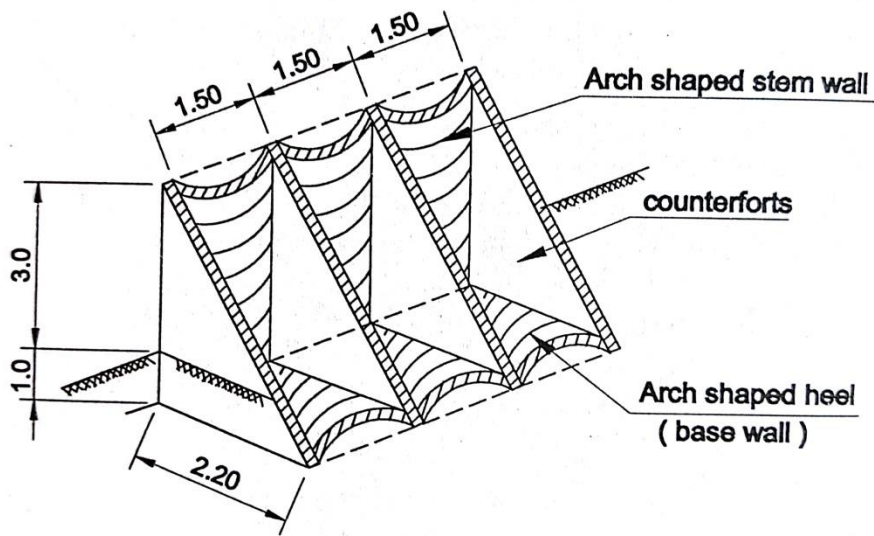
“A little change in the type and pattern of the reinforcement, the use of fine wire meshes instead of large diameter bars, and press filling mortar either by hand, machines, or precasting makes it a wonder material!!!”

This is how Dr Prof Divekar a pioneer, visionary, has explained it simply after living with it in body, mind and soul for the past more than 40 years and having designed and constructed a large number of structures successfully

Normally while constructing we use bricks, steel, metal, stone, timber etc, and sheets for roofing. But now we have to reduce quantity or eliminate them. Then without these, how to build a house?

Do you know what chicken mesh is? Yes, it a hexagonal wire woven GI mesh it's flexible and can be and needs to be stretched while fixing it to skeletal steel.

A weld mesh is a square grid of small diameter bars pre welded in a factory. It is more rigid. The skeletal steel is nothing but a skeleton of 6/8mm mm diameter steel bar by welding the to required shape and size. Then we fix the weld mesh and finally stretch this chicken mesh on both sides of the skeleton steel



Ferrocement dome near Pune, Maharashtra

In the second part we prepare a thick cement mortar. That is mixing of 1 part cement and 2 parts of fine sand and small quantity of water. We take this thick mortar and press fill it in the chicken-mesh layers. After the press and fill a final finishing and levelling is done using a plate trowel for aesthetics.

By pressing it becomes stiff. No wastage is seen. After some days you see this is just like a wooden plank, very slim and still very tough. Curing is required just like concrete.

The applications of this technology in the construction industry is enormous and wide ranging from very small to large structures both cast in situ and precast . Security Cabins, compound walls, small buildings, domes, pyramids, water tanks, treatment

plants,, repairs, waterproofing, permanent forms, check dams, silos, roads, pathways, pontoons, blast fences, and a lot lot more... !!!

Architectural features include hard landscaping, ponds, benches, flower beds, fins architectural shapes and forms, benches, jogging tracks, single leaf, double leaf partition walls, and many more!!

Ferrocement has been in use for the last 30 years across the country. Everybody is aware of it, but many do not know the details of the technology and costing. It is a simple, straight and easy to build. It is a futuristic material and is an easy solution for many of the problems which concrete even today cannot resolve!!

Typical Domes of Shikhar on Ramakrishna temple built in Pune are precast thin petals of ferrocement and its classical example of the potential of ferrocement when designed and constructed properly!!

So let us decide to understand in a bit more detail and adopt this magical innovation called as ferrocement technology.

In America, Mexico, England, France, Germany, Indonesia, it is being used extensively for multiple applications.

In India also now we can plan anything like, your home, ware houses, cattle sheds, toilet blocks, water tanks and insist your architect and engineer, that you want ferrocement and nothing else. So, let us use ferrocement and save our earth. Let us be friendly with environment.