Factory of prefabricated ferrocement elements

Boljevac-based "Milinković Company" Ltd. started realization of project “Factory of prefabricated ferrocement elements – construction of prefabricated buildings of prefabricated ferrocement elements” in 2008. "Milinković Company" has developed the idea, construction, production and transportation technology, and tools that are necessary for construction of facilities of prefabricated ferrocement elements.

Factory of prefabricated ferrocement elements in Boljevac is the first facility of the kind in Serbia.

The hall of prefabricated ferrocement elements can have the function of production, business, residential, sports or any other space. Application of new technology of ferrocement and constructive solutions has significantly improved the method and quality and shortened the time of construction of such facilities. Consumption of energy during construction and use of facilities has been significantly reduced, and the accent is placed on protection of environment and preservation of our environmental resources.

The owner of the company, Mr. Milenko Milinković, has also patented the technology of construction of facilities of prefabricated ferrocement elements, and he won the gold medal at the World Exhibition of Inventions in Suzho, China, in 2008.

One day workshop on “Ferrocement in Civil Engineering Structures” was organized on 3 February 2012 by department of civil engineering, Rajarambapu Institute of Technology, Rajaramnagar (Islampur, Dist. Sangli, Maharashtra) in association with Ferrocement Society.

In the first session Shri Himanshu Parikh introduced the concept and explained the difference between the RCC and Ferrocement. After that Dr. B. N. Divekar (Consultant, Ferrocrete, Pune) who has 30 years experience in Ferrocement design and constructions explained the construction details and the procedure and innovative ideas. He explained that Ferrocement is like a Joint Hindu Family which has got unbreakable emotional attachments and bonds in between the family members. Ferrocement bends but does not crumble in to discrete separations. This proves its ability to sustain the earthquake forces. The structures built in Ferrocement are seismic resistant.

A demonstration of the actual press filling the mortar in the Ferro grilled mesh was arranged near the stage on the internal ground. All the students were impressed as they took part in the practical of mixing the mortar, and then press filling and finishing.

Mr. Ulhas Adhav explained the cost analysis and market rates of the ferrocement works. Er. Prakash Nagnath explained with many photographs how Ferrocement is used for interior and exterior of the buildings. Prof. H.S. JadHAV, HOD, Civil Department was the convener. Prin. Dr. Mrs. Sushama Kulkarni expressed her interest for such new technologies and new research projects for the PG students.
Ferro-Cement Tanks
By RUCHI in Himalaya Regions

Even more than the Natural Springs (bawadis), often over-exploited, rainwater is the most reliable solution to Himachal’s potable and irrigation water scarcity.

RUCHI is a private non-profit, rural development agency that has been working with communities in the Himalayan foothills of North India for more than 28 years.

Since 1991 RUCHI has pioneered ferrocement technology to harvest rainwater and trained the government and other NGOs in the proper application of this technology. As the first agency to promote ferro-cement technology in Himachal, RUCHI has constructed over 600 ferrocement tanks in both its own project areas and also on a demonstration basis at other NGO and government sites. Rainwater that collects on the roof of a building is piped into a small multi-layered filtration tank placed on top of a ferrocement storage tank. The filtration tank consists of layers of sand, dense, fibrous materials like coconut husks and small rocks. After going through a slow sand-filtration process, the water is stored in the ferrocement tank underneath.

These storage tanks are made of chicken wire mesh, steel rods and cement and sand in a ratio of 1:2. The tanks are easy to construct with locally available materials and cost less than brick, stone, iron or HDPE tanks. They are leak-proof, durable and easy to repair. Regular chlorination of the rainwater stored in ferrocement tanks ensures a reliable and accessible supply of potable water, reducing both the drudgery involved in fetching water from distant sources and the incidence of water-borne diseases. The harvested rainwater can also be used for irrigation and for livestock.

When selecting households for whom to provide ferro-cement tanks, RUCHI considers the following criteria:
- Whether safe drinking water is available in the household’s vicinity
- Whether the household is SC or BPL
- Whether the household is willing to make a financial contribution towards a portion of the cost of construction
- Whether the household is capable of ensuring regular usage and maintenance of the tank.

When RUCHI first began constructing ferro-cement tanks, it asked for an in-kind financial contribution in the form of shramdan. Strangely, however, this failed to inculcate a sense of responsibility for the tank in the minds of the beneficiary households. In some instances, RUCHI would arrive at the appointed time to begin tank construction only to find the beneficiary householders nowhere in sight. Tank maintenance was frequently lax. One way to counter this indifference, RUCHI finds, is to require a cash contribution to the project. The cash is held as a deposit: if the villagers provide shramdan themselves, the deposit is used to pay them for their labour. If they choose not to provide shramdan, the deposit is used to pay hired labour.

Earthquake resistant houses
In Gujarat

Following the massive earthquake which devastated huge areas of Gujarat in January 2001, the international charity organisation Catholic Relief Services (CRS) committed itself to assisting several rehabilitation programmes. Their latest commitment is the construction of 6,000 houses of various types - each of about 28m² size - before June 2003.

The house design, which is earthquake resistant and has design approval from the Gujarat State Government, incorporates the use of Auroville-developed ferrocement roofing plus Auram hollow interlocking compressed stabilised earth blocks(CSEBs) for walls. The latter are being manufactured using Auroville’s highly acclaimed Auram 3000 press, 75 Nos. of which have been supplied, with some operating on a continuous double-time-shift basis in the area. The average wet compressive strength achieved with the local soil stabilized with 8-9% cement using these presses is around 50 kg/cm² (after 24 hours immersion).

It is also possible to repair any portion of the structure as and when necessary. Another interesting use of ferro-cement in many countries is for reinforcing the existing masonry structures against the stress caused by external factors, such as earthquakes.

Ferrocement Boat
Lungta - is a Tibetan word which translates literally to 'wind horse'. Although the literal meaning is appropriate, the name was chosen for its spiritual meaning in Tibetan Buddhism. The 'wind' refers to the fundamental energy or goodness associated with existence, and the 'horse' aspect refers to the ability to harness this energy in our daily lives.

ZEISS PLANETARIUM
Completion Date: 1922
Location: Jena, Germany
The world’s first lightweight steel structural framework was built on the roof of the Carl Zeiss optical works in Jena, Germany in 1922. When covered with ferro cement the structure became the first thin-shell concrete structure in history. What is even more remarkable about the dome is that it was almost incidental to a spectacular scientific and technical accomplishment: invention of the planetarium projector.

One day workshop at Sangamner
Amrutwahini College of Engineering had arranged a workshop on ferrocement at Sangamner for the BE and ME students and staff members of the college. Principal Vikhe and Prof. Wakchaure, prof. Kulkarni took efforts to make it success. PG students have started research on ferrocement topics under the guidance of Dr. B.N.Divekar.

Seminar at Nashik
Dr. Sunil Kute organized a seminar on ferrocement for Architects and Surveyors at Nashik. Nearly 45 participants attended the discussions and demonstrations at Nashik. Girish Dhotre explained the economics of the retaining wall. Ulas Adhav explained the cost analysis. Pushyanmitra explained the use of ferrocement in building construction.

HOUSE AT SATARA
N.S.Jadhav, Pune ferrocement professional has undertaken a house building at Satara. Use of ferrocement for all the components is the specialty of this building. Jadhav has constructed industrial shades, Ferrocement fins, caves and planters, domes and cornices, watchman cabins, interiors and many allied constructions.

How Ferrocement Can Save The World!

by Angus W. Macdonald
Production of Portland cement (a component of concrete) is the 3rd largest source of anthropogenic CO2, at about 3 billion tons annually. Cement is a trillion dollar market, but standard reinforced concrete is about 20% cement, and 80% aggregate. This aggregate is often composed of limestone & carbonate rock, mined from the earth’s lithosphere, often in unsustainable & environmentally-unfriendly open pit mines. Calcination of limestone requires a good bit of energy and release of CO2, which is often drawn from coal power!

Ferrocement is a construction method which uses considerably less material (both steel & cement) than standard reinforced concrete. Widespread use of Ferrocement could significantly lower the carbon footprint of new construction, by approximately 80%.

Except for wooden residential buildings in places like the USA, England, Canada and Scandinavian countries, most permanent construction worldwide is made of masonry and concrete, and for good reasons. Primarily, wood is often not available or durable enough to provide adequate built space in most climates. Am-cor has developed a method of prefabricating & panelizing Ferrocement forms. The carbon savings are simple: where a reinforced masonry and concrete building would require 8” (20cm) and 10” (25cm) walls roof and floor slabs to create useable spaces, the concrete building elements of an am-cor ferrocement structure of similar size are from 0.5” (1cm) to 2” (5cm) thick. The savings in material and in CO2 emissions average around 70%-80%. It is not to mention the lower carbon footprint because of time, labor, and transportation savings due to factory prefabrication. This is a huge savings, and most importantly, Ferrocement structures are actually rated to be stronger and safer than reinforced concrete buildings (especially during earthquakes!)

Ferrocement, the long-forgotten sister method to reinforced concrete, can be a civilization-saver by greatly lowering the volume of anthropogenic CO2 released in construction, and so mitigating climate change..

(From Ferrocement.net forums)

FERROCEMENT SEWER IN DAN
Commissioned by: Dan Region Association of Towns For Sewage
Duration: 18 months
Contract value: NIS 60M
Right at the heart of the city of Jaffa run two underground pipes each with 1.25 meter diameter, and 3.5 Km in length. These pipes gather and transport most of the sewerage produced by 2 million people that live in the Gush-Dan area to the Shphadian Sewerage Plant. The pipes were laid out 25 years ago and their physical state demanded immediate reinforcing and upgrading. The Shtang Construction and Engineering Ltd., Israel had to answer a double challenge: fixing and renewing the existing sewer line, without disturbing the daily life of the many residents and merchants living and working in this very crowded area, and protecting the sea front the discharge of sewerage. Shtang's solution to this challenge was installing a temporary overhead bypass pipe, which gathered and transported the sewage that enabled the company to fix and reinforce the existing lines, using Ferrocement technique - which has a definite advantage in the relatively thin pipes is enables, but demands maximum precision and a very high level of proficiency. This company has accomplished all requirements and completed the job before the stipulated time.
Congratulations
Dr. P. B. Sakhivel, and Prof. Jagannathan A. presented papers on Ferrocement at the International conferences during December 2011-January 2012:
3. Fiber Reinforced Ferrocement - A Review, 2nd International Conference on Advances in Mechanical, Manufacturing and Building Sciences (ICAMB 2012), held at VIT University, Vellore.

Talk in CBRI, ROORKEE
CBRI Roorkee has always been a pioneer in ferrocement research activities. Recently 67th colloquium and a presentation was arranged at CBRI campus. Er. Dave presented the ferrocement research activities. Dr. B.N.Divekar and Chandramohan presented the activities of the ferrocement society. The progress of research was under the guidance of Mr P.C.Sharma. Now Er. Rajeev, Er. S.K.Singh, Er. H.K.Jain, Er. S.G.Dave, are working with all S and T staff on different designs of ferrocement. Then Dr. Divekar had a discussion with Prof. V.K.Gupta, IIT, Roorkee. He presented some important books for the Ferrocement Society’s library. Dr. P.C.Sharma also donated some books to the Society’s library.

Welcome
New life members
Prataprao V Patil– is a creative civil engineer. He retires as Secretary to Govt. of Maharashtra. He has a wide experience of dam and canals and farmers needs as he is basically a farmer. He always thinks of low cost solutions for poor farmers.
Nandkumar S. Jadhav– is a mechanical engineer, but has experience in construction of ferrocement structures like domes and cornices, industrial sheds etc.
Mustapha Plummer--Owner of S. B. Consolidated Constructions, Parle, Mumbai. He is also member of Indian Water Works Asso, Indian Plumbing Asso, Brihan Mumbai Licensed Plumbers Association.
Adesh Kothari- M.S. Civil from USC, Los Angeles, USA. Now working as Project Engineer in D.Y.Patil Design Cell. He deals with Ferrocement, BIM, Scheduling.
Rajendra Mehara- He is a combination of Chemical Engineering and Civil Engineering. He carries out work at various project sites in Chemical Treatments for Structural Repairs / Strengthening / Fibre Wrapping / Special Waterproofing Treatments / Food Grade Epoxy Lining / as an independent Epoxy and other Polyester Treatment’s Applicator – Consultant- Contractor.
Avinash Kulkarni – ME Struct. And L.L.B. and is working in Ahmednagar, Maharashtra as a R. C. C. structural designer, Government valuer. He visited ferrocement works in Singapore recently. He is also a member of IEI, Institution of Valuers, Indian Society of Struct Engineers.
Girish Sangle – is working in Water Resources Department. He has experience in construction of dams and canals and colouret. He deals with the experiment of colouret ferrocement. He recently visited Singapore.

PETAL SHAPE WATER TANK AT MUMBAI
ARALDITE Barrier Coat Finished Tank with Bottom Base. Stiffening Flange @ Mid Height and Overhang Portion @ Top
Dimensions: Height 1,800 mm, Diameter of Inner Circle 2,500 mm, Outer circle 3,000 mm; Shell Wall in 8 Petals having approx. 3 inch thickness; Ribs at Base - Middle - Top; Storage Capacity approx. 10,000 liters; The Tank Cage comprised of tor steel bars bent in arch shape and spot welded to give form to the skeleton; tying of 10 gauge weld mesh and 22 gauge chicken wire mesh layers; Top of the tank has been built in a conical shape with Mild Steel Angles and covered with Bison Board Panels.
Appurtenances: Flanges are Built - In and welded to the Ferrocement Tank Cage to minimise the accidental damages to the FC tank wall in future. Vent, Overflow, Drain & Slip on flanges with internal threading (for Inlet, Outlet and Water Level Controller Insert connections); 2 Manholes have been provided; The Manhole Covers are fabricated from Light Weight Wooden Particle Board Impregnated and Sealed on all sides with about 500 micron thick Special Transparent Very Low Viscosity ARALDITE Epoxy Coating; External surfaces of the Ferrocement Tank have been coated with ARALDITE Barrier coat Epoxy, a White Water Based Epoxy Waterproof Breathable Coating @ 500 gm per SQM. Ferrocement is an excellent methodology. The rewards are equally high with excellent, unbelievable special strength properties in wonderful shapes. The end result is a durable and aesthetically appealing structure.

by Rajendra Mehara, Mumbai. The work had to be carried out in a Basement, with hardly any scope and space for maneuverability, which resulted in extended work completion schedule.

Ferrocement News