



Lightweight ferrocement panels

In many cities and towns, building plots are small, making thin walls important for two- or three-storey buildings. Construction time must also be minimized for social and financial reasons. Conventional construction cannot meet these needs. Large industries have developed systems to address these conditions, but they are usually technologically complex and depend on sophisticated equipment and more highly skilled labour. They are generally designed for large projects and are not suited to smaller buildings. Often, a shack or house lacking minimum living conditions already occupies the plot, so the new building must be erected within a few days, using the local community's workforce and at an affordable price. To meet these requirements, several EcoSur members developed a simpler, less expensive system. The solution was developed by CECAT in Cuba and implemented there and in Nicaragua.

How does it differ from other systems? This system uses vertical ferrocement elements and horizontal concrete tie beams. Two people can lift and position all components without mechanical equipment. The elements are prefabricated and transported to the site. U-shaped beams form the foundation and are placed on concrete pads cast a few days earlier. The vertical elements are self-supporting and are placed one after another.

the other, then a reinforced-concrete ring beam is placed on top. All joints are filled with mortar. The system provides high earthquake resistance; calculations based on international standards indicate that a magnitude 7.0 earthquake would cause no structural damage to a two-storey house. Nor would it be damaged by the strongest known hurricane-force winds.



placing the elements on U-shaped beams

The wall panels are made of high-performance microconcrete and have a smooth surface. They are only 3 cm thick, and each has an 8 cm-wide rib. They contain an internal reinforcing mesh, while the tie beams are reinforced with steel bars.



the technology adapts to local culture

The cost advantage

Where speed of construction is important, this system is an economically viable option. Components can be produced by local factories in both the formal and informal sectors, with flexibility to meet clients' needs. The technology is easy to learn and requires no costly investment in tools or machinery. Good moulds and a vibrator represent an investment of approximately US\$5,500 and allow a factory to produce components for two or three rooms per week.



Manufacturing the panels

Limitations of application

Production of the beams and panels must be closely monitored, since mistakes in the concrete mix or in placing the mesh can reduce quality. Because all components are designed to optimize material use, they may pose a risk if produced by workers with limited qualifications. A specialist should therefore supervise component production and building assembly. Building codes and standards may be a limitation in some locations, and specific technical calculations may be required to obtain a building permit. Ferrocement standards exist in countries such as Cuba. Two-storey buildings have been constructed in several countries and have met demanding earthquake-safety requirements.

SER panels produced by small and medium-sized enterprises

The system was designed specifically for small factories. The panels use microconcrete technology and are vibrated using different methods. Beams are produced in a standard size, but can also be adapted to the exact dimensions of the houses to be built. All components are handled manually; none weighs more than two people can comfortably carry. A factory can operate in a small area, potentially within densely populated neighbourhoods or informal settlements close to the market. The plant produces little noise.



From the core shelter to the complete home

Disaster mitigation

The system has great potential for rapid response after disasters such as earthquakes, floods and hurricanes, when homes must be built quickly. If panels are in stock, small shelter units can be erected within a few days. The rest of the house can be built around the shelter later. SER components can be stored for long periods without deterioration and transported to the site while mobile production is established nearby. This can provide a rapid, robust and economical solution, while also creating an attractive business opportunity.



Three-storey building, more than 20 years old



The network provides extensive knowledge transfer, including feasibility studies, technical training, business skills and the practical application of scientific knowledge. Equipment can be exported quickly in emergencies, or production can be established in the affected country.

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