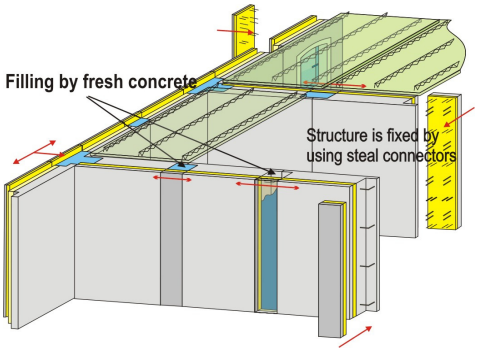
FINALISTS' PROJECTS

Necobac

Necobac is a mobile kit for washing all types of masonry equipment on jobsites. Developed by Anne-Sophie Lunel, from Innov'up Incubateur, France, it is easy to use and adapted to all worksites, allowing productivity gains and making worksites tidier and safer. Necobac also presents several environmental benefits: it allows for significant water savings, filters out residues and thereby removes the risk of soil or groundwater pollution when tools are being cleaned on-site.

New building construction technology with continuously insulated pre-fabricated concrete panel system

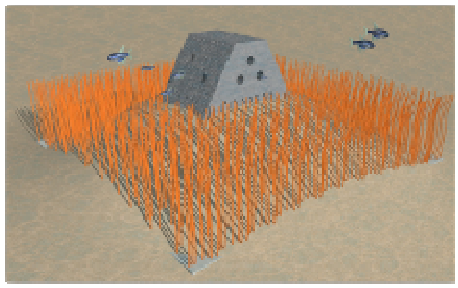
This invention has been developed by Mr. Jovan Nikolic of Quattro Construction in Serbia. It is a new building construction technology, using a concrete panel system. Panels are made of reinforced concrete and internal insulation to avoid thermal bridges and thus improve energy efficiency. Multi-functional tools are used to produce pre-fabricated panels of various dimensions, according to the building design, before installation on-site. Continuous insulation in a building constructed using this system is achieved through connecting panels: both 'wall to wall', but also 'wall to ceiling' connections. The system is adapted to residential buildings and allows an estimated 80% reduction in energy consumption through the avoidance of thermal bridges.



P.R.O.M.E.S.S (PROtecting Marine Ecosystems and Structure against Scour)

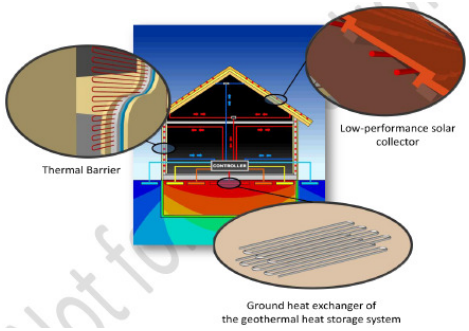
P.R.O.M.E.S.S is a combination of an Artificial Reef, made of concrete incorporating shell waste, with an anti-scour system. Developed by SM^2 Solutions Marines in France, represented by Sven-Michel Lourié & Michèle Cabanis, it consists of a layer of artificial seagrass adapted to fix the Artificial Reef. The linked system will rapidly be covered by invertebrates, algae epiphytes and colonized by fish.

The advantages of this system are twofold: it can help promote marine biodiversity, fisheries, while also providing scour protection for underwater structures such as offshore windpower piles, cables, pipelines, harbour structures etc.



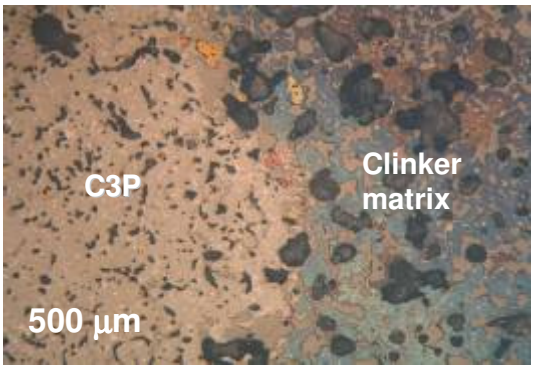
Thermal Barrier

The Thermal Barrier system developed by Marek Kraczek from Gdansk University of Technology in Poland, makes it possible to maintain a constant temperature of around 19°C in a building, throughout the year. This is thanks to an indirect heating and cooling technology which supplies energy not into the internal air but into the external walls of a building. It combines a roof-collecting solar energy and ground heat storage system to heat polypropylene U-pipes placed inside external walls. This limits temperature variations in the external walls, reducing energy losses from a building.



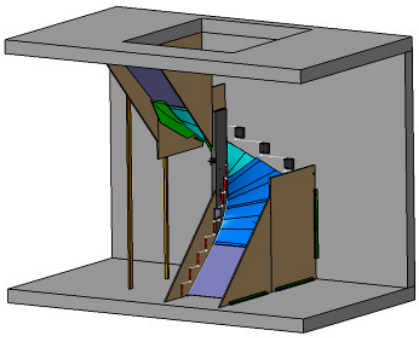
Increasing the Phosphorus Pentoxide (P_2O_5) rate in cement

Researchers Petr Sulovský from Palacky University, Olomouc and Theodor Stanek from the Research Institute of Building Materials in Brno, Czech Republic have developed a new method to allow an increase in the phosphorus pentoxide (P2O5) rate in cement, above existing limits. This enables the wider use of P2O5 by-products, such as Meat & Bone Meal, in cement production. These are used as a substitute for fossil fuels, meaning a reduction in the CO2 emitted during the cement production process, as well as the safe disposal of potentially hazardous waste. The cements produced with these 'phosphoclinkers' offer equivalent performance to that of Portland cement. Used for immobilization / solidification, 'phosphocements' can reduce the cost of waste disposal.



SCAL'IN

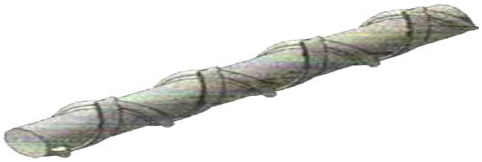
SCAL'IN, developed by Thomas Choquet from Innov'up Incubateur, France is an easy-to-install formwork system for making concrete stairs. Formwork can be set up seven times faster than with traditional systems, and can be reused hundreds of times. This allows significant productivity gains and safer on-site working conditions. SCAL'IN offers an all-inclusive service: from design, transport of the tools, to installation of the formwork and casting of the concrete on-site and finally, cleaning.



Shaped building block

The Shaped Building Blocks developed by Srecko Stefanovic from Serbia can be fitted together easily, allowing faster, simpler and more cost effective construction. The blocks are in four basic shapes and are made up of different layers of materials, with a lightweight polystyrene-concrete center ensuring good thermal and acoustic insulation. Spaces created by the assembly of different-shaped blocks allow faster, simpler and cheaper wall installation of electrical, water and other supplies.

Nonmetallic composite high strength reinforcement with high modulus of elasticity «LIANA»



This new product, developed by Andrey Buchkin, Russia, is an alternative to steel reinforcements, which can corrode in aggressive environments. The use of non-metallic reinforcements can also be useful when antimagnetic and dielectric and thermo physical properties are required, can help to extend the lifespan of concrete structures and reduce the need for maintenance or repair.

Fiber Reinforced Polymers typically have low elasticity, limiting their use as non-metallic reinforcements, particularly for flexural elements. However, 'LIANA', manufactured from glass or basalt continuous high-strength fiber, has a high modulus of elasticity, thanks to a 'plain trusion' production process and double spiral winding in opposite directions.

Prefabricated ferrocement elements

The solution developed by Mladen Milinković from Serbia is an integrated system for the manufacture, transport and assembly of prefabricated ferrocement elements called 'big bricks'. These are 'sandwich-type' elements with three layers: a thermal insulating layer made of lightweight concrete (Simprolit), cast on a fresh ferrocement base and with a protective layer, also made of ferrocement. Transport of these elements is simple and low cost. The supporting structure for these bricks is made of reinforced concrete arches, cast directly on site in the gap between adjoining half-cylindrical lines of elements. This solution provides an energy-efficient method of building semi-cylindrical buildings, suitable for multiple uses, such as production halls, sports halls, offices, etc. The final constructions are durable, safe and cost effective.

Ultra-thin Shell Dome Home Construction

This low cost housing solution proposed by Jay Emery of Dingley Dell Enterprises Limited, UK, consists of an easy-to-use inflatable construction kit. Simple foundations of either screw piles or concrete slab are installed. The dome formwork with window arches is inflated and glass fiber rebars attached. A modified concrete is hand or spray applied and left to set. The formwork is deflated and removed for re-use. This solution allows for fast construction, using local labor and materials. The resulting Dome Home is disaster-resistant and has a lower carbon footprint thanks to the lower quantity of raw materials used in construction (20-40 mm concrete thickness). The Dome Home is a possible solution for the South African Reconstruction and Development Program, but can be adapted to other contexts, including disaster relief.