

Touching the void

If you thought concrete had to be heavy then you've clearly never used the latest void forming systems, reports **Roger Northam** of Cobiax Technologies



The attraction of using concrete in construction is being enhanced by the latest innovative hybrid concrete products, which are more economic and easy to use than ever before. Not only are they removing critical work from site, but combined with ground-breaking void-forming techniques, they are also able to significantly reduce the weight of concrete structures.

The Learning Resource Centre at Sheffield University is one project that is benefiting from such advances in concrete technology. Here, a semi-precast concrete deck system called Cobiaxdeck is being used with great effect. Developed by Cobiax Technologies and Hanson Building Products, the system combines the long-established Hanson Omnidex product with Cobiax spherical void-forming to produce flat slab construction without beams.

It works by using hollow spherical void-formers made from recycled plastic to remove the non-working dead load of the flat slabs while maintaining their two-way spanning capabilities. Cobiaxdeck is supplied to site as precast reinforced panels measuring up to 2.4 x 9 m with the hollow spheres trapped in steel cages cast into the concrete panels. The absence of beams reduces

construction costs and the cost of services installation, as well as offering exposed concrete surfaces that enhance efficient thermal transfer, and providing for future flexibility. On top of this, the overall height of the building is significantly reduced compared with beam systems and so cladding costs can be minimised.

Architect RMJM and engineer Whitbybird designed the centre with exposed concrete soffits and slender circular columns. In the panel layout, RMJM patterned the ceiling to suit lighting and room layouts. Concrete frame contractor Stephenson Construction Services estimates that even with these layouts, the Cobiaxdeck system offered a 20% time saving over traditional methods. Other projects in the UK and Europe have achieved time savings of up to 40%.

The exposure of the soffits of



factory-finished Cobiaxdeck helps to fully realise the thermal mass benefits of concrete construction and so reduce the operational carbon dioxide emissions of the building. This is achieved passively through the use of winter solar gain and summer night cooling, and actively through fluid circulation. The system is so successful that concrete structures that have been built with Cobiax void-forming and fluid circulation in Switzerland and Germany have achieved a 66% reduction in energy needed for heating and cooling.

When the Cobiaxdeck system is used with twin-wall, another semi-precast product, the result is a further reduction in build time as a result of shorter curing periods and the need for less falsework. This combination was recently used on projects in Cobham, Surrey, and Swindon, Wiltshire, in each case for the wall and deck of a car park under a residential development.

Twin-wall is a factory-produced wall system consisting of two precast concrete leaves connected by a lightweight lattice girder. This is made to the required shape or size and the centre of the twin-wall is filled with ready-mixed concrete on site and cast integrally with the decks. The twin-wall is fast to erect and the need for the fixing of site reinforcement and formwork is almost entirely eliminated: typically, a 25 m² twin-wall panel can be placed in 15 minutes.

Hybrid concrete construction, such as this, offers the benefits of ready-mixed and precast concrete. It provides structural integrity but much of the on-site work is replaced by just-in-time delivery. The result is a lighter structure with a higher assured finish.



top left A model showing how Sheffield University's Learning Resource Centre will look when finished
above The Cobiaxdeck system as it appears when delivered to site
left Construction under way on the Sheffield University project