

Figure 1 right: Cobiax uses hollow plastic spheres within the reinforcement of the slab, replacing the concrete where it has no structural benefit.

“Using the spheres provides a weight reduction of up to 35% compared to an equivalent solid concrete slab.”



Photos: Hanson UK

Biaxial flat slab floor construction

Figure 2 right: Hanson's Cobiax precast concrete panels are used to create large spans without the need for supporting beams and columns.



Use of concrete flat slab construction has increased in the UK in recent years, but construction has been primarily an in-situ operation requiring extensive formwork, skilled labour and specialist equipment. Its use has also been limited by the fact that the flat slab becomes less efficient with spans greater than 6m.

ROGER NORTHAM, HANSON UK

Figures 3 and 4 right and overleaf: Using Hanson's Cobiax system, the whole frame for the new Tesco Stores development in Orpington went up in just 40 weeks – almost twice as fast as solid slabs.



When Pinnacle Consulting Engineers, on behalf of Tesco Stores, wanted to create a 16m x 12m grid for an underground car park at its new development in Orpington, post-tensioned concrete would traditionally have been the method of choice – but not any more.

The Tesco development is a joint venture with contractor Stephenson Shell & Core and the building work is being carried out by BAM Construction. The architect is Michael Aukett Architects.

The mixed-use site includes three floors of underground parking, two floors of retail space and five floors of housing. In total, the development includes 11,300m² of sales and storage space, 900 car parking spaces totalling 26,700m² and 7500m² of residential space. It is one of the first in the UK to benefit from the use of Hanson's Cobiax precast concrete panels.

Manufactured by the floors and precast division, Cobiax

combines the advantages of Omnia lattice girder slabs with hollow spheres to allow fast and cost-effective biaxial flat slab floor construction in spans of up to 20m.

The system removes the non-working, dead load in concrete slabs – while maintaining biaxial strength – by placing hollow plastic spheres within the reinforcement of the slab, replacing the concrete where it has no structural benefit.

The spheres, which are made from recycled beer crates, are held in place with modular, lightweight steel cages for ease of installation. Using them provides a weight reduction of up to 35% compared to an equivalent solid concrete slab that, in the case of the Tesco development, helped cut £50,000 off the cost of the foundations.

As the Cobiast system is biaxial, no supporting beams are required and columns can be placed further apart, creating wide, open spaces and maximising the amount of usable space.

The Tesco development in Orpington is right in the middle of the High Street so the fact that much of the work in producing the Cobiast system is carried out off-site was an added bonus. Not only does the factory-controlled environment ensure quality but it also allowed for just-in-time delivery. In fact the whole frame for the development went up in just 40 weeks – almost twice as fast as solid slabs and with much less disruption.

Another benefit is that the absence of beams reduces the overall depth of the floor zone of the building and simplifies installation of services such as electrics and cabling, while the quality of the factory-produced soffit finish is so true and flat that it does not need to be painted.

This void-forming technology, together with the absence of beams and reduction in the number of columns, reduced the amount of concrete needed at the site by



3850m³. This effectively reduced the CO₂ emissions produced in the manufacturing process by 800 tonnes.

In addition, Cobiast offers a substantial reduction of CO₂ during the life-cycle of the building as its strong thermal mass performance provides whole-life savings on heating and cooling.

As well as the Cobiast system, Hanson's Thermalite aircrete blocks are being used to construct the walling system of the development and the company is supplying the 17,000m³ of ready-mixed concrete that will be used in construction.

Thermalite offers high compressive strength, lightness for handling, high thermal insulation, and fire and moisture resistance. It is also one of the most environmentally friendly aircrete products available in the UK as it is made from 80% fly ash, a sustainable product. ■

Speaking up for precast concrete frames

The UK precast concrete industry produces over 35 million tonnes of products annually for the construction sector, worth an estimated £2 billion.

ROY NIELD-DUMPER, COMPOSITE

Precast concrete has many well-known attributes: it is strong, durable and versatile; its off-site manufacture means it can offer significant cost savings, both in terms of initial construction costs and accelerated programmes; and it requires low levels of lifetime maintenance. In fact, the British Precast Concrete Federation, in its *Little Book of Concrete*⁽¹⁾, lists no fewer than 100 benefits, beginning with its weatherproof quality and ending with the peace of mind brought about by its long-standing, proven technology.

In a later publication, the *Little Green Book of Concrete*⁽²⁾, the federation outlines how today's precast industry is becoming more resource efficient and environmentally aware with the adoption of new, green technologies and sustainable building initiatives.

Some of those at whom these publications are aimed – particularly architects, quantity surveyors and engineers – may be surprised at just how much precast concrete has going for it. Perhaps it is this lack of awareness that helps

(Photos: Composite Ltd.)



Figure 1: Frame construction during Phase 1 at Chessington Community College.

“We need, individually, to shout more loudly about how precast compares with, and often outclasses, the alternatives.”