



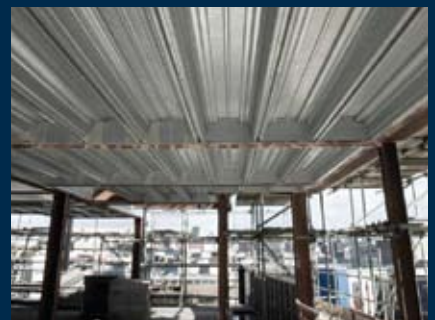
CORUS



Corus ComFlor® 225 Case Study

Zero 4 Development Project, Plymouth

A switch from a concrete frame to steel construction with advanced composite floor decking has been a major factor in the success of a complex city centre residential project. Downsizing at the Royal Navy's Devonport dockyard after the end of the Cold War hit the economy of Plymouth hard. Over the last few years, however, significant regeneration has begun, new employers have moved into the area, and the need for housing has increased.



Project details

Client:	Prestige Homes
Architect:	SMC Penrose Architects
Structural engineer:	Airey & Coles
Steel fabricator:	Siac Tetbury Steel
Comflor® product:	ComFlor® 225

Corus Technical Hotline: 0845 30 88 330



Like all Corus steel decking profiles, ComFlor® 225 has a sophisticated trapezoidal design which ensures maximum composite action between the steel and concrete infill, reducing the volume of concrete needed as well as the depth of the slab.

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In line with recent thinking on successfully revitalising a rundown city, much of this new residential development will be in the city centre and one such project, the Zero 4 Development Project is a prime example of modern day approaches to the regeneration and revitalisation of our cities.

Concrete was the first choice for the structural frame. The footprint was angular with the complex consisting of one nine storey and one ten storey block. The original concept of property developer, Prestige Homes, was for identical luxury flats throughout.

Changes in the local housing market led to an early rethink, the result of which was a switch to a mix of units, from one bedroom studio flats up to three bedroom duplex apartments on the upper floor. Imposing this layout onto a complex structural grid with tapering bays would have been a nightmare if structural engineer Airey and Coles had stuck with concrete for the frame. Fortunately, through previous experience with the Corus Slimdek® composite floor system, Airey and Coles were soon able to convince Prestige Homes that steel was a much better solution.

Two key components are at the heart of the Slimdek® system. Asymmetric Steel Beams (ASB) have lower flanges significantly wider than the top flange. These lower flanges support a thin steel profile deck that acts as both permanent shutter and tensile reinforcement to the completed floor. On the Zero 4 Development Project, Corus supplied the ComFlor® 225 profile, which can be used for slabs up to 400mm deep and clear unpropped spans of up to 6m.

Like all Corus steel decking profiles, ComFlor® 225 has a sophisticated trapezoidal design which ensures maximum composite action between the steel and concrete infill, reducing the volume of concrete needed as well as the depth of the slab. Through significant savings in overall structural weight, a meaningful project cost saving is evident. And with the main floor beams within the depth of the floor, overall floor to floor height is reduced, and services installation below the flat soffit is very straightforward.

Other benefits for the project, especially on a congested city centre commercial

development, proved to be speed of erection and minimal need for onsite storage. Every delivery of structural components comes in erectable packages, timed to avoid peak congestion periods. The Slimdek® system has an excellent fire performance capability, achieving a 60 minute fire resistance without any extra protection to the slab soffit.

Conveniently, most sections of the Zero 4 Development Project had spans of 6m, although in a few locations the complex grid stretched the span to 6.7m. Floor depth was 320mm, main floor beams were 280mm deep ASBs. Around the floor perimeter and the entrance hall the edge beams are formed from torsionally stiffer 250mm x 150mm RHS with shelf angles welded on. Some 400t of ASBs were needed, along with around 10,000m² of ComFlor® 225.

Traditional composite floors use steel mesh to control plastic cracking in the newly poured concrete. This has to be carefully positioned close to the upper surface prior to the pour, an inevitably time-consuming operation. The delay was eliminated by selecting a Fibreflor concrete mix, in which a combination of plastic and steel fibres provides '3-dimensional' reinforcement that does away with the need for crack control mesh. Concrete pumps were used to pour the floors, another contribution to speed of erection.

In all, Prestige Homes estimates that around 12 weeks has been slashed from the construction programme by going for the steel alternative. This has major implications for the developer's investment programme. Final completion is now scheduled for mid 2008.