Daisy Spring Works, Sheffield.

Modular balcony connectors aid efficiency

Using thermal breaks in concrete structures can deliver healthier, more energy-efficient environments says Paul Evans of Ancon Building Products.

At locations such as balconies where a concrete slab passes through the insulated building envelope, a thermal bridge is created which can cause considerable heat loss. Besides poor thermal performance, traditional monolithic concrete construction can also cause other detrimental side-effects including condensation and mould growth, which can ultimately lead to health problems in the building's occupants. Such defects were common in multi-storey dwellings of the 1960s and even later, and are extremely difficult and costly to remedy.

Fortunately in today's industry, the health and well being of residents and the energy efficiency of the structure are both key considerations in building design. Thermal breaks at balcony locations are now commonplace.

Modular balcony connectors

The effects of thermal bridging are minimised simply and effectively by the inclusion of modular insulated balcony connectors that form a continuous thermal break along the interface between a concrete balcony and internal concrete slab.

These connectors are normally supplied in short lengths to facilitate transportation and handling, then connected end-to-end on-site. Systems comprise rigid thermal insulation, corrosion-protected shear reinforcement (usually stainless steel) and provision for tension and compression reinforcement. They allow for the transfer of both moment and shear, back to the main internal concrete slab.

Ancon Isolan case study

Isolan balcony connectors from Ancon Building Products are shown in the photographs above, installed on the attractive, seven-storey Daisy Spring Works development in Sheffield. The Isolan system provided UKR frame contractors with a cost-effective solution to the problem of thermal bridging.

A patented concept, the system uses polypropylene inserts located at intervals within the insulating material to allow for the insertion of standard grade 500 reinforcing bars to provide tension and compression reinforcement. These bars are protected from corrosion by the concrete fines, which fill the tubes at the time of casting. By using conventional reinforcement, the Isolan system can provide cost savings over other systems and simplify installation.

Isolan units comprise CFC-free Styropor insulation and 1.4462 duplex stainless steel shear reinforcement, and are available in five heights to suit a concrete depth from 160mm to 240mm. Greater slab depths can be accommodated by adding further rigid insulation inserts.

Various system configurations are available for cantilevered as well as simply supported balconies. The system can also be used in some precast applications. Standard Isolan systems are specified from simple

> **The effects of thermal bridging are minimised by the inclusion of modular insulated balcony connectors that form a continuous thermal break along the interface between a concrete balcony and internal concrete slab.**

Construction of the building with (inset) close-up of the reinforcement bar.

Modular balcony connectors are a simple and effective solution to the problem of thermal bridging at balcony locations in concrete frames.

Right: Ancon Isolan MV system.

performance graphs based on slab depth, bending moment and shear capacity. The lightweight nature of the system makes it easy to lift and assemble on site. The typical thermal U-value of Isolan is 0.3W/m^{2}K and fire protection of up to 90 minutes can be provided by adding Duripanel strips to the top and base of the elements.

The Daisy Spring Works project uses a standard Isolan MV system for the transfer of moment and shear forces in the cantilevered balconies. However, Isolan components can be individually adapted to suit specific applications. The stainless steel reinforcement can be supplied in a range of diameters and bent into other required shapes to cater for stepped balconies. The number of tubes can also be modified to increase or decrease the amount of reinforcement through the system.

Standard components are held in stock, enabling the company to respond quickly to orders. Standard units for a first pour are usually available within five working days; a quick turnaround is becoming increasingly important due to the fast-track nature of contemporary building projects.

Simple, effective solution

Modular balcony connectors are a simple and effective solution to the problem of thermal bridging at balcony locations in concrete frames. Their use in the UK continues to increase with the growing popularity of balconies on city-centre apartments and the demand for more energy-efficient and healthy-living environments. It is important that the systems proposed and supplied by manufacturers are cost-effective, provide flexibility in design and offer quick, accurate installation on-site. ●