



## FLAT PACK ROOM SPEEDS UP HOTEL CONSTRUCTION

The 311-room Arora International Hotel, Gatwick under construction by contractors A. McAlpine Special Projects Ltd, consists of two bedroom blocks, one of five storeys and the second three storeys off a podium and are joined by a glazed atrium. To form the two bedroom blocks, the contractors opted for a modified version of the factory-engineered concrete flat pack room method of construction from Bell & Webster Concrete Ltd.

The external leaf, with cast-in window aperture, has been extended to span two rooms rather than the usual one. With the increased sizes, some of the precast units weigh more than ten tonnes.

With time of the essence, the method provides rooms much more quickly than traditional build and also enables the service trades to move in directly behind the erectors to install the main service

elements. External cladding is also able to progress, just days behind the room erectors. In this case, the erection time for the two precast blocks is just 12 weeks, a fraction short of 26 rooms per week.

*Contractor:*

A. McAlpine Special Projects Ltd

*Precaster:*

Bell & Webster Concrete Ltd

*Photographs courtesy of Building Trade & Industry*



# PRECAST CONCRETE – THE ANSWER TO PART E?

*Dr Jacqueline Glass, BA(Hons), DipArch, DipBRS, PhD, CertHE of the Oxford Centre for Sustainable Development (Technology), and Mike Downing, BSc, chairman of the Structural Precast Association discuss how precast concrete will fare under the proposed amendments to Part E*

Said to be ‘quite controversial’, the proposed changes to Part E of the Building Regulations *Resistance to the passage of sound* are set to impact significantly on detail design, mainly in the residential market, but there may well be a ripple effect on the broader commercial and industrial sectors.

Behind the development of the consultation package for Part E is DETR’s clear intention to create quieter, more robust buildings – an issue central to the sustainability agenda. Growing public concerns about sound pollution and ‘noisy neighbours’ have encouraged the Building Regulations Division to overhaul Part E. Almost 5 million people in the UK are ‘bothered by noise’ and 10,000 people a year suffer ill health as a result of noise disturbances. Furthermore, BRE estimates that up to 40% of new homes do not satisfy the current regime.

The new Part E clears up the confusion about whether buildings should, like hostels, be subject to the regulations by stating that it will apply to *all* dwellings including multi-occupancy buildings, i.e. hostels and student residences. In addition, the present exemption for schools from compliance with the Regulation is to be ended if the proposal is accepted. This means that new schools would also require higher standards of sound insulation between classrooms and against external noise. Hospitals and prisons may also be embraced by the regulations and discussions between interested parties to establish the appropriateness of higher

sound insulation standards are proposed.

The first major change to Part E is the general requirement to improve sound insulation between dwellings. A uniform performance standard for airborne sound insulation for new build separating walls and floors of 52 dB has been suggested, with a minimum of 45 dB. However, this is not the end of the matter, as the consultation package upgrades the Part E regulations to current EC provision. This means the calculation method for airborne sound transmission will now have an additional factor to take low-frequency sounds properly into account. It seems that low-frequency sounds such as traffic and music are among the most irritating and the DETR insists this must be addressed. In effect, this improvement will militate against lightweight structures and the performance advantage will lie with heavier materials such as concrete (much more able to dissipate low-frequency sound). BRE has stated that a minimum mass of 120kg/m<sup>2</sup> will be needed for loadbearing walls in flats. Precast concrete has the further advantage of fewer joints, i.e. gaps per unit area, than lightweight forms of construction.



The DETR remains concerned that compliance will be an issue, particularly for lightweight frame construction, which is highly vulnerable to gaps through poor workmanship and detailing. It has therefore proposed more stringent testing regimes to check compliance with the sound insulation requirement between dwellings.

The second key aspect of the DETR proposal is to improve sound insulation and privacy between rooms within the same dwelling. Approved floor constructions ‘deemed to satisfy’ include precast beam-and-block floors (220kg/m<sup>2</sup>) and precast hollowcore floor units (180kg/m<sup>2</sup>). Concrete blocks are also approved for internal walls. The DETR’s own estimates of the likely cost impact of the amendments range from £24 million to £240 million, with £75 million most likely. Over

50% of this arises from the requirement to satisfy E1 (reduction of sound between adjoining dwellings), with the requirement for E2 (for rooms in the same dwelling) accounting for about 40%.

As yet, Part E covers only housing and residential buildings. In the future, it is likely that the Building Regulations and performance standards such as those espoused by the British Council for Offices will influence wider building construction. Including sound insulation standards for external walls and target internal noise levels in the Part E amendments (and its enforcement responsibility being transferred to building control officers) does rather open the door for a wider consideration of the external sound and thermal performance of UK buildings.

Therefore, we could well see a growth in the use of concrete or other high-performance materials for walls, facades and floors.

Precast concrete components with fewer joints are likely to perform better under the new Part E than lightweight framing systems. Fewer joints mean manageably better airtightness and thus improved sound insulation and therefore timber and steel frames will be a high risk option for



designers. Factory-engineered precast concrete is produced under controlled conditions and so accuracy will be assured. Whether the full package or just some components are adopted, any changes will not come into force until mid-2002. Meanwhile, of course, precast concrete continues to find applications where its acoustic properties are important, as at the new multi-screen cinema complex at Leith's Ocean Terminal development (see above photograph), where 'Hardwall' cladding from Trent Concrete was selected partly for this reason.

*This is an edited version of an article published in Building Engineer March 2001*

# Rapid Erection Helps AstraZeneca in Macclesfield

*Glynn Rhodes, BSc(Hons) CEng MICE  
MIHT FConsE, Hill Cannon Partnership.*

**A**s part of its commitment to large-scale development at its Alderley Park and Macclesfield sites, AstraZeneca is erecting multi-storey car parks in place of surface car parks, so releasing land for development. The work is being carried out in an alliance with SCC Ltd and Hill Cannon Partnership, who recommended precast concrete, largely because of its fast construction time and reduced labour demands.

Construction is by the 'Tricon' reinforced concrete framing system, developed by Hill Cannon and since refined to provide a range of standard modules for car park structures. The system offers stall lengths of 4.8–5m, widths of 2.3–2.5m and aisle widths at 6m for one-way and 6.9m for two-way flow. Frames can be at two- or three-bay centres.

Working with specialist precast concrete contractor SCC Ltd, Hill Cannon Partnership has

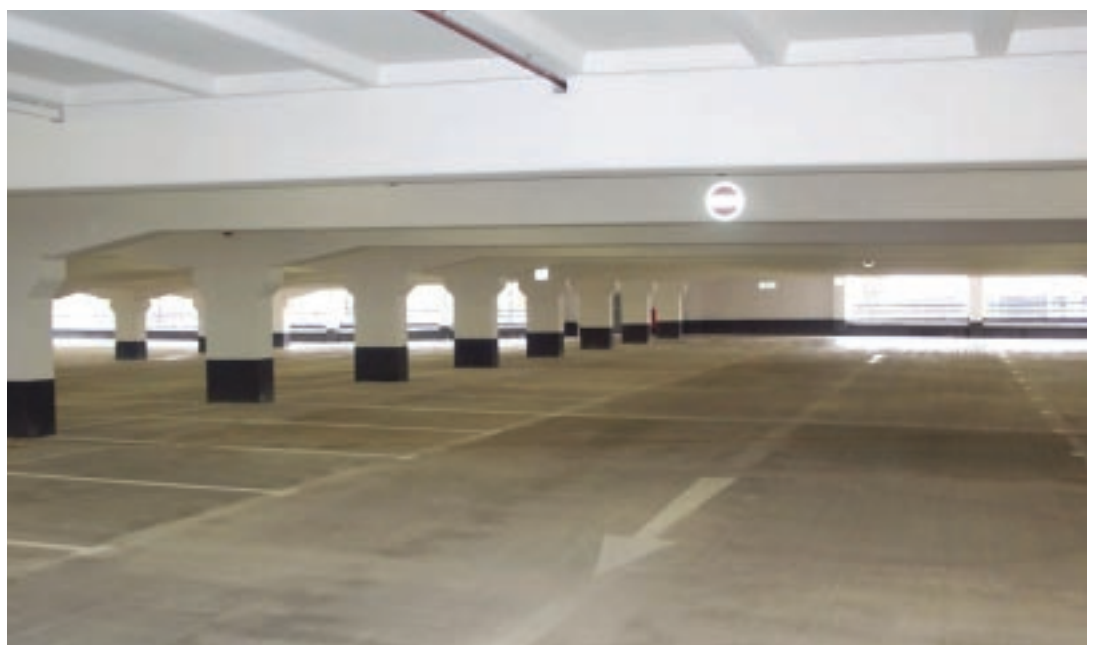
developed a precast 'Tricon' frame system. Initially a hybrid of precast and in-situ concrete, the system has evolved to offer high-quality factory-controlled finishes, with all exposed faces precast. The inherent advantages of 'Tricon' – slender structural sections that reduce storey heights, cut down material usage and give an attractive structure – are maintained, while on-site construction time is minimised.

The structure is broken down into standard components, with

upstands and parapets designed to architectural demands. To maintain portal continuity, beams are precast full length for the downstand depth and attached to columns with shear connectors. Precast slab units rest on beams, continuity being achieved by linking the beam top bars to the column and the slab projecting bars with an in-situ strip. Surface finishes can be smooth, textured, pigmented or subject to recessed patterns, and columns and edge panels can be supplied with brick finishes.

On site, the frame components are delivered to suit erection schedules and are rapidly erected by crane. Little back-propping is needed, giving early access to following trades.

*Client:*  
AstraZeneca  
*Consulting Engineers:*  
Hill Cannon Partnership  
*Main Alliance Contractor:*  
SCC Ltd  
*Architects:*  
Pulmann Associates



# STAIRS RISE TO CHALLENGE

An innovative solution to a strict design brief has recently been achieved by Hanson Concrete Products for housebuilders St James Homes on their major new development at Kew, London. The requirement was for three-storey precast concrete staircases to provide a sound-absorbing concrete version of what had previously been constructed on another site in timber. This called for a combination of L- and U-shaped stair flights in plan incorporating winders and finished with a smooth curved and winding soffit.



The apparently simple brief produced a problem that was best solved by one-piece storey-height flights. However, the detailing of the string section of the flights required considerable design analysis. Even when the computer-generated image suggested a possible solution, some of the string sections looked so slim that there were concerns that the flight might be too

fragile to survive demoulding and transportation.

Hanson Concrete Products decided to commission a full-scale mould of the most complicated section of the stair flight and subsequently produced a trial cast.

On seeing the sample section, the client's project engineer Derek Pickup was satisfied that the Hanson proposal would meet the specification. An order was placed for the staircases and the prestressed concrete hollowcore flooring for the upper floors in the dwellings.

The tolerances needed in both the manufacture of the staircases and the construction of the supporting structure on site called for tight co-ordination of the flooring, steelwork, blockwork and innovative staircase supports to ensure a proper fit, particularly in the crescent-shaped terraces

where none of the dividing party walls are parallel to each other.

The total development will include over 400 new homes including 104 town houses together with six blocks of apartment buildings offering the latest in luxury dwellings along the River Thames.

*Housebuilder:*

St James Homes

*Architects:*

PRP Architects

*Structural Engineers:*

Lewin Fryer & Partners

*Precaster:*

Hanson Concrete Products



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## CONVEYOR BELT PRODUCTION?



To a bespoke precaster, the very idea of conveyor belt production is unthinkable. However, to meet the challenge for yet another Ikea fast-track superstore near Glasgow, Ebor Concretes has purchased a 6m<sup>3</sup> truckmixer with its own telescopic conveyor discharger. Moulds previously only accessible by overhead crane

and skip are now continuously fed via the long reaching tangential arm of the 'Theam' conveyor system. Not only has the pour time been reduced significantly, it has also released the overhead crane for its main purpose of lifting and turning completed castings.

The company is supplying some 2000m<sup>2</sup> of two-hour

firewall to suit 8m and 10m bay widths, 10m high. The panels are manufactured in dense C40 grade concrete with tongue-and-groove mortar joints and supported by pre-encased steel columns with concealed fixing brackets.

To complete the package Ebor is also supplying its dock leveller pit and wall system.