The Steel Construction Institute

Modular supplier, Rollalong, team up with architects, The Design Büro and Ayrshire Framing to construct a 7-storey modular building on a steel framed podium for use as a 'mixed' student residence, key worker accommodation and retail premises.

World's Largest Modular/Steel Framed Building in Manchester

Modular and Composite Construction

The modular suppliers worked closely with their architects to offer a 'mixed' steel solution which was completed in a narrow 'window' from February to September 2002.

A total of 1,425 modules in light steel framing were installed over a four month period on the Wilmslow Park site of Manchester University to create the largest modular building in the UK and probably in the world. The 7-storey modular building was constructed on a steel-composite 'podium' structure at first floor, which housed retail premises and a car park below ground.

The super-structure above podium level was originally conceived in timber framing, but was later replaced by a modular steel solution.

The modular suppliers, Rollalong, worked closely with their architects, The Design Büro, to offer a design which could be completed in a narrow 'window' from February to September 2002, in time for the new intake of students. This speed of manufacture and installation would not have been possible in any other form of construction.

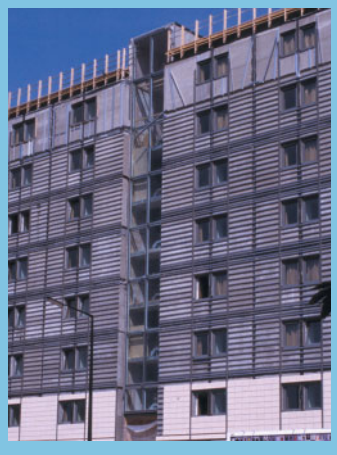
The Design Büro already had experience of the *Ayrframe* system used for manufacture of the modules on the nearby Royal Northern College of Music, and produced all the working drawings for manufacture and interfacing with other components.

Rollalong commissioned a purpose-made factory in nearby Wythenshawe and in a few months was able to set up a sophisticated ten-line production of modules over an eight-day cycle of boarding, servicing and fit-out before delivery to site.

The modules formed 945 study bedrooms, and communal areas used pairs of open-sided modules to create larger spaces. A strict quality assurance 'passport' and locked door policy ensured that the modules were checked before installation and were immediately fit for use.

The 'mixed' residential-commercial development also incorporates retail outlets, a health club, 130 key worker apartments (for rent) and six rooms for people with disabilities. The retail and car park levels were designed using a primary steel frame to a column grid based on pairs of modules on the upper floors.

The same team is working on other schemes involving a range of steel and modular technologies for the urban residential sector.



Modules in place before installation of façade

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Technical details

Application benefits

- Required construction (60% time saving relative to site-intensive construction)
- High quality manufacture (locked modules until handover)
- Podium structure in composite construction
- Dimensional accuracy
- Reduced site infrastructure
- Reduced waste creation
- High level of safety in installation

Project data

Client
OPAL for University of Manchester

Architect (for client)
Ogden Associates

Contractor
Watkins Jones Construction

Consulting Engineer
Veryards Ltd

Modular Supplier
Rollalong using modular units by Ayrshire Steel Framing

Architect for Modular Supplier
The Design Büro

Modular Consulting Engineers
Peter Dann Ltd

Modules being lifted into place (using man-basket)

Construction details

The modules use the *Ayrframe* system, which comprises a grillage of C and top hat sections to create an extremely stiff structure with narrow walls. The modules were designed as self-supporting over seven storeys. Manufacture permitted variations in the façade arrangement, and corridors were also integrated into the modules. Standard modules of widths from 2.4 m and 3.6 m were arranged in three, four and five bedroom clusters around kitchens and communal areas, which were also manufactured as modules. Corridors in-built within the modules reduced the site work and achieved weather-tightness during construction. An integrated modular stair and lift shaft was also an important innovation for this project.

The podium structure on which the modules were placed consists of long span I beams acting together with a composite slab on steel decking. The light weight of the modules was important in order to economise in the design of the podium structure. The 175 mm deep composite slab supports the loads from the module walls where they do not align directly with the beams below.

The installation procedure for the modules used a 'man basket' system which was approved by HSE as being the safest method for working at height. A peak installation rate of 28 modules a day was achieved by the 9 man team over the 4 months of the production and installation period on site. Manufacture through-put averaged 10 modules per day on an 8-day production cycle in Rollalong's purpose-made factory nearby. This is the first example in the UK of such a facility set up for one project.

The 'rain-screen' cladding system was selected in order to achieve the rapid-build programme. It generally consisted of terracotta tiles on a sub-structure fixed through the cement particle board facia and back to the modules. On the courtyard area, an aluminium rainscreen cladding was used.

Ayrframe modules in Rollalong's factory

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