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Library Extension, University of Bath, Claverton Down, Bath

Owners: The University of Bath

Architect: Alec French Partnership

Structural Engineer: Oscar Faber

Steelwork Contractor: Tubemasters Ltd

Main Contractor: Balfour Beatty Construction Ltd

The University of Bath required an extension to its existing library building which clearly demonstrated its potential as a "24-hour study centre" and which doubled its capacity to 1200 students.

The brief stressed the need for the extension to enhance its external setting - the library's location is central to the University's raised pedestrian spine and dominated by lacklustre 1960s CLASP system architecture. The client wanted the building to act as a glazed "shop window" for the library and computer facilities, which would 'shine like a beacon' throughout the day and night and reflect the University's forward-thinking ethos.

The original design brief included a major upgrade of the existing building, its services and environment, and developed during the construction process to include additional refurbishment and remedial work on the library. The total spend was £4.5m, of which £2m was spent on the extension.

From the beginning of the project, the structural engineering input was key to its development, determining the form and visual characteristics of the building, and also the construction methods by which it was built in what is the middle of a busy and restricted campus. This close cooperation between the structural engineering and architectural teams contributed greatly to the project's success.

The building's form and structure was based on the required additional floor and the nature of the existing structure, with the new work extended the existing CLASP

building by 25%. The new exposed steel structure springs directly off existing foundations and columns, which support the external concourse above a service roadway. A row of six new steel cruciform column masts support cantilevered steel beams which radiate out in a carefully controlled manner. The floor system was developed to minimise the span of the floor elements and edge beams, therefore reducing thickness and weight.

The main steel structure is made almost entirely from fabricated and welded flat steel plates. The columns are cruciform in section and the beams are triangular tapered box sections for stability and elegance.



As existing foundations were being used, the lightness of the overall building mass was critical - but even so, each base load was increased by 200 tonnes. The existing roadway columns therefore needed a little strengthening to increase their capacity, work which was critical in keeping the road access below open.

A thin segmental exposed precast concrete system was developed for the floors, with a concrete topping which tied the fabricated steel beams together. The steel frame was erected in a phased manner in sequence with the concrete floor segments, with the new steel frame supporting all the vertical loads and lateral stability



provided by the upgraded existing bracing system.

The new elevation faces due south, which meant careful attention had to be given to control solar gain, high daylight factors and potential problems with glare on computer screens. The building section contributes significantly to shading at the lowest two levels, and extensive use of sun shading protects the upper floors. Screen printed glass was used to control daylight and give a satisfactory internal working environment. Internal light shelves reflect natural light deeper into the library area, thus helping reduce the need for supplementary artificial lighting

The internal environment is controlled by a displacement air ventilation system with chilling facility and thermal wheels. Infra-red controlled lighting also helps to save energy.

The extension is now widely used throughout the day and night and has successfully created the strong focus that the client set out to achieve.



An elegant conceptual solution has been worked out with technical innovation and flair. The considerable contribution made by this extension to the library facilities is out of proportion to its modest size. So also is the much needed enhancement to the central University concourse.