

Mansion on Bourke

SERVICED APARTMENTS

Mansion on Bourke

Mansion on Bourke is a 63 unit apartment complex in Melbourne's central business district at 151-163 Bourke Street.

Located toward the Eastern end of Bourke Street, Mansion on Bourke faces North and enjoys views along the street that is the heart of commercial Melbourne.

Some of Melbourne's finest attractions are located within walking distance of the development.

Operating as serviced apartments, a trend which began in the United States, the complex is designed with the business traveler in mind.

They offer luxurious accommodation for executives who find themselves on extended stays in cities away from home.

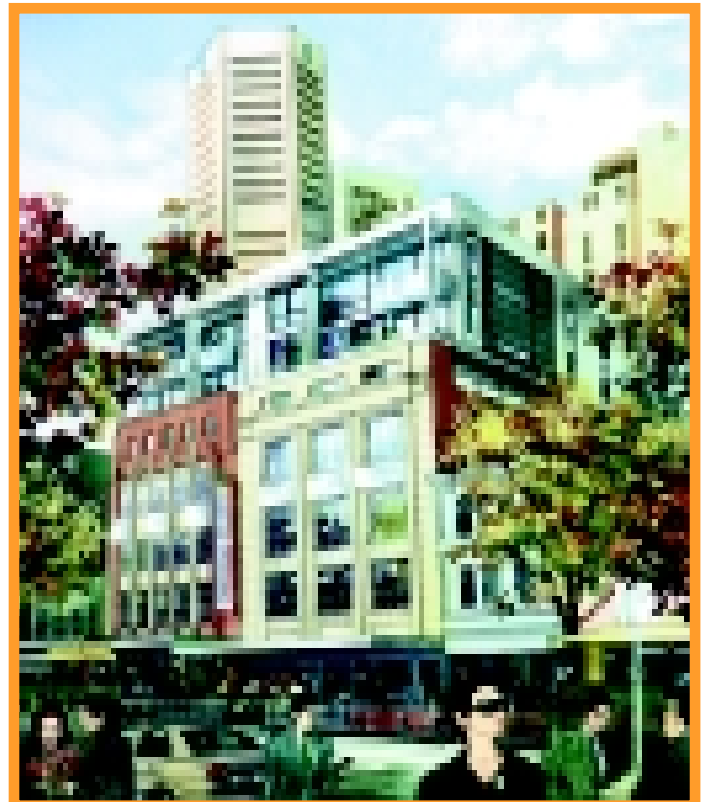
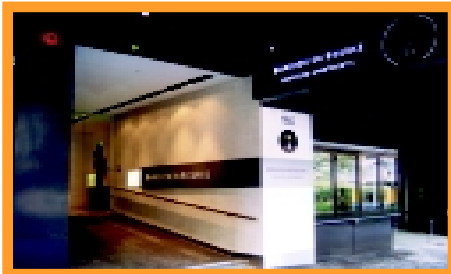
Multiple rooms provide more space and freedom than a hotel, but daily servicing offers the same level of comfort.



The serviced apartment sector of the accommodation market is growing rapidly. Melbourne's CBD is expected to have more than 2,600 serviced apartments by the year 2000 (*The Age, March 18, 1998*).

Buyers have the option of including servicing in their rental deal to clients or renting the apartment as a self-contained unit.

As part of the Mansion Hotels Group, Mansion on Bourke incorporates conference rooms, a gymnasium, two shops and a restaurant and is designed to be an all inclusive accommodation option for executives.



Introduction

This case study examines Mansion on Bourke as an example of an innovative use of the Multi Residential Timber Frame Construction (MRTFC) system in a challenging project.

The Site

The ex-retail building that was to become Mansion on Bourke, consisted of an existing four storey structure built with concrete, timber and steel.

Three new levels were added using the MRTFC system.

Being bordered by other buildings on three sides with weekend-only access for cranes from the fourth side, supplying building materials to the roof for the additional three floors would be a challenge.

Timber presented itself as the logical choice. Its relative light weight and small section sizes meant that it was ideal for this project as the material could be 'carried' in as required, without the need for difficult cranae.

The MRTFC system was then incorporated in the design of the apartments, enabling the speed and ease of use of timber, whilst still meeting the acoustic requirements necessary for this type of building.



Building Design

Designed by Reed HLS Architects in association with Barry Gale Engineers, the Class 2 MRTFC complex (sole-occupancy, self-contained, separate ownership units) was built using timber framing to achieve the sound and fire ratings required by the Building Code of Australia.

Timber was chosen as the ideal building material due to access and design considerations, but was also the most cost competitive.

The project designers considered three options for the building extensions;

1. timber construction
2. combined timber and steel and
3. concrete.

Concrete was excluded due to the load capacity limitations of the existing footings.

Of the timber framed and timber and steel combined options, timber construction proved to be slightly cheaper.

Some steel sections were used in the building, however. Steel columns (90x90mm hollow sections) were used in some wall construction, particularly on the inside of the Bourke Street façade. These walls consisted of a conventional glass/steel curtain wall system.

The completed building is around 95% timber framed (with concrete lift and stair wells).



Performance Based Design

Multi-residential timber framed construction (MRTFC) was introduced to Australia via Amendment N° 7 to the Building Code of Australia (BCA 90) in 1994.

This amendment allowed MRTFC to be used in Class 1 construction, Class 2 up to three storeys (or four storeys over a lower level of car parking constructed of masonry or concrete) and a maximum of two storeys for Class 3 buildings.

However, as a result of the release of the new performance based Building Code of Australia in 1996 (BCA 96) the possibilities for MRTFC developments may now be expanded in various ways, such as increasing the number of storeys or simply varying the methods of construction, provided the appropriate levels of life safety are maintained*.

The designers of Mansion on Bourke consulted Peter Luzinat and Partners P/L Building Surveyors from the first stage of design to ensure that some of the innovative design solutions they sought for the building would comply with BCA 96.

Structural Design

One such innovation was the approach to deflection control in the floor design.

Load bearing walls were spaced at 5-6m centres, requiring overly deep floor joists to maintain deflection control.

The final solution was to use previously non-load bearing walls (non-party walls) as support for the floor joists.

To eliminate the need to then fire-rate these walls, the floor joists were sized to satisfy strength requirements, supporting the wall in the event of a fire.

In this situation, the floor would sag excessively, but still satisfy strength and stability requirements and provide a one hour fire rating.

To achieve lateral stability, a model was used to estimate the number of walls that would be lost in a typical fire. This information was used to ensure the building could remain standing in a fire.

The calculations were then utilised to establish which walls required bracing without the need to fire rate them.

This kind of design innovation and flexibility is one of the major benefits of using timber in multi-residential construction.

Fire Rating

The one hour fire rating of internal walls was also a result of the flexibility of performance based design.

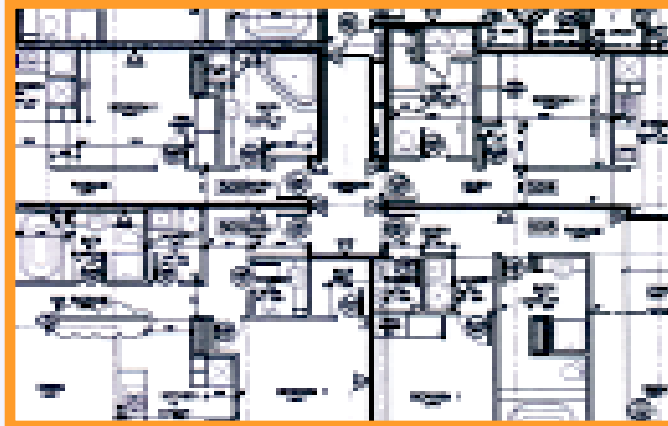
A Class 2 building of this type would ordinarily require a floor/ceiling fire rating of one and a half hours.

However, in a building of less than 25 metres in height, the BCA does not require an internal sprinkler system for a

Class 2 building. By installing one throughout the complex, a reduction in fire rating was permitted.

Additionally, all apartment doors were smoke sealed to prevent smoke entering apartments from corridors and smoke detection systems combined with early warning speaker systems in each apartment, also assisted in permitting a reduction of the fire rating necessary for the floor/ceilings and walls.

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* Refer to *Gaining Approval for MRTFC Projects Under BCA 96* [Information Bulletin #2] for further detail - see back page for availability.

Wall Construction

One of the most impressive benefits of using MRTFC is the ease with which sound transmission requirements can match and even exceed that achieved by concrete and masonry.

Load bearing walls between apartments were fire and acoustically rated.

They were constructed with a single stud timber frame of 90mm top and bottom plates and 90mm studs with one layer of 6mm fibre cement sheet and one layer of 13mm fire grade plasterboard on each side.

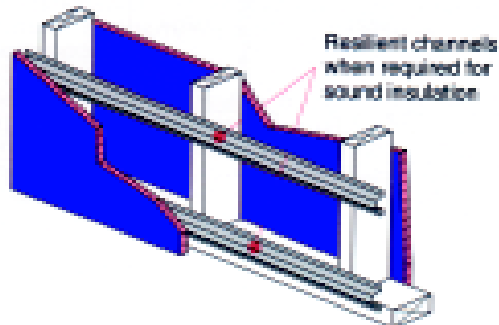
This achieved an STC of 45 and an FRL of 60/60/60.

Between service areas of apartments (e.g. bathroom abutting bedroom in the next apartment), an STC of 50+ and an FRL of 60/60/60 with impact resistance was achieved by using a staggered stud wall frame (180mm plates) with two sheets of 13mm fire grade plasterboard on each side.

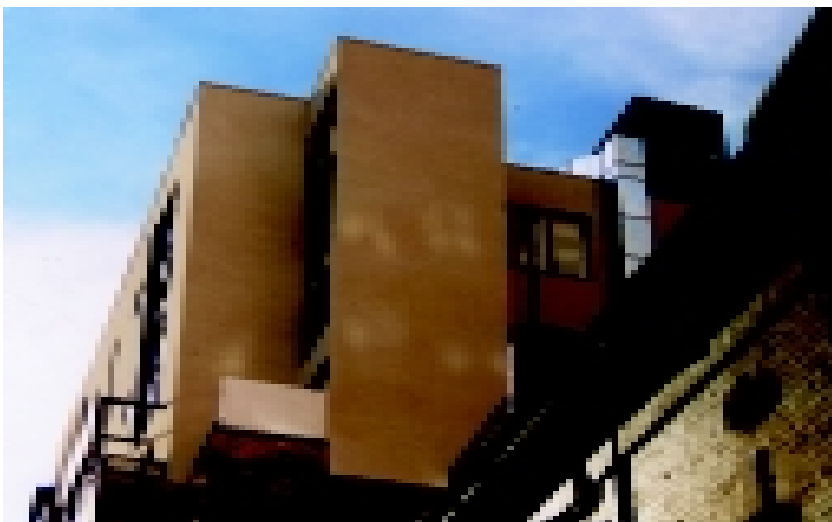
All external walls of the building are required to be fire rated to an FRL of 90/90/90.

This was achieved by using 100mm thick 'Hebel' block laid in mortar with a 50mm cavity and 90mm framed timber wall with two layers of 13mm flush jointed fire grade plasterboard on the inside and one layer of 10mm flush jointed plasterboard on all exposed surfaces.

The vapour barrier and infill consisted of 52mm polyester partition batts.



Example of a typical single stud MRTFC wall detail



Conclusion

As a relatively new method of construction in Australia, MRTFC is rapidly gaining widespread acceptance and being incorporated into increasingly varied structures right around the country.

As with all such systems, evolution and development results from increasing use and the performance based BCA 96 is allowing new and innovative design solutions to be incorporated into MRTFC projects.

Mansion on Bourke benefited from the use of MRTFC through;

- The use of timber;
 - It's light weight made it the only real option when existing building footings were to be considered
 - It was cheaper when compared to combined timber and steel construction and concrete construction
 - Restricted access to the building leant itself to a timber frame's ability to be constructed on site and the portability of the components
- The design flexibility offered by the MRTFC system and the performance based BCA 96 enabling creative solutions that saved time and money during construction and still meeting all of the fire and sound requirements.

In combination, timber and Multi Residential Timber Framed Construction enabled the developers of Mansion on Bourke to construct a luxury apartment complex on a difficult site with cost and time savings and still satisfy or exceed the requirements of building codes and regulations.

MRTFC SUPPORT MATERIAL

Available from your State and National timber associations is a comprehensive suite of manuals that detail timber wall and floor/ceiling construction systems for MRTFC buildings. Produced by the Australian timber industry, these manuals provide a complete guide for designers, local authorities and builders on MRTFC construction to comply with the Building Code of Australia.



Since the introduction of MRTFC into the BCA in 1994, the system has been in a constant state of development as materials have changed and improved and different construction methods have been developed. Industry has produced data sheets to reflect the development of alternative joint details as well as a guide to approval of projects under the performance based BCA 96. Additional data sheets are currently in production.

A 21 minute video has been produced by the National Timber Development Council to promote the use of MRTFC. The video comprises two parts; PART A - *Introduction to MRTFC* outlines the benefits and applications of the system featuring completed projects and interviews with engineers and builders about their experiences with MRTFC. PART B - *Building with MRTFC* looks at the detail - discussing some of the more technical aspects of the MRTFC building system.



And as part of the continuing effort by timber industry associations to provide timber users with the most up to date information, an MRTFC newsletter is being produced quarterly to report on developments of the system. In addition, several other case studies have been produced to showcase some of the projects that have already been constructed using MRTFC technology, including; Couran Cove Resort (Qld), Kensington Banks (Vic), Wickham Terrace (NSW) and Lutwyche (Qld).

For further information on MRTFC, contact:

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