

Location: 151-163 Bourke Street, Melbourne, Victoria

Developers: Deal Corporation Pty Ltd

Architect: Reed-HLS Architects

Engineer:

Structural: Richard Eckhouse & Partner Pty Ltd

Service: Meinhardt (Vic) Pty Ltd

Builder: Hamilton and Marino Pty Ltd

Construction Date: 1999



written by: Susan Ferguson | with: Greg Nolan | design: Peter Walker



Mansion on Bourke

Central Melbourne - Victoria

Like the U.S. and Europe, Australian cities are showing buoyant trends in the serviced apartments market and a culture for building a range of short and long-term accommodation for the business traveller. Mansion on Bourke is an example of this and is the "first 5 star serviced apartment building in Melbourne". As a development concept, the serviced apartments offer 63 leased hotel style, extended stay corporate apartments, complemented with ground floor retail space, gym and conference facilities.

The scheme adopted for the development retains two existing masonry four storey buildings on Bourke Street, in the heart of Melbourne's theatre district and provides an additional three storeys of Multi Residential Timber Framed Construction (MRTFC) apartments above.

The apartment floors comprise a range of one to three bedroom apartments, gathered around a new central lift and stair core. Between 4-6 apartments occupy the north facing Bourke Street elevation. The remainder face south to existing light wells or east, to views toward Parliament House.

top right perspective of the development

main image the facade to Bourke street photo: courtesy of the architects

• **Architects' Statement** - Deal Corporation Pty Ltd, an established client, approached Reed HLS Architects to investigate the development of 151-163 Bourke Street as a 5 star serviced apartment complex with associated retail and restaurant facilities.

Whilst Deal Corporation were negotiating to purchase the building, we developed a scheme of ground floor retail, serviced apartment foyer and restaurant together with sixty- three serviced apartments. This scheme involved the retention of the buildings and the addition of three new floors.

An alternative scheme was developed which demolished the existing buildings and created some 100 serviced apartments in a new ten storey building.

After exhaustive analysis it was decided to proceed with the scheme as we now see it. The structural system adopted comprised of three levels of Multi-storey Residential Timber Framed Construction surmounting the existing four storey building.

The system did not fall within the permitted options under the prescriptive requirements of the Building Code of Australia (BCA) 1996. A fire engineering analysis was therefore undertaken based on a package of enhanced fire safety measures including:

- Fire sprinkler protection throughout to AS 2118.1
- 60 minute fire resistance level construction for all primary structural elements.
- A combination of residential smoke alarms within apartments and commercial smoke detectors within public areas on apartment levels, the latter connected to a building occupant warning system.
- Smoke seals and self-closing devices to apartment entry doors.

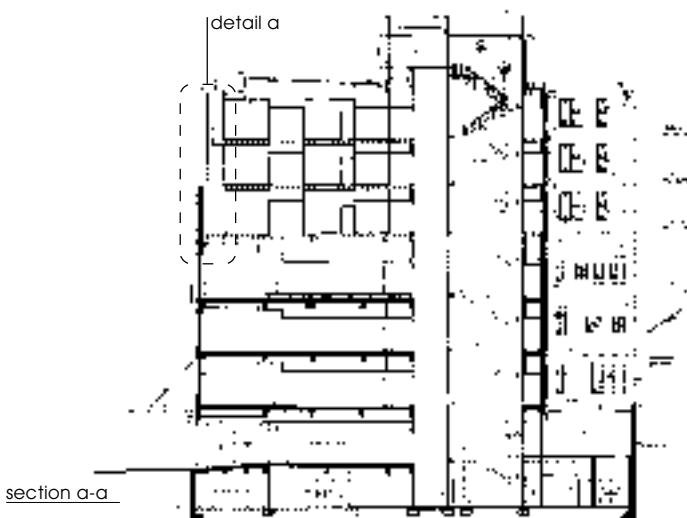
The proposals were accepted by the approving authority as an alternate solution under the performance provisions of BCA 96. The project was very successful (all the apartments were sold before construction was complete). Two buildings with important facades have been retained.



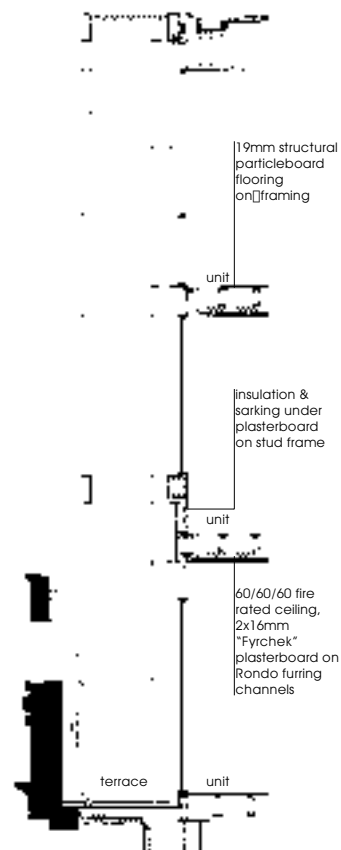
north elevation



plan (sixth floor)



section a-a



detail a

top right
Bourke street elevation
above
detail a
top left
plan (sixth floor)
bottom left
section a-a

• **Structural Description** - One of the keys to retaining the two original buildings in this project was the need to limit the weight of any new construction as the structure and foundations of existing buildings generally have limited additional load carrying capacity. The MRTFC system helped to achieve this by providing a lightweight timber option for the three-storey addition. It also offered considerable cost savings as it used skills well known to the residential and commercial building trades and eliminated the need for a crane on site.

The addition is primarily a three-storey load bearing timber frame that sits above a series of steel I-beams. These form a support platform at the original roof line. The timber frame surrounds concrete stair and lift wells and incorporates additional steel support members, especially to the facades.

The envelope of the addition includes a combination of fibre cement and metal cladding and aerated concrete panels, used as a veneer over the timber frame.

Internally, the frame has load-bearing fire and acoustic rated timber walls between apartments and standard framed walls within them. Protected by fire resistant plasterboard and fibre cement sheet, the common walls are staggered stud frames with a design **FRL** of 60/60/60 and a minimum design **STC** of 50. The floors have I-section engineered timber joists that span continuously between the common walls. To help reduce the size of the joists and limit deflection, the joists are also supported off the internal walls. While this would normally have required these internal walls to be fire rated, the floor joists have been designed in such a way that they satisfy the strength and stability requirements of the BCA even if these internal walls were removed. As a result, the need to fire rate the internal walls was waived. To achieve the necessary vertical fire rating, two layers of fire resistant plasterboard protect the floor joists.



east elevation



west elevation

above
side elevations

top right
timber frame separating wall

middle right
design sketch of from bourke st

bottom right
an apartment lined and painted, ready
for finishing





top left
resilient ceiling channel supported
from the timber floor joists,
ready for lining

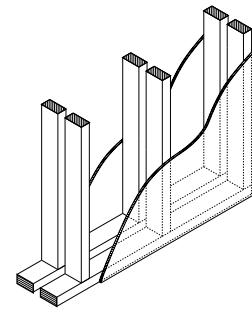
middle left
timber infill walls framed and lined

below
mrtfc wall framing types

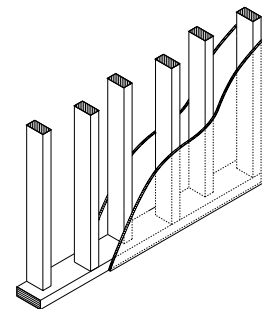
A strategy for design with timber

• **MRTFC and The Building Code of Australia** - The culture for building multi-storey timber framed residential buildings has a long history throughout the United States and Europe. Many four to five storey buildings built in those countries use timber framed walls between apartments to achieve fire separation. Although fine examples of multi-storey timber framed buildings exist in Australia, predominantly from before the 1930's, the culture for apartment buildings to be masonry has prevailed here, largely determined by the evolution of Australian building codes.

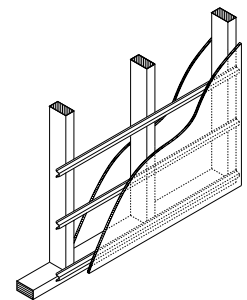
Building codes and ordinances within Australia evolved on a state by state basis, generally based upon English building regulations. These codes prescribed construction. They required that the fire separating walls between abutting residential buildings had to be masonry, specifically 230mm brickwork. So, for a terrace house, buildings common to Sydney and Melbourne, the party walls had to be brick while the structure in between could be timber. In terms of building ecology, it meant that a brick layer would always be on site and in this way, a culture for building in brick evolved.



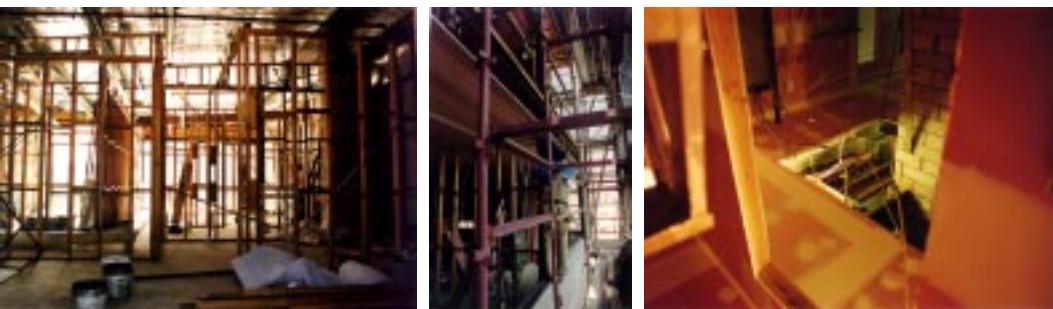
double



staggered



single



In 1990, there was a shift from state by state codes and an amalgamated, national building code, the BCA, was released. Still **prescriptive**, this code rationalised, simplified and determined a common terminology for building regulation. By 1996, the BCA developed into a **performance based** document, with 'deemed to satisfy' provisions. Following the 'deemed to satisfy' provisions mean the code's requirements are met. However, if the designer wishes to deviate from these provisions, testing and other analysis can be used to demonstrate that the alternative solution satisfies the Code's performance requirement.

The Bourke Street development challenged the 'deem to satisfy' of the BCA, in this case, to provide a cost effective, lightweight timber framed solution for the additional three stories. Yet, it satisfies the performance criteria of the code in terms of sound separation and fire protection. A timber framed solution would not have been possible under previous codes.

A performance based code represents a considerable opportunity for the designer. It provides a means to challenge historic conceptions of the appropriate material and provide the best design solution for a specific site.

• **Detailing Issues in MRTFC** - It is clear that timber construction techniques can provide the sound separation and fire protection between units required by the BCA. However, as the MRTFC system was only adopted relatively recently, it is evolving to address issues that arise from practice in the field. Perhaps the most important of these is enhancing sound separation between units, especially vertical separation through the floor. While the current solutions meet the requirements of the BCA and perform well in service, research is under way around Australia to enhance them economically. Overseas, cement screeded and floating floor arrangements are being used and these may soon make their way to this country.

• references

National Association of Forest Industries 1995, MRTFC Manual, vols 1-3, Canberra

Pine Australia 1999, MRTFC Case Study: Mansion on Bourke, Serviced Apartments, Victoria

Australian Building Codes Board 1996, Building Code of Australia, vol 1, Sections A1, A2 and F5, CCH Australia Limited

Deal Corporation 1998, Mansion on Bourke, promotional brochure

• glossary

FRL (fire resistance level): grading periods in minutes of the fire resistance of building elements for structural adequacy/ integrity/ and insulation (refer to BCA SECTIONS A1.1+A2.3, and AS1530.4)

performance based: a code where the requirements are expressed as objectives to be achieved

prescriptive: a code where the requirements are expressed as rigid rules or predetermined solutions

stc: sound transmission class (refer to BCA SECTION F5.2)

• on the internet

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