



STEEL  
REINFORCEMENT  
INSTITUTE  
OF AUSTRALIA



## TEN GOOD REASONS WHY CONCRETE IS THE PREFERRED BUILDING FRAME MATERIAL

### 1 CONCRETE Framing is the Cheapest way to build

This is confirmed by recent cost studies<sup>[1]</sup>. The study found *“Concrete framed structures are more competitive than steel framed structures in the medium- and high-rise commercial office markets in Sydney, Melbourne, Brisbane, Adelaide and Perth. In medium-rise (10 storey) buildings, the cost premium for steel framed structures ranged from 26% (Adelaide) to 85% (Sydney), relative to a concrete framed structure... For high-rise (30 storey) buildings, the cost premium for a steel framed structure ranged from 22% (Adelaide) to 65% (Sydney) relative to a concrete framed structure...”*

### 2 CONCRETE Structures go up Faster

With normal concrete construction techniques many multi-storey buildings are erected at a rate of one typical floor every 4–6 working days. For example, Deutsche Bank Building, Sydney, 31 levels, 43,000 m<sup>2</sup> total floor area: 4-day cycle. Rialto Building, Melbourne, 60 storeys, 86,000 m<sup>2</sup> total floor area: 4- to 6-day cycle.

### 3 CONCRETE Framing keeps Storey Heights to a Minimum

Reduced floor-to-floor heights mean reduced cost of the facades and services – both expensive items. The cost study<sup>[1]</sup> found: *“The steel framed option adds between 100 mm and 200 mm (for 10-storey buildings) and between 200 mm and 300 mm (for 30-storey buildings) to the floor-to-floor height when compared to the concrete framed structure... The cost of facades would increase by approximately: 2.4% for a 100 mm increase in floor-to-floor height (based on the 16.2 x 8.4 m grid option for 10-storey buildings) and 5.4% for a 200 mm increase in floor-to-floor height (based on the 16.8 x 7.2 m grid option for 30-storey buildings).”*

### 4 CONCRETE allows Construction to Begin Sooner

Steel has a lengthy lead time because of the need for shop drawings and off-site fabrication.

### 5 CONCRETE Framing is Readily Adaptable to Late Changes

Changes to formwork and reinforcement are generally much quicker than waiting for fabrication of steel replacement members.

### 6 CONCRETE Framing is Resistant to Fire

The natural fire resistance of concrete eliminates the need for expensively-applied protection. The cost study<sup>[1]</sup> found: *“Fire rating (2 hour) adds 5–10% to the cost of the steel structure depending on fire protection requirements, grid size, locality and concrete design.”*

### 7 CONCRETE can be Easily Moulded

Concrete can produce complex shapes and set-backs and can be self-finished in many attractive ways. This gives expression to more architectural freedom than can be obtained economically from steel.

### 8 CONCRETE'S Greater Mass means Improved Thermal Behavior

The improved thermal behavior over steel-framed buildings means reduced running costs. Additionally, *“the greater mass of the concrete structure provides better acoustic performance for both impact and transmitted noise when compared to the steel solution”* the cost study<sup>[1]</sup> found. The mass of a concrete frame also produces better damping of external wind loads.

### 9 CONCRETE Reduces Capital and Financing Costs

Cheaper and faster construction means lower holding charges and an earlier yield on investment. From a risk point-of-view, the cost study<sup>[1]</sup> concluded: *“Steel structures have an accelerated cash flow draw-down and arguably greater contract disruption and financial risk in the event of subcontractor/supplier default. Price volatility between locations is high for steel-framed structures.”*

### 10 AUSTRALIAN Concrete Industry

Australia has one of the most sophisticated concrete industries in the world, and a building construction industry highly-skilled in, and well-equipped to handle, concrete construction. The cost study<sup>[1]</sup> noted: *“The expertise in high-rise steel structures is viewed as more limited than in concrete high-rise structures.”*

Final comments from the cost study<sup>[1]</sup> include: *“Reinforced concrete columns with post-tensioned concrete floors are the most cost-effective framing design.*

*Concrete framed structures remain more competitive than steel framed structures across all spans studied – 8.4 m to 16.8 m.*

*... that alternative designs or price fluctuations would need to be considerable to alter the fact that, for commercial construction in Australia, concrete framed construction... is a significant 26% to 85% cheaper than steel framed solutions”*

[1] **Concrete Concepts Costing Study** an independent study by WT Partnership in conjunction with Irwinconsult for Cement Concrete & Aggregates Australia. A summary is available for free download from the CCAA web site: [www.concrete.net.au/concreteconcepts](http://www.concrete.net.au/concreteconcepts)

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