

“...the ramifications of the project’s recommendations extend right across the multi-storey steel and construction value chains”

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STEEL
FRAMING THE FUTURE
BUILDING A PLATFORM FOR

The Steel – Framing the Future project findings, addressing the multi-storey building sector, have the unmistakeable ring of a call for industry reform. Robust investigation of the status of the steel construction industry over two and a half years has revealed a sector that is well behind its counterparts in the US, UK and New Zealand, with dwindling skills and average capabilities. To contrast the Australian industry’s status quo with, for example, the UK, is to understand that ignoring the call for reform signals the nation’s divestment of what could be a thriving, innovative industry with export potential.

THE ISSUE: A STRATEGIC SECTOR CAUGHT IN A ‘VICIOUS CIRCLE’

The steel-framed building sector of Australia’s construction industry has strategic importance to the nation’s economic health. Though small, its supply chain spans a wide array of skills, including architects and designers, engineers, detailers, steel and metal deck suppliers, fabricators, surface applicators and builders. Expertise in this sector not only contributes to a competitive commercial construction sector, but also flows through to industrial, resources and infrastructure construction activity.

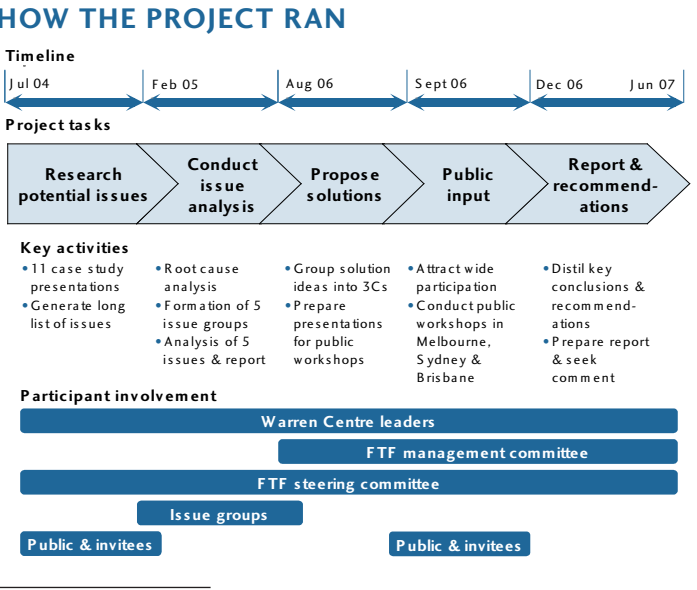
At 13 per cent of the market, steel framing’s¹ share of Australian building construction significantly lags that of the UK (70 per cent) and US (50 per cent). The reward for greater market share is immense – each per cent recaptured equates to some 2500 tonnes of steel to be processed by the sector annually.

However, low market share creates its own obstacles to change: development is curtailed and the availability of skills supporting steel framing dwindles. A vicious circle exists that leaves the sector exposed to the growing inflow of imported steel sections and ultimately, solutions.

In 2004, The Warren Centre for Advanced Engineering initiated the *Steel – Framing the Future* (FTF) project to investigate these issues, focusing on the multi-storey building sector.

Over the course of the two and a half year project, it became clear that some members of the steel-framed construction value chain were addressing some of the issues identified, pursuing courses of action concomitant with the project’s recommendations.

Most notably, companies such as Alfasi, Epic Steel, Sebastian Engineering and BlueScope Lysaght’s Design and Construction Division have packaged procurement, steel fabrication, detailing and erection into a single offer and point of responsibility, streamlining a previously disjointed process and creating compelling, lower-risk solutions for the commercial construction market.



¹ Steel framed buildings are, in fact, steel and concrete composites where the structural properties are delivered by the beneficial interaction of both materials



With these organisations in the vanguard, steel framing for multi-storey buildings in Australia is becoming cheaper, faster and less risky than at any time in the past. It has the potential to yield substantial rewards for its value chain players and the Australian economy as the recommendations from this project continue to be implemented.

THE CAUSE: PERCEPTION OF RISK PUTS STEEL AT DISADVANTAGE

Using case studies of multi-storey CBD, suburban and industrial park developments, early assessment identified five root causes affecting the steel-frame construction industry’s performance:

- Lack of strong leadership
- Inability to provide reliably accurate cost estimates
- Non-integrated supply chain
- Inability to articulate the value proposition for steel framing
- Poor take-up and integration of proven technology.

Each issue was examined in depth, calling on the expertise of some 50 senior executives from organisations across the steel and construction value chains.

Australia has an efficient, competitive and well-established concrete-framing industry. By comparison one of the earliest insights of the *FTF* project was that builders and developers considered the use of steel to be a far riskier option than concrete. The perception of high risk² was based on: apparent price volatility, poor access to consistently reliable data impacting on costs and estimates, concerns about safety on site, confusion about steel’s sustainability credentials and exposure to additional supply chain complexity.

Other findings specific to the steel-framed value chain that emerged over the course of the project included:

- Decision makers in the preliminary design phase of construction rarely considered a steel-framed solution unless it was a stipulation of the design or if concrete was not viable, and when selected, rarely involved fabricators at the design stage.
- Engineers were largely unaware of the improvements brought about by modern fabrication technology.

² These risks may be defined, for example, as relating to cost, time, quality, safety and sustainability

THE SOLUTION: TIME TO EMBRACE TECHNOLOGY AND A “ONE-STOP SHOP”

The cornerstone of the project’s recommendations is its support of the Design and Construct, or ‘steelwork contracting’ business model. This ‘one-stop shop’ entity (as perceived by the builder or developer) could offer a complete steel-framing solution including engineering, detailing and project management capabilities. Certain skills may be outsourced, but the responsibility rests with a single entity and the extent of the contract, while flexible, can embrace the entire building frame and facade (i.e. the weatherproof shell).

Supporting this model is the necessary application of current and emerging manufacturing and information technologies. Building Information Modelling software radically streamlines the existing design process by enabling the close integration of procurement, design and fabrication. Beamlines, robots and other advanced fabrication technology have yielded dramatic benefits for steelwork contractors in the UK where output per person per annum has risen from 30 tonnes to 240 tonnes in the past 13 years, a 35 per cent increase annually.

A national supply chain measurement system that is independently operated, gathering real data from construction projects and harnessing web interfaces to enhance accessibility, creates greater transparency and cost estimation accuracy for the steel-framed value chain.

The Australian Steel Institute is now undertaking several initiatives that align well with the project’s recommendations, such as addressing steel’s sustainability credentials and resolving perceived fire-engineering hurdles. The Institute’s role in stewarding these changes in the steel-framed value chain is noted, as well as that of the first mover entrepreneurs, referred to as Key Leaders, who are making or will make the initial investments to transform the sector from within. It is anticipated the development of new processes and standards for the entire value chain will arise from the contributions of these Key Leaders in collaborative forums, such as those facilitated by the Australian Steel Institute.



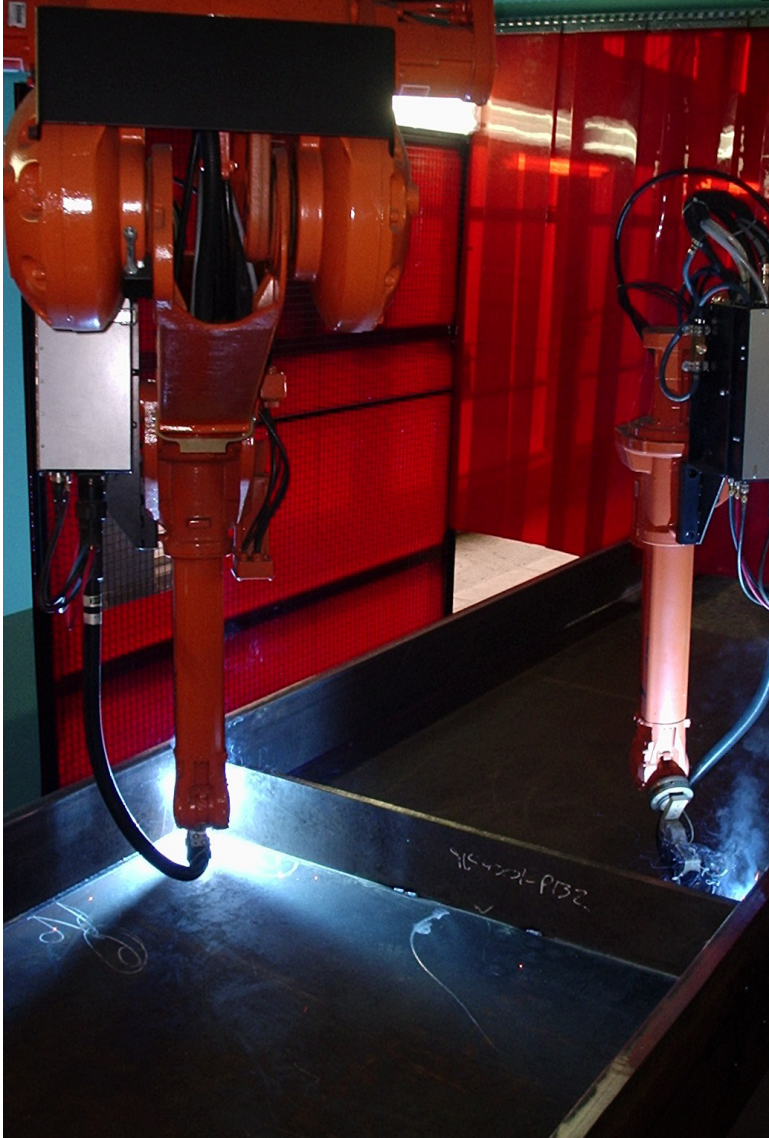
CONCLUSION: STEEL FRAMING CAN BE FASTER, CHEAPER AND RELIABLE

A strong steel-framed construction value chain is essential to the Australian construction industry, and the business case for radical change in the sector has never been more apparent. The *Steel – Framing the Future* project has focused its investigation on multi-storey buildings; however, the ramifications of the project’s recommendations extend right across the multi-storey steel and construction value chains. The results from the two and a half year, collaborative and consultative process shows how faster, cheaper and less risky steel-framed construction solutions may be in an imminent future in Australia.

This project found new technologies can be applied to steel-framing that make it easier to design and alter, and allow builders to fully capitalise on the new collaborative business models delivering steel-framed structures to the market. The steelwork contracting model consolidates the value chain to give a single point of responsibility that reduces risk, ensures a flow from one part of the building process to the next and retains rather than loses innovative processes and experience. Virtual buildings are designed in a digital space and key players such as fabricators, quantity surveyors and estimators are able to give accurate cost forecasts using shared value-chain information. While these practices are far from the norm, their existence amongst the emerging Key Leaders shows the new deal with steel is real.

Since the inception of the *Steel – Framing the Future* project the share of steel in multi-storey buildings in Australian has risen from 3 per cent to 13 per cent and many initiatives put forward in the project documents are being adopted. The experience of some of the Australian steel construction sector’s international counterparts shows the ‘size of the prize’ for adopting the recommendations of this project is substantial. Some supply chain participants are well under way in their transformation, while others make incremental movements and the cost of steel framing, in real price terms, continues to fall worldwide.

If this continues, as is the objective of this project, the future of steel in Australian building construction will be secured.



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