CONSTRUCTION 2020

A Vision for Australia's Property and Construction Industry

Executive Summary

Introducing the 2020 vision

Property and construction is the backbone of the Australian economy. It provides 14 percent of the nation's wealth and employs 730 000 people. As well as its own output, it has a significant impact on other industries. If the industry uses its resources more effectively, Australian industry as a whole will be more competitive. It promotes investment through its own activities and generates further investment in the broader economy.

Yet globalisation, advances in technology, environmental factors and changes in the structure of the Australian economy are presenting new and serious challenges. To increase its contribution to Australia's wellbeing and to capture new opportunities, the industry must respond positively. New challenges require new approaches.

Looking to the future is an important step in any industry. Through a national initiative of the Cooperative Research Centre (CRC) for *Construction Innovation*, Australia is taking a significant step forward in establishing a vision for the future of the property and construction industry — this initiative is *Construction 2020*. Industry leaders and members around the country have been consulted in order to refine the future research for our important industry. The process of collecting and analysing input from industry has culminated in the report, *Construction 2020 — A Vision for Australia's Property and Construction Industry*. It documents a framework within which Australia can set a research agenda to position itself to perform more competitively at an international level. Out of this process nine key themes emerged. These *visions* for the future reflect the major concerns of the industry and the expected improved future environment in which its stakeholders would like to work.

CRC Construction Innovation
BUILDING OUR FUTURE

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Conceiving the 2020 vision

"My vision is for an industry focussed on real value and sustainability, and able to deliver this economically, efficiently and safely."

Construction 2020 began with a series of workshops held from November 2003 to February 2004 in every capital city of Australia, seeking the views of hundreds of industry leaders and members. During a questionnaire and workshop, respondents considered a timeframe to the year 2020. They identified their visions for the industry future, barriers to implementation and the research required to achieve their vision. They were also asked to define their best dreams and worst nightmares for the industry.

For clarity, each of the nine key visions is presented separately, although in reality they are interdependent and the boundaries between them blurred. *Australian leadership in research and innovation* is the overarching (or ninth) vision central to delivering the 2020 vision. *The 2020 visions in focus* describes the eight remaining and more specific visions.

Delivering the 2020 vision

"I envisage a change in the contracting basis for construction to more equitable relationship-based principles."

The overarching vision: Australian leadership in research and innovation

Industry has clearly identified a closer relationship between researchers and research users as an aspiration for the future. Australian leadership in research and innovation is a key step to achieving a world's best-practice industry.

Achieving Australian leadership in research and innovation requires the industry to embrace the concept of industry, government and research bodies working together through research and innovation. A culture of self-improvement, mutual recognition, respect and support underpins this vision. By 2020, the vision is for the industry to be taking more responsibility for leading and investing in research and innovation. The tripartite collaboration should have developed a robust and viable national research and innovation capability delivering real value to Australian property and construction business.

The *integrated research agenda* to achieve Australian leadership in research and innovation will leverage from existing achievements and the identified industry visions. The challenges and opportunities identified by industry through this *Construction 2020* process are significant and exciting. Integrating R&D strategies from the eight visions will enable an impact on industry performance through:

- developing tools for evaluating design standards and facility performance
- identifying more appropriate skill requirements for a changing business environment
- encouraging national uniformity of codes of practice and legislation
- comparisons with other national and international industries for adaptation of advanced approaches to Australian property and construction
- process analysis to better understand and identify interactions and opportunities for improved practice.

Australian industry is recognising the need for change in business environment, environmental sustainability, and information and communication technologies. It also clearly identifies the need in this change process for *improved education and training*. An active program of education and technology diffusion is required to achieve the visions, and may include:

- case studies or demonstration projects as valuable teaching tools through industry awareness programs (especially useful for small to medium enterprises (SMEs))
- national consistency of education to service a mobile and project-based workforce (complementing nationally consistent standards and legislation)
- integration of effort between Technical and Further Education, vocational education and training and higher education sectors together with professional and trade organisations.

The 2020 visions in focus

This section summarises the eight visions and suggests goals for achievement for the year 2020.

Vision One Environmentally sustainable construction — for industry to design, construct and maintain its buildings and infrastructure to minimise negative impacts on the natural environment, thereby preserving environmental choices for future generations. By 2020, the vision is for the industry to have comprehensive eco-efficiency evaluation tools for all stages of the construction life cycle. Respondents placed environmentally sustainable construction as a key research priority leading to 2020.

Vision Two Meeting client needs — for the design, construction, and operation of facilities to truly reflect the present and future needs of the project initiator, owners/tenants, and aspirations of stakeholders. This should take into account the need for improved quality and economic viability, as well as have the flexibility to adapt to future circumstances, technologies and the needs of society. Responses in the questionnaire showed strong support, particularly from the property and design professions.

Vision Three Improved business environment — for a regulatory, financial and procurement framework which encourages longer-term thinking and returns, a sharing of ideas and innovation between stakeholders, and a fair distribution of risk and returns. By 2020, the vision is for the industry to have a business environment achieving four types of dividends:

- economic — with a fairer balance of risk and return to stakeholders
- social — providing equitable returns across the community
- environmental — striking a more sustainable balance between the built and natural environments
- governance — providing clarity of business responsibilities, leading to a more informed, transparent and honest marketplace.

"My 2020 vision is for an appealing industry that attracts the best people, and Australia becomes known for world's best practice in construction process and safety."

This vision was considered the highest priority for an improved future for the industry and the most important future research topic.

Vision Four Welfare and improvement of the labour force — for the industry workforce to be computer-literate and highly skilled, showing mutual respect for each other through management and workers acting collaboratively, with improved health and safety conditions on-site. A goal for 2020 is an ongoing supply of skilled workers to service this vital Australian industry. The fragmented set of occupational health and safety laws supports a call for a national code of construction safety management. The industry must also aim for a more internationally productive labour force operating in a less adversarial context. Almost 100 percent of site respondents confirm that workplace-related issues should form a part of the future research agenda.

Vision Five Information and communication technologies for construction — for communication and data transfer to be seamless and include mobile devices providing a commercially secure environment. These technologies will be embedded within both construction products and processes to improve efficiency and effectiveness. The knowledge economy will require property and construction to become more engaged in IT developments.

Vision Six Virtual prototyping for design, manufacture and operation — for the opportunity to *try before you buy* — from inception to design, construction, demolition and rebuild. The prototype will be an electronic representation of the facility, from which relevant decisions can be made and from which the procurement processes can develop. Respondents considered that virtual prototyping would have the highest likelihood of becoming the basis for design, procurement and asset management in the next 5 to 10 years.

Vision Seven Off-site manufacture — for a majority of construction products to be manufactured off-site and brought to the site for assembly. This will enable better quality control, improved site processes including health and safety control, more environmentally friendly manufacture and possible reductions in cost. The goal is to establish the economic viability of off-site manufacture. Respondents considered off-site manufacture to have a very high likelihood of occurrence in the next 5 to 15 years.

Vision Eight Improved process of manufacture of constructed products — for developing new production processes, allowing property and construction to work more efficiently. The goal for 2020 is to re-engineer the supply chain to ensure that the property and construction process is as *lean* as possible. The industry will use IT to enhance the value of the product to the client and stakeholders through better quality control, organisation and management of site activities. A substantial proportion of respondents reinforced the focus on the *process* of construction to achieve these improvements rather than the final constructed *product* or components.

Conclusions

Significant industry, government and researcher initiative and investment will be required to properly address the range of education and research challenges posed by industry from this *Construction 2020* process. The focus of the *Construction 2020* study has been on research initiatives that service the industry. A comprehensive national study of broader issues impacting the industry needs to be carried out to provide an update on the Action Agenda process of the late 1990s.

The CRC for *Construction Innovation* is well poised to deliver strategic and relevant research outcomes and is moving to partner with other industry leaders in the important technology diffusion role. But it will be impossible to succeed in this critical task without ongoing support from industry and government research users and other research organisations.

It will be the responsibility of the property and construction industry to ensure the industry's future by exploiting research and innovation to continuously improve in line with international competition, and to meet the increasing demands of clients and the community. Government at all levels has a responsibility as major client and industry regulator and legislator to use its position of influence to drive industry improvements and promote research and research user linkages. Given that 94 percent of Australian construction businesses employ fewer than five people each, encouraging more involvement with SMEs is critical in ensuring the awareness and uptake of advanced technologies and management systems to upskill Australian industry.

For Australian property and construction to enhance its international competitiveness through technological advance and increased management expertise, it must be supported by well-resourced, focussed and energetic research and innovation. An industry culture more accepting of research and innovation is developing — but there is still some way to go.

Australia's CRC for *Construction Innovation*

The CRC for *Construction Innovation* is a national research, development and implementation centre focussed on the needs of the property, design, construction and facility management sectors (broadly referred to as the property and construction industry). Established in 2001 under the Australian Government's Cooperative Research Centres Programme[1] with headquarters at Queensland University of Technology in Brisbane, the CRC for *Construction Innovation* is developing key technologies, tools and management systems to improve the effectiveness of the property and construction industry.

Construction Innovation takes ideas and turns them into collaborative research to produce industry-relevant results for our partners and the whole industry. We encourage innovation in our research, and collaboration in our projects.

The full report is available from the web: **www.construction-innovation.info**
email: **enquiries@construction-innovation.info** or write to: **CRC for *Construction Innovation*, Level 9 - L Block, QUT Gardens Point, 2 George St, Brisbane Qld Australia 4000**

Industry

ARUP
Bovis Land Lease
BROOKWATER
dem
John Holland
Rider Hunt
WOODS BAGOT

Government

ABCB
BRISBANE CITY
Building Commission
Queensland Government Department of Main Roads
Queensland Government Department of Public Works
Queensland Government State Development and Innovation

Research

CSIRO
QUT
RMIT UNIVERSITY
The University of Newcastle Australia
The University of Sydney
University of Western Sydney Bringing knowledge to life

[1]*CRCs support research partnerships between the public sector (universities and government research agencies) and the private sector (firms and industry organisations), in long-term collaborative arrangements which support R&D and education activities to achieve outcomes of national economic and social significance. The CRC for* Construction Innovation *has been made possible through a $14 million Australian Government grant through the CRC Programme and complemented by $50 million in cash and in-kind support from industry, research and government partners.*