INNOVATION

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Mindset under construction

Public infrastructure projects are starting to lead change, but the biggest barriers to innovation are still short-term thinking and a lowest-price-is-best mentality. By Jane Searle

Innovation has always been a tough challenge in construction, but industry experts say that the future is looking brighter. Clients are beginning to take a longer-term view on projects than they did in the past, which is creating opportunities for innovation. The industry differs from many others in that innovation is largely dependent on the behaviour of clients, not on the construction companies themselves.

The more that contracts are based on price alone, the less conducive it is for the industry to invest in process and product innovation. The public sector provides between 30% and 40% of commercial construction work and dominates the infrastructure industry. It has a crucial role to play in promoting innovation by selecting value-based contracts, rather than just the cheapest tenders, to boost industry resources.

The chief executive of the Co-operative Research Centre (CRC) for Construction Innovation, Keith Hampson, says the conservative mindset of many clients has hampered innovation in the past. "Government around Australia has a patchy approach to encouraging innovation," he says. "Often there is an established mode of operation that does not reward organisations that do things differently, which means taking a larger risk." Hampson says there has been a dearth of support for applied research, which was only remedied in 2001 with the set-up of an industry CRC.

Hampson says investment in construction productivity increases GDP at twice the rate of the same investment in any other sector, because of the strong link that effective infrastructure has with general business productivity. The construction sector accounts for about 14% of Australia's economy, and an ACIL Tasman report last year found that a one-off innovation productivity improvement in the sector of 0.3% annually would increase GDP by $5 billion.

Hampson says government, which is the largest industry client, must take a longer-term view and consider a project's costs over 20 years rather than simply the initial capital cost. The construction industry is usually highly segmented. But the trend for clients to combine the functions of designing, building, owning and operating means they are more likely to adopt a long-term view. The increase in public-private partnerships also favours a holistic approach that encourages the prospects of innovative companies.

Several barriers to innovation remain. The CRC's survey of more than 1300 industry participants, known as the BRITE project (building research, innovation, technology and environment), was released last year and pinpointed three key impediments to innovation: low company profitability, a tendency for clients to select the cheapest contractor, and the project-based nature of work.

The survey was led by a senior research fellow in the school of urban development at Queensland University of Technology, Karen Manley. She says: "Companies are good at reactive innovation when problems arise on-site, but are not strong at applying the lessons learned to later projects. The project-based nature of production creates discontinuity in information flows." The BRITE survey found that previous projects ranked fourth out of 14 as the most important source of ideas — highlighting the need for effective ways to transfer knowledge across projects.

Manley agrees with Hampson that the public sector has a mandate and responsibility for industry development. "Traditionally, clients wanted to save money, so desperate contractors would under-bid and hurt the whole industry. [Innovation can be boosted] if clients adopt a value-add, instead of low-cost, tender selection," she says.

Manley is optimistic about a move among public-sector clients towards greater use of value-based contracts. Industry participants are buoyed by the attitude of the Queensland Government, which is seen as being receptive to the idea of value-based contracts for more projects in its $55-billion infrastructure plan for south-east Queensland over the next 20 years.

Attitude change needed

An industry-wide change in mindset is still needed. A principal of Arup Australasia and head of its project-management business, John Tsoukas, says: "If you say the word innovation to a client they run a mile ... they think 'I don't want you experimenting on my project'. We have to educate them that it's good for them and the industry, and it will benefit the project."

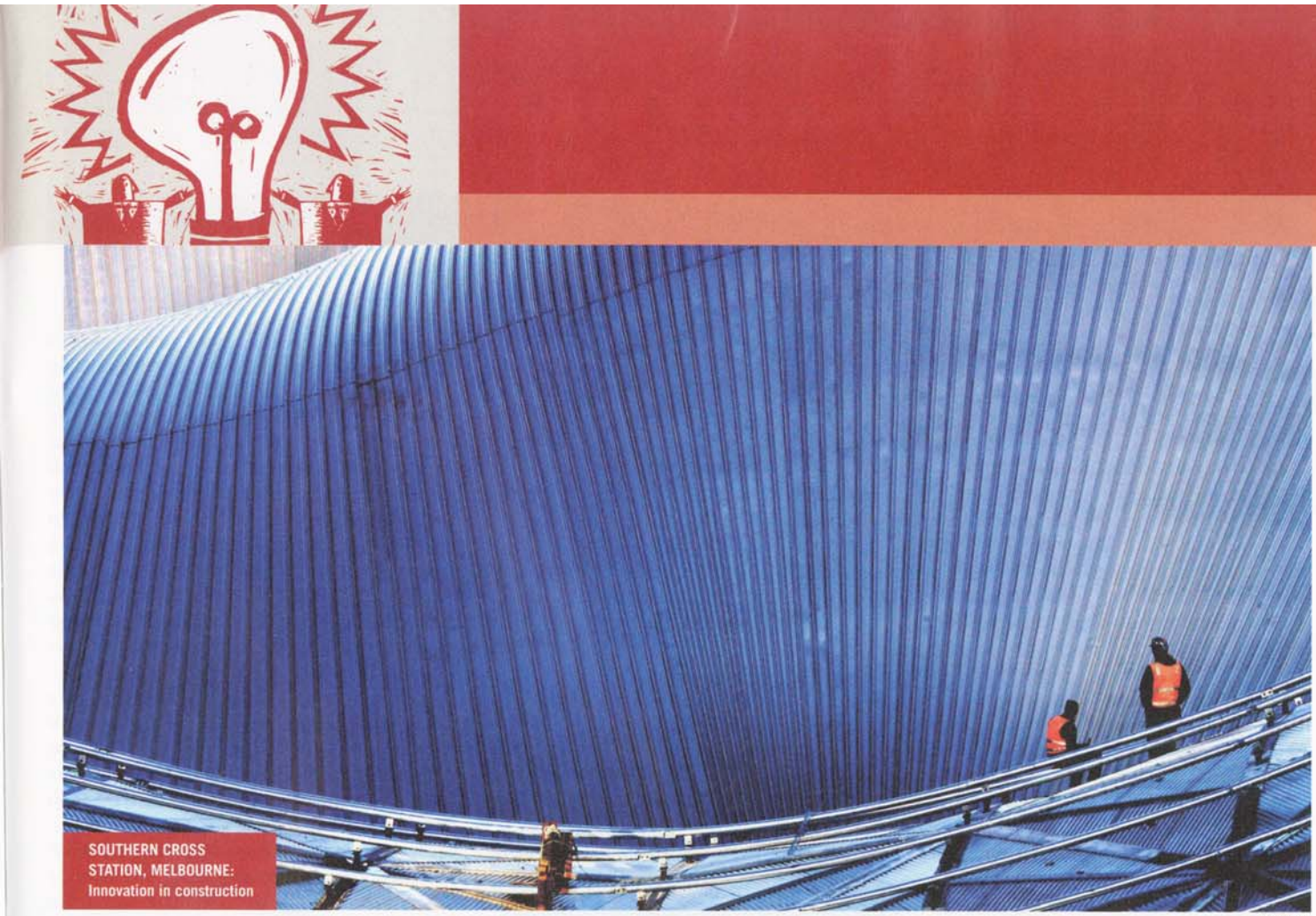
Tsoukas says an innovative, value-based approach demands a greater understanding of a project's aims between client and consultant. For example, Arup has been engaged by

BRITE EXAMPLES

Leaders are more likely to:

Recruit new graduates
Learn lessons and use them in future projects
Have heard of the CRC for Construction Innovation
Place great value on employee, technology and knowledge strategies
Have a formal program to evaluate innovation
Reduce client costs
Monitor international competition

SOURCE: CRC FOR CONSTRUCTION INNOVATION



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the Queensland Government to work on part of its infrastructure plan. Tsoukas says: "They had a specific requirement to develop a software system that tracks all the information on 200 projects. At face-value we could set up the system and track the projects. But the client is really looking for a way of smoothing the transition of projects to market, so they don't hit the market at the same time."

By understanding the broader client need, which a purely cost-focused contractor is less likely to do, Arup has built into the software such information as industry capacity, demands on infrastructure and other factors that influence and satisfy a client's needs.

Tsoukas says an innovative approach may demand more time and cost, but its benefits reach further. "There are some projects where the lowest-cost option still works well, but increasingly that is not the case. Even the most mundane projects have something of value and innovation you can bring to delight the client."

Profitability margins are tight across the industry but global firms such as Arup can rely on resources from their international offices to finance research. Tsoukas says: "We have a global director of research and each year the firm allocates millions for research. Profitability is a means to an end. We have to keep staff challenged, and innovation keeps them interested."

Manley says the future for innovation looks bright, and points to the Federal Government's initiative in the late 1990s that led to the development of centres for research co-operation. "The [construction] CRC was the first time that government promoted national collaboration between private sector, government, universities and the CSIRO," she says. "It builds organisational, project and personal partnerships."

The CRC will bid for a second round of funding in August, of about $18 million for applied research. It would be the largest Commonwealth contribution for research and development to the industry.

Product innovation is also crucial to construction industry productivity. The industry has normally used two-dimensional computer-aided design (2D CAD) but is moving towards 3D CAD. This automates several functions and provides much richer information on the elements of a construction.

The deputy chair of Arup's global building business, Tristram Carfrae, says Australia's construction industry suffers revenue loss of about 10% because of documentation errors. "It is a huge amount of money and could be halved if all designers used 3D models. Most companies say they are using it, but are just putting their toe in the water." Carfrae says 3D CAD will be standard in five years.

Australia's contribution to product innovation is in the form of add-on products to capabilities in 3D CAD known as building information models.

The four add-on products have been developed through collaboration with construction firms, the CSIRO, and universities through the CRC for Construction Innovation. They include a cost estimator for constructions; a design checker that lets designers know if a building conforms to code requirements such as disability access; and a program that provides information on the ecological footprint and environmental cost of a construction.

The CRC's Hampson says: "Australia is able to punch above its weight [in industry innovation] but we need the ongoing support of industry and government. There is a strong spill-over between productivity improvements in construction to national economic growth. By working across industry, government and research we can make significant national economic gains." ●