

# Addressing sustainability without compromise

The following case study was developed by the BRITE Project of the Cooperative Research Centre for Construction Innovation. BRITE case studies demonstrate the benefits of innovation and successful implementation strategies in the Australian building and construction industry.

## Innovation Case study No 2: Concrete planking innovation saves over \$300,000 on major sports stadium

A new method of manufacturing concrete planks and connecting them to supporting steel beams has resulted in substantial benefits to the Suncorp Stadium project in Brisbane, QLD. The new 'composite' connection method generated estimated savings of \$260,000 in steelwork costs and \$70,000 in labour costs.

Suncorp Stadium is a 52,500-seat, world-class football facility constructed by a private sector managing contractor under a two-stage document and construct, guaranteed maximum price contract, with a project budget of \$280 million. The stadium was opened in June 2003, delivered on time and within budget after a two-year documentation and construction program.

The 'clever plank' innovation involves the design of formed rebates in the ends of precast prestressed polystyrene-voided concrete planks - together with the design of concrete topping and reinforcement details - to provide a crack-free, reliable composite connection between the planks and steel beams supporting the grandstands at Suncorp Stadium. The two main elements of this innovation - the polystyrene-voided planks and the formed rebate detail - have only been combined on a few occasions globally in the building industry. The particular planks supplied by

Quickcell Technologies, and the particular rebate and associated details designed by Arup, are unique to the Stadium project and have resulted in substantial benefits.

The use of clever planks reduced the weight of the Stadium grandstand steel floor beams by approximately 25 per cent, due to the efficiency of the composite connection between the planks and the steel beams. This translated to an estimated saving of \$260,000, which represented approximately eight per cent of the cost of the grandstand steelwork. Further, the concrete topping detail resulted in toppings free of the cracking that normally occurs with use of standard planks. Not having to repair cracks resulted in an estimated saving of \$70,000. These combined benefits, totalling \$330,000, have been estimated compared to precast prestressed polystyrene-voided concrete planks with a conventional non-composite connection to steel beams.

### Lessons learned:

- Contract type plays a critical role in establishing incentive structures for innovation on projects
- Robust linkages between suppliers and more central project participants can yield significant dividends
- Innovation is dependent on good

linkages with global experts.

- Prefabricated building components can offer significant project savings
- Local firms can be global technology leaders
- Robust relationships between firms and universities provide mutual benefit, enhancing learning and innovation opportunities
- Government clients play a key role in shaping the industry's innovation opportunities, through both prequalification activities and contract types
- Internal company award competitions can provide incentives for learnings to be documented and encourage employees to suggest new approaches
- Labour conditions associated with various trades can effect the direction of innovation by impacting on the likely cost of alternatives
- Borrowing ideas from related industries is a useful innovation strategy

For further information regarding this study, contact Dr Karen Manley, CRC for Construction Innovation, by phone on (07) 3864 1762 or by email to [k.manley@qut.edu.au](mailto:k.manley@qut.edu.au) ■

Organisations consulted in preparing this report: Arup and Quickcell Technologies.

### Selected project participants:

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| Client:              | Sport and Recreation Queensland (SRQ)  |
| Project Director:    | Queensland Department of Public Works (DPW)  |
| Project Manager:     | DPW  |
| Managing Contractor: | Multiplex Constructions and Watpac Australia, as the Lang Park Redevelopment Joint Venture |
| Architects:          | HOK Sport and PDT Architects   |
| Engineers:           | Arup Structural/ Civil/Transportation/ Geotechnical/Environmental/Traffic                  |
| Plank Supplier:      | Quickcell Technologies   |