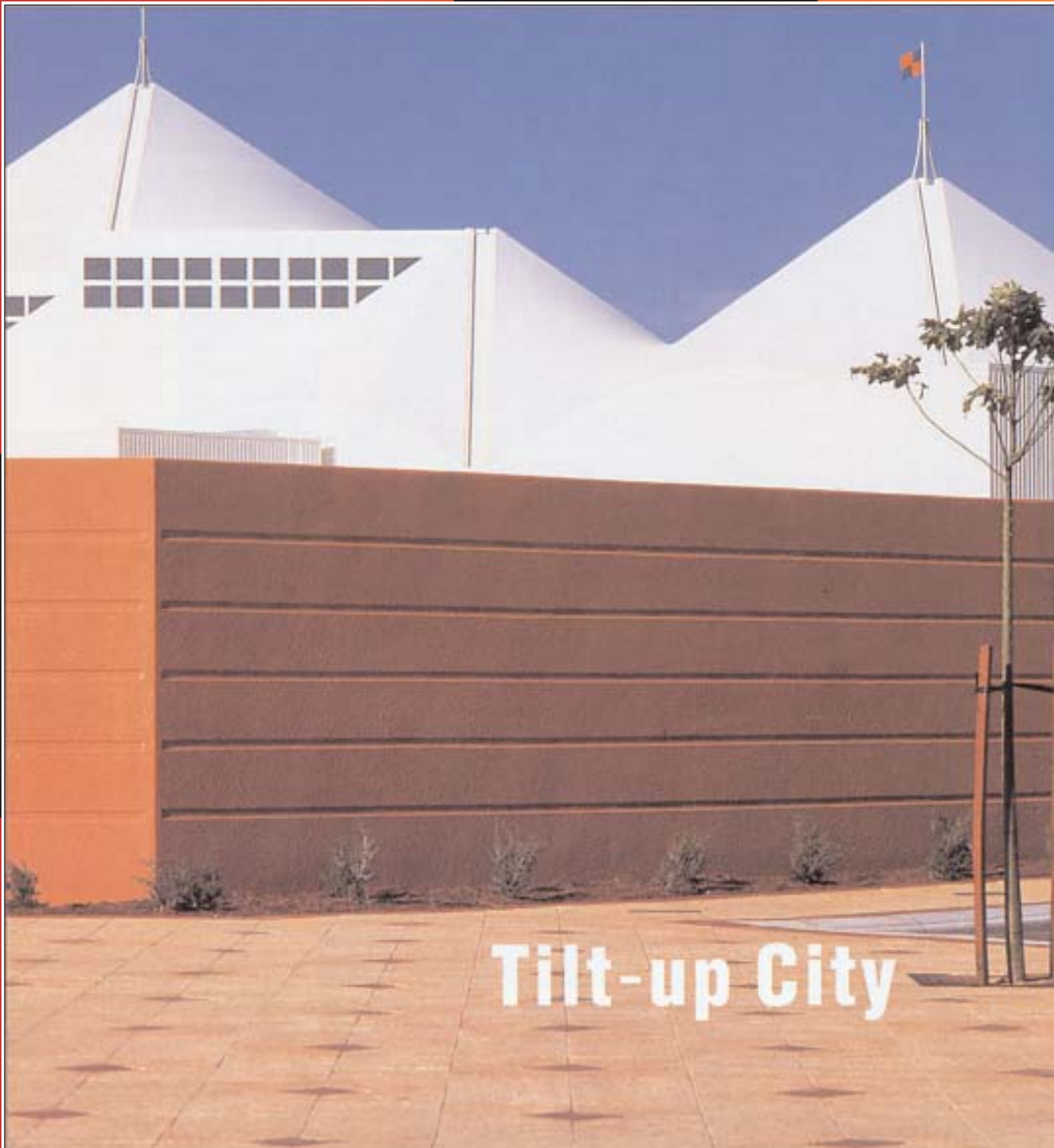


TILT-UP

DIGEST 5

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Tilt-up City

Architects and builders have coined the phrase 'Tilt-Up City' to describe Joondalup, Perth's futuristic second city, because of the prolific use of this innovative construction technique.

The city, located 26 km north of Perth in one of Australia's fastest growing regions, has rapidly taken shape over the past 18 months. LandCorp, the Western Australian State Government land development body which oversees Joondalup, estimates construction times and costs have been halved by the use of tilt-up concrete in the city. Nearly all of the buildings in the Joondalup Business Park, west of the Joondalup city centre, have used tilt-up construction.

Tilt-up was used to build the major retail development, Lakeside Joondalup Shopping City, Sanori House sports, business and medical centre, the Department of Social Security and Sarich nightclub and restaurant developments in the central business district. Concrete also has been used to feature public artwork around the city, including colourful ceramic tiles set in kerbs and imaginative street furniture.

The concept of Joondalup as Perth's second city dates from 1976 when Sir Charles Court's government allocated 100 hectares of land in the north west corridor. The project ballooned to become Perth's second business district and is expected to attract a workforce of 40 000; a student population of 25 000; and 515 000 residents by the year 2021.

Public and private investment in infrastructure, land and buildings in the city totals more than \$340 million and is expected to peak at \$1.5 billion in 1996.

Joondalup now has a hospital, court complex, universities, TAFE college, a major business park and a commercial sector in the city's central business district.

Stage one of the city's multi million dollar Arena sports and leisure centre was officially opened on 25 April 1994. Six new Business Park lots ranging in size from 2000 to 2700 m² were put up for sale in June 1994.

This Digest reviews the contribution that tilt-up concrete has made to the Joondalup streetscape by considering several projects in commercial, retail and residential construction and the realisation of LandCorp's vision of 'A City in Harmony'.



Tilt-up walls combine with the billowing roof of Lakeside Joondalup Shopping City



Lakeside Joondalup Shopping City



Lakeside Joondalup Shopping City is the major regional shopping centre servicing Joondalup City north of Perth. The first stage of the centre comprises Coles and Advantage supermarkets, a Kmart discount department store and approximately 100 specialty shops.

Totalling 80 000 m², the shopping centre utilises more than 370 tilt-up panels with a total wall area in excess of 16 000 m² – making it the largest tilt-up project in Western Australia.

Lakeside Joondalup Shopping City displays its arresting architecture – harmony with tilt-up

Bright blue skies form a background to the sculptural shapes of these tilt-up buildings

The largest panels weigh about 43 t, the highest panel reaches 11 m, and the widest panel measures 18 m.

The cost benefits, durability and appearance of tilt-up construction plus planned future stages encouraged architects CCN/Hames Sharley and structural consultants Connell Wagner to explore the design options. This is particularly evident in the malls where a streetscape theme has been created using building facades with parapets below the arched ceiling line. The malls feature entry and forum areas which open out from the standard mall width of 7.5 m to about 12 m.

These areas are also delineated by tilt-up concrete arches which promote the individual identity of the entry and forum while performing specific structural-bracing and load-transfer functions. The tilt-up arches in most cases carry the bulkhead trusses so that tenancy division walls can be created and positioned aesthetically without structural dependency. The tilt-up arches also provide smoke compartmentation and the ability to locate exhaust functions independent of retail facades.





The speed of tilt-up construction is graphically demonstrated in these pictures of construction stages spanning only eight weeks

The flexibility of tilt-up in a planning sense was well illustrated when it was decided to extend the south mall well into the construction programme. The tilt-up entry structure which had already been erected was simply picked up and moved 12 m to its new location.

The major contractor for the shopping centre, Consolidated Constructions, planned the tilt-up project, oversaw the finishes on each wall, and supervised the quality assurance programme.

Sub-contractor, Unit Construction, which specialises in the manufacture and erection of architectural precast concrete elements, organised the casting, tilting and propping of the panels.

The three major retailers, Kmart discount department store, Foodland Advantage and Coles supermarkets, used conventional 150-mm tilt-up walls with chamfered external edges.

Walls for the supermarket service areas and north-south and east-west malls were more complicated to make and required unconventional production methods. Large and complex structural curved arches were made by using steel moulds and plywood. Horizontal grooves were cast into the concrete. Each panel was then finished by using a vibrating screed, machine and hand trowelled, then painted.

The vast amount of concrete used to build the external walls contrasts with the visually striking Great Space roof which is the largest fabric structure of its type in the southern hemisphere. Large roof panels of Teflon-coated fibreglass stretched between prefabricated steel rise over the centre's roof to a height of 27 m and create the illusion of sails blowing in the wind.

Future stages of the shopping centre, including department stores and a market square, will be linked to stage one over the rail station and will be completed as demand increases. An additional discount store and specialty shops are planned for later this decade. The versatility of tilt-up concrete will still provide an economical means of extending the complex.

Joondalup Business Park

More than \$30 million has been spent on 130 major retail outlets and showrooms in the Joondalup Business Park. Most of the developments used tilt-up concrete construction.

Guidelines initially allowed only colonial peak roof features, but were later relaxed to include dome-shaped styles – providing greater scope for innovative tilt-up designs and curved reliefs.



Imaginative shapes are expressed through unusual curved verandahs and moulded ellipses



Inlay linework and strong copings at parapets convey the strength of tilt-up



A Builder's Perspective

Calibre Constructions, one of the State's leading tilt-up builders and designers, has worked on about a dozen of the Business Park developments. Calibre's two-storey commercial development with showroom frontage at 133 Winton Road received the Wanneroo City Council's Best Premises award in 1993.

Co-Director, Robert Witney, said the builders opted for a 'Unitex' plaster finish to correct slight indentations in the concrete form while meeting the client's colour requirements.

Inlay linework and imaginative reliefs were used to create dramatic effect on several of the developments. Architects Oldham Boas Ednie-Brown featured an unusual curved verandah and moulded ellipses in the front panels of one building in Winton Road.

Architectural Freedom

Bateman Grundmann Wilson Jones Architects designed three of the Business Park buildings and have more on the drawing board. Principal Norm Bateman said the firm chose tilt-up for the projects because it was economical and advantageous not having to use scaffolding or hoisting materials. Mr Bateman said the construction provided the flexibility of new and different designs. Tilt-up had the advantages of cast concrete and the structure, interior cladding and interior wall were all in one. The use of tilt-up allowed extra space in the developments.

Central Business District



Sanori House displays elegant roof shapes and wrought iron while Bronson's Nightclub invokes classical detailing

The versatility of tilt-up and its application for public buildings is highlighted in three fine examples within Joondalup's Central Business District.

Sanori House

Sanori House is planned to be the largest medical, health and sports centre of its kind in the State. The \$5 million complex, winner of the prestigious 1993 Australian Building and Design Award, is the city's first privately developed building to be fully occupied by private-sector tenants.

Designer Meyer Shircore & Associates used tilt-up concrete on one wall in the development – it was economical and needed to be used as a retaining wall for a swimming pool. The designers also worked on a two-storey office complex in Reid Promenade. Constructed entirely from tilt-up, the builders used 'Insulplast' moulding to make recesses in the surfaces of the concrete panels. The design combined wrought-iron balustrades to create an elegant facade.

Sarich Developments

The city's first late-night entertainment complex, a two-storey, 4500 m² night-club and restaurant development on the corner of Reid Street and Grand Boulevard. Designed by Bateman Grundmann Wilson Jones Architects, the complex uses tilt-up to create a simple facade.

The second Sarich development, a small retail centre in the Joondalup central business district designed by the same architects, amalgamates concrete panels with steelwork and metal decoration. The interesting combination exploits the merits of both materials.

Department of Social Security

The Department of Social Security in Joondalup, developed by Yokine Investments, features curved forms which highlight the flexible nature of tilt-up construction. Panels were poured on site and hoisted to an upright position to create the building.



Delightful civic details abound, ranging from seating to ceramic inserts in kerbs



Public Art

LandCorp has encouraged the community to help create an exciting city centre rich in art and culture, through its Art in Public Spaces project. Public art has been incorporated into every aspect of the new city's design and has seen innovative approaches to street lighting, bollards, street furniture, kerbing, pavements and signs.

The 52 light poles, designed by artist Andrew Carter and Electrical Technology Consultants, were painted in a teal colour which matched signs and street furniture. The design combines formal and organic lines, allowing them to be at home alongside buildings, trees or as stand alones.

Ceramic artist Geoff Yorks worked with children, senior citizens, local personalities, ethnic and community groups to make 3000 tiles which have been set into the city's kerbs and pavements.

In Central Park artists David Woodland, Wendy Herington and Bryce Kershaw were commissioned to produce a centrepiece which includes a mosaic pond of 3600 hand-made tiles illuminated by fibre optics at night. Wooden sculptures created by John Tarry and woven tapestries by Judy Bunn are featured at the court house.



An imaginative tilt-up application to a restaurant

City North

Five WA building and architect teams have designed innovative homes for a \$2 million demonstration street in Joondalup's inner-city residential and commercial precinct, City North. Several homes have been designed in post-modern architectural style using tilt-up concrete construction.

The demonstration street is designed to give prospective home owners a sneak preview of the mixed-use precinct.



Variety is the soul of a city.
Here, diversity in style is
a vital element.

A City In Harmony



The sterility and lack of soul often evident in newly 'planned' cities is thankfully missing in Joondalup.

LandCorp, through the Joondalup Development Corporation architects, engineers and builders have worked to develop the commercial, residential and social infrastructure simultaneously. The many projects already completed show a diversity in style but achieve harmony in that they have focussed on the people who live and work together. The community involvement in the development through the Art in Public Spaces project has enabled the vision to be shared.

Reinforced concrete in tilt-up construction has been a vital facet of the growth of Joondalup. It has allowed architectural expression, and provided a medium which has been fast to construct, cheap to maintain, and durable. There will be many more opportunities to use this versatile material in Joondalup. A City in Harmony, a City in Tilt-Up.



Variety could not be better expressed than in tilt-up

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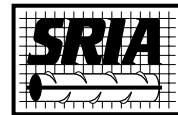
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