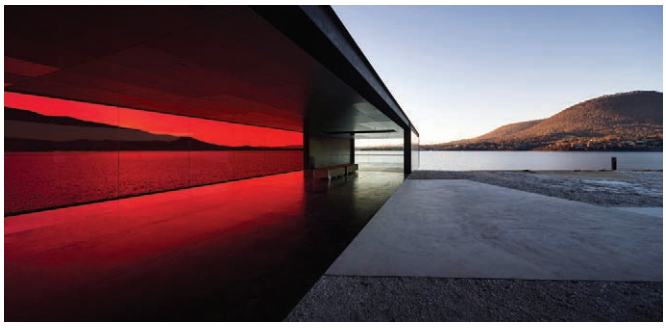
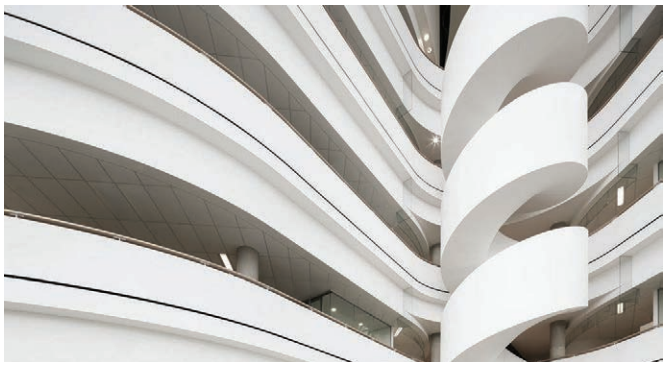
# CONCRETE:
## THE LIFEBLOOD OF BUILDING

Concrete.
FUTUREPROOF
your build™

**“Some people view the 20th century as the atomic age, the space age, the computer age - but an argument can be made that it was the concrete age...”**

**– Hendrik van Oss**





Top: Glenorchy Art & Sculpture Park (GASP), Photographer: Ben Hoskins
Bottom: South Australian Health & Medical Research Institute (SAHMRI)
Photographer: Peter Clarke

# FUTUREPROOF YOUR BUILD

**What made our modern urban lifestyle possible?**

Was it the invention of the steam engine? The motor car, or aeroplane? Radio, telephones or the internet? Electricity?

One factor that rarely gets a mention is concrete. A uniquely versatile, sustainable, cost-effective and durable material that has risen to become the enabler of the built form.

One that is embraced across every major building sector; Civil, Commercial and Residential, and is used for endless applications in; houses, multi-residential buildings, roads, tunnels, bridges, driveways and landscaping to name a few.

Something humans make more of than any other product or substance in the world.

There are no limits to where and how concrete can be used, enabled by its unique ability to form any shape required and set in a state that lasts and lasts.

Concrete is the right choice to ensure a bright future for future generations. It delivers environmental sustainability, resilience and cost efficiency over the long term, thus saving time, energy, money and resources.

Concrete is the material that lets you build and design with confidence to your imagination, your designs, your engineering requirements or your environmental objectives.

The following pages will take you on a journey designed to let you rethink concrete, and help you re-discover why concrete truly is the lifeblood of building.

Cover image: Indigo Slam, Sydney, Issue 27 C+A Magazine
Photographer: David Roche

# THE HUMAN TOUCH

**Out of mind, but certainly not out of sight.**

Concrete is everywhere – in the buildings we work and live in, the roads, tunnels and bridges we drive on, even the spaces we play in.

Of all the materials we build with, concrete is not just the most popular – it is arguably the most human and sensory.

The stunning shapes and flowing forms of modern concrete architecture are visually stunning and the key to our bright and beautiful modern cities.

The silky smoothness of a polished concrete floor in the home is a luxurious treat underfoot, while the natural textures and colour of an exposed aggregate driveway can uplift a tired soul at the end of a long day. Both represent great taste.

Concrete because of its thermal mass can also support natural climate control and offer unique energy-savings, absorbing energy slowly and holding it for much longer periods of time.

Its high-density can bring peace to living spaces by blocking out noisy neighbours from adjacent apartments and reducing noise from exterior sources.

The feeling of safety and security that solid, durable concrete provides is unrivalled.

Concrete protects in times of crisis; resisting fire, withstanding earthquakes, and is impervious to flooding. It is a safe, inert material, making it the right choice for sustainable living environments.

Top: Mosman House, Shaun Lockyer Architects, Photographer: Scott Burrows
Middle: One Central Park, Sydney, Frasers Property & Sekisui House
Bottom: Invisible House, NSW, Issue 18 C+A Magazine, Photographer: Michael Nicholson

## SMARTER EVERY DAY

The cost and environmental impact of building and construction materials is under ever-increasing scrutiny. Researchers, engineers and scientists are working to develop new types of concrete with capabilities never thought possible, to ensure its place in the buildings of tomorrow. These include:

**Translucent concrete** that lets light pass through

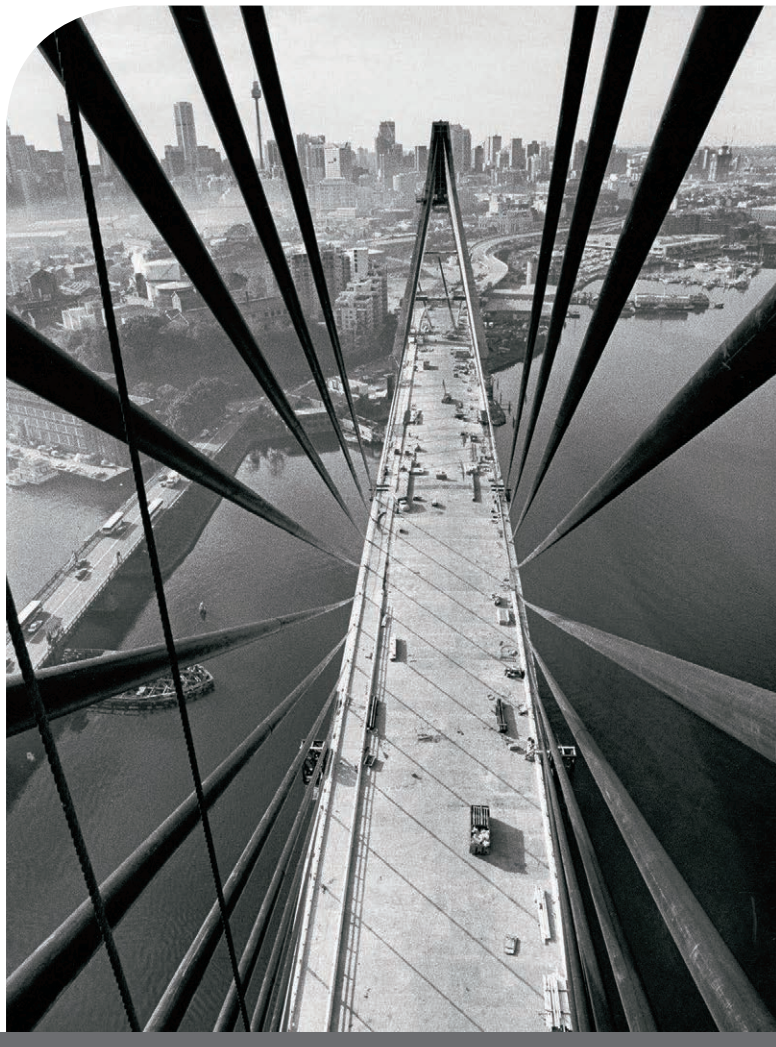
**Pervious concrete** that allows water to pass through it completely, allowing the fast drainage of storm water and to refresh aquifers

**Superworkable concrete** that is flowable and pump-able for taller buildings and challenging construction sites

**Flexible concrete** that can withstand greater bending

**Ultra-high-strength concrete** that not only offers compressive strength of up to 150MPa – 6 to 8 times more than basic concretes – but enhanced flexural performance too

**Environmental Mix designs** that utilise industrial waste and improve the environment.



## SUPPORTING THE SUPERLATIVES

Concrete is even more amazing when you consider that it literally enables the world's superlative projects – the tallest buildings, the longest bridges, the deepest tunnels. They are all indebted to concrete and impossible without it. It is the material that helps to advance civilization.

Right: ANZAC Bridge (construction), Photographer: David Moore

## BRINGS LIFE TO BUILDING

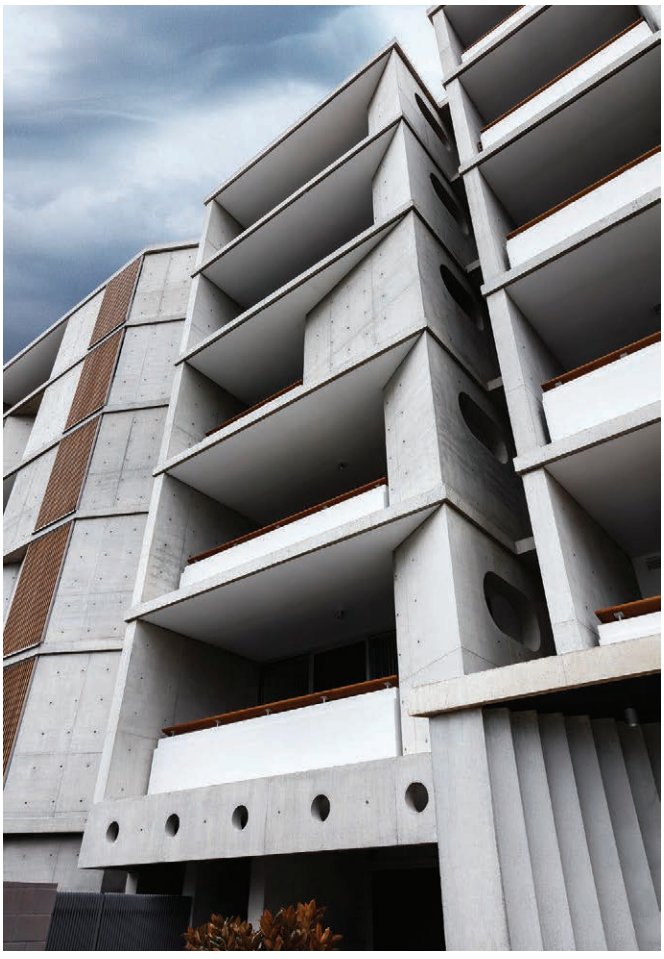
When designing buildings and infrastructure, the sustainability and cost-effectiveness of the materials should always be considered from a whole of life perspective. It's important to develop a "holistic view" that takes every aspect of the structure and its performance into consideration over the entire life of the building.

Concrete is unmatched in this regard, underpinned by outstanding durability, high thermal mass that enables lower energy usage and minimal maintenance requirements. Protection against fire, floods and natural resistance to rotting and termites also leads to enhanced occupant safety for life.

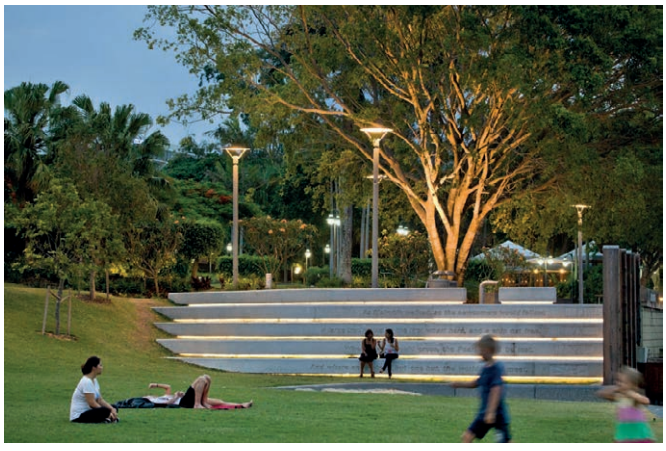
## BUILDAGILITY

Concrete isn't just great for the end user. It is easy to work with on-site and its placement, handling and finishing are well understood. Amongst its capabilities are:

- Easy to obtain, with longstanding national supply & distribution chains
- Build Fast. In high rise buildings floor cycle times of as little as four days are common
- Building with concrete is so well accepted it allows for more efficient scheduling of trades, saving time and money
- Little wastage onsite, ensuring fast site clean-up
- Concrete elements can be factory manufactured to precise specifications, then delivered to site for fast installation.



Top: Orama Sydney, Issue 25 C+A Magazine, Photographer: Sharrin Rees
Bottom: President Apartments, Sydney, Candalepas associates
Photographer: Geoff Howden



## ALWAYS GROWING GREENER

Concrete and cement manufacturers are united in their efforts to reduce the industry's environmental impact. The industry continues to invest in modern technology and practices that minimise emissions and energy consumption. Since 1990 the emissions from cement manufacturing have dropped by 24%.[1]

Did you know:

- Waste material is used as fuel in cement kilns including old tyres, spent solvents, demolition timber, used oil and other unwanted matter that might otherwise end up in landfill
- Improvements in kiln technology have improved the energy efficiency of cement manufacture
- Partial replacement of cement with supplementary cementitious materials such as fly ash and blast-furnace slag. This avoids the need to place these materials in landfill and reduces emissions whilst enhancing performance
- Recycled coarse and fine aggregates can substitute the use of some virgin natural resources.

Its not just environmentally sustainable. The industry keeps thousands of Australians employed, delivering significant economic and social benefits to our local communities.

[1] Cement Industry Federation data http://www.cement.org.au/AustraliasCementIndustry/CIFFastFacts.aspx

Top: Phillip Island House, Photographer: John Gollings
Middle & bottom: River Quay, Brisbane, Photographer: John Gollings

# EVERY WAY, SHAPE AND FORM

Concrete is the only building material that can be shaped to meet every need of an architect or designer. It is delivered in a living, agile state, which affords the architect endless design possibilities. When combined with concrete's strength, durability, and availability, the architectural potential of concrete is unlimited.

Amongst its many capabilities, concrete is known to expand spaces, frame and enhance landscaping, and connect outdoor and indoor spaces.

Concrete was critical to the Modernist architectural movement in the 20th century.

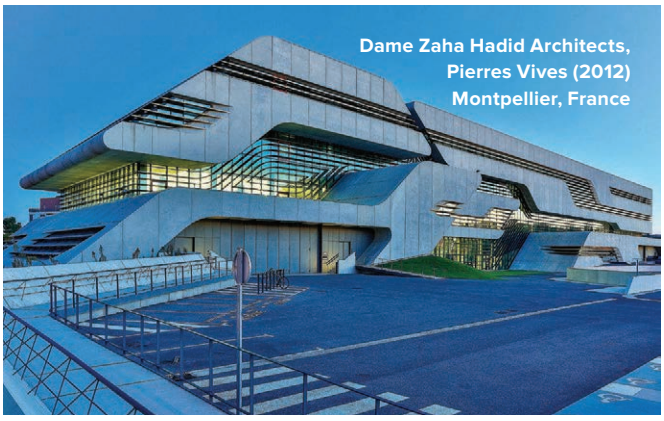
Only concrete met the demands of luminaries such as Niemeyer, Corbusier and Seidler with the unique combination of flexibility and strength necessary for their breathtaking, swooping works of art.

Louis Kahn captured this most beautifully, referring to concrete as 'molten stone'.

Into the 21st Century, Dame Zaha Hadid used concrete in exhilarating ways to create avant-gardist feats of architectural engineering. Zaha Hadid's signature style elevated concrete to new levels of creative audacity with otherworldly beauty that dared us to reimagine the possibilities for artistic expression in the built environment.

Taking advantage of the architectural power of concrete is a pursuit that continues with passion and fury today.

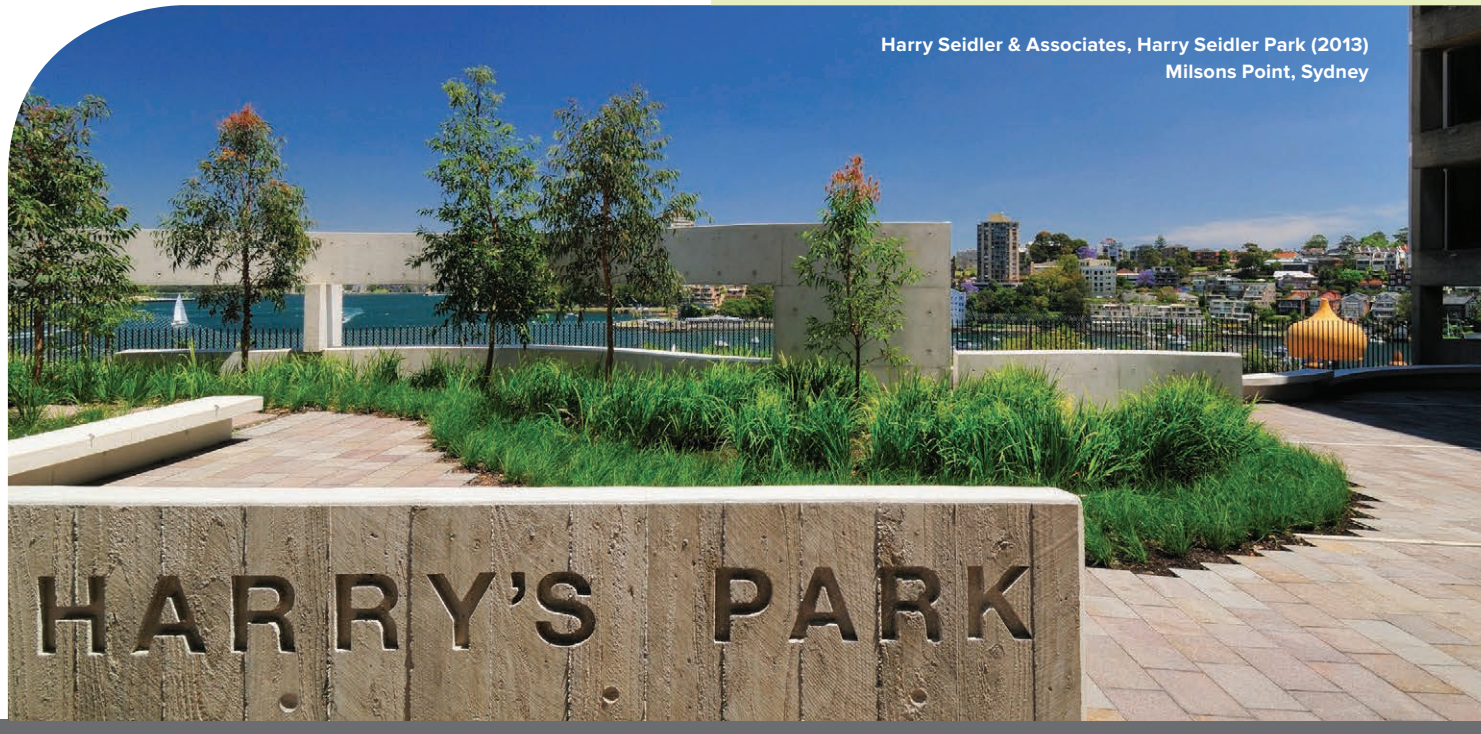
**ARM Architecture, Geelong Library & Heritage Centre (2015). Geelong, Victoria**



**Dame Zaha Hadid Architects, Pierres Vives (2012) Montpellier, France**

**"Concrete you can mould...after all, you haven't any straight lines in your body. Why should we have straight lines in our architecture?"**

**– Phillip Johnson**




**Harry Seidler & Associates, Harry Seidler Park (2013) Milsons Point, Sydney**

The Pantheon, Rome

# BUILT FOR ETERNITY

**As our industry looks forward, it's worth reflecting for a moment on the past.**

The Roman Empire was among the earliest masters of concrete. The Coliseum, Pantheon, and Trajan's Market are sites that people travel from around the world to see. They are all in remarkable condition for their age and have weathered all the unthinkable changes in our world since they were built millennia ago.

Only concrete can deliver that combination of style, sustainability and longevity.

Concrete.
FUTUREPROOF
your build™

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