



Concrete³ 2011

Sustainability Awards
ENTRIES NOW OPEN



www.sustainableconcrete.org.nz

“Sustainable development implies meeting the needs of the present without compromising the ability of future generations to meet their own needs.”

OUR COMMON FUTURE: THE BRUNDTLAND REPORT.
WORLD COMMISSION ON ENVIRONMENT AND DEVELOPMENT, UNITED NATIONS, 1987.

About Concrete³

Launched in 2007 by the Cement & Concrete Association of New Zealand (CCANZ) the Concrete³ programme of education, information and research seeks to raise awareness of concrete's contribution to New Zealand's sustainable development across all areas of economic, social and environmental endeavour.

About Concrete³ Sustainability Awards

Key to Concrete³ supporting the development of innovative and sustainable concrete solutions for the built environment are the Concrete³ Sustainability Awards. Presented annually, the awards provide architects, designers, engineers and/or industry with the opportunity to submit a concrete based product, project or initiative, substantially completed within the past three years, that demonstrates sustainability in either the production or use of concrete.

The inaugural 2008 winner was The Pride, Lion Nathan's new integrated manufacturing and warehousing facility in East Tamaki. In 2009 the Northern Gateway Toll Road took home the award, while in 2010 Fletcher Construction's concrete "Mix M" for Stage 2 of the Tauranga Harbour Link project received the highest accolade. These Supreme Winners along with other category winners from the previous 3-years are showcased in this booklet.

2011 Concrete³ Sustainability Awards

Entries are now open for the 2011 Concrete³ Sustainability Awards.

Each concrete based product, project or initiative entered may relate to any of the following areas:

- Lean production / less waste
- Protecting against pollution
- Minimising energy use
- Managing natural resources
- Respect for people
- Setting performance targets

The 2011 Concrete³ Sustainability Awards will be presented in the following categories:

- Excellence in Residential Concrete Construction
- Excellence in Concrete for the Community
- Excellence in Commercial Concrete Construction
- Excellence in Civil Concrete Construction
- Excellence in Concrete Innovation

Within each category entries will be judged by a panel of New Zealand and international industry experts, using an environmental, economic and social sustainability set of criteria. From the category winners, the Supreme Winner will be selected.

Entry information is available from www.sustainableconcrete.org.nz. You have until Wednesday 29 June 2011 to submit your entry.

The winner will be announced at a presentation at the 9th Symposium on High Performance Concrete Design to be held in Rotorua 9–11 August 2011.

ENTER NOW www.sustainableconcrete.org.nz

2010 Supreme Award Winner + Excellence in Civil Concrete Construction

FLETCHER CONSTRUCTION COMPANY - TAURANGA HARBOUR LINK "MIX M"

A special concrete mix designed by the Fletcher Construction Company, Firth Industries and Golden Bay Cement for the Tauranga Harbour Link project won the 2010 Supreme Concrete Sustainability Award, as well as the Excellence in Civil Concrete Construction Award.

Designated "Mix M", the resulting concrete is designed to survive 100 years in harsh marine conditions, and was employed extensively in Stage 2 of the Harbour Link project to form beams used in the off-ramps, bridges and land spans.

Mix M achieved top honours in concrete sustainability for its specially blended and extensively trialed mix of Golden Bay Cement, fly ash (a waste product from coal burnt at Huntly Power Station), and microsilica 600. Together these ingredients enabled demanding durability, high early strength, and high workability requirements to be met. The use of fly ash and microsilica also resulted in a significant reduction in cement requirements and a corresponding reduction in the carbon footprint of the concrete beams.

Mix M represents a significant step forward in concrete mix design and durability modelling, one which combined enhanced environmental credentials with superior performance. Not only was the mix design sophisticated in optimising cement replacement, but by sourcing its fly ash from within New Zealand, and using microsilica slurry rather than more energy intensive powder, Mix M scored additional sustainability marks.

"It was great for Fletcher Construction to be able to work with Firth and Golden Bay Cement to develop a product that ticked all the sustainability boxes as well as being a real construction solution. Winning the award was a really great endorsement of this combined team effort."

Stuart Chapman - Environment Health and Safety Manager, Fletcher Construction Company

Excellence in Commercial Concrete Construction

DUNNING THORNTON CONSULTANTS - THE CUSTOMHOUSE, WELLINGTON

Designed by architects Studio Pacific Architecture, the Customhouse is Wellington's newest 5-star Greenstar building. Featuring dramatic precast facade panels, the building's design makes the most of the unusual triangular island site to gain excellent natural light and maximise the sea views. On the west facade, heavy exposure to the setting sun has been treated with striking metal sunshades.

The use of concrete is an integral part of the sustainability characteristics, in particular, the soffit of the doubletees and precast frame have been left exposed to allow their thermal mass, working in synch with chilled beams, to provide a high level of internal temperature stability.

Normal and pre-stressed reinforcement was used to achieve components that allowed for efficient off-site manufacture and rapid construction. The building is also designed to resist seismic loads through a full height jump-formed core, with walls coupled using steel beams to achieve a ductile design. The core is supplemented by vertically pre-stressed 'outrigger' walls that help reduce torsional oscillation in earthquakes.

Deep angular wing-shaped precast panels provide texture to the exterior and add to the solar shading. Self-compacting concrete was used to create the complex shape and to allow deep recesses to be formed inside the panels which were filled with insulation. The facade was seen as a better solution, for both solar shading and cost, over traditional curtain wall glazing.



Excellence in Residential Concrete Construction

POWERED LIVING (NORTH ISLAND) - RESIDENTIAL HOUSE, WAIKATO

Powered Living's (North Island) Waikato residential property was designed to conserve energy through passive solar principles, utilising the thermal mass of concrete in combination with the sun's energy to achieve a 60% reduction in energy requirements compared to similar houses.

Oriented due north to maximize solar gain, the house enables heat transfer from the north to the south via a natural process of thermal heat conduction through building materials. This is a realistic attempt to achieve an attractive, affordable, environmentally designed, and energy efficient house with off the shelf environmental technologies and materials.



Images - Frances Oliver



Excellence in Residential Concrete Construction

BUCK + ASSOCIATES, ARCHITECTS - TEEAR HOUSE, CHRISTCHURCH

The recently completed Teear House in Christchurch was designed by Buck + Associates, Architects to be self-sustaining in terms of space and water heating requirements. This involved adopting a practical balance between thermal mass, glazing, and insulation to minimise the effects of daily and seasonal external temperature swings and solar variability via passive means. The end result is a uniform internal temperature predicted to be no less than 17°C.

In addition to an energy efficient and healthy living space, this predominantly concrete house offers durability and low maintenance, and integrates seamlessly with the surrounding environment.



Excellence in Concrete Innovation

MAINZEAL PROPERTY & CONSTRUCTION LTD
- THE ALAN MACDIARMID BUILDING, VICTORIA UNIVERSITY OF WELLINGTON

Opened in July 2010, New Zealand's first multi-storey PRESSS building is a true collaborative effort, involving Jasmax, Dunning Thornton Consultants, BECA, RLB and Lab Works. The result was the implementation of a new technology in seismic and component-based concrete construction. By utilising un-bonded post tensioning and rocking joints within the structure the PRESSS system ensures the building returns to upright without significant structural damage, even after a major seismic event.

The environmentally sustainable credentials that come with being prefabricated and de-mountable, are matched by the building's low maintenance requirements and the protection it offers the hugely valuable fit-out and services.



Excellence in Concrete for the Community

DUNNING THORNTON CONSULTANTS
- MOVING THE ROB ROY (BIRDCAGE) HOTEL, AUCKLAND

Through the innovative use of concrete the historic Rob Roy Hotel was strengthened to current seismic code requirements with minimum intervention to the heritage fabric, and then relocated horizontally 45m, on top of stiff and precisely levelled concrete runway beams that spanned culverts and soft ground.

The 750 tonne building made the journey with no damage to its delicate heritage fabric and now awaits the return trip. The result has been a win for the community with the sustainable retention, recycling and re-use of an important Auckland heritage icon for future generations to enjoy.



2009 Supreme Award Winner

NORTHERN GATEWAY ALLIANCE - THE NORTHERN GATEWAY TOLL ROAD

The 2009 Concrete³ Sustainability Supreme Award was taken away by the Northern Gateway Alliance for the Northern Gateway Toll Road, a 7.5km \$360 million extension of State Highway One from Orewa and Puhoi, which at the time was New Zealand Transport Agency's largest ever capital project.

The route passes through a historically rich and diverse landscape containing steep topography, large tracts of native bush, regionally significant and environmentally sensitive streams and estuaries and areas of pastoral farmland. The project included 5 new bridge structures, one widened structure, and twin bore tunnels, consuming 60,000m³ of concrete.

Amongst numerous other features the project achieved top marks in concrete sustainability for the concrete lining in the twin Johnstone's Hill tunnels, which made extensive use of polypropylene fibres for fire resistance, and its bridge structures, which used timesaving match-cast technology for the first time in New Zealand.

The Northern Gateway Toll Road is a truly significant project and the Alliance behind it demonstrated a genuine commitment to large-scale sustainable construction. All aspects of the project, from design through to operation, have considered ways in which to minimise the carbon footprint and contribute to New Zealand's sustainable development. The project's use of concrete for its sustainable properties, in particular durability and fire resistance, is outstanding.

"We are committed to sustainable development in all areas of our organisation and entering the Concrete³ Sustainability Award was a chance to celebrate the good work of those involved in the project. It also provided a strong endorsement of our practices which can be shown to future partners and clients."

URS (Northern Gateway Alliance member) spokesperson Amanda Harrison

Excellence in Commercial Concrete Construction

STUDIO PACIFIC ARCHITECTURE - SITE 7: MERIDIAN BUILDING, WELLINGTON

New Zealand's first 5-star Greenstar building makes extensive use of concrete as a structural material. Other features include concrete's thermal mass as part of an integrated passive solar design, as well as low cement concrete in the precast elements and piles to help combat the harsh marine environment.

Excellence in Concrete Innovation

ALLIED CONCRETE LIMITED - THE NEST, WELLINGTON ZOO

Following a detailed research programme, around 60m³ (40% of the total cast on site) of 25MPa Recycled Crushed Concrete (RCC) was supplied for the Wellington Zoo's new hospital complex (The Nest). The RCC concrete was used in structural applications at a 30% replacement rate.

Excellence in Residential Concrete Construction

CRANKO ARCHITECTS LIMITED - SUSTAINABLE HOUSE, WELLINGTON

This stylish dwelling takes advantage of concrete for its energy efficient thermal mass and its low maintenance features. Key to the design is a striking gallery which acts as a double-height conservatory and circulation space, spanned by a concrete bridge.



Image - Simon Devitt



Image - Kevin Hawkins

2008 Supreme Award Winner

MAINZEAL PROPERTY & CONSTRUCTION LTD AND HOLCIM (NEW ZEALAND) LTD FOR LION NATHAN'S THE PRIDE

The inaugural Concrete³ Sustainability Award was presented to Mainzeal Property & Construction Ltd. In partnership with Holcim (New Zealand) Ltd, a special concrete mix was developed for Lion Nathan's new integrated manufacturing and warehousing facility in East Tamaki (The Pride) which made extensive use of recycled glass as aggregate.

Directed by the principles of Ecologically Sustainable Design (ESD) the project team identified a natural synergy between Lion Nathan as a beverage manufacturer and collective concerns about Auckland's large stockpiles of waste glass, as well as acknowledging the region's acute shortage of locally produced aggregate.

Following a rigorous research and testing programme, concerns about the potential for alkali silica reaction (ASR) were eased, and a high-strength concrete mix containing recycled glass as aggregate was achieved. Other challenges that needed to be overcome during the development stage included glass contamination, grading curve selection, crushing cost management, and procurement of a suitable glass stockpile.

Recycled glass as aggregate in concrete has been used throughout The Pride in the substructure concrete, selected floor slabs and precast panels, and trench backfill, pipe bedding and sand blinding – all to glittering effect.

By embracing the principles of sustainable development as key to business success, and working hard on modifying attitudes to accommodate the extensive use of recycled glass as aggregate in concrete, The Pride has literally paved the way for the wider implementation of this exciting technology.

"Winning the Concrete³ Sustainability Award was a huge honour for Mainzeal. It is certainly in line with what we are trying to achieve with respect to our strategic business objectives, as well as being timely in the sense that sustainability is now a genuine business concern."

Mainzeal's Sustainability Manager, Ross Copland

2008 Highly Commended

WILCO PRECAST LTD – SINCLAIR HOUSE, WHITIANGA

This contemporary family home makes extensive use of lightweight concrete precast panels called *Litecrete*. Unlike typical concrete, *Litecrete* uses pumice to dramatically reduce the weight of the concrete and achieve a unique strength-to-weight ratio.

The air cells in the pumice aggregate also help provide superb insulating properties, making *Litecrete* the ideal material from which to construct an energy efficient home, such as Sinclair House. Thermal mass provided by the concrete foundation slab, along with the built-in insulation of the *Litecrete* components and double-glazed window units, combine to ensure that the internal living space is not subject to large daily temperature fluctuations. The result is reduced energy costs and a more comfortable and healthy living environment.

Sinclair House also benefited from precast concrete construction's rapid erection and zero waste on-site. In addition, exhaust emissions from the transportation of *Litecrete* to site were reduced, as the volume of panels that could be trucked doubled due to the material's lightweight properties.

Litecrete offers Sinclair House fire resistance that exceeds four hours, along with excellent acoustic performance. It will not rust, rot or attract mould, achieving top marks in durability. Its low maintenance features, both inside and out, provide a further tick in the sustainability column making Sinclair House a model for residential living in New Zealand.





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