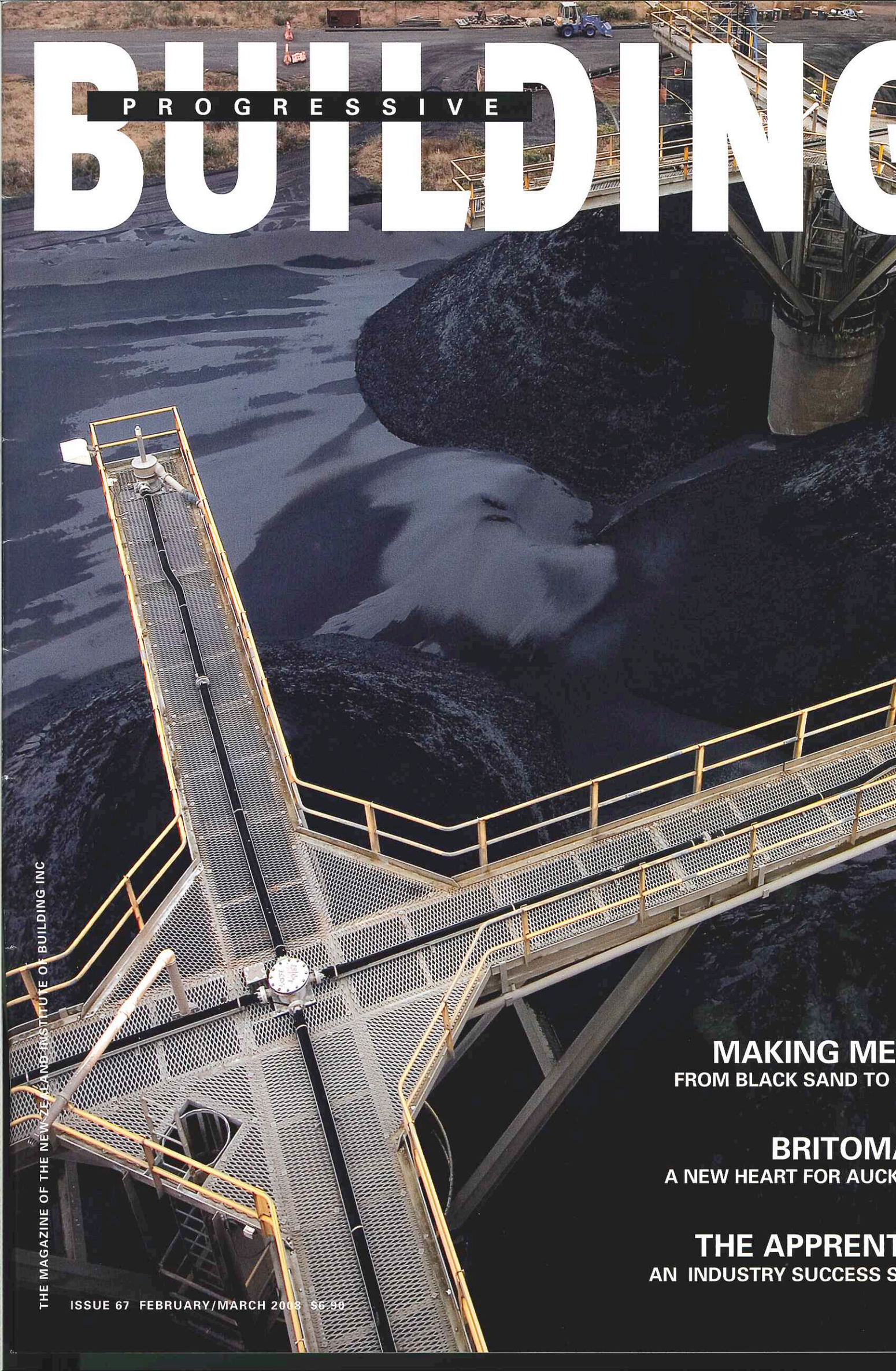
PROGRESSIVE

BUILDING



MAKING ME
FROM BLACK SAND TO

BRITOMA
A NEW HEART FOR AUCK

THE APPRENT
AN INDUSTRY SUCCESS S

THE MAGAZINE OF THE NEW ZEALAND INSTITUTE OF BUILDING INC

ISSUE 67 FEBRUARY/MARCH 2008 $6.90

LIGHT AND LOW

A new, low-level state-of-the-art office building for the Bank of New Zealand is currently under construction in Wellington's Harbour Quays. The building has been designed to provide a large, open working space that is light and healthy. As with most waterfront buildings in Wellington it also needs to be able to withstand a range of climatic conditions.

TEXT **HELEN FRANCIS** / PHOTOGRAPHY **MARTY MELVILLE**

On the wharves of Wellington the Bank of New Zealand's (BNZ) new business operations building is taking shape. Light and low, with large scale artwork on the facade overlooking Waterloo Quay, this is a very different building from the "black box" completed for BNZ tenancy on Willis Street in 1983. The southeast facade of the five level building is being clad with clear, double-glazed glass panes, interspersed with white aluminium panels. A light catching design depicting water currents attracts the attention of rail commuters and traffic along the quay. The building will be ready for business in 2009.

The BNZ building is part of CentrePort Wellington's masterplan for the Harbour Quays development, which already houses tenants such as Statistics New Zealand, the NZ Rugby Union and TelstraClear. Harbour Quays follows a worldwide trend of bringing together the working environments of city and sea. Once completed the 6.5 hectare development will house a mix of corporate and government businesses, with retail outlets, residential and recreational spaces. The masterplan provides another 10 available commercial building sites of varying sizes and by 2010 the buildings tagged for completion will house three thousand people, half the expected final population of six thousand.

The Harbour Quays' masterplan, designed by Studio Pacific Architecture, includes: environmental landscaping using "swale" drain sustainable water management system; public spaces; extensive planting; and incorporates heritage buildings such as Maritime House and Shed 35. CentrePort's plan is committed to ecologically sustainable development (ESD). Moving forward the minimum specification for Harbour Quays' new buildings is five green star under the newly launch NZ Green Building Council rating system.

Key players in the BNZ project team are:

Jasmax, the architects, Beca, responsible for structural and services engineering and Fletcher, who are constructing the building.

The masterplan has a bespoke buildings clause that allows CentrePort's tenants to influence the building design. BNZ's brief required a building that embodies how the organisation works says Warren Young, design architect at Jasmax in Wellington. Key concepts are transparency, lightness, space and the creation of a building that allows people to interact and communicate easily.

"Instead of appearing to be quite separate from the world, BNZ wanted to show that the organisation is part of the environment and part of the city," says Young. "An added benefit of providing spacious, quality accommodation for staff is an increase in productivity for the organisation."

The structure is in fact three separate buildings – known as piers – that are joined by internal air bridges crossing the two atria. The three piers are 13.5m apart and form one open space at each level, clad in a varied glass and aluminium curtain wall system with one large roof over the entire building.

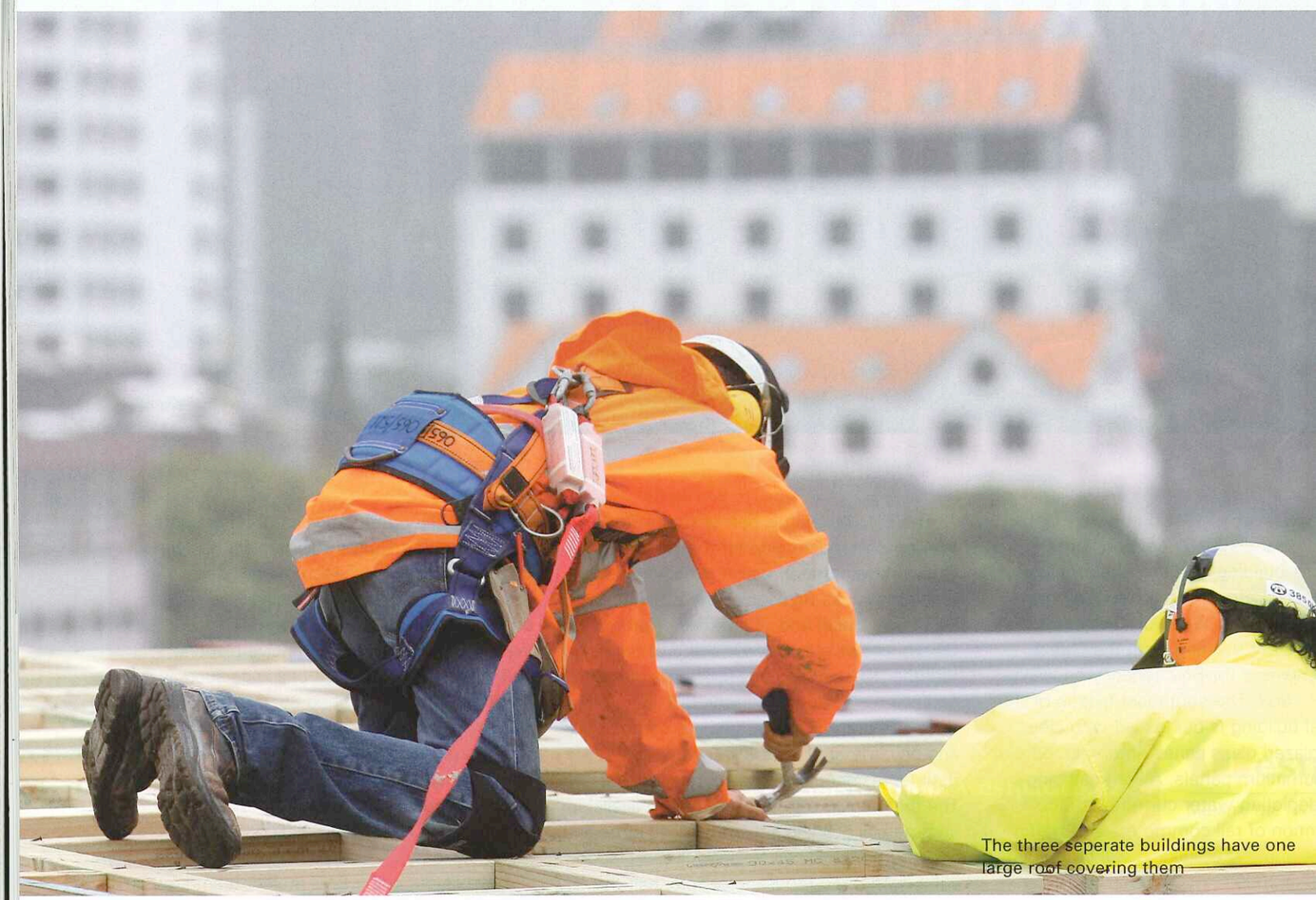
Instead of appearing to be quite separate from the world, BNZ wanted to show that the organisation is part of the environment and of the city. An added benefit of providing spacious, quality accommodation for staff is an increase in productivity.

The atria break up the open internal area, approximately 18,700sqm of which will be let as office space. The ground floor will house 1,800sqm of retail tenants and parking. The total lettable floor area is around 20,500 sq m. The three-pier/two-atria design is a first for a commercial building in New Zealand.

The architects addressed a number issues specific to the brief and site, ran from how to hold up a large building an make it look light, to managing the vari climatic conditions on the different faca Other considerations were the building interface with the city, incorporating ur design, whilst constructing a large, ope internal working environment with high quality services and meeting the five g star rating requirements of the New Ze Green Building Council.

To create an effect of lightness in th structure, Young says they have avoide using large amounts of spandrel glass set back the heavy perimeter seismic f common in Wellington buildings.

"To mitigate that we have cantilever slabs on the lane facades and on each of the building added composite steel concrete frames termed clip-ons. Thes are lighter and thinner and create a mo delicate, less dominating structure." T two mechanisms permit the use of flo



The three seperate buildings have one large roof covering them

ceiling glass, giving the effect of a light and transparent building.

Key elements such as insulation, ventilation, lighting systems, acoustics, thermal properties, solar shading and rainwater harvesting have been designed down to the smallest detail to meet stringent new Building Code requirements. For example to control heat gains and losses the lane facades are 50 percent solid, insulated aluminium panels, and 50 percent glass.

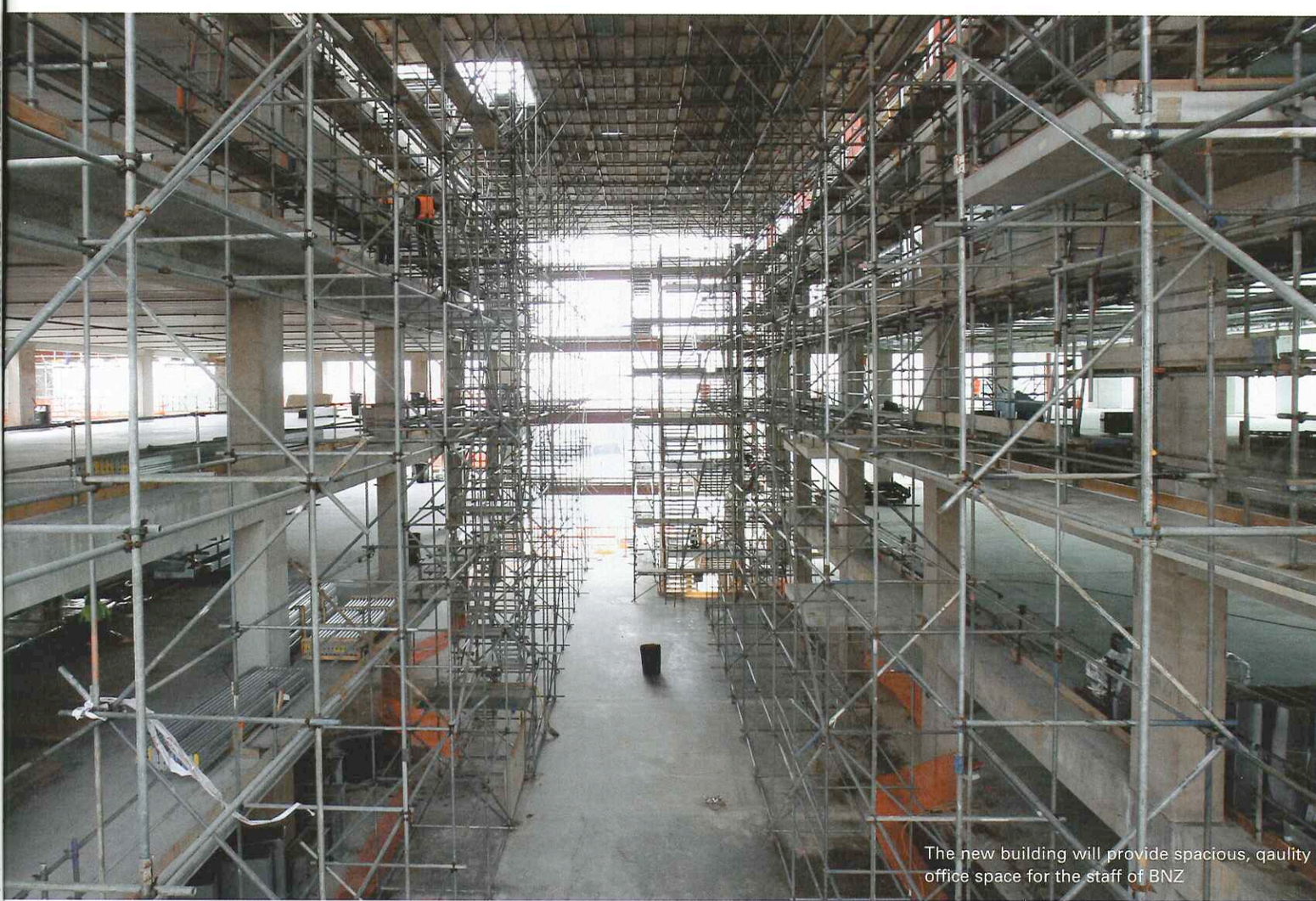
"The building has high thermal demands on it due to the large floor area and exposure to the elements of sun, sea and wind," says Aaron Muir, Fletcher's project manager.

The architects' response brought these varied environmental conditions together with considerations of urban design to create the look and feel of the building. "The aim is to build a texturally varied and diverse building," says Young. "On the north-east and south-west sides we have insulated aluminium panels interspersed with double glazed panels, with the amount of glass increasing towards the waterfront. On the south-east [waterfront] facade we let the light and views in with double-glazing for insulation and on the north-west side where there is a lot of solar radiation we have the "art façade", enclosing the toilets and acting as a thermal buffer. We have had to acknowledge the issues of urban design and how the building relates to the city. The art façade presents the public face of the building, using Stuart Forsyth's work that depicts the movement of water, linking city and sea."

Other sustainable design features include heavy insulation, rainwater harvesting, acoustic linings, and a flexible ventilation system. To date foil-faced insulation has been used in the roof and Thermax for under-slab insulation in the car park. Other insulation is currently under discussion. A 5,500sqm roof will harvest rainwater into tanks for use in toilet flushing. Echo Hush foam has been used in the atria roof, cantilevered slab soffits and balustrade linings to reduce internal noise. The air conditioning system utilises the smoke extract system to either remove exhaust air from the building or to re-circulate

AT A GLANCE

1. The deepest pile is 33m deep. The building height from ground level to roof is 28m. **2**. The building consists of three individual concrete structures linked by air bridges and two atria. The single roof posed challenges, especially along the lines of seismic movement joints. All three buildings move independantly of each other. **3.** Total Volume of concrete placed on site is 7000 m3. **4.** Total Weight of Structural Steel is 700 Tonnes. **5.** Peak labour force to construct was 300(150 at present) **6.** As many components as possible for this build were pre-fabricated. Benefits in pre-fabrication are: less time spent on site by sub-contractors and more cost effective in some cases. **7.** Lift shaft walls constructed from 'Speedwall', it ordinarily takes 6 weeks to construct but was completed in one week.



The new building will provide spacious, qaulity office space for the staff of BNZ

it back in to the system.

Building began in November 2006 when Fletcher signed the construction contract with CentrePort, and by December 2007 had completed the main structural elements.

> If we drilled a hole in one place, just a metre away we'd find the ground conditions were completely different. Every pile had its own issue

The project is operating on a simultaneous design-and-build approach to meet tight timeframes says Muir. The challenge is to coordinate the stages of construction as the building progresses, ensuring builders and subcontractors have the information they need to deliver on time.

The building is predominantly reinforced concrete with structural steel ends. The majority of the flooring systems are pre-cast, pre-stressed concrete including the cantilevered slabs off the side of the building. Pre-stressed, hollow-core beams are also pre-cast, with block outs formed for elements such as power points and thermostats. Pre-casting off site through Stresscrete meant they could start earlier, which in turn shortened the overall programme for construction. There have been two tower cranes and many mobile cranes working on the site.

The foundations were the first challenge Fletcher faced and they worked with subcontractors, Brian Perry Civil, to solve a piling problem they had not expected. They found the land into which over 70 concrete and steel piles were to be driven more than 30m deep was extremely variable. Water was seeping into the holes when they drilled and the discovery of foundations of buildings built in the early 1900s also complicated matters.

"If we drilled a hole in one place, just a metre away we'd find the ground condit were completely different," says Muir. " pile had its own issue."

Brian Perry Civil lead by their project manager, Peter Siepp, in conjunction wit geotechnical engineers at Tonkin and Tay came up with a solution in the form of a polymer slurry, commonly used overseas This is likely to have been the first time method was used in New Zealand thoug other Wellington sites are now using it. Polymers form long chemical chains and the slurry liquid (like a gooey paste) stop water getting to the exposed dirt in a pil hole. The slurry also has a very high visc and doesn't transfer the kinetic forces o drilling so it provided support during the operation, eliminating the need for drillin through caseons.

"We dropped the reinforcing cage int the hole and, using the tremie pour met poured concrete through a tube to the b of the hole which we had widened from 1.2m diameter to 2.4m into a bell shape allowed the bigger end to bear the weig

says Derek Bilby, Brian Perry's Wellington regional manager.

The concrete displaces the polymer slurry and they collected and reused any that had not come into contact with concrete.

Additional strengthening of the existing seawall and the construction of a new steel sheet pile seawall in front of the building by CentrePort has also been carried out to prevent damage under liquefaction and to provide road access for port traffic

Green building practices and the use of environmentally friendly products are an important part of the project.

"We are working hard to achieve the five star rating and just about every trade is affected," says Muir.

On this project and others, Fletcher is continuing to improve recycling practices as part of its commitment to deal with the waste generated by construction. The company already recycles general waste, paper, cardboard and steel that is sent to recyclers to be melted down and reused. It is also discussing with local authorities how to recycle waste timber, gib, and various types of concrete. On the BNZ site the 300mm layer of concrete that existed across the site has been crushed on site and reused as fill rather than being dumped in a landfill.

"Recycling brings savings to the company and the environment," says Muir. "The changes have been quite rapid."

Labour has also been abundant during 2007 with perhaps more design going on than construction within the Wellington market, and the BNZ project has benefited from this.

"Our design teams are very busy at present," says Muir, "We are getting as much done now as possible before the market gets really busy in the New Year."

Moving into 2008 the design and build teams continue to meet the challenge of tight deadlines and to use already well established working relationships to their advantage.

Jasmax in Auckland is designing the interior fit outs on behalf of the BNZ and, says Muir, the in house connection makes communication and speed of delivery a lot more efficient. | **PB**

THE LIST

Main Contractor Fletcher Construction
Structural Engineer Beca
Architect Jasmax
Piling Brian Perry Civil
Structural Steel Stevenson Structural Engineers
Curtain Walling Thermosash
Plumbing JB Malcolm
Excavation Kiwi Contracting
Reo Fixing Tek and Steel
Reo Supply Wireplus
Pre Cast Stresscrete Concrete
Lifts Schindler
Mechanical Services Aqua Heat Industries
Electrical Frank Millar
Fire Wormald
Concrete Concrete Solutions

An impression of how the BNZ offices will look once they are completed