

APPLICATION OF NEG ARG FIBRE

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NEG ARG Fibre, manufactured by Nippon Electric Glass Co., Ltd., is used throughout the world as a reinforcement for cement composites, including asbestos replacement products.

From Dilapidated to Deluxe at Auckland's Princes Wharf — GRC plays leading role in the transformation —



Over the seventy-five years since its construction, the Princes Wharf in Auckland, New Zealand had aged into an eyesore. In any other city, it could well have been a candidate for demolition. But Aucklanders have a way of doing the impossible and making it look easy. Still, even they occasionally used the word "challenging" when talking about the job of transforming a collection of six huge cargo sheds and a shabby overseas terminal into a mixed entertainment and commercial space including 297 luxury apartments, top-level commercial offices, 12 restaurants, cafes and bars, stylish retail outlets, and a 167-room five star hotel — plus parking for 800 cars. The zeal behind the undertaking was well reflected in the statement announcing

the project: "Positioned right next to the activity that will surround the America's Cup and all the other celebrations of the new millennium, Princes Wharf will be in the international spotlight."

Auckland Landmark Princes Wharf

Location:	Auckland, New Zealand
Architect:	Leuschke Group Architects
Main Contractor:	Hartner Construction Ltd.
Engineer:	Buller George Engineers Ltd.
Manufacturer:	GRC New Zealand Ltd.
Completion:	2000
Total area of deck:	33,000 square metres
Total development area:	100,000 square metres
GRC area:	7,650 square metres



The dominating design feature of the GRC wall panels are the small holes, simulating portholes, that punctuate the massive expanse of the outer walls with a pleasing rhythm. (opposite, top)

The Princes Wharf Project was divided into three stages. Stage 1 was for rebuilding three sheds on the city side into 132 apartments and the Ports of Auckland building. The first stage also included installation of water, power, sewer and other infrastructure facilities. Stage 2 was for redeveloping two other sheds, and Stage 3 for converting still another into the new Hilton on the Wharf. Hotel project manager Paul Feltham views the new hotel as the centrepiece of the redevelopment, describing it as "eight stories of top luxury, virtually surrounded by the Waitemata Harbour."

The Ports of Auckland building, an international overseas passenger terminal, would also be a hub for the America's Cup. Workers who showed up on Day One of the Princes Wharf project must have felt somewhat daunted by the size of the development. The total area of the Princes Wharf deck is 33,000m² and the total development area about 100,000m².

Can the old piles take it?

The basic idea was to strip the sheds down to their reinforced concrete frames and add new layers of external skin and more floors. With the wharf standing on piles over 15 metres of water, an early question was whether the old piles were strong enough to bear the weight of the larger new buildings. The architect determined they were, provided that GRC-cladding panels and structural steel framing were used above existing concrete

structures. The only new piles that had to be installed were the ones required for lateral strengthening against earthquakes under the modern building code. The cost saving was tremendous.

A typical 3x3 metre GRC panel weighs a mere 330kg compared with 3,000kg for a like-sized precast concrete panel. The lower weight reduces the cost of the building frame and foundation, and also provides a considerable savings in panel fixing brackets. Another cost-saving feature is speedy installation, which could be as fast as 25 panels a day.

Making an eyesore into an eye-catcher

Use of GRC (Glass Fibre Reinforced Concrete) for the cladding system also turned out to be an excellent choice in terms of aesthetics. The theme set for the Princes Wharf Development was nautical — for optimum harmony with the harbour setting. GRC was an ideal choice for realising the masts, portholes, curved panels and other special shapes this required. Thanks to the versatility of GRC, the architect was able to implement the theme with relative ease. GRC panels can be manufactured in an almost infinite variety of shapes to meet the needs of architectural designs ranging from the everyday to the highly creative. Variations in surface finish are also virtually unlimited, because the production process is compatible with a broad range of face mixes, textures, colours and special features.

The facilities planned for construction along Princes Wharf evoke the image of giant luxury liner anchored in Waitemata Harbour.







Cladding panel detail

Panels manufactured locally

GRC New Zealand Ltd. won the contract to manufacture and supply the GRC cladding. The car park panels, featuring square portholes, were made using a GRC rib construction method. Stair tower and curved feature panels between the buildings needed a steel-backing frame. The total GRC cladding area amounted to some 7,650m², which the company produced at an average of 28m²/day.

Particular attention was given to ensuring the corrosion resistance needed to fend off the ravages of the salty environment at a seaside location.

The rib panels had an average weight of only 520kg and could be put

up much more rapidly than conventional precast concrete panels. Once a panel had been mounted on brackets fixed to the building frame in advance, workers aligned it precisely using hand tools. Meanwhile, the crane installed the next panel.

The interior finishing material was attached to the inside of the GRC backing frame. This left substantially more floor area inside the building.

The GRC panels were manufactured to meet all requirements stipulated by the Prestressed Concrete Institute. The Institute's comprehensive guidelines cover every aspect of panel production, from materials and design to quality

control and testing. In earlier days, post-installation panel shifting and strength loss were sometimes a concern, but these problems have now been overcome through better design.

Use of GRC is fairly new in New Zealand but is catching on fast. High-rise buildings with a GRC facade are an increasingly common feature of the Auckland skyline. Impressed by the potential of this versatile building material, Dirk Kapma of GRC New Zealand says, "We are developing other applications with this exciting material for future projects."

Most in the construction industry agree he is on the right track.



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