

WEST GATE BRIDGE
STRENGTHENING PROJECT

BRIDGE TO THE FUTURE

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BRIDGE TO THE FUTURE

The latest technologies and materials give Melbourne's
West Gate Bridge plenty of new strength and time

Written by Barbara Taormina & Produced by Lorraine Heist

KEVIN DEVLIN WASN'T yet born when the West Gate Bridge collapsed in 1970, killing 35 workers in what was, and remains, the worst industrial accident in Australia's history. But today Devlin, an engineer for VicRoads, the governmental authority that oversees Victoria's roadways, is the Project Manager for the West Gate Bridge Strengthening Project, a \$300 million infrastructure upgrade and a key piece of the overhaul of Melbourne's \$1.4 billion upgrade on the Monash-CityLink- West Gate network (M1).

"It's been an amazing opportunity," says Devlin who sees the 2.5 kilometer bridge not only as a critical piece of roadway that connects Melbourne's urban center with the city's western suburbs, but also as a key element of the city's skyline and cultural identity.

But Devlin admits it has also been an amazing challenge. The project, which includes reinforcing the steel box girder bridge's structural elements and expanding the roadway capacity from eight to 10 lanes, is in the hands of the West Gate Bridge Strengthening Alliance.

Devlin and VicRoads have been working with the John Holland Group, which is responsible for the construction and design firms of Flint & Neil, and Sinclair Knight Merz.

In addition to the routine time-and-cost pressures on a public project of this size, there was a union disputes and health and safety challenges that needed to be addressed. But Devlin says setbacks are a natural part of any project of this size and intricacy, and part of his job is going to work each day prepared to devise a way around any surprise road blocks.

But Devlin also heads home each night with a sense of satisfaction that the Alliance has kept traffic flowing over the bridge during construction and the project is on schedule to meet its targeted completion date of early 2011.

Designing for the future

Back in the '70s when the bridge, which was two years into construction, collapsed as a result of a design flaw, it became a textbook model of the problems and limits in modern engineering. Today, the bridge strengthening

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WEST GATE BRIDGE



project may make West Gate a leading example of how to address aging infrastructure in cities around the world.

Like other major 20th century roadways and bridges, the West Gate Bridge has seen a dramatic increase in use over the past several decades. When the bridge opened in 1978, it carried an average of 40,000 vehicles, including trucks weighing 25 tonnes, across the Yarra River each day. But the volume of traffic has since climbed to about 160,000 vehicles, with plenty of double-load trucks weighing in at about 70 tonnes. “The bridge has been asked to do a lot more over the years,” says Devlin.

Planning on how to address that increase in use and ease growing traffic congestion

“There was a lot of structural analysis using advanced software and real field data to understand the true state of the bridge”

Kevin Devlin, VicRoads Engineer

began in 2007. “There was a lot of structural analysis using advanced software and real field data to understand the true state of the bridge,” says Devlin. And there were other challenges. “Part of the complexity of the task was due to the need to keep the bridge operational during construction,” he adds.

SUPPLIER PROFILE:

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APS is one of Australia's leading access solutions providers. Established in 2005 and with 60 plus personnel across its business's, APS provides suspended access systems such as the APS Technitruss, a light weight and extremely strong suspended access system ideal for bridge access, wharf and pier access, building façade restoration, power station boiler maintenance. Having carried out works in Europe and Australia the Technitruss platforms are a strong, adaptable and safe alternative to traditional access systems such as scaffolding.

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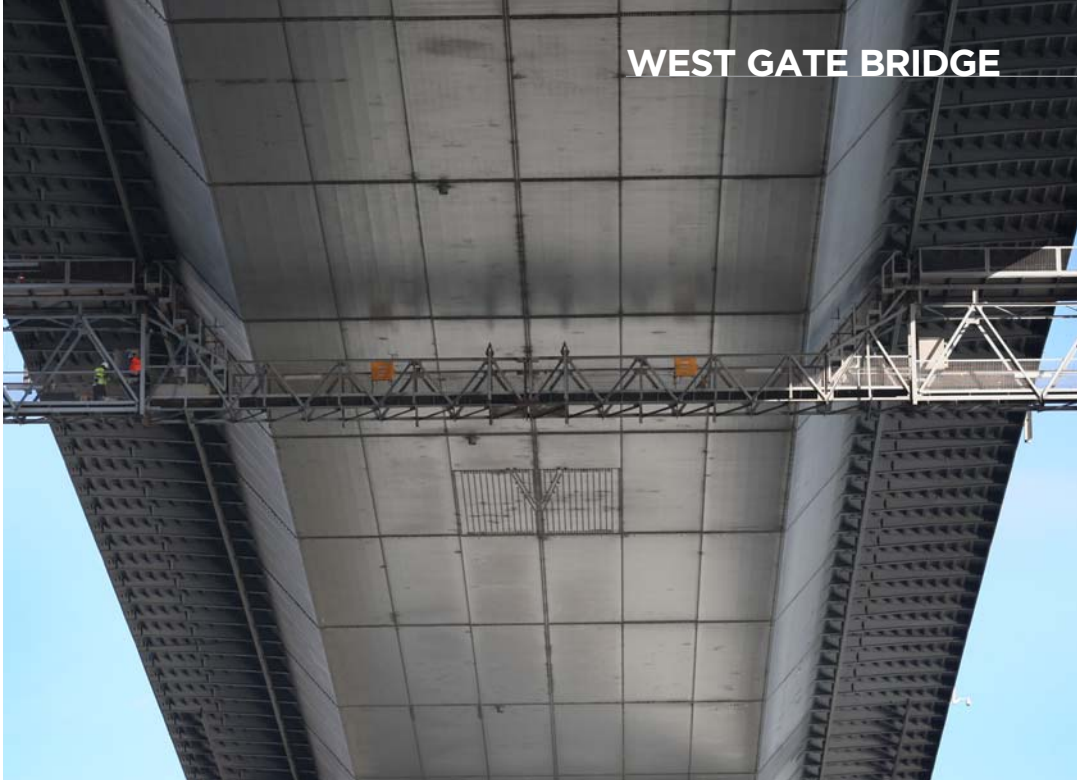
The advertisement for Gordon McKay features a large image of a bridge with workers on it. Below this, there are three smaller images: one showing a worker in a yellow safety vest and hard hat, another showing a worker in an orange safety vest and hard hat, and a third showing a worker in an orange safety vest and hard hat. The text 'gordon mckay' is written in a large, bold, blue font. Below this, the text 'Electrical and data cabling services' is written in a smaller, blue font. At the bottom, the website 'www.gmckay.com.au' is listed.

gordon mckay
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The advertisement for McElligotts Partners Pty Ltd features a large image of a bridge with workers on it. Below this, there is a smaller image of a worker in a yellow safety vest and hard hat. The text 'MCELLIGOTT PARTNERS PTY LTD' is written in a bold, black font. Below this, the text 'Protective Coatings, taking care of Australia's Assets. With over 50 years experience and extensive resources we have the necessary capacity to deliver major projects. McElligotts are a quality accredited company and have PCCP level 5 and also ISO accreditation. McElligotts Partners Pty Ltd are acknowledged as leaders in the protective coatings industry. Our involvement in the Westgate Bridge Strengthening is a reflection of our companies experience and ability to carry out large scale projects.' is written in a smaller, black font. At the bottom, the company name 'McELLIGOTT'S' is written in a bold, black font, followed by 'PROTECTIVE COATINGS CONTRACTORS' in a smaller, black font. The tagline 'Protecting Australia's Assets' and the website 'www.mcelligotts.com.au' are also included.

MCELLIGOTT PARTNERS PTY LTD
Protective Coatings, taking care of Australia's Assets. With over 50 years experience and extensive resources we have the necessary capacity to deliver major projects. McElligotts are a quality accredited company and have PCCP level 5 and also ISO accreditation. McElligotts Partners Pty Ltd are acknowledged as leaders in the protective coatings industry. Our involvement in the Westgate Bridge Strengthening is a reflection of our companies experience and ability to carry out large scale projects.

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View of the steel section of the Bridge from the Yarra River

Construction details

Once the logistics were in place, the Alliance decided on the materials and methods. The final design combined post-tensioned tendons in the box girder with precured carbon fiber-reinforced polymer laminates manufactured by BASF Construction Chemicals in Melbourne. Before the project is complete, more than 62 miles of carbon plates, 10,000 square meters of carbon fibre fabric, 65 tonnes of adhesive and 20 tonnes of epoxy resin will go into the West Gate Bridge.

And then there are the bolts. Devlin says when all is said and done, workers will have installed more than 400,000 new tension-controlled bolts made by the British company, TCB. The bolts not only have a new eco-friendly

The scrap metal removed from the bridge will head to an engineering lab where experts can study the effects of stress on metals

coating which takes the place of galvanization, they are stronger, cheaper and easier to install.

Devlin says the project is saving costs and resources by recycling water needed on the job, but the scrap metal removed from the bridge won't go to a recycling center. Instead, it will head to an engineering lab where experts can study the effects of stress on metals.



Back on track

Last year, the West Gate Bridge Strengthening Project made headlines and construction ceased for 88 days because of a labor payment dispute between John Holland and workers who were hired by a subcontractor. The subcontractor offered wages that were higher than the others who had been hired by John Holland under its original contracts.

John Holland dug in arguing that the bridge strengthening was a public project funded by taxpayers, and the wages that were being demanded were unrealistic. Work, and there protests and confrontations.

Those were stressful days for Devlin, but the problem has been successfully resolved. Other safety challenges including working at heights,

over railway lines, over high voltage electricity cables, close to traffic and amongst red lead paint residue have also meant a sometimes, bumpy ride. But Devlin was grateful for the chance to address the problems in time.

Among the many things the West Gate Bridge has contributed to Melbourne is its legacy of industrial safety. "The bridge and its history changed the standards," says Devlin. "There has been a quantum leap in terms of safety."

But today, with the project on track Devlin has more enjoyable details to consider such as Roads and Ports Minister Tim Pallas' proposal to wire the bridge with seven kilometres of LED lights that could be used for multi-coloured displays to mark special occasions, such as Australia Day and New Year's Eve.

WEST GATE BRIDGE

THE BRIDGE &
ITS HISTORY
CHANGED THE
STANDARDS IN
SAFETY



View from
the crows
nest at dusk



And those finishing touches are a nice balance to the all the hard work involved in infusing a massive amount of strength into the West Gate Bridge.

"It's a unique bridge, and a unique project," says Devlin. "There's really been nothing like it and it has been a great opportunity to be new and creative." ■

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For feedback and comments please get in touch.

> feedback@whitedm.com

STATISTICS

Name: **West Gate Bridge
Strengthening Alliance**

Employees: **700**

Project Cost: **\$300 million**

URL: **www.mcwupgrade.com.au**

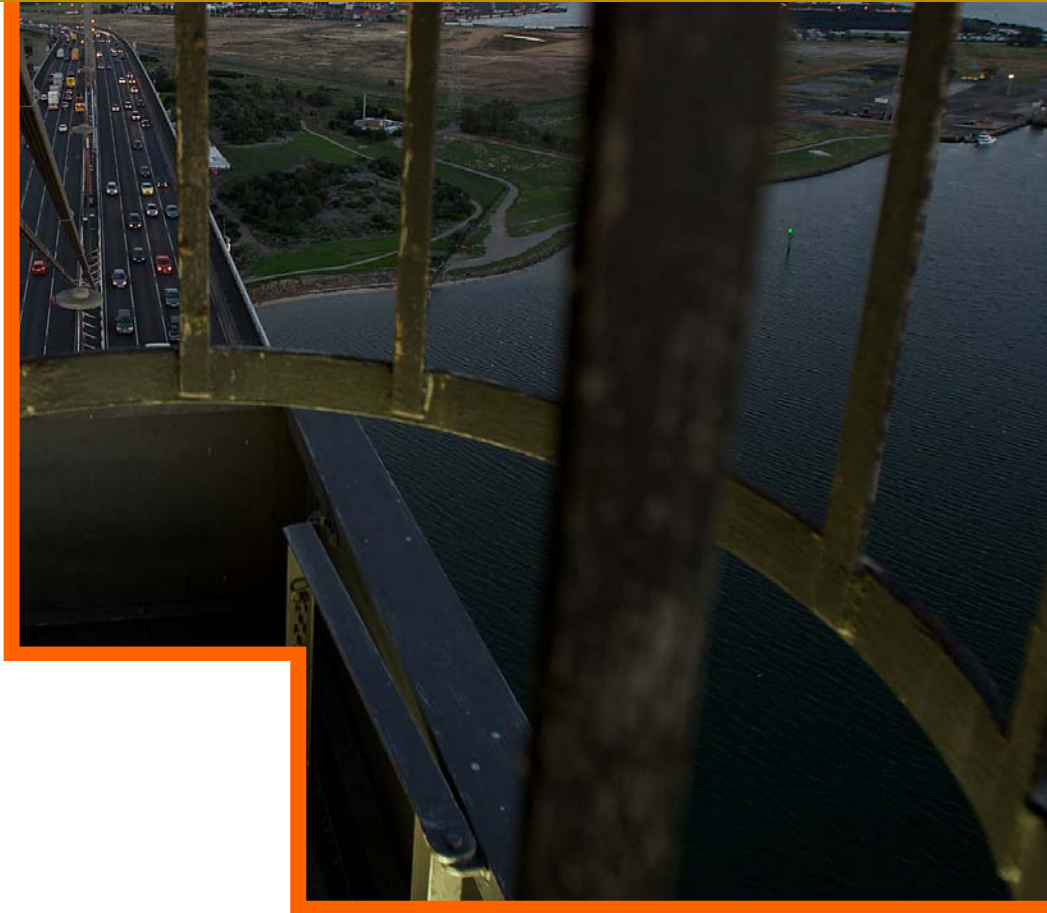
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