

# Auckland Harbour Bridge Resurfacing

– constructing with precision technically difficult projects



**“This is a technically complex project where a lot can go wrong. Aggregate has to be crushed, graded to a precise size, dried in an aggregate drier and bagged in batches. Absolutely NO water contamination is allowable.”**

The original seal on the Auckland Harbour Bridge was operating at the upper limits of its design. The bridge clip-on lanes expand and contract at a huge rate and the hot mix wearing course was not sticking and on downhill slopes was shoving (rolling up like a carpet).

CLIENT NZ Transport Agency (Transit New Zealand)

CONSULTANT OPUS International Consultants Ltd

JOINT VENTURE PARTNER T.B.S. Farnsworth



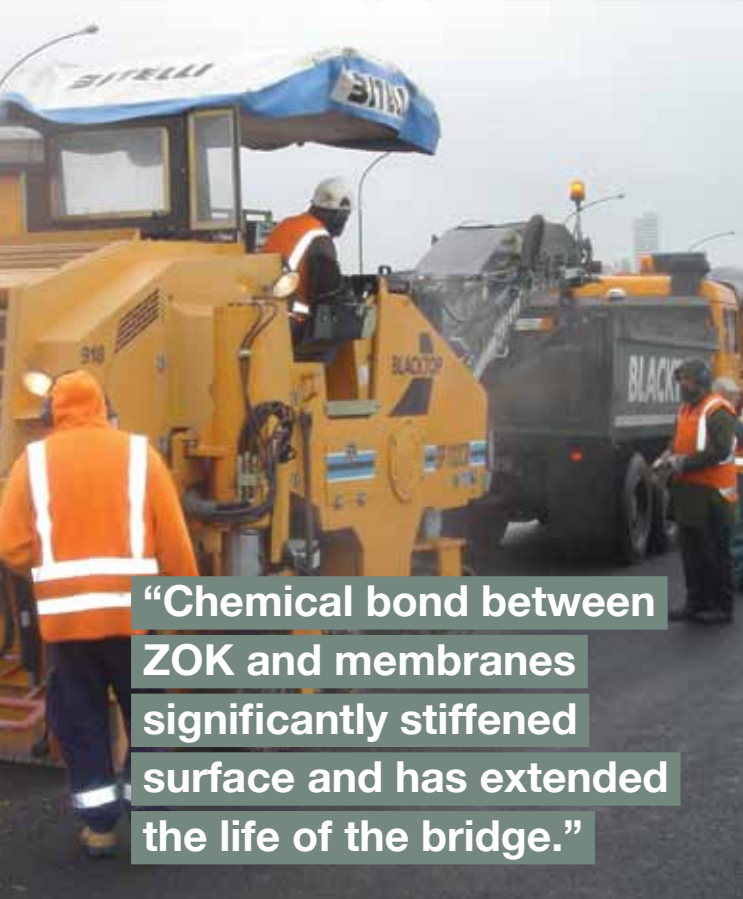
Analyse | Solve | Construct



Research | Design | Analysis



Source | Formulate | Distribute



**“Chemical bond between ZOK and membranes significantly stiffened surface and has extended the life of the bridge.”**

### From ocean liners to the Auckland Harbour Bridge

A concept was developed by OPUS International to transfer the technology used on decks of ocean liners to the surfacing of the Auckland Harbour Bridge. In 1997 a joint venture was formed between T.B.S. Farnsworth and Blacktop Construction to adapt the BOLIDT system, developed in the Netherlands, for use as a sustainable surfacing solution on the clip-on lanes. This project has been undertaken annually since 1997.

#### **Cross-Section of BOLIDT System**



Once an area is defined for resurfacing, existing wearing course is removed from the steel decking. The decking is prepared to allow specialist membrane coatings to be applied. On-site manufacturing and laying of new wearing course takes place.

The advantage of this alternative surfacing solution is that the polyurethane binds the decking, membrane and wearing course together so there is no shoving.

### Absolute precision required – no tolerance for faults or delays

With the harbour bridge being a critical piece of transport infrastructure there are huge complications associated with this project. The work needs to be done over the Christmas period at a time when there are reduced traffic flows. From 6am on Boxing Day two lanes are closed off for a period of approximately ten days to ensure work is completed by the end of the New Year public holidays (the maximum allowable time period for this work to be undertaken).

Material manufacturing is a critical component with this job. Aggregate has to be crushed, graded and screened to a precise size, dried in an aggregate drier and bagged in batches.

Three different types of sands and one type of aggregate are mixed together in a mixer and discharged into the paving machine. Each mix has to be batch manufactured on-site.

A one hour timeframe has to be achieved to complete the batch applications before the hardening process takes hold, the timing of the chemical interface being critical to avoid delamination.

Paving operations have to be streamlined. Quality and cleanliness are imperative and strict safety operations put in place to manage hazardous chemicals safely.

### A mammoth logistical planning exercise is required for this project

Planning for this project starts in August with materials imported from the Netherlands. Sand is prepared and manufactured in batches and all plant and equipment has to be pre-cleaned vigorously – everything has to be spotless.

Over 100 people are on-site during the resurfacing project and a specialised on-site materials manufacturing operation is put in place specially for this project. The weather is monitored on an hourly basis, as NO water contamination is permissible.

In the event if a breakdown to ensure continuous operations, there has to be a total fleet of back-up plant and resources on stand-by.

Senior representatives from OPUS, NZ Transport Authority and Blacktop Construction are on-site making collective decisions to ensure critical pathways and timelines are achieved.

This project on an on-going basis, has been an example of a successful early adoption of partnering and an effective model of a strategic alliance developed to manage project quality and risk.

Project duration	10 days.
Labour force required	100 personnel.
Quantity of seal	250 tonnes.
Bridge movement/flexion	Raises by half a metre in height when seal is lifted.
Length of involvement	Have been running this job since 1997.
Project value	\$1 Million spent in 5 days.