

Lessons learned from one of New Zealand's most challenging civil engineering projects: rebuilding the earthquake damaged pipes, roads, bridges and retaining walls in the city of Christchurch 2011 - 2016.

## Bridge of Remembrance Triumphal Arch rebuild involves city boys' school

**Story:** Bridge of Remembrance and Memorial Arch

**Theme:** Construction

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A web story about the model design work by Christ's College pupils.

This document has been provided as an example of a tool that might be useful for other organisations undertaking complex disaster recovery or infrastructure rebuild programmes.

For more information about this document, visit [www.scirtlearninglegacy.org.nz](http://www.scirtlearninglegacy.org.nz)



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## Bridge of Remembrance Triumphal Arch rebuild involves city boys' school

With so much rebuild work happening in the city, it is not surprising that a central city school, Christ's College, took the opportunity to help SCIRT build a model of the Triumphal Arch, part of the Bridge of Remembrance.

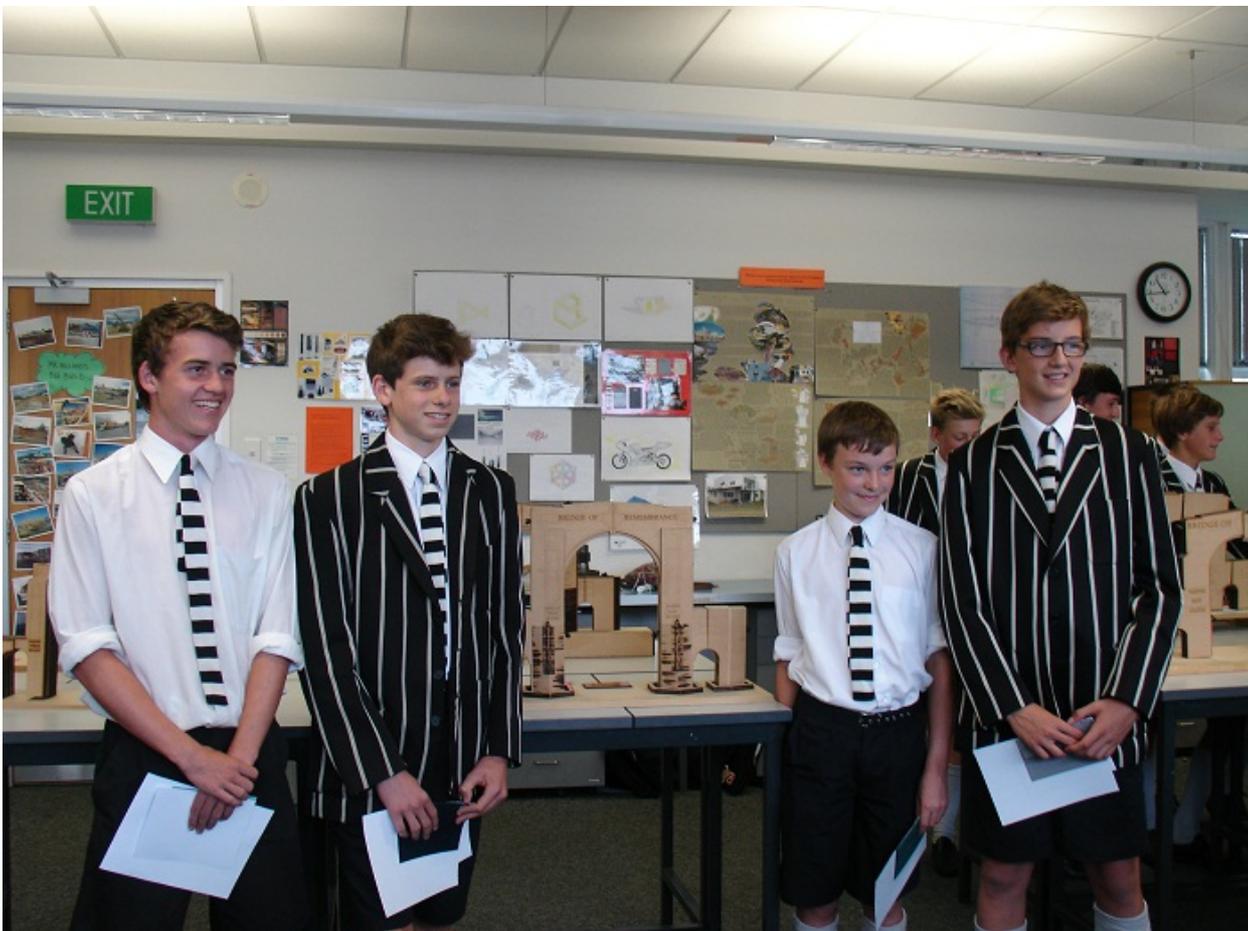
The arch is currently part way through major technical repairs to strengthen it and reduce the risk of damage in any future earthquakes.

SCIRT designer for the arch strengthening work, Peter Routledge, seconded from Opus, was on hand to help judge seven versions of his model at Christ's College this week, along with members of SCIRT's Downer team and Christchurch City Council's Heritage and Transport teams.

Seven teams of boys took part in the technology challenge to replicate a model of the strengthened Triumphal Arch, showing how the parts fitted together and how damage would be minimised in any future earthquakes.

The aim was to make it as life-like as possible and also show how three key mechanisms worked. These were the collars at the base of the columns, sliding joints at the top of each arch, and horizontal post-tensioning across the joints which act together to allow the structure to rock. This will enable it to withstand a large earthquake without significant damage to the heritage structure.

The winning team comprised Hunter McKenzie, Logan Finlay, Ben Smith and Sam McGuire (*see photo below, left to right*). Their model was "really impressive" according to Downer project director Tim Mason. "The detailing is far beyond anything I would have been able to produce at school."



The boys said gluing the layers together and lining them up exactly was challenging. “We were all praying it would all work together,” said Hunter McKenzie. Jobs were divided up so Logan did most of the drawing and computer work, but the four also planned as they went along and shared tasks. Team-work was part of the judging criteria.

Teacher Tony Holland said the model-making project gave the boys a strong focus for the end of 2013 and they had all risen to the occasion. Technology was a popular choice at the school for many boys thinking of engineering or architecture careers, although the winning team all agreed they were open-minded about their futures at this point.

Currently they are in their third year of high school, year 11.

The aim of the is to have the best models on display at the Bridge of Remembrance and around the city.

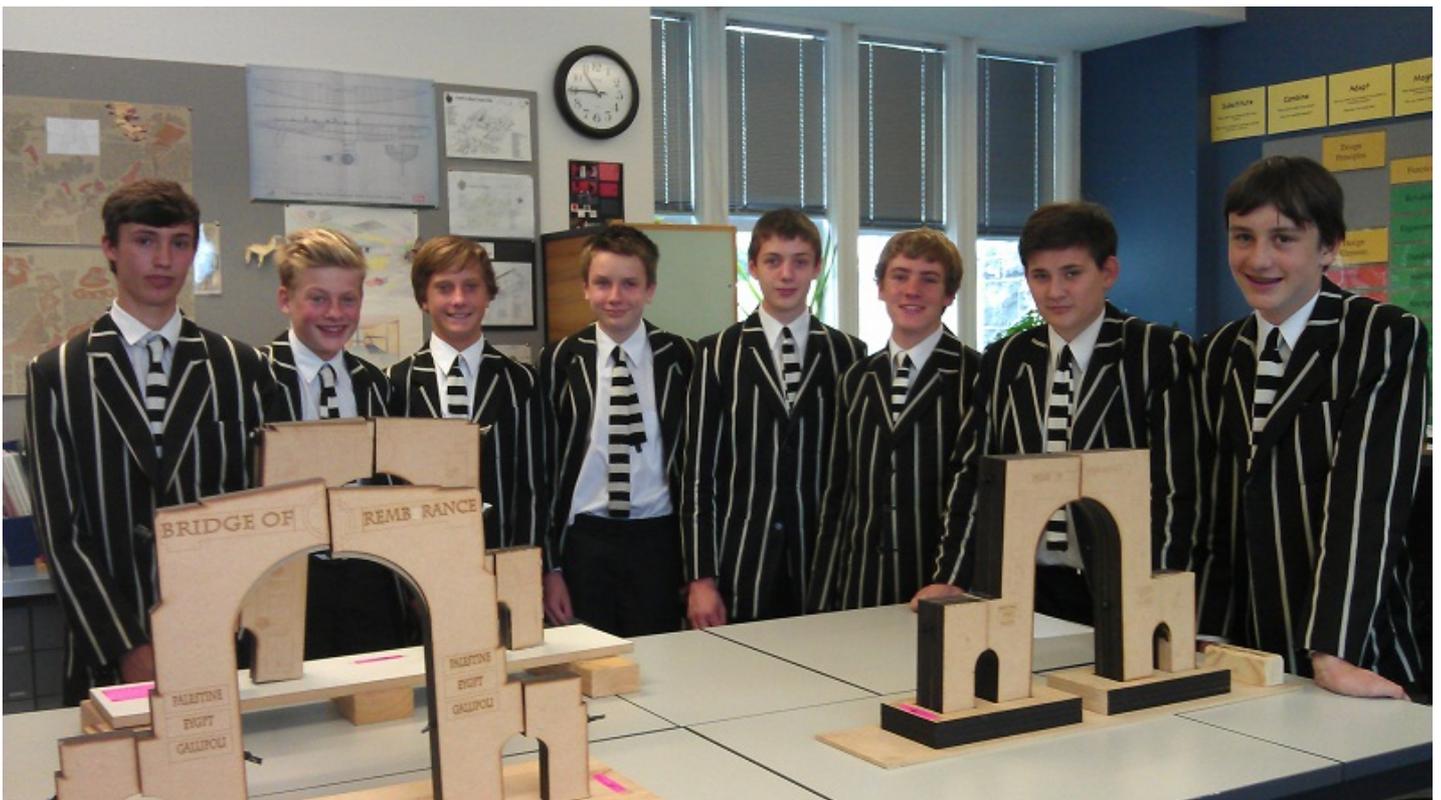
Principal Simon Leese said the school was delighted to be part of the project and would welcome any future opportunities to connect the students to rebuild work happening in their midst. As part of their prize, the winning team will get a personalised tour of SCIRT work sites to get an insight into some of the challenges crews are facing.

SCIRT’s Downer team is working to have the Bridge of Remembrance and Triumphal Arch completed for the 100-year ANZAC Day anniversary in 2015.

**CTV were present for the judging of the strengthened Triumphal Arch models (Friday, 21 February, however this link will only be available for a week following 21 February, around [4 minutes 40 seconds into the news item](#) [1] )**

**The BBC also filmed site engineer Emma Parkinson, who hails from Scotland, as [part of a series](#) [2] they are doing on the way people from overseas are helping the Christchurch rebuild.**

*Not everyone got the winning prize, but these boys were all well placed. Left to right, Ciaran Banks, Alex Birkett, Munro Hall, Thomas Van der Geest, Connor Leadley, Hamish Penrose, Angus Bowers-Hallum and Angus Porter.*





**Background, Bridge of Remembrance Triumphal Arch:**

SCIRT's Downer team will be improving the foundations, strengthening the structure and undertaking significant technical repairs to reduce the risk of damage in any future earthquakes.

The aim of this design is to prevent collapse of the structure and to control the locations of damage and movement so as to avoid significant cracking of the heritage stonework.

The complex internal strengthening work will ensure the structure meets the new building standards and can sustain a one-in-2500 year earthquake.