



## Innovation in bridge column design: Creating safer, longer lasting structures

**Professor Zhong Tao from the Institute for Infrastructure Engineering and a research team\* have received Research Partnerships Program funding to investigate a new type of bridge support column, made from stainless steel and strain-hardening cement composites (SHCC). The team will test the properties of these materials, and will create design guidelines for constructing it in columns in different conditions.**

'Bridges contribute to a society's commerce and individual mobility, and the columns of the bridge are the most critical load-carrying element', Professor Tao says. 'When bridges collapse, like the Tasman Bridge did in 1975, the results can be catastrophic. These collapses are usually due to extreme events (such as high winds) combined with the degradation of bridge parts due to ageing, especially the columns.' A new type of column – consisting of a stainless steel tube filled with SHCC – will be trialled under different conditions to determine if current and future bridge structures can be made safer.

The stainless steel and strain-hardening cement composite (SHCC) material will be subjected to temperatures ranging from 100-1000C, and static and dynamic loading conditions. A stainless steel tube filled with SHCC will be tested under a variety of conditions, including fire. The findings of these tests will inform a simulated model of the materials that can be used by engineers wishing to predict how the columns will perform in different environments and construction configurations. The research team will then create guidelines for constructing the columns in a real world context.

SHCC-filled columns may provide a novel way to improve bridge safety and longevity without increasing costs. The guidelines for their construction



can be used internationally, and pave the way for the next leap in infrastructure engineering.

**Project Title:** Development of durable and resilient bridge columns through use of emerging materials  
**Funding has been set at:** \$69,960

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