



Blast-resistant technology: The surface sprayed material protecting Australia's infrastructure

Dr Chunwei Zhang from the Institute for Infrastructure Engineering will lead an international research team* in investigating the properties of a surface sprayed material that may shield structures from damaging explosions. The Australian Research Council has awarded a Linkage Project grant for the study, which aims to: measure the performance of the material in different blast conditions, develop a model to predict this performance, and promote industry use of the substance in Australian infrastructure.

'In Australia, unexpected fiery explosions can devastate livelihoods and infrastructure – such as the September 2014 Rozelle fire that killed three people in NSW', Dr Zhang explains. 'In recent years, new ways of using materials in construction to lessen the impact of blasts have been discovered. One of these was originally used in the manufacture of spandex (lycra) – an elastomeric thermoset polyuria.' The researchers will test how well this highly expandable substance, when applied to surfaces using a sprayed cladding method, absorbs the force of an explosion and helps preserve an object's structural integrity.

Field and laboratory tests will be carried out on the polyuria surface spray: field work will take place on construction sites provided by the Qingdao Haichuan Construction Group, and laboratory tests at the National Facility for Physical Blast Simulation at the University as well as the Gas Blast Shock wave test facility at the Harbin Institute of Technology, China. The material will be sprayed onto different shaped structures and subjected to blasts from outside, and from within. The polyuria's reactions in these conditions will form the basis of a model to predict its performance.



Mining accidents, gas explosions and terrorist attacks all pose a threat to Australia's infrastructure today – this material can help prevent building collapse and loss of life during these events by stabilising structures and absorbing the blast impact

Project Title: Development of novel viscoelastic sprayed material for the effective blast resistance of critical and resource infrastructure

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