

# RESEARCH DIRECTIONS

## High Performance Steel in Building

**Professor Brian Uy from the School of Engineering is collaborating with Dr Alex Remennikov from the University of Wollongong and Associate Professor Jat Yuen (Richard) Liew from the National University of Singapore to explore the benefits of high-performance steels (HPS) for protection against extreme loads and events in bridges and other engineered structures, through a three year Australian Research Council Discovery project.**

'HPS are steels which exhibit improved strength, corrosion resistance and energy absorption' says Professor Uy. 'These enhanced properties compared to conventional steels may give HPS protective properties against extreme loads that may occur in events such as explosions, earthquakes, fire, hurricanes and accidental impacts. Such events are severe events for buildings, bridges and other infrastructure, and need innovative structural engineering solutions. The subject of this project is to explore the possibility of reducing the vulnerability of buildings and infrastructure systems to such events through cost-effective protective systems using high-performance steels.'

The research team will compare high-performance steel beams and columns with the same structures made from stainless steel, and will also compare the performance of HPS columns and plates filled with concrete with conventional composite structures. The columns and beams will be tested on state-of-the-art simulation machinery in order to analyse the relative performance of the different materials against sharp impacts and shocks, explosive blasts, and continuous load pressures. This will allow analysis and modelling of characteristics of



particular interest to the real life world of engineering, including energy absorbing capacity.

The results of this project will provide comprehensive engineering and design parameters for high-performance steel to enable effective use of these innovative materials. The benefit from increased safety of critical infrastructure will provide greater security against physical and financial losses should an extreme event take place.

**Project Title:** Utilising the benefits of high performance steels (HPS) and infill materials for critical infrastructure protection (CIP) against extreme loads

**Funding has been set at:** \$371,000

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