



**UNSW**  
SYDNEY



## Structural Engineering

**The CIES structural engineering research group investigate the structural integrity of materials used in buildings, bridges, dams, tunnels and roads when exposed to natural phenomena or hostile environments. Our focus is on resilient, sustainable, and energy-efficient infrastructure. We contribute to Australian and International standards and codes of practice for concrete, steel, composite and bridge structures.**

### Competitive advantage

- We have the depth of knowledge, expertise and resources to take on projects from the nanoscale to macro scales
- Largest structural testing facilities in Southern hemisphere
- State of the art equipment and computational facilities
- Research experts in: Cement chemistry and cementitious materials, Concrete, steel and timber structures & materials, including hybrid (composite) construction technologies and the use of FRP composite materials in construction, Geopolymer concrete, Advanced computational structural analysis

### Impact

We have the people and resources to service and solve our industry problems and challenges, including product development opportunities.

### Successful applications

- World-first green concrete trial with City of Sydney – using geopolymer low-CO<sub>2</sub> concrete on busy city road
- Developed a new high-density (low carbon) geopolymer concrete that greatly enhanced the stability of armour units on breakwaters – Port Kembla trial
- Developed a mix design approach to reduce early-age thermal cracking of concrete
- Have demonstrated the feasibility and superior structural performance of innovative steel-timber systems compared to conventional steel-concrete composite
- Award winning for structural health monitoring of bridges
- Delivered knowledge on the performance of energy-efficient insulating concrete sandwich panels that was accepted by international standard committees

### Capabilities and facilities

- Our Heavy Structures Laboratories are equipped with state-of-the-art servo-controlled hydraulic actuators and universal testing machines to maintain a capacity for high load testing, ranging from 10 kN to 5000 kN, including the ability to apply cyclic fatigue loading, horizontal loading, and long-term creep testing
- Cementitious Materials Laboratory – is equipped with cutting-edge facilities for measuring cement and concrete materials characterisation and for durability testing

### More Information

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