



# Smart Structures Laboratory

Australia's next-gen research hub for  
large-scale experimental testing and  
hybrid simulation.

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The Smart Structures Laboratory is paving the way for the next generation of structures and construction materials to be thoroughly tested and to provide industry and consumers with the necessary level of confidence in performance and safety.

The Smart Structures Laboratory is at the forefront of advancing the next generation of structures and construction materials.

We provide both academic and industry clients with rigorous testing and the confidence needed in performance and safety.

Valued at \$15 million, our laboratory is the only facility of its kind in Australia, featuring a state-of-the-art, three-dimensional testing system designed for large-scale evaluation of civil, mechanical, aerospace, defence, renewable energy, and mining engineering components and systems.

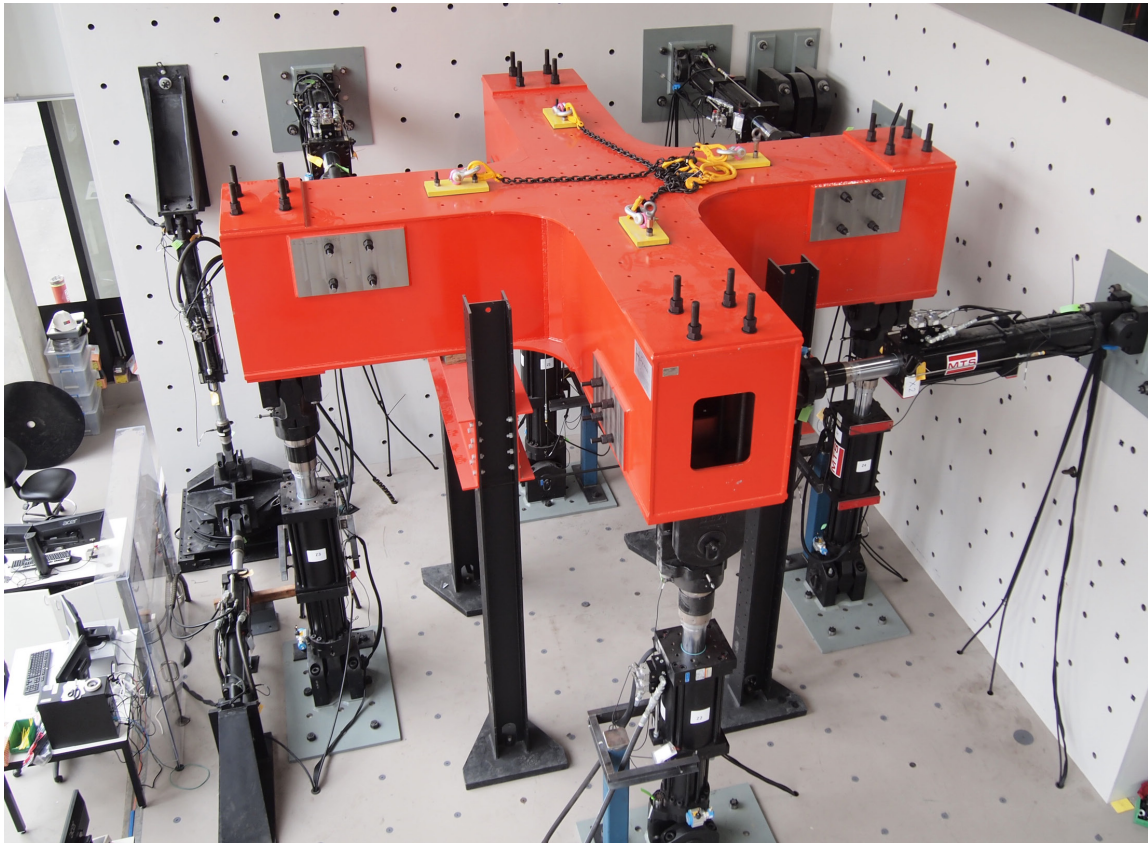
## Area of expertise

The Smart Structures Laboratory undertakes a wide range of large-scale research and consulting projects. Our advanced equipment and instrumentation enable the execution of diverse testing programs, including:

- **Extreme event simulation:** Full-scale 6-DOF hybrid simulations to evaluate structural performance and collapse safety under seismic, wind, and other extreme events.
- **Structural safety assessment:** Advanced 6-DOF quasi-static and cyclic testing of large-scale structural components and infrastructure systems under complex extreme loading.
- **Impact and collision testing:** Large-scale pendulum impact testing to assess resistance to vehicular, debris, or equipment collisions.

- **Fatigue and durability analysis:** High-Cycle Fatigue (HCF) testing of full-scale specimens to determine long-term performance and service life.
- **Material characterisation:** Comprehensive testing of traditional and advanced materials including concrete, steel, timber, and novel composites.
- **Fire resistance evaluation:** Fire testing of structural elements such as panels, cylinders, and short columns to assess thermal performance and integrity.
- **Dynamic and vibration testing:** In-depth analysis of dynamic response and vibration characteristics across a range of structural and mechanical components.

Right: Multi-Axis Substructure Testing (MAST) System





Left: Teaching in the Smart Structures Laboratory

Our key capabilities include:

- Concrete laboratory
  - EIRICH intensive mixer
  - FEECO pan pelletizer
- Struers CitoVac vacuum impregnation unit
- BELSORP-max surface area & pore size analyzer
- Fully-equipped workshop with CNC machining for custom fabrication.

## Advanced Technology Centre

The Smart Structures Laboratory is located in the Advanced Technology Centre (ATC) at our Hawthorn campus. This facility showcases leading-edge research facilities and teaching spaces, as well as architectural design and sustainability that encompasses 20,000 square metres.



## FURTHER INFORMATION



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The information contained in this guide was correct at the time of publication, October 2025. The university reserves the right to alter or amend the material contained in this guide. For the most up-to-date information please visit our website.

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