## THEME 6: BUILDINGS AND INFRASTRUCTURE

Our research strength in this theme lies at the intersection of construction materials and automation, asset integrity management and intelligent systems. This strength is fortified by our expertise in these areas, collectively contributing to shaping the future of sustainable and resilient built environments. We closely collaborate with industry partners to innovate green construction materials that lower CO_2 emissions and enhance structural longevity. Additionally, our efforts encompass developing automated buildings and inspection equipment, infrastructure health monitoring and post-construction management algorithms, all contributing to improved safety and reliability of structures. As we forge ahead in this research field, we are committed to advancing these disciplines and addressing the pressing challenges of modern construction and development.
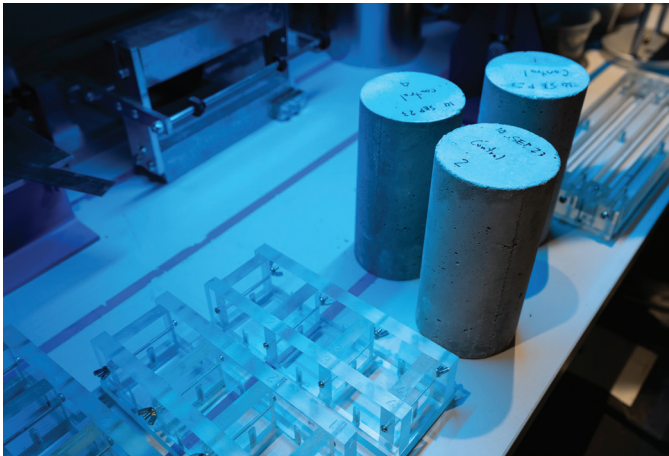

ADVANCED MATERIALS IN STRUCTURES

This project focuses on developing an upscaling process to correlate micro-nano properties of engineering materials with their comprehensive physico-chemical properties using systematic mechanical and statistical analysis approaches and nanoindentation technology. This process enables assessing material mechanical and viscoelastic properties at microscales, generating new knowledge to increase material efficiency, assess existing structures, and strengthen and repair materials within structures.
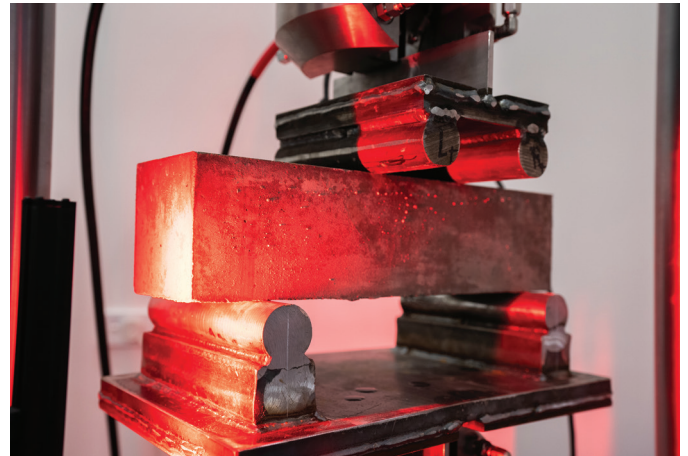
RISK AND SAFETY ENGINEERING

We specialise in risk analysis for various engineering operations, focusing on enhancing safety and reliability. Our developed innovative models enhance the integrity of assets in onshore and offshore infrastructures. These models bolster operational reliability and contribute to minimising environmental footprints and reducing costs, aligning engineering practices with sustainability and efficiency.
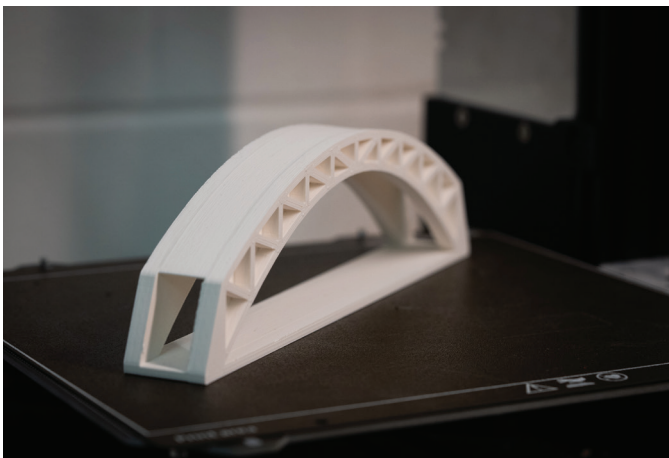
BIOCOMPOSITES MATERIALS

We use cutting-edge 3D-printing technology with biocomposites, using recycled bio-based materials widely available as residue in Australia. The project benefits from a product-driven approach, resulting in structurally tested and evaluated 3D-printed beams and columns, paving the way for future large-scale applications.