INCREASED RESILIENCE is a key requirement for built infrastructure, but achieving this is an industry-wide goal requiring open and ongoing conversations across the building industry.

Seismic issues a constant
We’ve seen seismic risk become reality most recently in Christchurch, and it’s a challenge we will always have. Christchurch is not unique, with damage from the sacrificial structural design approach having long-term effects in earthquakes worldwide. We’ve also seen the disconnect between the performance targets applied by structural engineers and public expectation of structural performance. Too often, we heard comments like ‘That’s a new building, it shouldn’t be damaged,’ following the earthquakes. The public expects a higher level of performance.

The challenges
Research can only improve lives if it is translated into practice. Ways to facilitate greater uptake of research outcomes by the industry are often the focus of academic research, but a balancing act is required. Ultimately, this may only be resolved by collaboration between academic researchers and the building industry.

There must be a balance between applying new design methods and technologies fast enough to make a difference and improve performance, yet slow enough to ensure that they will perform as expected. The devil is often in the details. Unintended interactions, unforeseen load-paths and out-of-plane response can undo otherwise good designs.

Experimental tests are usually undertaken in one or two dimensions, limited by the complexity of recreating full 3D field conditions in a lab. Most component testing cannot be done at a full system level, and often, dynamic load conditions cannot be fully recreated due to the magnitude of the energy input required.

Cost usually precludes experimental test specimens that are fully fitted out with non-structural components, and architectural trade-offs and compromises are not usually incorporated. While system-level effects and interactions are critical to overall performance, they are challenging to reproduce in the lab.

The opportunities
One way of responding to these limitations is by observing how structures perform in the field. International reconnaissance missions and internationally collaborative learning from earthquake programmes report on observed outcomes in the field. These produce valuable insight but are a prolonged way of determining the performance of new design methods.

We can only resolve these challenges through a nationally and internationally collaborative approach, where everyone involved in the industry has a seat at the table. Open discussions on design details and loading conditions unforeseen in normal academic research are critical to increased understanding and improved outcomes.

The close-knit New Zealand community means these discussions are common, and organisations such as BRANZ play a key role. Conferences in New Zealand attended by practitioners and researchers are the envy of international researchers. QuakeCoRE and the Quake Centre also provide collaborative opportunities. I challenge everyone to make the most of these opportunities.

We can all be proud of the innovation and uptake of low-damage design methods in the Christchurch rebuild. However, we have a duty to continue to advance the field and will only achieve this with open dialogue and ongoing and meaningful collaboration.