



Centre for
Advanced
Engineering

Shaping our
future through
shared knowledge

Introducing CAE

- “ The CAE is a charitable trust which promotes the development of a technology based economy
- “ We facilitate discussions through workshops and conferences, publish a monthly newsletter, and undertake projects
- “ We were formed in 1989, and we have published numerous reports and newsletters, and we were involved in the initial thinking around lifelines and infrastructure resiliency
- “ See our web site at www.cae.co.nz for our publications, our new monthly newsletter and other information about us

Speech to Lifelines Conference

7 November 2013

Richard Bentley, CEO, Centre for Advanced Engineering

Good afternoon

I appreciate the opportunity David and Tony have given me to say a few words this afternoon about the Centre for Advanced Engineering

I will traverse a number of issues in this short presentation which the Centre sees as important to the development of NZ's technology economy and which might initially seem to be a bit distant from the business of a lifelines group forum.

But the ideas and concerns that underpin the Centre's aspirations for the development of the technology economy reflect in our view that there is opportunity to accelerate its development - and to widen our export base, to improve our per capita income, and therefore to derisk the NZ economy from a reliance on agricultural and still mostly our commodity exports.

So in a sense we are about building a resilient economy . and resiliency is a word that has been used a fair bit so far in this forum . and it seems to me to be a bit like the word strategy in that it means different things to different people. Although I am basically an engineer, I think of resiliency ultimately as a concept that reflects economic robustness.

The Centre for Advanced Engineering undertakes and organises engineering and technology related projects it determines can materially impact the NZ economy and which need fresh collaborations and coordination.

We embrace connected knowledge, technology path finding and applied rigour. We offer an authoritative non-partisan viewpoint. We undertake in - depth analysis and require an independent and objective approach. We seek to develop outcomes that result in actions and progress. We form teams of experienced and authoritative commentators and we will often use part volunteer inputs from semi-retired experts with lifetime experiences to draw upon.

Not every problem requires this sort of approach . but my instinct is that there are instances in both the local and central government arena where we might be able to assist . especially in coordinating your collaborations with firms, universities, CRI's and polytechnics.

The Centre builds on the reputation and outputs of our predecessor trust, which was established in 1989 and had an operational base within Canterbury University. Over 100 projects were completed before the trust went into recess in 2012. All of these are published on our web site and freely available. The focus was on infrastructure investment, infrastructure operations, and infrastructure resiliency to New Zealand's natural hazards. Important projects included Risk and Realities . which provided a

blueprint for the strengthening of Canterbury's lifelines, largely implemented, the Fire Engineering Design Guide, and more recently we have coordinated a substantial report on infrastructure investment for Treasury, and a compendium of document summaries from the Canterbury earthquakes.

Earlier this year it was decided to reactivate the Centre independently of Canterbury University - or any University - and this rebuild process was crystallised by my appointment in July.

The Centre's work programme currently involves several projects being established, lots of projects in discussion, a sequence of newsletters and think pieces, and a schedule of regional meetings yet to be organised.

The main project we have commenced design of is around Earthquake Prone Buildings.

From extensive discussions it appears there are concerns that the proposed 3% policy does not fully deal with the loss-of-life risk, and is uneconomic to implement in many situations. We wonder for example whether outside of Wellington and central Auckland and especially in marginal seismic regions, and in commercial and industrial environments a more sensible procedure might be to first deal with life risk for example by:

- fixing critical building weaknesses
- removing or strengthening parapets and verandas, and
- fixing building frontages on streets with pedestrian traffic to floors

A second and subsequent step would be to improve lateral strength and resiliency to some modest proportion of New Building Strength.

However, provided life risk is more or less addressed as above, lateral strengthening seems to make economic sense only if the strengthening is sufficient to reliably avoid demolition after the design event, and rapid re-occupation is possible ensuring minimal economic disruption.

If this is the objective perhaps criteria could be established which incentivise this outcome. A halfway house strengthening policy may be a really good way of potentially wasting a great deal of scarce resources.

There are other issues here which are beyond the scope of this presentation including

- the problem that minor buildings works can trigger expensive fire protection and egress upgrades, delaying any action by owners
- Historic and Monumental buildings are significantly threatened by the policy despite often having minimal occupancy levels.

Additionally director and owner responsibilities in regard to tenating EPBs is emerging as a major problem, particularly with the proposed Health and Safety

Reform Bill. I have written about this in our September #52 newsletter . on our web site.

The Centre with Economists Sapere Research Group are currently drafting a Centre proposal to coordinate a detailed review of the proposed 3% policy and prepare alternatives for discussion and presentation to government. The study will also review ways of giving those involved in tenancy issues objective information on risk. We intend to circulate this proposal to interested parties and to see if there is an appetite to fund what I believe would be the first proper economic and technical analysis of this issue.

We have consulted widely - including with Auckland City, Wellington City and the Greater Wellington Regional Council, with Dunedin City, Palmerston North City and Wanganui City - and we have also talked to the Property Council, to property developers, banks, insurance and reinsurance interests and the IOD. We would be pleased to hear from any other local authorities who would like to get involved with us on this project.

Moving on - surely we need to start building a stock of resilient low damage technology buildings that can be reoccupied immediately after the next big earthquake, and that assist minimise the disruption to the local economy. These buildings . think of base isolated structures or light weight sophisticated timber buildings are now being commonly built in Japan and California.

I find it odd that even where the government is the long term owner and or even the long term tenant it still doesn't insist on low damage technology buildings . the life cycle economics are overwhelmingly supportive. The more complex situations . and where financial incentives may be required - are in the commercial property market where the minor up front extra cost of low damage buildings puts developers off.

We continue to assess whether this is another earthquake related project the Centre could facilitate some thinking about.

Other resiliency topics interest the Centre.

At the household level, especially in rural NZ, resiliency must mean movement toward energy self-sufficiency, and the Centre sees NZ on the cusp of significant developments in this regard, as the benefits of the smart metering systems (now covering 50% of households), improved photovoltaic technologies, new technology wood pellet burners similar to northern hemisphere products, and improved battery technologies - combine to provide an integrated package which both improves independence whilst delivering cost effective supply.

The concept of resiliency is also relevant, as I have noted, when we talk about the economic development of firms and the importance of supporting and nurturing firms that will stay in NZ while building larger export businesses. I have been involved in programmes that support NZ start-up firms that eventually get bought out and leave

NZ with minimal spillovers. But there are areas where we can nurture resilient industry development . and I list E- health, agritechology, environmental monitoring, advanced food, and manufactured wood products to name just a few.

You will see our newsletter working its way across these opportunities, reporting on what's going on in our universities and CRIs, and looking for clarity and better focus of how we can build a growing, sustainable and competitive advanced technology economy.

A further project we are working in is the issue of professional engineering performance standards. Our suggestion, which we are discussing with interested parties, is that NZ industry and engineers should adopt an Australian protocol which is a project based agreement between an engineer and a client. This protocol was initially proposed by the Australian construction industry who had got fed up with litigation in this area. The protocol seeks to reveal important understandings between engineer and client prior to project commencement . and I understand it is slowly starting to be used. The point of the protocol is that it is an agreement between parties not some generic standard . and also reflects an Australian view especially that the engineering professional bodies are good at competency assessment and ethics but should stay well out of performance standard setting. A point I personally agree with.

Finally, I would like to observe that the Centre is a different sort of business than its predecessor trust especially with its additional focus on the technology economy. And I stress we are not consultants - rather we are facilitators of complex conversations and investigations. It may be that some of you - especially from the regions - might consider talking to us about how we might facilitate the development of local discussions about the development of your regional economy and the building of resilient businesses and infrastructure.

Thanks