



IRANZ Connections.

MORE INDUSTRY MONEY FOR HEAVY ENGINEERING RESEARCH



December brought good news for New Zealand heavy engineering innovation with the long-awaited amendment of the Heavy Engineering Research Levy (HERL) Act via a unanimous Omnibus Bill passing through Parliament. In 2000 the industry sector agreed that the industry contribution to R&D via HERL should be increased. However this was only possible if the HERL Act was amended with the support of the Minister responsible for the Act. Over years the industry and their industry-owned research association HERA stayed patiently on the case lobbying different governments to implement the requested changes. Thanks to the expressed support of MBIE Minister Steven Joyce, the implementation this year of the industry supported doubling of their research contribution will allow HERA to get out of their

financial constraints and activate a number of long-planned activities.

Examples for additional activities are research and design guide development into damage resisting seismic systems, increased competitiveness in steel construction, particularly with a focus of combating imports and manufacturing for export, but also more focus on transforming our industry from being largely contracting based to more higher value-added product ownership with increased export potential as evident in the renewable energy projects currently underway.

Says HERA Director, Dr Wolfgang Scholz: "It is good to see that this Government with the support of all parties fulfilled the request of an industry sector to substantially increase its own spending in R&D via a government regulated process. However it is hard to understand it took so long for successive governments to make it happen while all political parties agree that we need more industry R&D to drive our economy forward. Having had success now the heavy engineering industry may be an example for other industry sectors which are united behind a sector overarching approach to R&D to use the commodities or other levy mechanisms to core fund industry research activity".

www.hera.org.nz

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LINCOLN VENTURES IS NOW LINCOLN AGRITECH

After nearly two decades of science and engineering achievement under the name of Lincoln Ventures, and an organisational history that dates back to our formation as the NZ Agricultural Engineering Institute in 1963, we felt the need to change our name to better reflect our unique position in the New Zealand science system as an agritech-focused science and engineering research company owned by New Zealand's only specialist land based university, Lincoln University.

We've had a long history of adding value through our research and development to the sector; Lincoln Ventures itself was created in

1994 through combining a number of operations including the New Zealand Agricultural Engineering Institute (NZAEI), the Kellogg Farm Management Unit and the Centre for Resource Management. In many ways, the new focus we're announcing represents a link between our historical work and the opportunity that still exists to support New Zealand's primary industries and the environment through the application of our technologies.

Lincoln Agritech's core capabilities are well aligned with the value chain of the primary sector - from on-farm precision management of inputs such as fertiliser and irrigation, to protecting the sustainable productivity of the land and environment, to maximising the efficiency and value-add of manufacturing and

processing activities by applying new sensor technologies.

We will continue to be just as active in engaging across all the key sectors we've previously covered including environmental services, high value manufacturing, and software consulting. Much of the work underpinning our core science platforms originated from an initial focus on identified needs in the primary sector, with the results later being applied upstream or downstream in the value chain, or in another sector in consultation with our clients. We're excited by our current research and how it could also benefit a wide range of stakeholders.

www.lvl.co.nz



Future Streets

TERNZ has recently started a 4 year research contract with MBIE that is aimed at determining the overall economic benefit of using a self explaining roads approach to managing vehicle speeds and to encourage walking and cycling in urban areas. Road safety, health, and other economic factors are being considered.

The research builds on the successful Self Explaining Roads (SER) research programme, carried out by TERNZ and Waikato University. Current evidence suggests that the health benefits (or disbenefits) of transport infrastructure are greatly undervalued. An analysis of the self explaining roads results suggest that the health benefits could be 3 to 4 times higher than the already considerable road safety benefits (86% reduction in crash severity in the trial area). There was also an increase in walking which will help to reduce travel costs and congestion.

Pre and post intervention measurements will be carried out within the intervention area(s) and at matched control area, which will not immediately receive specific intervention. Those measurements include changes in: traffic speeds and behaviours, travel mode and public health. Residents will be surveyed and their travel behaviour and health will be monitored using pedometers, GPS tracking and health screening that includes obesity, blood pressure and other indicators of chronic illnesses.

A multidisciplinary research team that includes TERNZ, The research team also includes Auckland Transport, Auckland University, Otago University, Massey University, AUT, Mackie Research and Consulting, and Synergia Ltd are undertaking the research in partnership with Auckland Transport.

www.ternz.co.nz



Seismic Response Of Underground Services

The saying goes that while a duck seems to be moving serenely across the pond, its feet are actually paddling like mad. Our cities are the same – while we go about our daily lives, below us a vast infrastructure is keeping the cities running.

Similarly, after the shaking stopped in Christchurch it was easy to see the damage the earthquakes had wrought on the city above. What wasn't as evident was what effect they had underground and this is what this new research project led by Dr Rosslyn McLachlan focuses on.

The Ministry of Business, Innovation and Employment has awarded OPUS \$2.54 Million over 4 years to research how underground services responded to the Christchurch earthquakes.

Opus will be working closely with industry to research lessons from the damage caused to underground services such as water supply, wastewater, storm water and telecommunications in order to make those services more resilient to future seismic events.

A GIS database of damage data from Christchurch will be combined with state-of-the-art 3D geological information and those findings will

be further analysed using a large shaking table with earthquake loading sequences in order to look at and optimise the behaviour of typical models of pipeline components. To ensure this process is robust, 3D numerical analysis will also be used to assess various scenarios.

The project will also draw on GNS Science's expertise around geology and earthquake load sequencing, as well as their RiskScape model, which provides a framework for calculating the impact risk from different types of natural hazards. The knowledge gained from the testing and analysis will then enhance the RiskScape model.

When combined with Opus' previous work, this physical and numerical analysis will help in developing methodologies to assess the remaining life of existing underground utilities. This will allow more informed planning and decision-making around the positioning of utilities within the Christchurch area, as well as provide the basis for enhanced asset management methodologies applicable throughout New Zealand.

www.opus.co.nz

CB3 Mine Services Launch - Making Mining Operations Safer

Coal and other materials can self-heat and spontaneously combust – causing devastating mine fires and explosions. Identifying spontaneous combustion potential before mining, during transportation, and when stockpiling materials such as coal is a major concern for these industries. Now reliable help is at hand from a new company CB3 Mine Services Pty Ltd recently established with laboratories in Brisbane, Australia and Wellington, New Zealand.

CB3 Mine Services Pty Ltd is the brain child of New Zealand's CRL Energy Ltd and Australia's B3 Mining Services Pty Ltd, with the new company set to provide a range of advanced laboratory tests that are leading practice in quantifying the spontaneous combustion propensity of coal and other materials.

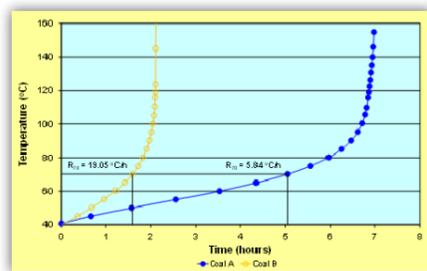
"More than ever before mining companies are aware of the need for using a sound scientific and/or engineering basis when developing principal hazard management plans – particularly the hazards of spontaneous combustion in underground coal mines," says Dr Basil Beamish, Managing Director of B3 Mining Services.

"B3 Mining Services already has an established international reputation in spontaneous combustion expertise and mine hazard assessment and consultation with CRL Energy bringing to the table 30 years of industry-focussed research and development knowhow" says Dr Rob Whitney, CEO of CRL Energy.

CB3 supplements the research and technical support service CRL Energy currently offers to its New Zealand clientele through established laboratories at Gracefield in Wellington and Westport in the South Island. The range of spontaneous combustion test services offered by CB3 Mine Services includes; R70 testing; SponComSIM™ testing; SponComGAS™ testing; and ponComBULK™ testing.

Each of these tests has a specific purpose and the most appropriate ones are selected after discussions with the client to suit their operational situation. All test results are analysed, interpreted, and reports certified by experts with appropriate experience.

www.crl.co.nz



Are A Country's Policies And Actions Sustainably Increasing Its Wellbeing?

Motu has been awarded a three-year RSNZ Marsden Fund grant, *Testing the Validity and Robustness of National Wellbeing and Sustainability Measures*. The research will be led by Motu Senior Fellow Arthur Grimes and affiliate Les Oxley (University of Waikato), with Jamie Ataria (Lincoln University) and Robert MacCulloch (University of Auckland) as associate investigators.

The study will address a fundamental question: *Are a country's policies and actions sustainably increasing its wellbeing?* Although material prosperity in New Zealand and other developed nations has increased over the past fifty years, life satisfaction has not changed much, many people still suffer from uncertainties, social and economic divisions have widened, and concern has grown about environmental degradation. Over recent decades, social scientists and ecologists have developed many indicators of national wellbeing and sustainability.

However, there is no overarching study that tests the adequacy and robustness of these aggregate measures for answering our fundamental question.

The programme will compile a new measure of sustainable economic progress for New Zealand and will test the validity and robustness of existing wellbeing measures, testing for differences in interpretation and measurement of wellbeing between Māori and Pākehā.

www.motu.org.nz

New Investment A Positive Sign For New Zealand Oyster Industry

One of New Zealand's largest fishing companies now has a stake in Cawthron Institute's aquaculture research and development centre in Nelson.

Cawthron Institute and Aotearoa Fisheries Limited (AFL) have signed an agreement which will see AFL take over and expand Cawthron Institute's commercial oyster nursery and spat growing operation at the Cawthron Aquaculture Park at Glenduan, north of Nelson. Cawthron Institute will continue to produce and supply oyster larvae to industry.

"Cawthron Institute is a world leader in aquaculture research, and we are excited to be strengthening our longstanding partnership with them to support the future development of New Zealand's oyster industry," AFL aquaculture general manager Don Collier says.

The new agreement means that from March this year, both New Zealand's largest Pacific oyster (AFL) and Greenshell mussel (SPATnz) hatchery operations will be based at the Cawthron Aquaculture Park.

"SPATnz have been based at the Cawthron Aquaculture Park since 2010,"

Cawthron Institute Chief Executive Charles Eason says. "Bringing in AFL alongside their operations supports our vision for the Cawthron Aquaculture Park as a centre of excellence for aquaculture, and a place where scientific research and development underpins industry for the benefit of our economy."

www.cawthron.org.nz



Fat-Liquor Distribution in Leather

Fat-liquor is an important component in the processing of leather used to soften leather during processing. Research is being carried out within a research consortium funded by the New Zealand Ministry of Business, Innovation and Employment to understand the impact of fat-liquor in the rheological properties of this material.

Analytical techniques have been previously applied to examine the relationship between total fat-liquor content and ultimate leather properties. These techniques do not however take into account the differences in distribution of fat-

liquor during processing.

An objective image analysis technique was therefore developed for this work to examine differences in fat-liquor distribution during processing and its resulting impact on the final leather.

A staining method for fats both in raw skins and in leathers which could be quantitatively analysed through image analysis of cross sections was made possible by the development of staining technique to differentiate fats by colour from other skin components. This technique involves staining the sections with a stain for

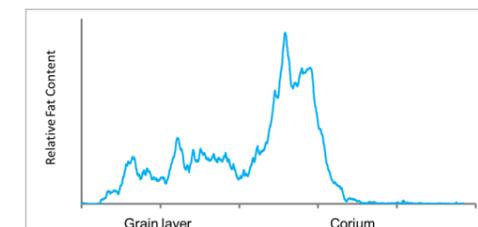
the component of interest, counterstaining the other components with a different-coloured stain, photographing the section (where necessary making a mosaic of several photomicrographs to get a whole cross-section in one photomicrograph), separating the photomicrograph into the colours of the different stains, and analysing the distribution of the stained material.

This technique is being applied to both our research and for helping understand production problems in commercial processes.

www.lasra.co.nz



Cross-section of stained leather after image pre-processing



Distribution of fatliquor after colour separation and profile analysis

National Award Recognises Local Leaders' Ground Breaking Success

Powder Metallurgy is breaking new and exciting ground in the world of design and manufacturing. It has revolutionised the ability to make complex products not previously possible, or just too costly. TiDA (Titanium Industry Development Association), based here in the Bay of Plenty, is at the leading edge in the research and production of titanium-based products using powder metallurgy consolidation processes. In recognition of their work, the team at TiDA have recently been awarded the coveted Metals New Zealand Innovator of the Year Award, during the Metals New Zealand Conference.

TiDA has been recognised for their innovative design and development of world-class products using powder metallurgy in high-tech manufacturing processes, and are now regarded as one of Australasia's leading Titanium Powder

consolidation leaders. TiDA has recently installed a Laser Sintering (3D printing) Machine that is able to produce intricate parts in Titanium, Stainless Steel and many other metals. This machine is one of only a few commercial machines of its kind operating in Australasia, and manufactured items are widely varied from body implants and complex machinery parts, to high spec sporting equipment and jewellery. Added to this, the newly acquired Vacuum Sintering Furnace, which can reach up to 1600°C, is used in the Metal Injection Moulding process. This machine is the only one of its kind in New Zealand, available for research or commercial purposes.

In addition, design prototypes are able to be produced and tested quickly and easily on the plastic 3D printers. Advanced metals research

and specialised coating options on finished products are also able to be completed right here in the Bay of Plenty, either in-house or with local commercial partners.

www.tida.co.nz



Building A Better New Zealand: The Research Strategy For The Building And Construction Industry

BRANZ, the Construction Industry Council, the Construction Strategy Group and the Ministry of Business have partnered to produce Building a Better New Zealand: the research strategy for the building and construction industry is the culmination of close collaboration and co-operation between industry and Government to develop and refine a strategy for the Building and Construction Sector that brings together in one place, the building and construction industry's research needs.

The building and construction industry is increasingly complex and in order for it to be effective we need to understand the impacts that decisions in one area have on the rest of the system and New Zealand as a whole.

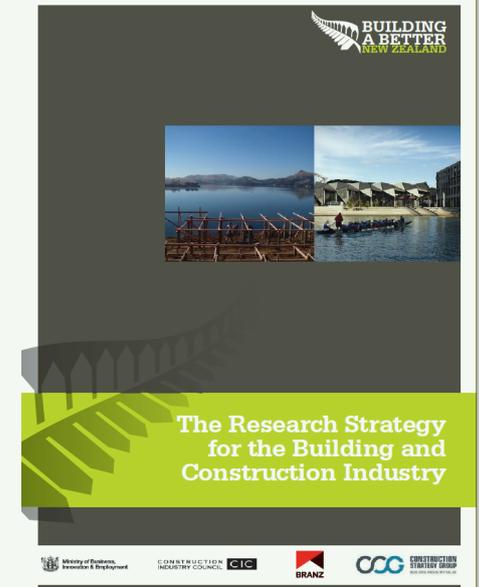
A successful and innovative building and construction industry is critical to New Zealand as we look to provide the homes, work places and communities that will secure firm foundations

for current and future generations. Research is essential to help us find new and better ways of achieving our goals.

New ideas and solutions will be needed as a generation of work re-shapes the buildings and infrastructure in the Christchurch rebuild. Auckland will undergo significant change over the next few decades as its population grows by 40% from its current 1.34 million to 2.5 million by 2040 and there is further concentration of employment and high value production activities in the Auckland region.

If we are to meet these challenges, take advantage of the opportunity they present, and influence and improve building and construction across the whole of New Zealand, then changes in what and how we build will be required.

www.branz.co.nz



CHANGES AT IRANZ

Since the last newsletter there have been a few changes at IRANZ. Sadly after four years with IRANZ we have farewelled Kate who has decided to pursue other opportunities. We have appointed Ruth Berry to take over from Kate. In addition to supporting IRANZ, Ruth works with the Research Strategy Group at BRANZ and other private and public organisations in research management and strategy. Prior to this Ruth worked in the Investment Strategy team at FRST.

We have also had a change of contact details. Our new postal address is:

IRANZ
PO Box 10088
The Terrace
Wellington 6143

And our new phone number is 0508 4IRANZ (0508 447 269)

Who we are:

IRANZ is an association of independent research organisations. Its members undertake scientific research, development or technology transfer. Members include Aqualinc Research Ltd, BRANZ, Cawthron Institute, CRL Energy Ltd, Heavy Engineering Research Association (HERA), Leather & Shoe Research Association (LASRA), Lincoln Ventures Ltd, Motu Economic and Public Policy Research, Opus Central Laboratories, Titanium Industry Development Association (TiDA) and Transport Engineering Research NZ Ltd (TERNZ).

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