



IRANZ Connections.

Independent Research key to nation's Science and Innovation capability



IRANZ member organisations employ more than 400 people, and undertake close to \$60 million per annum of research. We offer an important complement to university and Crown Research Institute research.

Our smaller sizes and greater flexibility provide environments that are particularly conducive to innovation and end-user engagement. The science sector structure that has been in existence for the past 20 years has enabled independent research organisations to make valuable contributions in a broad range of scientific fields.

IRANZ cautiously welcomed the recommendations from the Crown Research Institute Taskforce. IRANZ commends the Government on its strong acknowledgement of the value

of innovation to the economy and society as reflected in the pre-budget announcement of increased science funding. The taskforce report clearly outlined the current issues in the science sector, in particular the impact on the CRIs of the competitive funding environment. Member organisations of IRANZ are very familiar with this situation, which makes it challenging to retain valuable core research capability in New Zealand. While collaborating closely with CRIs and universities, we also compete for research funding from the same sources. It is pleasing to see the taskforce acknowledged that changes in funding should not place other research organisations at a disadvantage.

IRANZ member organisations are committed to playing a continuing role in getting the best outcomes for New Zealand from investment of public funds in science and innovation. An innovative and productive science sector includes strong independent research organisations. Other countries, such as Australia and the United States, recognise the national value and contribution of independent research organisations by providing support for their infrastructure and capability. IRANZ looks forward to engaging in the implementation processes for the taskforce report and contributing our expertise in the new science landscape.

Gillian Wratt - CHAIR, IRANZ

Issue 1: May 2010

HERA Fire Research lowers building costs	2
Biosensor and toxicity analyser commercialised through Sci-TOX	2
International award for paper on geosequestration	3
New WAVE of BRANZ research	3
NZ/US collaboration brings robotic submarine to Tasman Bay	4



HERA Meets John Key at Ullrich Plant Opening

In December 2009, Ullrich Aluminum officially opened an addition to their Ullrexco extrusion plant. The Prime Minister, Hon John Key, was on hand to officiate the opening. The event also hosted a few dozen exhibition stands with participation from companies in the light alloys manufacturing, supply or research fields. The Heavy Engineering Research Association's (HERA) stand received a visit from the Prime Minister and HERA Director Dr Wolfgang Scholz took the opportunity to explain HERA's role and mission in detail to John Key.





The non fire-protected, yet safe, steel-work of the cellular beams can be seen clearly in the photo of the Britomart East office building.

HERA fire research lowers building costs

A new method to design fire safe floor systems in multi-storey steel framed buildings has been developed within the fire research programme of the New Zealand Heavy Engineering Research Association (HERA). The programme, supported by the Foundation for Research, Science and Technology, was part of a larger HERA research programme to mitigate the effects of natural hazards.

Taking the previous design methodology named the "Slab Panel Method (SPM)" HERA research took SPM a quantum leap forward. Full-scale fire tests on steel-concrete composite floor panels were undertaken at BRANZ, and demonstrated that the floors perform adequately in severe fires, even when a number of the supporting beams do not have fire protection applied to them. The SPM

permits designers to safely omit fire protection from many of the beams.

SPM was employed in the Britomart East office building in the Auckland Central Business District. It was found that 75% of the fire protection could be eliminated from the long-span beams resulting in significant cost savings to the client.

HERA is working with researchers from UK, continental Europe and Australia to assist in adoption of SPM. Funded by the European Commission, HERA is taking an active role in the design of a large 15 x 9 m span demonstration fire test in Northern Ireland. This test extends the SPM research to longer-span cellular beams and will help to develop uniform European design rules for protected and unprotected cellular beams subjected to fire.

Biosensor and toxicity analyser commercialised through SciTOX

At the end of 2008, SciTOX was formed to commercialise a biosensor technology developed by Dr Neil Pasco and his team at Lincoln Ventures Ltd. This technology uses bio-molecules to interact with target chemicals.

SciTOX has launched two products based on the patented technology. SciTOX Alpha uses a microbial based biosensor for the rapid measurement of toxicity in waste. It provides quick, reliable, cost effective measurement of the toxic effect of a liquid or compound entering a wastewater treatment plant. This allows customers to control plant operations, reject unacceptable toxic waste and charge customers based on the toxicity of their waste.

The second product, the UniTOX toxicity analyser, is aimed at universities and research organisations, and allows these customers to develop applications and methods for toxicity and metabolic measurements. The company is looking at future applications including diagnostic systems for environmental, dairy, industrial and medical use.

Now the Lincoln Ventures team is focusing on developing advanced third generation biosensors. These biosensors are based on the phenomenon of Direct Electron Transfer, whereby electrons are directly transferred between enzyme and electrode. The resulting fast direct electron transfer between an enzyme and the electrode virtually eliminates any interference and they operate with higher sensitivity and selectivity. The research is expected to result in a new range of analytical tools for processing industries, waste water treatment plants and regulatory authorities.



For more information visit:

www.SciTOX.com and www.lvl.co.nz

Review of Heavy Vehicle inspection process

The New Zealand Transport Agency has asked Transport Engineering Research New Zealand (TERNZ) to review the process used for the Certificate of Fitness inspections of heavy vehicles. The investigations include the development of new models for improving the safety and service and reducing the costs of the inspection regimes.

Lincoln Ventures to help the Philippines formulate guidelines for aerial spraying

Dr Andrew Hewitt, an expert on aerial spraying of fungicide and drift, was recently invited by the Philippines' Fertilizer and Pesticides Authority and Department of Agriculture Taskforce on Aerial Spraying to help conduct an intensive study on the effects of aerial spraying in communities surrounding banana plantations in the Davao region.

International award for paper on geosequestration

An international research team led by Dr Anthony Clemens, CRL Energy General Manager for Research won a silver award for an "Outstanding Contribution" at the 2009 Pittsburgh Coal Conference. The award recognised Dr Clemens' scientific paper which directly observed the changes in coal structure when injected with pressurised carbon dioxide.

This process of geosequestration involves capturing carbon dioxide that would otherwise be emitted to the atmosphere, and injecting it into deep geological formations such as un-minable coal seams or oil and gas fields, where it will be trapped for thousands or millions of years. This is an important process as even with efforts to convert to alternative sources of energy, fossil fuels will continue to be the primary source of energy for decades to come. Geosequestration provides the potential to combust fossil fuels without significant emissions of greenhouse gases to the atmosphere.

In a collaboration with the US Argonne National Laboratory, Dr Clemens focused

on ten New Zealand subbituminous coals in the past year. This work will help to determine if un-minable coal seams in New Zealand could be used as part of geosequestration.

This research was initiated with support from a bilateral climate change research partnership between the NZ Ministry of Foreign Affairs and the US State Department, and more latterly by the Foundation for Research Science and Technology and the Ministry for the Environment.

*In tribute to Dr A H Clemens
July 1950 – February 2010.*

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New WAVE of BRANZ research

BRANZ is undertaking valuable research to establish the engineering basis for indoor moisture and indoor environmental quality of buildings.

The six-year Weathertightness, Air Quality and Ventilation Engineering (WAVE) programme responds to the Department of Building and Housing's need for new calculation and testing methods to support innovation in weathertight building design and improved indoor environments. The programme has 4 main subthemes – Weathertightness; Interstitial Moisture; Ventilation; and Indoor Air Quality.

The ventilation work will include a survey of 40 dwellings to see how ventilation rates in modern New Zealand building stock relate in the global context. Results from this survey, combined with

the lessons learned in an experimental building, will be used to shape building code changes and help protect New Zealand buildings from the internal moisture issues experienced overseas.

Stephen McNeil, BRANZ Materials Scientist says the models developed will allow architects, designers and homeowners to make building-moisture related decisions using sound engineering and scientific knowledge.

In the long term, a successful programme will have: prevented a recurrence of the leaky building problem in houses and apartments; reduced complaints related to indoor moisture; reduced the incidence of respiratory illnesses; advanced the international knowledge of the interaction between structure's moisture, allergens and their occupants.

Auckland's Toxic Sea Slugs

The Cawthron scientists who discovered the tetrodotoxin producing sea slugs responsible for dog deaths on Auckland beaches have been awarded Cawthron Internal Investment funding to continue their efforts to learn more about this phenomenon. The science team, led by Dr Susie Wood, is hoping to grow the sea slugs in captivity in order to better understand how the powerful neurotoxin tetrodotoxin is produced.

School bus safety

TERNZ is undertaking research into improving the safety of school bus transport. While travelling by bus is safer than by car to school, at least one school bus passenger is killed on the road every year. This is mainly when they have left the bus and are crossing the road.



All aspects of school bus safety are being considered including crossing the road, and preventing injuries if the bus were to rollover.

Dr Lee Burbery returns to Lincoln Ventures

Dr Lee Burbery has recently returned to Lincoln Ventures, to contribute to groundwater research projects. Lee has a background of researching practical methods for determining natural attenuation processes in groundwater. This includes development of the Re-Circulating Tracer Well Test method, designed as a cost-effective solution to the problem of determining nitrate reaction rates in fast-flowing aquifers.

NZ/US collaboration brings robotic submarine to Tasman Bay

A robotic submarine has been exploring the waters of Tasman Bay, near Nelson. Scientists from Cawthron Institute in Nelson are using the \$800,000 Autonomous Underwater Vehicle (AUV) to study the Motueka River plume as it comes into Tasman Bay. The plume, which can extend over 20 kilometres into the Bay, is known to influence water quality and growing conditions for shellfish.



Cawthron scientists and visiting scientists from North America launch the AUV to carry out a mission in Tasman Bay.

An international collaboration between the University of Delaware, Cawthron Institute, Waikato University and the Royal Society of New Zealand has brought the AUV to New Zealand. Cawthron Institute's Commercial & Investment Manager, Daryl Wehner says this new collaborative relationship will strengthen the Institute's ability to provide research, technology and advice for the management of sustainable

marine and freshwater ecosystems and resources. "This in turn can only be of benefit to the region and New Zealand. Cawthron Institute would eventually like to see one of the AUVs permanently housed in New Zealand", he says.

One of 13 worldwide, the AUV is in effect a miniature submarine, only with a virtual crew. It is 2.7 metres long and weighs just 80 kilograms. In addition to measuring what's in the water, the AUV has underwater cameras, side and bottom mapping sonar for acquiring high-resolution imagery of the seabed.

Cawthron Marine Scientist Chris Cornelisen says the AUV's cutting-edge technology will enable them to gather more information on a little-known phenomenon in Tasman Bay: a bottom layer of suspended sediments and phytoplankton that can appear in the summer and is thought to be linked to the productivity of scallops in the area.

Chris Cornelisen says it is like nothing else scientists in New Zealand have had a chance to use before and for oceanographers, it is the ultimate research tool.



Underwater view of the AUV

New Director for LASRA

Dr Warren G Bryson has been appointed as the Director of the Leather and Shoe Research Association (LASRA) by its board following the retirement of Tony Passman. Dr Bryson comes from a wool research background with a track record in establishing international collaborations and attracting business funding from major corporations such as the Kao Corporation (Japan), Unilever UK and Australian Wool Innovation. Previously head of Fundamental Sciences at WRONZ, then Canesis, Dr Bryson has capabilities in proteomics, structural biology, protein chemistry and wool processing technologies.

Breeding Pearl Oysters

A containerised algae culture lab assembled at Cawthron's Glenhaven Aquaculture Centre near Nelson was recently shipped as a kitset to Aitutaki in the Cook Islands. This is part of an NZAID funded project with the Cook Islands Ministry of Marine Resources, to develop a breeding programme for the black pearl oyster, *Pinctada margaritifida*.



Who we are:

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

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