



IRANZ Connections.

SCIENCE AND INDUSTRY PARTNERSHIP STRENGTHENED

Aquaculture in the top of the South Island has received a further boost following the signing of a formal agreement between Cawthron Institute and Wakat Incorporation.

Wakat -owned seafood company, Kono, has been based at the Cawthron Aquaculture Park since 2003, working with Cawthron at an operational level on shellfish research and development. The new agreement between both boards sets out terms around the leasing of land, shared resources, collaborations and infrastructure at the park.

“By working together at a strategic level we’re able to better pool our resources and knowledge so we can continue to support sustainable

aquaculture growth,” Cawthron Institute Chairman Ian Kearney says.

Wakat Incorporation Chairman Paul Morgan says the agreement cements its longstanding partnership with Cawthron.

“It’s a smarter way of doing things and will help in future planning and decision-making around new investments, research and developments,” he says.

“It’s good for us, for the industry and for our region to have this added security and certainty, and sends the message that we’re in this sector for the long haul.”

www.cawthron.org.nz



Issue 11: December 2013

Science & Industry Partnership Strengthened	1
Changes at CRL	1
New Research: Introducing the Wheel of Water	2
Productivity of New Zealand Firms	2
Breakthrough in Didymo Research	2
Low Cost, High Precision Diagnostic Platform - A Golden egg for Menexis Ltd	2
Heel Shock Absorption	3
New Research leads to Revised Seismic Design Guide	3
Assessing the effects of Vibration	3
Testing Building Resilience	4
New Chief Executive for BRANZ	4
Networking Success International Titanium Powder consolidation & Metallurgy Conference 2-4 December 2013	4

Cawthron Aquaculture Park (pictured) is breeding success through industry and science collaborations.

CHANGES AT CRL

After 25 years at the helm of profitable research company CRL Energy, CEO Dr Rob Whitney is handing over the reins.

The move follows the purchase of the company by New Zealand Coal and Carbon Ltd (NZCC) from the Coal Association of New Zealand Inc. NZCC, New Zealand’s largest privately-owned coal mining company and exporter of coal, encompasses two mining companies; ROA Mining Company Ltd and Francis Mining Co Ltd, both based on the West Coast of New Zealand’s South Island.

NZCC previously purchased CRL Energy’s spin off company Nuenz, which specialises in a patented process for producing Silicon Nitride nanofibres.

Dr Whitney remains with the company as Chief Science Advisor to CRL Energy and the Coal Association. Dr Whitney says the move will allow him to focus on his roles within the World Energy Council (through EFNZ and the BusinessNZ Energy Council), in particular his role as Executive Chair of the WEC Flagship Energy Scenarios Programme, and also the International Energy Agency (IEA) Clean Coal Centre and IEA Greenhouse Gas R&D Programme, while knowing that CRL Energy is in good hands.

“I will continue as a Director of CRL Energy’s Australian joint venture CB3 Mine Services and as a Director of Austmine NZ. I’ll also continue to facilitate a New Zealand research programme in the sustainable commercial use of energy and mineral resources, and do all I can to assist in the

future growth and prosperity of CRL Energy.

“The new role will also allow me to work with other parties in the energy and science sector, a prospect that is interesting, challenging and complimentary to both CRL Energy and the Coal Association.”

The Managing Director role will be filled by Barry Bragg, the current Managing Director of Nuenz and former Chief Operating Officer at Solid Energy, where he worked for 20 years in marketing and senior management roles.

CRL Energy will continue to operate with an independent Board chaired by longstanding Chairman Alan Broome, who is also the Chairman of Nuenz.

www.crl.co.nz



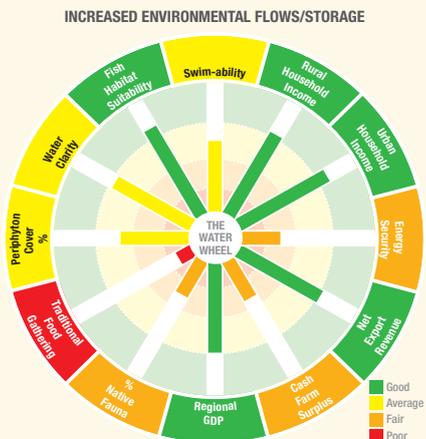
NEW RESEARCH: INTRODUCING THE WHEEL OF WATER

Access to abundant freshwater resources is one of New Zealand's most significant competitive advantages. However, the management of water resources has become a significant issue, as water demands increase. In addition, although the quality of New Zealand's freshwater is good by international standards, monitoring shows that it is declining in places, triggering a rethink about water resource management.

Setting limits for freshwater resource use is complex because of the intricate nature of the relationship between land and water, and the potential environmental, social, economic and cultural impacts of any decisions. The Wheel of Water research is investigating how to use a comprehensive range of indicators to set these limits, so that the economic and social consequences of water use limits can be assessed alongside any environmental impacts. One example of the complexities surrounding freshwater use is the significance of the economic relationship between rural agricultural business and the city: cash flow from farm expenditure by Canterbury Plains farmers makes a notable contribution to the Christchurch economy (initial studies suggest \$2.2 billion is contributed each year from the Selwyn and Waimakariri areas alone). Therefore, water management decisions that may appear to only affect farmers do in fact affect urban communities. The Water Wheel (see Figure for an example Water Wheel) enables us to consider a number of different indicators at once, helping decision-makers to make optimal decisions for the benefit of all New Zealanders.

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THE WATER WHEEL shows the impacts of different scenarios on a variety of environmental, social, economic and cultural indicators. Poor outcomes are indicated by short, red 'spokes' on the wheel and good outcomes are indicated by longer green ones. This example Water Wheel demonstrates the outcomes for a particular scenario – conclusions can be drawn by comparing Water Wheel outcomes for different scenarios.



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The Wheel of Water research program is a three-year government-funded multi-agency project researching collaborative decision-making and water resource management. To find out more about our research, please contact Dr Ton Snelder at Aqualinc: t.snelder@aqualinc.co.nz.

www.aqualinc.co.nz

Productivity of New Zealand Firms

Motu has established a new two-year research programme (funded by the Productivity Commission, Treasury, MBIE and Statistic NZ) on the productivity of New Zealand firms. The programme is built around the Longitudinal Business Dataset (LBD) of Statistics NZ.

The LBD is a unique and rich dataset that links information from multiple sources to provide a comprehensive picture of the activities of New Zealand firms over time.

The programme will involve original research conducted by Motu affiliates, collaborative research between Motu and the research staff of the funding agencies, and a broad-based effort to increase the capability of researchers from multiple organisations to utilise the LBD.

For further information contact Adam Jaffe, Director and Senior Fellow, Motu Economic and Public Policy Research Adam.Jaffe@motu.org.nz

www.motu.org.nz

BREAKTHROUGH IN DIDYMO RESEARCH



In a world-first, scientists at Cawthron Institute have discovered how to grow the invasive algae Didymo in the laboratory – a breakthrough that could one day lead to its control.

Didymo, also known as 'rock spot', has spread to over 150 South Island waterways in the past nine years. In some areas it forms thick, slimy-looking mats that can smother entire river beds. It is not a significant human health risk, but can affect stream habitats and sources of food for fish, and make recreational activities unpleasant.

For the past four years, Cawthron scientists have been trying to better understand the basic biology, distribution and abundance of Didymo in New Zealand. As well as discovering how to grow it in a controlled laboratory environment, Drs Susie Wood and Jeannie Kuhajek have also identified bacterial species that might enhance or suppress its growth. Funded by the Ministry of Primary Industries and the Department of Conservation, their research has attracted world-wide attention. Dr Kuhajek presented these latest advancements at this year's International Didymo Conference in the United States, where they were well received.

"Our research could ultimately help us understand why this algae is so invasive and why it has established in some rivers but not others," Dr Wood says.

While eradication is unlikely, Dr Wood believes chemical or biological methods could eventually be used to control Didymo in areas where it is problematic.

Email Susie.wood@cawthron.org.nz or Jeannie.kuhajek@cawthron.org.nz to find out more about this research. www.cawthron.org.nz

LOW COST, HIGH PRECISION DIAGNOSTIC PLATFORM – A GOLDEN EGG FOR MENIXIS LIMITED

Lincoln Agritech has been working with a Dunedin-based technology start-up called Menixis to develop a novel instrumentation platform for identifying parasitic worm eggs in stool samples for the vet and human healthcare industries.

Menixis was founded by Dr Stephen Sowerby of the University of Otago, Otago Innovation and Greg Mirams, Managing Director of Techion, an animal parasite diagnostic company; and is centred on a method for providing small particle microscopy which is robust to use in the field by non-technical operators. The company was recently capitalised following investment from Enterprise Angels and the New Zealand Venture Investment Fund. Techion will also be the first customer of the Menixis devices, with the device enabling them to offer high value services into new international markets, using time zone offsets to offer an overnight service to Northern Hemisphere customers without a physical sample ever needing to be shipped.

Lincoln Agritech worked alongside Menixis, and the Dunedin-based DC Ross Ltd which managed the mechanical product design; to develop an instrument that includes an automated sample cartridge feeding system with custom optics to focus in on sample wells to image microscopic egg particles and send focal-stacked photos back to Techion's New Zealand laboratory for analysis.

Lincoln Agritech's background in complex image processing applications, electronics design and embedded software helped deliver a precision instrument that was operable with minimal user intervention. The project was also a great example of how facilities like video conferencing can allow development teams to work remotely but still stay in step through time critical development programs.

Menixis has also made a key advance in validating the application of its technology in the human health market, with the technology receiving a Grand Challenges Explorations award (part of the Bill & Melinda Gates Foundation) for the University of Otago to investigate applications in developing nations.

This project was made possible by an R&D Project Grant from Callaghan Innovation.

www.lincolnagritech.co.nz



HEEL SHOCK ABSORPTION

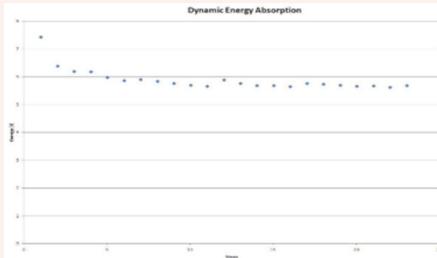
A recent International study has shown that in simulated and actual wear tests the shock absorbing properties of sports footwear can become significantly diminished over time in use. Over the lifespan of a running shoe, the capacity to absorb shock was found to be reduced by as much as 70-75% after 500 miles of running.

Some running shoes with superior initial shock absorption capability were found to degrade rapidly in these trials, so initial comfort properties were not found to necessarily be a good measure of performance in wear

To investigate this documented drop-off in shock absorbance in footwear, LASRA developed a test rig which reproduces heel strike and measures the energy absorbed. By repeating this test over dozens of cycles, the energy absorption performance for particular polymer and foot bed combinations can be analysed to assist footwear companies with developing shock absorbing footwear.

www.lasra.co.nz

The test is suitable for any kind of footwear, but has so far mostly been applied to sports and industrial footwear, where shock absorption in an important performance and comfort property.



NEW RESEARCH LEADS TO REVISED SEISMIC DESIGN GUIDE

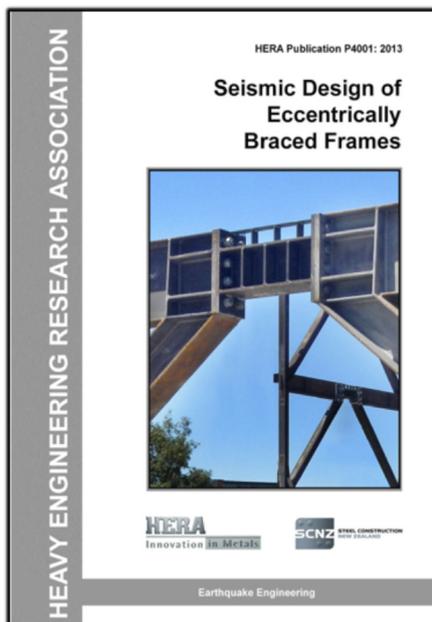
The Heavy Engineering Research Association (HERA) is leading New Zealand's cross sector wide steel construction innovation through continued R&D. Recent outcome was the revision of its Seismic Design Guide on Eccentrically Braced Frames (EBF's). EBF's are the most common form of seismic forces resisting bracing used in multi-storey construction in New Zealand. EBF's are designed to yield under a serious earthquake and need to be repaired if such an event happened. For the most part, EBF's performed very well during the 2010/11 Canterbury earthquakes but some links needed repairing. To facilitate ease of repair of the traditional EBF's, HERA in conjunction with the University of Auckland and industry partners has developed a replaceable EBF link.

HERA's research focused on finite element analyses of removable active EBF links in multi-storey buildings. The results showed that the design procedure achieves the objectives of suppressing inelastic demand outside of the active link region, allowing the rest of the structural system to remain essentially elastic under severe earthquake excitation. A bolted replaceable active link allows for independent control of beam stiffness and strength, resulting in more efficient structures. It also allows for quick inspection and replacement of damaged links following a major earthquake, significantly minimising the disruption time to reoccupy the building.

HERA, in conjunction with Steel Construction New Zealand (SCNZ), launched HERA Publication P4001:2013 - Seismic Design of Eccentrically Braced Frames at a seminar series during November. This new publication is a significant update to the EBF section of HERA Report R4-76: Seismic Design of Steel Structures.

The new design guide can be ordered from HERA at http://www.hera.org.nz/Product?Action=View&Product_id=306.

www.hera.org.nz



Assessing The Effects of Vibration

Vibrations are a common side effect of both construction and demolition processes. The adverse effects from harsh vibrations can pose risks to people's health, like broken sleep and hand-arm vibration syndrome, or result in building damage due to cracking.

As awareness for the potential harm of vibrations grows, so does the demand to have it monitored and controlled. Opus Research is a leading provider of specialist vibration services and has extensive capabilities for monitoring and analysis of vibrations, including the capability to undertake trial blastings to help inform prospective tunnelling and quarrying operations.

Examples of the types of assessment include:

- Ground motion due to vehicle traffic, construction vehicles, pile driving, or blasting.
- Building motion resulting from vehicle traffic, wind effects, activities in buildings, machinery, or earthquakes.
- In-vehicle ride quality.
- Floor and bridge deck responses caused by walking, dancing and other activities.



Measured vibrations are assessed against recognised criteria for the perception of people living or working nearby, or the potential for cosmetic damage to buildings e.g. cracking in wallboards. Assessments ensure that the measured vibrations are within acceptable limits, and to inform the choice of measures to reduce or eliminate the vibrations if required.

With research into the impacts of vibration being relatively new to New Zealand and our road building, the New Zealand Transport Agency commissioned Opus Research to develop a reliable and user-friendly method of gauging the potential impact of ground vibrations caused by road construction activity. The associated report can be downloaded from <http://www.nzta.govt.nz/resources/research/reports/485/docs/485.pdf>

www.opus.co.nz/opus-research

TESTING BUILDING RESILIENCE



Recently BRANZ has been working with the Ministry of Education and Housing New Zealand to gather evidence on the seismic performance of timber framed classrooms and state homes.

Desktop engineering assessments, which use information from the buildings' drawings and estimates of the strengths of the identified bracing components to give the building a strength rating against New Build Standards, had indicated that many classrooms and Housing New Zealand properties were potentially earthquake-prone and required strengthening.

BRANZ engineers designed destructive tests that would simulate the stresses placed on the buildings earthquakes of various magnitudes, by applying longitudinal and transverse loads to the buildings in a controlled manner. Results to date are showing that timber-framed classrooms, which makes up approximately 90% of Ministry of Education building stock, are more resilient than first thought.

These are important results for both the Ministry of Education Buildings that are more resilient than previously calculated will offer occupants greater protection in the event of an earthquake and the cost of seismic strengthening programmes will be reduced. By being able to target earthquake strengthening to the areas where it is needed will allow the Ministry of Education to release money to spend on modernising classrooms. Results from Housing New Zealand's tests are due to be finalised in the New Year. If they find that state homes are stronger than originally thought it has the potential for Housing New Zealand to reduce estimated strengthening costs which will be invested in building more new state homes where they are needed.

www.branz.co.nz



NewChief Executive for BRANZ

BRANZ has recently appointed a new Group Chief Executive Officer, Chelydra Percy.

Chelydra comes to BRANZ from Callaghan Innovation where she was the General Manager for Future Products and Innovation.

BRANZ Chair Helen Anderson says "BRANZ is fortunate to have secured someone as experienced as Chelydra for the CEO position. The BRANZ Board are excited to be working with Chelydra to continue the growth of the organisation. With a strong background in science management and strategic skills developed during her time at Scion and as Chief Executive for the Electricity Supply ITO and Kiwi Star Optics, Chelydra brings an excellent package of leadership skills to BRANZ"

Chelydra says "BRANZ is a strong and well recognised organisation within New Zealand's building industry. I am really looking forward to working with the team to increase the level of quality knowledge and information we deliver for industry benefit"

For more information, contact: Richard Arkinstall, General Manager, Knowledge Transfer

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www.branz.co.nz



NETWORKING SUCCESS

INTERNATIONAL TITANIUM POWDER CONSOLIDATION AND METALLURGY CONFERENCE. 2 – 4 DECEMBER 2013

Along with sponsorship partners, the University of Waikato, TiDA is reflecting on the success from recently hosting this specialised Conference, which attracted over 100 Industry leaders from all corners of the globe. The Programme was specifically designed to enable many networking opportunities during the four days to maximise the global reach of the attendees. Presentations covered a wide variety of recent Research findings and successes, plus commercialisation and Industry growth learnings and issues. Presentations will soon be available from www.tida.co.nz, with an International TTP publication available from the mid- 2014.

Guest speaker, Dr Jonathan Bray, Assoc. Professor at Massey University Veterinary Teaching Hospital, is one of many TiDA clients who has recently had success in the prototyping field. Massey University

Vets contacted Axia Design Group in Napier, to design a jaw bone replacement for large dog, who had an aggressive cancerous growth. In consultation with the pet owners and Massey, Axia designed a 3D CAD model from a CT scan, which TiDA then 3D printed on the newly commissioned SLM printer.

"The process was urgent for the welfare of the dog, and to have the piece fitted within five days of finishing the design, ensured that he had this replacement option, as opposed to a straight removal" said Massey University Vets. The surgery was a success, with a happy pup enjoying solid food the following morning.

www.tida.co.nz



FINISHED JAW BONE



Ajit Singh, PhD Candidate, University of Waikato, NZ, Willie du Preez, Director, CSIR South Africa, Llanley Simpson, Director, Mining and Minerals Beneficiation, Department of Science and Technology, South Africa, Brian Gabbitas, Assoc Professor, School of Engineering, University of Waikato]

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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