Quality, Certainty and Value Through Innovation

ANNUAL REPORT 14

HERA
Innovation in Metals
Heavy Engineering Research Association

About HERA

HERA is the Research Association for the New Zealand metals engineering industry. Established in 1979 under the Heavy Engineering Research Levy Act as a member-based, not-for-profit Research Association, HERA today serves 600-plus industry members as their leading resource support centre.

HERA PURPOSE
- **Service heavy engineering sector interest**
- **Facilitate access to markets**
- **Provide Research & Development, technical training, advice and support**
- **Provide a respected voice for the aspirations and concerns of members**
- **Lead the movement towards a sustainable and internationally competitive industry**

HERA Executive 2013/2014:

From left: Dr Troy Coyle (inset), Terry Duff, Mike Lehan, Bernard Hill, Alistair Fussell, Dr Wolfgang Scholz, David Moore, Peter Hutton, Noel Davies, Paul Bryant, John Frear, Sean Gledhill (inset), Prof Thomas Neitzert, Simon Ward (inset)

Name	Company Affiliation	Membership Representation
John Frear (Chairman)	Best Bars Limited	Ordinary & Associate Members
Mike Lehan (Deputy Chairman)	Page Macrae Engineering	Ordinary & Associate Members
Peter Hutton (Past Chairman)	Fitzroy Engineering Group	Ordinary & Associate Members
Paul Bryant	Steel & Tube Holdings	Ordinary & Associate Members
David Moore	Grayson Engineering	Ordinary & Associate Members
Prof Thomas Neitzert	Auckland University of Technology	Ordinary & Associate Members
Bernard Hill	Hawkins Infrastructure	Ordinary & Associate Members
Terry Duff	Southern Cross Engineering	Ordinary & Associate Members
Sean Gledhill	AURECON	Ordinary & Associate Members
Noel Davies	Hydraulink Fluid Connectors	Heavy Engineering Educational & Research Foundation (HEERF)
Dr Wolfgang Scholz	HERA	Director
Dr Troy Coyle	NZ Steel	Representing the President NZ Steel
Alistair Fussell	Steel Construction New Zealand	Co-opted representing SCNZ
Simon Ward	A-Ward Attachments	NZ Manufacturing & Exporters Association (NZMEA)

About the Cover - Quality, Value, and Certainty through Innovation

This year the New Zealand's heavy engineering industry has made major progress on its sector wide promise to deliver quality, certainty and value through innovation. In co-operation with Steel Construction New Zealand, HERA put in place the *Steel Fabricator Certification* scheme aimed at demonstrating that certified companies produce consistent quality in line with New Zealand and international best practice standards, deliver value through ongoing innovation and certainty by being independently certified as meeting the claimed requirements.

CONTENTS

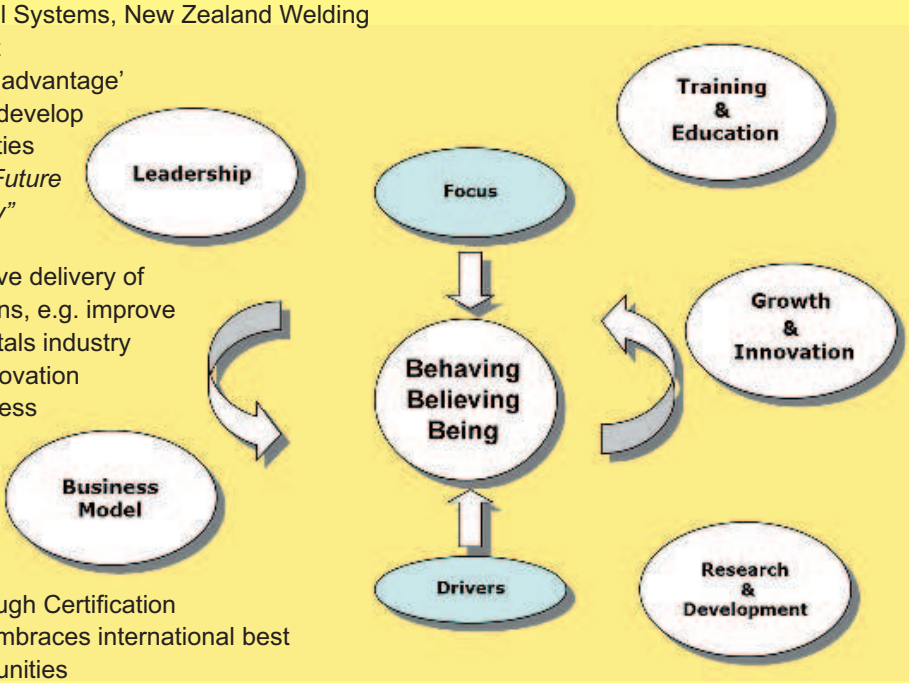
HERA STRATEGIC FOCUS:

INDUSTRY VISION
To have New Zealand's Metals Engineering Industry achieve world-class standards for profitability, quality and sustainability

HERA MISSION
HERA to be the catalyst for research, innovation, growth and development in New Zealand's Metals Engineering Industry

The HERA Strategy has the five focus areas as identified in the diagram. The strategies developed and followed by HERA staff for each of the focus areas remained unchanged with key strategies such as :

- Maintain industry input in research road maps in each of the research focused HERA divisions Structural Systems, New Zealand Welding Centre and Industry Development
- Develop NZ industry 'competitive advantage'
- Use HERA Roadmap Process to develop Clean Energy business opportunities
- Drive and support *"Securing the Future of NZ Metals Engineering Industry"* programme
- Better use of technology to improve delivery of key messages and communications, e.g. improve online presence of HERA and metals industry
- Use Standards as a means of innovation and through harmonisation to access to new markets
- Develop and implement programmes to enhance productivity in key areas of metals fabrication such as welding and construction
- Grow business opportunities through Certification
- Product development work that embraces international best practice to facilitate export opportunities



John Frear
HERA Chairman

Industry Activity – Steel Construction Rock Star Performance
Heavy steel usage in New Zealand rose by 10% compared to last year, bringing the total consumption to over 145,000 tonnes. The major growth was in sections with over 21% growth being indicative of the buoyant building and construction market.

However as the graph shows this is still 12% short of the pre-2009/10 Global Financial Crisis peak, indicating operations are still below industry capacity especially when considering newly-built steel fabrication capability. The fact that plate volumes stayed static is of concern, indicating that the general heavy fabrication area excluding construction did not see a hoped-for expansion. From industry feedback, we also know that some members had a tough business year.

Metals Based Exports Grew
The heavy engineering import-export collective showed exports in our tradable items sector grew by over 4%. Considering this against the prevailing high exchange rate, this is a pleasing result but we are still well behind previous peaks.

As an industry sector, we need to continue to advocate for more to be done by Government to support our high-value industry transformation towards increased export contributions. Imports were dominated by the high-value ship category and more than doubled as we typically see when driven by big ticket items.

The particularly relevant steel structures category (7308) showed an annual increase of 25% in imports. While this is within the normal fluctuation for this category, it is justifying ongoing focus on increasing our competitiveness.

Steel Construction Certification Scheme Operational
No doubt this year's biggest industry achievement in our effort to increase competitiveness via the consistent delivery of quality products was the implementation of the Steel Fabricator Certification scheme.

In a joint effort between HERA's NZ Welding Centre, SCNZ and leading construction industry members, the industry-governed **A**uthorised **N**ational **B**ody for **C**ompany **C**ertification (ANBCC) to IIW/ISO 3834 has been put in place. All conditions of the international scheme have been met and following an international audit the HERA - ANBCC received its official accreditation to commence operations.

However, most significant to note is the extent of the industry buy in with one company concurrently achieving their certification in conjunction with the HERA audit. Another 12 companies have formally signed up to the scheme.

While demonstrating consistent quality and meeting international requirements is one driver; the critical factor has to be cost-effectiveness. It is pleasing to see that for the first company achieving certification, the cost of remedial work in the year following implementation reduced by over 75%.

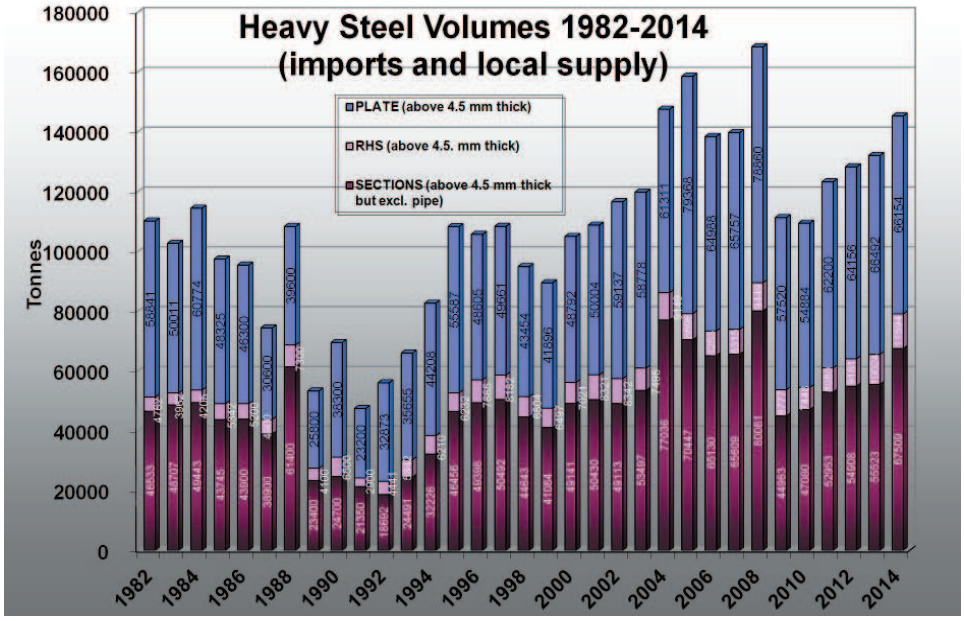
HERA and SCNZ's role now is shifting towards ensuring large scale uptake and product user awareness of the benefits. Informing and working with the regulator, it is pleasing to note that product conformance is taken more seriously in order to ensure that all construction, and particularly imported materials, meet the New Zealand requirements.

Securing the Future of New Zealand Metals Engineering
HERA's strategic focus on securing a sustainable and high-value metals engineering industry, achieved another milestone with the appointment of Gary Hook as CEO of Metals NZ at the end of 2013. Gary is now running the *"Securing the Future of New Zealand Metals Engineering"* programme.

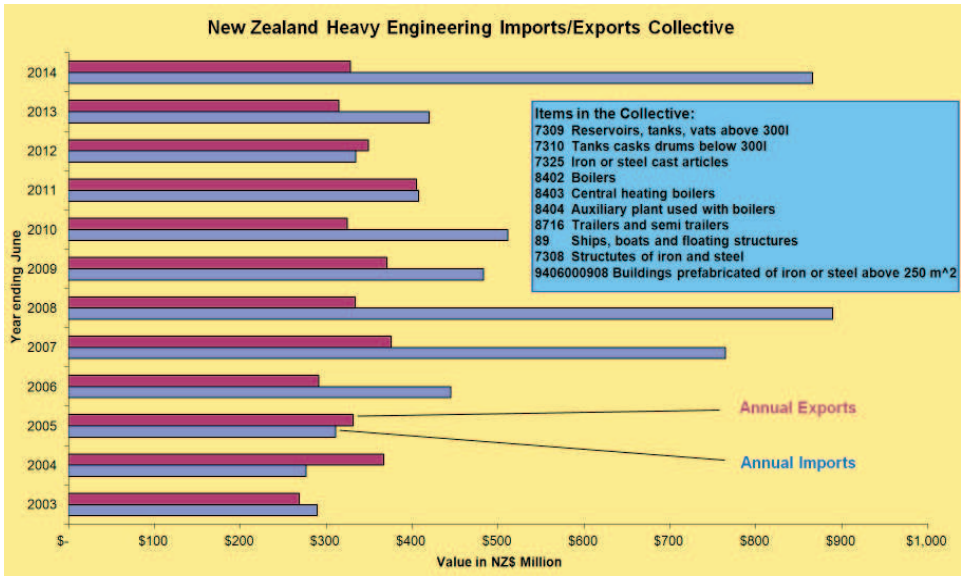
Recognising public sector procurement as the key client of our industry and with the potential to be the most significant lead user innovator for our sector, HERA, supported by the Metals NZ activities, engaged extensively in the Government's procurement reforms.

Outcomes included submissions to the All of Government (AoG) procurement initiatives, participation in the Government Procurement Reform Business Reference Group and ongoing high level advocacy on the issue.

Having the *Five Principles of Government Procurement* as approved Government policy including *Get the Best Deal for Everyone*, which includes the requirement for *Balanced Decision Making*, is a powerful requirement supporting local industry participation and needs constant reinforcement to decision-makers. HERA will continue working



Source: Statistics New Zealand / HERA



Note: Exports from NZ Steel and the NZ Aluminium Smelter are not included

towards Metals NZ becoming self-funded and independent, with the aim to effectively compliment HERA's role as an R&D and education services provider.

Financial Performance – Surplus Marks Turnaround

After a long time in the planning, this year HERA ended up with a healthy surplus of over $500k on the back of better-than-budgeted industry activity translating into higher-than-budgeted levy income. Other factors include unspent salary components planned for new activities but unactivated due to difficulty in obtaining specialist staff required, and also better-than-budgeted self-generated income. This surplus will now assist in paying for the comprehensive HERA House refurbishment, which was previously deferred due to constrained finances.

R&D Outcomes

• Steel Construction Research

The main thrust of HERA's steel construction research was on the improvement of steel construction standards and design guidelines.

Primary outcomes were the publication of the Steel and Composite Bridge Design Standard AS/NZS 5100.6, significant progress with joint Australian and New Zealand Steel-concrete Composite Design Standard for buildings AS/NZS 2327, development of AS/NZS Fabrication and Erection Draft Standard as a joint project with SCNZ and the Australian Steel Institute (ASI), launch of HERA Publication P4001:2013 *Seismic Design of Eccentrically Braced Frames* in conjunction with a seminar series, and development of new provisions for composite slabs using high strength steel, including recommendations for the revisions of Eurocode 4.

Several commercial research projects were also performed for industry members operating in overseas markets.

• General Heavy Engineering

About half of HERA's members operate in the diverse heavy and metals engineering industry sectors. Following prior years' priority-setting work, the R&D focus on renewable energy continued.

The establishment of a New Zealand Marine Energy Centre came a big step closer to potential realisation with a detailed business case developed in co-operation between HERA, AWATEA and the European Marine Energy Centre in Orkney, Scotland and was delivered to Government for funding support consideration.

The Government co-funded Above Ground Geothermal and Allied Technologies (AGGAT) programme entered its second year. The programme has been rather challenging in managing the academic interface, and also in gaining the required industry contributions.

The industry contribution challenge was largely due to the changes in government-industry co-funding from the previous Tech-NZ to the new Callaghan Innovation R&D grant funding rules, and these issues are still not fully resolved.

However, progress made in addressing the challenges has confirmed continuation of the programme. The manufacture of at least two New Zealand-manufactured Organic Rankin Cycle pilot plants is the measurable outcome at the end of the next two years.

• Welding Technology R&D

NZWC's R&D focus was on the AGGAT programme with contributions to the development of the *Materials Knowledge Base*, including a multi-sample heat exchanger test bed for geothermal fluids, the establishment of the AGGAT collaboration platform and contributions to the *Expert Design Tool*.

Other research supported the adoption of the IIW/Eurocode 3 fatigue design provision in the AS/NZ 5100.6 bridge standard and seismic damage accumulation research in the contexts of driving low-damage steel structures' development.

A commercial project for MBIE delivered a forensic guide for the assessment of damaged steel structures, which was also published as a HERA Report. The continuation with Konstanz University in Germany of the long-term corrosion research programme of welded lower-cost alternative stainless steel grades delivered two further international papers.

Outlook

The steel construction sector no doubt looks forward to growth in the year ahead with steel being seen as the leading material for use in multi-storey construction. The sector with its increased capacity is well-prepared to meet the expected demand, and with the emphasis on product conformance and cost-competiveness, should exceed client expectations.

HERA expects steel volumes for the coming year to at least match this year's figures, so core levy funding is budgeted accordingly. This optimism, however, is not shared in the general metals engineering sector and predictions for growth particularly in export are for a relatively small expansion.

In addition to the ongoing activities to improve the competitive position of our industry, HERA's R&D focus in Structural Systems is for the development of a steel construction innovation research partnership proposal. For the Industry Development division, it is the execution of the market development elements of the AGGAT programme. And for the NZWC, it is its contribution to the AGGAT materials research aim.

There is of course the positive prospect of moving back into a fully-refurbished HERA House towards the end of 2014. After years of delayed HERA House maintenance, being able to work in a refreshed and contemporary environment will no doubt re-energise all those working within HERA House and our industry network.

Acknowledgement

Looking back, it was a turnaround year for HERA; signalling regained strength in our way forward to ensure our industry's future. The achievement would not be possible without the incredible support of our members, including the many individuals who freely give time for the common good. This also applies to individuals from our partner organisations and key stakeholders outside the industry, including from Government, its departments, and the many research providers we interface with.

Our thanks go out to all of those who contributed and this includes HERA's committed team of 20 plus staff, visiting scholars and associated contributors.

Dr Wolfgang Scholz
Director

2013/14 HERA SUCCESS STORIES

Industry Advocacy
- Metals NZ CEO Gary Hook established & running *"Securing the Future of New Zealand Metals Engineering"* programme
- Responded to many calls for submissions & dealt directly with Ministers & reference groups on industry issues
- Held business opportunities & industry issues meetings in co-operation with Metals NZ

Heavy Engineering Industry Development
- Second year of AGGAT programme science base in co-operation with universities of Canterbury & Auckland
- Comprehensive AGGAT Research Roadmap completed & published, & joint NZGA/HERA AGGAT Workshop held
- Completion of business case for New Zealand Marine Energy Centre & submission to Government
- Web-based multi-capability company register operational & NZ Geothermal Capability Register updated & re-issued
- Extensive industry support, networking & advocacy programme maintained

Structural Systems
- HERA Design Guide on Eccentrically Braced Frames launched
- Launch of Australasian Environmental Product Declaration Programme funded through Sustainable Steel Council
- Composite Bridge Design Guide published by NZTA
- Completed new fabrication and erection code of practice through a joint initiative with SCNZ and ASI
- HERA finite element simulations and major UK loaded fire test provide cost savings of $180k to 40-storey building
- Board of Directors level input to Australasian Certification Authority for Reinforcing & Structural Steels

NZ Welding Centre
- Established certification body - HERA ANBCC, IIW ANB for Company Certification to IIW MCS ISO 3834
- Developed Steel Fabricator Certification scheme
- Record attendance of seminars & courses - 260+ attendees - with 86 of them at Welding Supervisor & Welding Inspector courses
- HERA ANB has issued 23 AS2214 Welding Supervisor certificates & for the first time 22 diplomas for the International Welding Inspector qualifications IWI-B and IWI-S
- Research project *"Performance Evaluation of Alternative Stainless Steel Grades"* completed

I & QC Centre
- Maintained training and advisory programme with part-time commitment of former Manager Peter Hayward

HERA Information Centre (HIC)
- In line with HERA House refurbishment, implemented move towards digital HERA Library
- Supported Metals NZ, and AGGAT, HERA Verified and IIW ANB & SFC programmes

As stated in its Mission, HERA is to be the catalyst for research, innovation, growth and development in New Zealand's metals engineering industry. The close interaction between industry members and HERA staff, and the fact that industry governs HERA and charges it with the execution of its strategy, assists HERA in providing industry leadership.

Steel Fabrication Certification Scheme Up and Running

To maintain a competitive edge and to ensure safety and reliability of steel structures in New Zealand, SCNZ and HERA have developed a quality compliance scheme referred to as Steel Fabricator Certification (SFC) scheme. Following international best practice, the SFC takes into account a risk-based approach introducing four Construction Categories for steel structures covering a wide range of applications.

The introduction of ISO 3834 – *Quality Requirements for Fusion Welding* is the key certification plank of the SFC scheme and reflects the structural significance of the quality of welded connections, as for example required during inelastic demand in major seismic events.

And to provide our industry with the internationally recognised certification, HERA applied to the International Institute of Welding (IIW) to become the IIW-Authorised National Body for Company Certification (HERA ANBCC) to IIW MCS ISO 3834 for New Zealand.

The HERA ANBCC in April 2014 has successfully passed the IIW audit conducted by auditors Mr Christian Ahrens of Germany and Prof. Boyoung Lee of Korea. The international auditors also witnessed the assessment to the requirements of IIW MCS ISO 3834 of D&H Steel Construction Ltd by the HERA ANBCC assessment team.

The NZWC represents NZ welding fabricators on the joint AS/NZ Welding Standards Committee WD-003 Welding, WD-002 Welding Consumables and ME-001 Pressure Equipment making a significant contribution to the update and development of relevant welding standards.

IIW and HERA ANBCC assessment team at D&H Steel Construction Ltd (Left to right: Dean Pouwhare, Prof. Boyoung Lee, Alan McClintock, David Gulland, Heath Johnston, Peter Hayward, Christian Ahrens, Cameron Rogers)

Standards Development Drives Innovation

A key driver of metals industry innovation is advancement of adopted industry standards and HERA plays a key role in this. Being research focused, well-connected to industry and research providers and being internationally linked benefits this development and allows New Zealand to make contributions particularly in steel construction well-above what is expected from the size of its industry.

Building Maintenance Unit (BMU) designed by HERA member ETS Engineers designed and installed on Rankine Brown Building of Victoria University, Wellington. The BMU travels around corners with "swing arms" and pivoting bogies.

• Steel and Composite Bridge Activities

Through support from the New Zealand Transport Agency (NZTA) and the steel industry, HERA developed a new design guide on steel-concrete composite bridges in collaboration with the UK Steel Construction Institute (SCI) and AECOM.

Published by NZTA as Research Report 525, the publication has been written in accordance with AS 5100.6 and compliments the 3rd edition of the NZTA Bridge manual. To ensure that the contents are understood, and can easily be translated into current design practice, the guide is accompanied by three fully worked examples.

Through his position as Chair on the AS/NZS 5100.6 Committee, Dr Stephen Hicks has been participating on the Steering Group for an NZTA research project that was undertaken by Beca on establishing the appropriate fatigue loading for road bridges in New Zealand.

Published as NZTA Research Report 547, to provide greater international alignment,

HERA ANBCC Report 2014

To provide New Zealand fabricators with the world-class certification system to ISO 3834 '*Management of Quality in Welded Structures*', HERA has established the certification arm HERA ANBCC - the International Institute of Welding (IIW) Authorised National Body for Companies Certification (ANBCC) for New Zealand to the IIW MCS ISO 3834.

All activities of the HERA ANBCC are controlled by an independent Governing Board that includes representation from NZ fabrication industry and other interested parties.

ISO 3834 as the core of the Steel Fabricator Certification (SFC) scheme reflects the significance of the quality of welded connections for the safety and reliability of steel structures. Welding is recognised as a so-called "special" process, which means, different to standard manufacturing processes such as machining, compliance verification of the welded joint is not possible without destroying it.

Therefore a procedural approach is taken which ensures welding processes are controlled from the very start and the welding quality management system ISO 3834 does cater for this.

Staff competency is the key element of ISO 3834. For all tasks assigned staff has to be able to demonstrate adequate technical knowledge. The exceptional attendance numbers for the HERA Welding Supervisor and Inspector courses in 2013/14 indicates that the training aspect is taken seriously by the industry.

A number of HERA and SCNZ member companies have already committed to ISO 3834 with one being already over the finish line. Confirmed commitments by more industry members will see many more companies achieve certification in the coming year.

Dr Wolfgang Scholz
Chairman HERA ANBCC

the recommendations are based on AS 5100.2 with modifications derived from weigh-in-motion data collected from around New Zealand.

Dr Stephen Hicks and Dr Michail Karpenko have been developing new fatigue provisions for Section 13 of AS/NZS 5100.6, in close co-operation with the world authority on fatigue design Prof. Adolf Hobbacher, Germany together with Dr. Fidelis Mashiri in Australia.

The new fatigue provisions eliminate the existing tedious calculation procedure of damage accumulation by the use of damage equivalent factors λ, which relate the stresses from real traffic to the idealised code-defined fatigue load model.

As the λ-factors given internationally have been developed based on fatigue load models used in Europe, HERA has developed Australasian λ-factors by calibrating the existing loading standard AS 5100.2 with the proposed AS/NZS 5100.6. In addition, it is proposed to introduce reliability differentiation for fatigue design, where different safety factors are used in design depending on whether the structure is regularly inspected or not (known as the 'damage tolerant method' and 'safe life method', respectively). Work on AS/NZS 5100.6 has now been completed and the draft for public comment is awaited from Standards Australia.

• Steel and Composite Building Activities

Work has been progressing well with the development of the joint Australian and New Zealand steel-concrete composite design standard for buildings AS/NZS 2327 (which will replace the existing NZS 3404 Section 13). There has been significant input from New Zealand on AS/NZS 2327 with Dr Stephen Hicks chairing the working group for composite slabs, as well as contributing to the provisions on composite beams, composite columns and system design for serviceability.

Kevin Cowie of SCNZ is responsible for drafting the provisions for seismic design, whilst Associate Prof. Charles Clifton of the University of Auckland and Dr Tony Abu of the University of Canterbury are drafting the design rules for fire resistance, which will include the Slab Panel Method – a world-first in international design standards on fire resistance. It is expected that the standard will be published for public comment in 2015.

• Joint AS/NZS Fabrication and Erection Standard

As a joint HERA, SCNZ and ASI project, the draft fabrication and erection standard has been completed and is now in the hands of Standards Australia for final formatting. The new standard has been given the designation AS/NZS 5131 and has taken inspiration from international standards EN 1090 and ISO 10721. The new standard will provide a direct link with the Importance Classes given in AS/NZS 1170 and will identify requirements for minimum levels of fabrication and erection quality together with minimum competencies for welding personnel. It is expected that the draft for public comment will be published in 2015.

HERA Industry Development Roadmap Process Starts with the Market

The general heavy engineering industry development activities are based around the HERA Industry Development Roadmap Process that links market opportunities to companies and to the research required to support the development of products, and to provide a pathway to market. This articulates with the HERA, Above Ground Geothermal and Allied Technology (AGGAT) programme which brings research capability from a variety of sources to underpin the efforts of individual companies and is supported by co-funding from the Ministry for Business Innovation and Employment (MBIE).

• Collaborations Driving Innovation

Collaborations have been a defining characteristic of the past year and crucial to driving innovation. Following an approach to HERA by Australian company Smith Innovation Technology and Science, and a subsequent meeting between them and HERA member BOP Gearcutters, agreement was entered into further development of a rotary positive displacement expander with potential application in products developed through the AGGAT programme.

From left: Bill Ross of BOP Gearcutters, and Errol and Ken Smith of SITAS Australia

A collaboration with Konstanz University in Germany on the development of a memory metal (Nitonol) engine saw German student Mark Muller spend six months at HERA undertaking research which has now developed into a collaboration including the University of Waikato.

HERA Senior Research Engineer Dr Boaz Habib attended the Organic Rankine Cycle (ORC) Conference in Rotterdam, and visited turbine developer and AGGAT collaborator Green Turbine. He also visited a number of ORC competitors and met with UK company Zero Emissions to discuss future collaborations on turbine development as part of the AGGAT programme.

HERA member company PFS Engineering in Hamilton has joined the AGGAT programme and is moving forward with the testing of their boundary layer turbine in an ORC setting. AGGAT member Advance Boiler Services, working with HERA's industry Development division has submitted an application for Callaghan Innovation funding support for the development of a gas engine ORC plant to be trialled at the Envirowaste landfill site at Hampton Downs.

AGGAT researchers progressed during the year with the design of a materials test rig to be located at Contact Energy's Wairakei geothermal resource in Taupo. This will allow multi-material comparative and discreet testing on live geothermal fluid, and contribute useful data to the geothermal materials database component of the AGGAT programme.

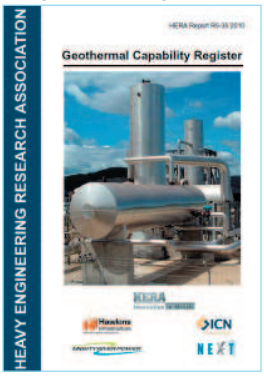
A series of AGGAT Executive Briefings were conducted around the country by Industry Development General Manager Nick Inskip and Dr Boaz Habib which resulted in expressions of interest from thirty-two more companies in the AGGAT programme.

Waitaki Replacement bridge - HERA member Eastbridge supplied 92m and 206m bridges for the upgrade project in the south island. These bridges are weathering steel ladder deck designs and Eastbridge is assisting with the site erection

HERA member Downer Group installed many of the components used in client Contact Energy's Te Mihi geothermal power station

The NZ delegation shown above that attended consisted of Dr. Jung HyungChul (left, University of Canterbury), Tony Gray (middle, Geothermal Energy Solutions) and Dr. Boaz Habib (right, HERA).

Promoting Industry Capability



Work continued on updating the functionality of the industry member capabilities register displayed on the HERA web site. The NZ Geothermal Capability Register that showcases the capabilities on NZ companies has been fully reviewed and updated and is now available as HERA Report R5-35:2014 as a hard copy, and as a PDF and a searchable directory on the HERA and AGGAT web sites.

Tariff concession application monitoring of products imports wishing to be exempt from import duty continue to be performed on behalf of industry members. The increased opening of our border due to free trade agreements is reducing this engagement and the opportunity to promote local alternatives to importers is definitely reducing.

Bioreactor by HERA member PFS Engineering for Contact Energy. This is a plant focused on removing H2S from the water discharged from Wairakei PowerStation before it goes into the Waikato river

Below: Bird's eye view of a geothermal plant taken by a Un-piloted Airborne Vehicle (UAV) mounted camera operated by HERA member Linetech Consulting. The unit operates in a "no go" area from a people safety perspective - it avoided the risks of climbing, and was quick and cost-effective. (Inset The UAV unit itself)

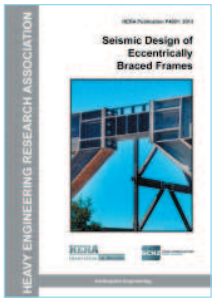
Visitors being shown around a oil recycling process module fabricated by HERA member Fitzroy Engineering Group in New Plymouth for Northern Oil Refining in the Queensland city of Gladstone. They will produce approximately 60 million litres of high quality hydrocarbon-based oils for re-blending and re-use

HERA R&D is closely linked to the growth and innovation focus described previously and advanced across all HERA divisions.

Structural Systems Research

• Research Leads to Revised Seismic Design Guide

HERA, in conjunction with Steel Construction New Zealand (SCNZ), launched HERA Publication P4001:2013 *Seismic Design of Eccentrically Braced Frames* at a seminar series in November 2013.



As well as updating the contents of the former Eccentrically Braced Frame (EBF) section of HERA Report R4-76, the new publication includes a fully worked example of an 8-storey V-braced EBF. One of the key innovations that is now included in HERA P4001 are design provisions for removable active EBF links, which were developed from finite element analyses conducted by HERA.

The advantage of a bolted replaceable active link is that it allows for independent control of beam stiffness and strength, resulting in more efficient structures. It also permits speedy inspection and replacement of damaged links following a major earthquake, significantly minimising the disruption time to re-occupy the building.

• Design Rules for Composite Slabs Using High Strength Steel

Through research and development work undertaken by HERA on composite slabs using decks formed from AS1397 G550 steel, as well as lower strength EN 10326 S350GD steel, new provisions have been developed for the forthcoming AS/NZS 2327; also, revisions have been recommended for Eurocode 4.

The research shows that, when a deck manufacturer establishes the longitudinal shear resistance of the embossments on their particular profile, the lowest values are achieved on decks with the highest yield strength that will be used in practice.

Moreover, although the ductility of the G550 steel itself is low, the longitudinal shear behaviour of the composite slabs was deemed to be ductile according to international recommendations such that plastic design principles may be used. The work has recently been published as an internationally peer-reviewed paper within the Proceedings of the Institution or Civil Engineers, Structures and Buildings Journal.

• Safety Factors for Composite Beams and Concrete Filled Coumns

Although steel-concrete composite construction is widely used, no work has been undertaken to evaluate the appropriate safety factors that should be used in design when considering the geometric tolerances and the variability of material strengths required in NZS, AS and AS/NZS product standards.

To remedy this situation, Dr Stephen Hicks and former HERA Structural Engineer Andrew Pennington, have been undertaking structural reliability analyses of the bending resistance of composite beams to evaluate the required capacity factors for Australasian design. The work considered data from 164 full-scale beam tests that have been undertaken around the world, which was supplemented with over 3 million Monte Carlo simulations.

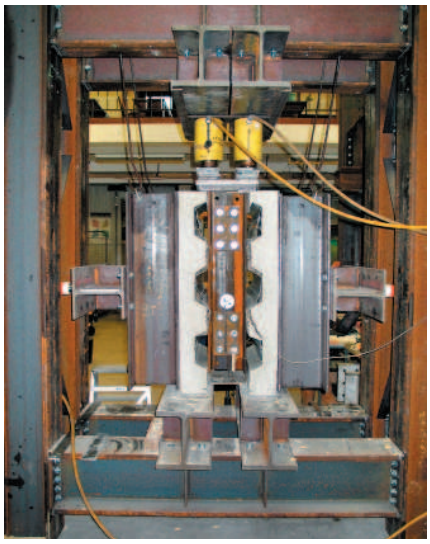
In addition, from consideration of an extensive database of 1,583 test results covering a wide range of input parameter values, a structural reliability study has also been undertaken in collaboration with the University of Western Sydney and University of New South Wales.

The results show that the international design provisions used in European and North American practice may be safely extended to higher strength steels and concretes than currently permitted. These findings have been implemented within the forthcoming composite bridge and buildings standards AS/NZS 5100.6, together with AS/NZS 2327, and are expected to be published in an international journal in 2015.

• Performance of Stud Shear Connectors

Prior to joining HERA in 2008, Dr Stephen Hicks was responsible for a major UK research programme that was undertaken in response to concerns raised by Australian researchers on the ductility of headed stud connectors welded within profiled steel decking.

Following the recent approval to disseminate the findings by the funders of the research, the work has finally been published as a peer-reviewed paper by the International Association for Bridge and Structural Engineering (IABSE).



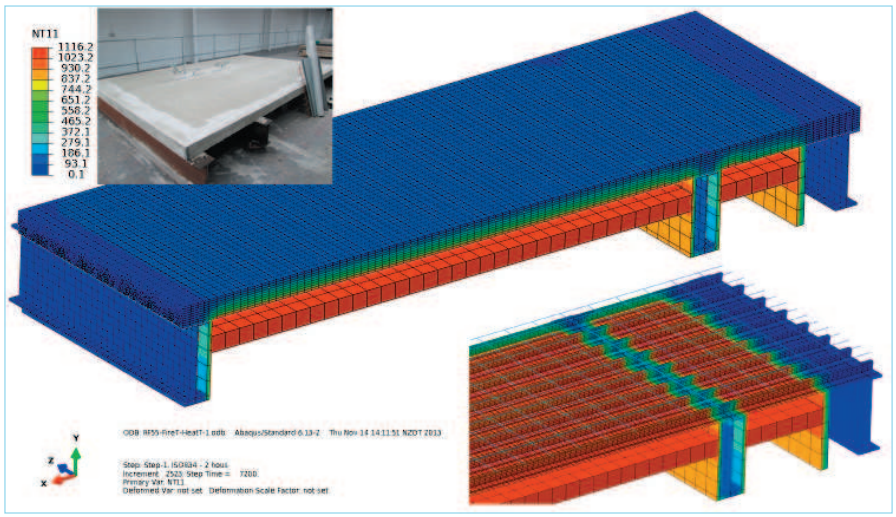
Improved standard push test rig for shear stud connectors

From full-scale ultimate load tests on 5 m, 10 m and 11.4m span composite beams it was shown that the traditional small-scale push test does not accurately represent the performance of shear connectors within a beam.

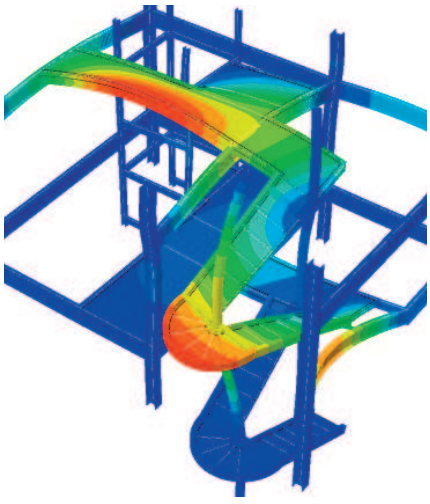
An improved standard push test was developed by Stephen, and was subsequently used to develop the revisions to the UK standard BS 5950-3.1. This improved test is currently being considered for inclusion within AS/NZS 2327.

• Walkway-stair Vibration Assessment

HERA FE Analyst Nandor Mago and Dr Stephen Hicks assisted the designer by verifying that the vibrations occasioned by walking activities, together with persons ascending and descending the stairs was unlikely to cause adverse responses from the occupants within a new building. From a modal analysis of the structure the general methodology given in SCI Publication 354, of which Stephen is a co-author, was applied and it was found that the response of the walkway-stair was acceptable.



Half of the fire test specimen showing the temperature distribution for 2-hours of ISO 834 fire loading. Photo of the slab waiting to be positioned over the furnace.



Staircase vibration Eigenmode

• Concrete Filled Tubes Without Applied Fire Protection

The presence of load bearing concrete within a hollow steel column has a beneficial effect on the fire resistance of the steel section. Where hollow columns are plain concrete filled, they will usually also be fire protected in the conventional way using externally applied protection but, in most cases, significant periods of fire resistance can be obtained without the need for external protection if the concrete is reinforced.

Following the April 2014 amendment to EN 1994-1-2, Annex H the design rules for concrete filled tubes are now limited to only very stocky columns where the capacity is less sensitive to buckling. In response to this limitation. FE Analyst Nandor Mago has been working closely with the Polytechnic University of Valencia in Spain to calibrate FE models with tests and develop a HERA capability to assist New Zealand designers who wish to use this technology.

Welding Technology Research

• International Corrosion Study of Alternative Stainless Steels

The NZ Welding Centre in co-operation with NZSSDA and the international partners University of Applied Sciences, Konstanz and BAM Berlin, Germany, completed a long-term research project investigating performance of a range of lower-cost stainless steel grades in welded and unwelded condition, and different finishes.

The study also included long-term exposure corrosion tests simultaneously performed in New Zealand and Germany focusing at application in civil engineering, examining the effect of coastal and urban atmospheres. The research results have been published in the Stainless Steel World magazine.

• AGGAT Materials Research

In the Above Ground Geothermal Allied Technologies programme, the NZWC focused on the development of an experimental testing rig that allows simultaneous testing of up to 20 real size samples. It will be installed at Contact Energy's geothermal site in Taupo.

The generous support from industry members fabricating the test rig is appreciated and is recognised as industry co-funding to the programme.

Further work included research into existing material databases, literature, case studies and research reports with the aim to have a customised AGGAT material selection database accessible for our industry members.

2013/14 Structural Systems Publications:

- Clifton GC, Cowie K: *Seismic Design of Eccentrically Braced Frames*, HERA Publication 4001, Jones A, Hicks S, Fussell A (eds), 2013
- El Sarraf R, Iles D, Momtahan A, Easey D, Hicks S. *Steel-concrete Composite Bridge Design Guide*. New Zealand Transport Agency, NZTA Research Report 525, ISBN: 9780478407693, 09/2013, p.252
- Hicks SJ, Pennington AF, Jones AS. *Longitudinal Shear Resistance of Composite Slabs*. Proceedings of the Institution of Civil Engineers Structures & Buildings. 2014, p. 8, DOI: http://dx.doi.org/10.1680/stbu.13.00078
- Hicks S, Smith AL. *Stud Shear Connectors in Composite Beams that Support Slabs with Profiled Steel Sheeting*. Structural Engineering International. 2014. 24(2), pp. 246-253, DOI: http://dx.doi.org/10.2749/101686614X13830790993122
- El Sarraf R: *Performance of the Weathering Steel Components of SH1 Mercer to Longswamp Off-ramp*, HERA Report R4-146, 2014
- Mago N, Hicks S, Simms WI. *Sequentially Coupled Thermal-stress Analysis of a New Steel-concrete Composite Slab Under Fire*. 2014 SIMULIA Community Conference, 19-22 May 2014, pp. 247-260
- Chaudhari T, MacRae G, Bull D, Chase G, Hobbs M, Clifton C, Hicks S. *Composite Slab Effects on Beam-column Sub-assemblies: Further Development*. 2014 New Zealand Society for Earthquake Engineering Annual Technical Conference, 2014, Auckland, http://db.nzsee.org.nz/2014/oral/6_Chaudhari.pdf
- Uy B, Hicks S, Kang W. *The Proposed Australasian Composite Bridge Standard, AS/NZS 5100 Part 6*, Steel and composite construction. 7th New York City Bridge Conference, 2013, New York, http://www.bridgeengineer.org/2013/forms/Conference2013.pdf

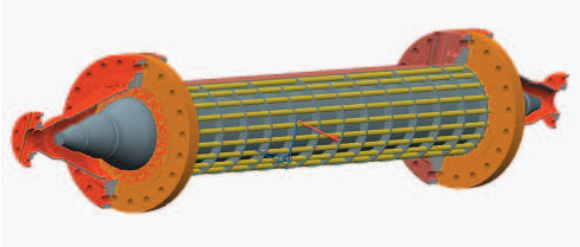
2013/2014 NZWC Publications:

- Karpenko M, Hicks S: *New Zealand Guidance for the Investigation into Building Failures: Best Practice in Material Testing - Steel Construction*. IIW Document XV-1446-13, 2013
- Gümpel P, Leu F, Burkert A, Lehmann J and Karpenko M: *Corrosion Resistance of Lean Alloy Alternatives for 300 Series Stainless Steels – Part 1*. Stainless Steel World, June 2014.
- Karpenko M, Hicks S: *Guidance for the Investigation into Building Failures: Best Practice in Material Testing - Steel Construction*. HERA Report R5-55:2014

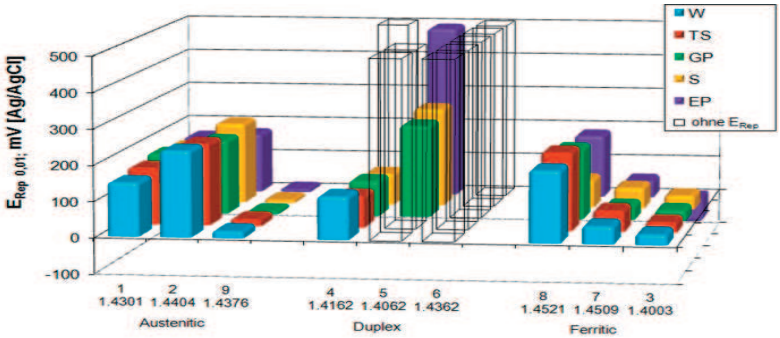
2013/2014 Industry Development Publications:

- Above Ground Geothermal and Allied Technologies Research Roadmap: HERA Report: R5-47 2014
- Geothermal Capability Register (3rd edition): HERA Report: R5-35 2014
- Design Considerations for a Shape Memory Alloy Machine: HERA Report: R5-54 (draft) 2014
- Five papers by AGGAT researchers were published or accepted for journal publication.
- AGGAT researchers made 10 presentations at national and international conferences.

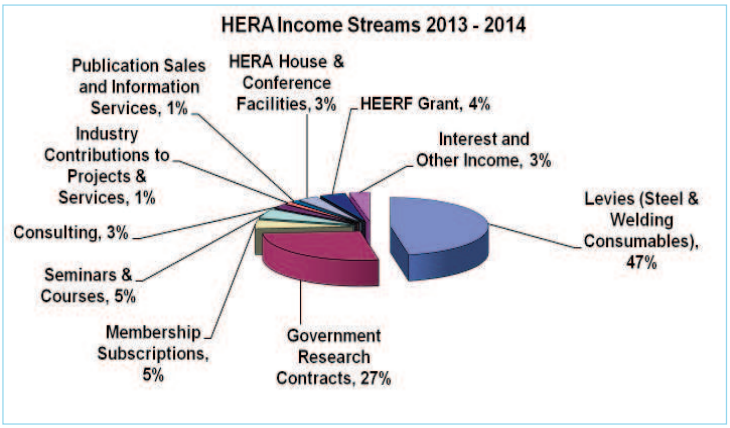
Right: Two Dust Control Discharge Hoppers ready at Port Tauranga for shipping to Geelong Port, Australia. The hoppers are designed and manufactured by HERA member Page Macrae Engineering, and were sold to Boral Cement, Australia, 2013 .

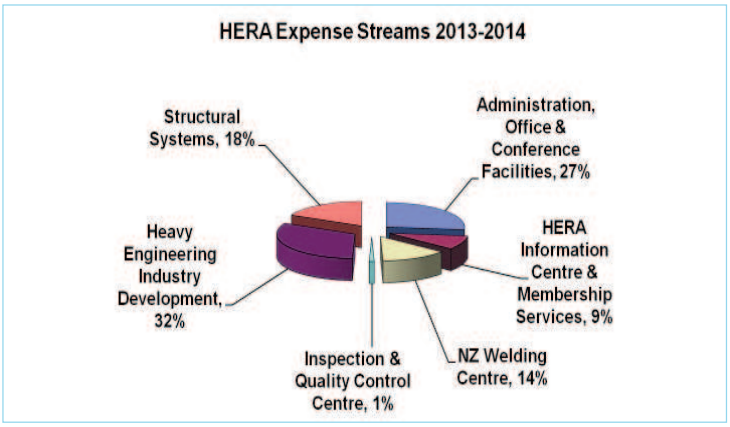


AGGAT heat exchange test rig



Repassivation-Potential at 20 °C for a range of stainless steel grades and finishes tested





HERA's business model as an industry research, training and advocacy organisation is based on a balanced mix from Heavy Engineering Research Levy (HERL), Government and Heavy Engineering Educational and Research Foundation (HEERF) co-funded R&D, self-generated income from contract research, consulting and training, members-based income from membership fees as well as HERA conference management and facilities hire.

As a result of the significantly increased industry funding via the levy on heavy steel, an increased focus on industry levy-funded research was considered in the 13/14 budget. However, HERA was unable to fully deliver on this plan due to performance pressure from committed commercial projects, and inability to attract suitable qualified research staff.

The HERA 2013/14 income and expense streams are as outlined in the income and expenses diagrams. It shows the shift in income balance to 47% industry levy, 27% government and 25% self-generated income as a result of the increase in industry levy, while traditionally this was more even 1/3 1/3 1/3 balance. Based on a total 13/14 HERA income of $3.5 million, the HERA surplus for the year was just over $500k.

As reported, this was largely due to better-than-budgeted industry activity translating into higher levy income, better-than-planned self-generated income and underspending including on salary components planned for new activities but not activated. This surplus will help pay back HEERF loans of the last few years and will now assist HEERF to fund the substantial HERA House refurbishment planned during the year. Covering considerable deferred maintenance, extending usable space and future-proofing the look and feel of the building for the next 20-30 years will benefit this recognised industry meeting place.

HERA Research Exports

• Cost Savings to Composite Floor Design in Singapore

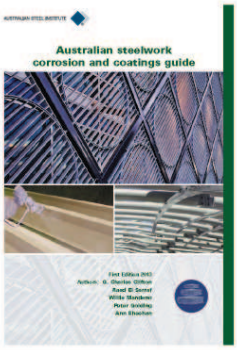
HERA's efforts for diversification of income streams continue to show results. FE Analyst Nandor Mago and Dr Stephen Hicks were responsible for numerical simulations to estimate the performance of a composite slab using a re-entrant profiled steel sheet.

This was prior to a full-scale loaded fire test being undertaken at Warrington in the UK to verify the performance predicted by the simulations, and obtain a fire rating according to the more severe standard test requirements given by the European standard EN 1363-1.

Excellent correlation between the simulations and the fire test were achieved, which led to unnecessary reinforcing bars being eliminated from the floor. It is estimated that the work led to cost-savings of approximately $180,000 to the Client of a 40-storey building in Singapore.

An overview of the work was presented by Nandor Mago at the 2014 Simulia Community Conference in the US.

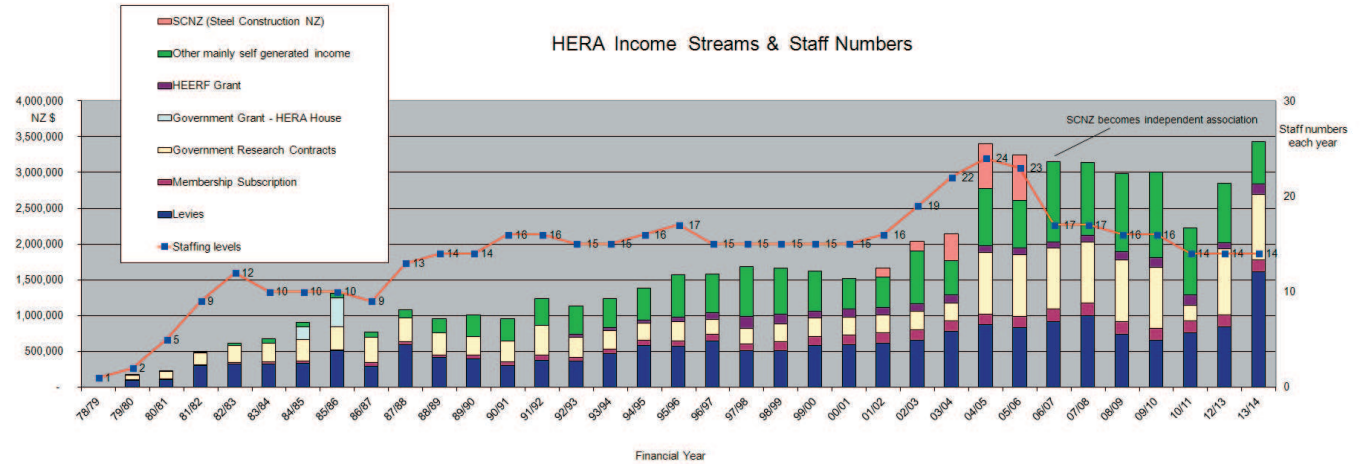
• HERA Collaborates On New ASI Australian Steelwork Corrosion and Coatings Guide



A new *Australian Steelwork Corrosion and Coatings Guide* has been published by the Australian Steel Institute (ASI). This design guide has been adapted from HERA Report R4-133 entitled *New Zealand Steelwork Corrosion and Coatings Guide*, which is the result of collaboration efforts with HERA, the Galvanizers Association of Australia (GAA), the Australasian Corrosion Association (ACA) and ASI.

An associated IP agreement provides for some ongoing HERA income from sales of the guide in Australia.

Loaded fire test on composite slab at Warrington, UK



One of three 50t cranes fabricated by HERA member Baker Cranes lifting segments for Waterview Tunnel project

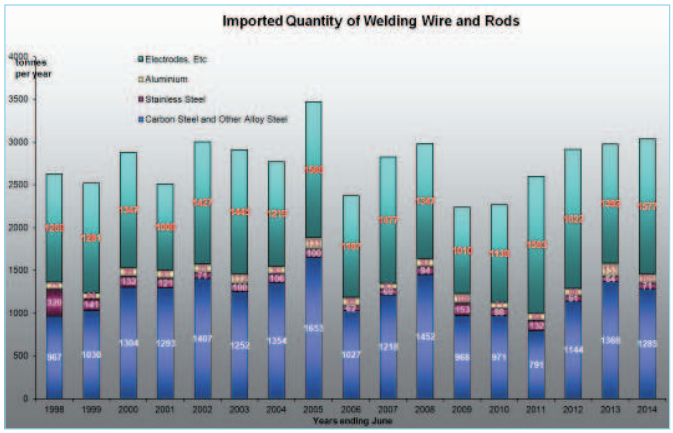
Although HERA is primarily a research provider, it also provides industry training through filling the gaps that are not provided through conventional education providers. In 2013/14, seminars and courses accounted for 5% of HERA income.

HERA through its NZ Welding Centre (NZWC) division is committed to providing technology courses that comply with the best national and international practice. The training is provided by the ANB Approved Training Body (ATB), the HERA Training Centre. The courses include the popular AS 2214 Welding Supervisor course and also the newly established International Welding Inspector IWI-B and IWI-S courses. A total of 84 welding professionals attended HERA's training courses in 2013/14.

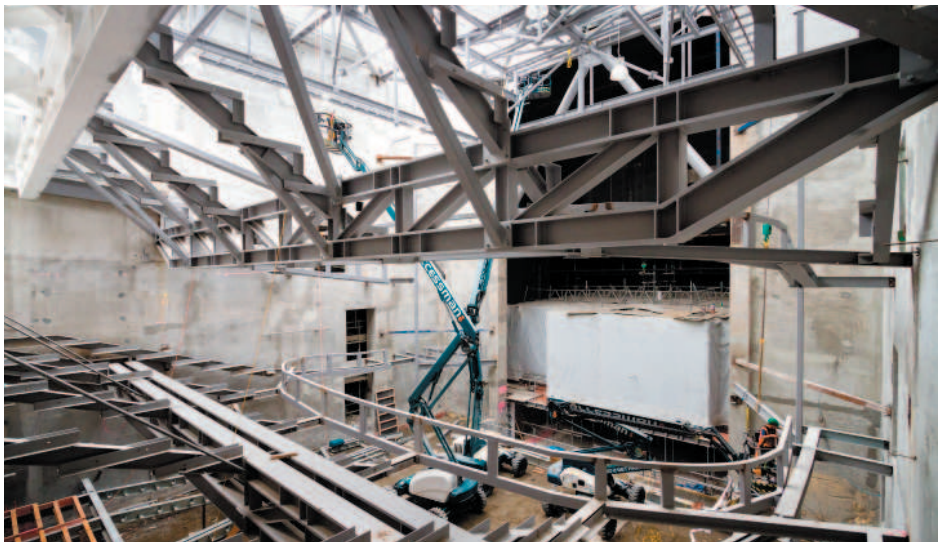
The 14m long, 4m width, 35-tonne LTS Skid for Greymouth Petroleum, LT separator, twin heat exchanger, piping and instrumentation fabricated by HERA member Tenix New Zealand at New Plymouth workshop. The scope of the Tenix contract included design to ASME VIII, AS1210, PD5500 Cat 1 TEMA R standards, all piping and instrumentation, protective coating system, and delivery to site

Below left: Welding consumable imports give a good indication of welding activity development Source: Statistics New Zealand / HERA

Below right: Presentation of IIW Welding Inspection Diplomas to attendees of the course in Auckland



Minister Gerry Brownlee and MP Rt Hon Amy Adams with Pegasus Engineering MD Gavin Lawry at the opening of their new engineering facilities in Christchurch



Main structure of the Isaac Theatre Royal in Christchurch fabricated by HERA member Pegasus Engineering. The original building was badly damaged after the earthquake and rebuilt, with strengthening of the original front facade and new roof structure installed

Left to right: Dr. Duane Miller, Lincoln Electric USA; Mr Duncan Hill, Lincoln Electric NZ; Dr Michail Karpenko, HERA; Dr. Wolfgang Scholz, HERA Director

In 2013/14, the NZWC has made contributions to technical events to an audience of more than 260 professionals. The events included the SCNZ-organised Steel Structures seminar on seismic steel design and standard compliance, NZWC Design of Welded Connections seminars with world authority on welded designs Duane K. Miller from the Lincoln Electric Company, USA, and a Quest Technology Fitness for Service course covering the basis for assessment of pressure plant equipment for continued service in accordance with the API 579 organised by the NZWC.

Seismic Design and Compliance

Dr Stephen Hicks and Michail Karpenko delivered presentations on compliance of steel structures at a well-attended seminar series in Auckland, Wellington and Christchurch on behalf of SCNZ. The presentations provided an overview of the current compliance requirements in the key structural steel design and welding standards (NZS 3404 and AS/NZS 1554), as well as presenting current industry initiatives to ensure quality and certainty in the delivery of structural steel projects. The seminar series also provided the platform for the launch of the new HERA Publication P4001:2013 - *Seismic Design of Eccentrically Braced Frames*.

New 5-level car park servicing Christchurch's Hazeldean Business Park - a development by Calder Stewart. The steel was fabricated and erected by HERA member Chapman Engineering with the primary floor beams (440 tonnes) supplied by HERA member Steltech Structural

Polished stainless steel food grade dairy fan with 750kw motor designed and built by HERA member Windsor Engineering

HERA ANB Chairman's Report 2014

Phil Stacey
Chairman HERA ANB

The HERA ANB has now completed its first full year in operation. Around the world, standards and regulations relating to the construction and welding of products recognise the importance of the competency of welding coordination/supervision and welding inspection personnel.

These two roles are seen as essential to ensure not only greater productivity, quality and integrity of welded components, and plant maintenance, but also for the delivery of improved public safety.

To maintain a competitive edge, New Zealand industry requires a skilled work force provided through tertiary education.

While following the domestic requirements for qualified Welding Inspectors and Welding Supervisors, it is essential that technology-related training complies with internationally recognised standards and qualification systems.

The International Institute of Welding (IIW) pioneered a series of qualifications and certifications by introducing minimum requirements for training and education for personnel involved in welding activities more than 10 years ago.

This scheme is now recognised in more than 43 countries and is now acknowledged in many AS/NZS Standards. The IIW requirements are applied uniformly by all countries involved and the diplomas granted are mutually recognised. The organisations administering the system in each country are known as the IIW Authorised National Bodies (ANBs).

The 'welding' industry needs welding co-ordination/supervision and welding inspection staff with specific technical knowledge that is not usually available within a standard technical education.

This is a unique and very important niche market that has been successfully filled by the HERA ANB the International Institute of Welding (IIW) Authorised National Body (ANB) for New Zealand.

The HERA Training Centre policy is to provide courses that lead to both national and international qualifications. HERA ANB implements the training and examination requirements for these welding-related qualifications.

All activities of the HERA ANB are controlled by an independent ANB Governing Board that comprises representation from the NZ fabrication industry, training providers, universities and other interested parties which have a valid interest in the programmes.

These representatives give freely of their time and expertise – I thank them for their contributions and efforts in making this first full year as successful as it has been.

Statistics for the year 2013/14 are I believe very impressive for our first year of operation: the HERA ANBCC (Authorised National Body Certification Committee) issued: 22 diplomas for the International Welding Inspector qualifications IWI-B and IWI-S, and 23 certificates for the AS 2214 Welding Supervisor qualification.

All the lecturers involved both from HERA and specific guest lecturers must be commended for their commitment and quality of teaching to obtain these results.

HERA's welding supervisor and welding inspection qualification programme is also central to the Steel Fabricator Certification Scheme (SFC) that has been jointly developed by HERA and SCNZ.

The Scheme is based on IIW's world-class Manufacturer Certification Scheme IIW MCS ISO 3834 that requires certified fabricators to have appropriately qualified staff in place.

Sustainable Steel Council Supports Australasian EPDs

Globally, manufacturers and their customers are increasingly recognising the value of Environmental Product Declarations (EPDs) as a robust science-based communication tool that provides information and data about the environmental performance of products.

This is especially true for building and construction - a sector that uses numerous products and materials fulfilling different functions frequently in combination with other products, which makes assessment inherently challenging. This complexity has made it difficult for manufacturers to demonstrate the environmental credentials of their products, based on objective, transparent, performance-based criteria.

EPDs, backed by Life Cycle Assessment (LCA), are developed using consistent rules and are independently verified, providing a robust basis for measuring and communicating environmental performance. They report on the environmental impacts of products for all or part of the life cycle, based on measured data such as amount and types of energy used, water use, amount and type of feedstock materials, packaging and transport.

EPDs are also increasingly being used by the major green building rating tools around the world, including the Green Building Council of Australia's Green Star tool, BREEAM in the UK and LEED in USA. Building on the success of their web site that was launched last year, together with the support given to NZGBC on their BASE tool, the Sustainable Steel Council (SSC) is the only material-specific organisation that is seed-funding the development of an Australasian EPD Scheme.

The Australasian EPD Programme has been created as a developer of Product Category Rules (PCRs) and Registrar of EPDs by the formation of a company jointly owned by Life Cycle Association of New Zealand (LCANZ) and the Australian Life Cycle Assessment Society (ALCAS) in alliance with the International EPD (IEPD) System which is operated by the Swedish Environmental Management Council, the world's largest EPD registrar, to ensure recognition of the Australasian scheme and the associated EPDs internationally.

Australasian Certification Authority for Reinforcing and Structural Steels

As steel is now being sourced from a wider range of suppliers, and the conformity assessment of products is a specialised skill, third-party conformity assessment is becoming the normal approach internationally.

The Australasian Certification Authority for Reinforcing and Structural Steels (ACRS) has become the first structural steel product certification body to be accredited by the Joint Accreditation System for Australia and New Zealand (JAS-ANZ) to ISO/IEC 17065: 2012.

The new 4-level office block in Christchurch's Hazeldean Business Park by Calder Stewart Industries. It incorporates Buckling-Restrained Braces (BRBs) with removable active links recommended by project consultant and HERA member Structure Design Ltd

The MIT buuilding in Manukau completed by HERA member Hawkins Infrastructure Group with steel structure components supplied by HERA member MJH Engineering

Air-cooled condenser built by HERA member ABS Boiler for client Technip in New Plymouth to the petrochemical industry

AdaptARC® trials at HERA member Culham Engineering. Inset: The Welding Expert Team at Culham with HERA's Alan McClintock (centre) and Dale Flood, TRI TOOLS Inc. (centre right)

To ensure that New Zealand interests are represented at the board level, Dr Stephen Hicks of HERA and Nick Hill of BOINZ were elected as ACRS Directors in 2014.

Welding Fabrication Connects

NZWC is closely linked to the SCNZ, NZSSDA, Metals NZ and international partners from the Academic and IIW environment. Dr Michail Karpenko represents HERA, HERA ANB and HERA ANBCC at the IIW. He also performs the Secretariat role for the NZSSDA. He is the Chief Executive of the HERA ANB and the Scheme Manager of HERA ANB.

There is a close collaboration with Competenz – Training Centre Manager Alan McClintock contributes to the Sector Advisory Group for Fabrication and Welding, and through the Director, HERA assisted the Governance Group overseeing the review of Mechanical Engineering Qualifications.

Membership of university advisory committees and industry advisory boards complete the many HERA industry representation roles played. HERA senior staff also play leading roles on the Executive and Boards of its related industry associations, such as SCNZ, NASH, NZSSDA and Metals NZ.

Building Industry Export Opportunities

awatea

Industry Development General Manager Nick Inskip continued in his role representing the metals industry on the Executive of the Aotearoa Wave and Tidal Energy Association (AWATEA). He chairs the working group on the development of a New Zealand

Geothermal ORC low-heat capture system demonstrated at the ORC Conference attended by Dr Boaz Habib

HERA Innovation in Metals

A new weather radar tower built and installed by HERA member Acme Engineering for the NZ Metservice on a hilltop just outside of Kaeo in Northland. This is the 4th in a series of towers that Acme have built and installed around the country for the Metservice.

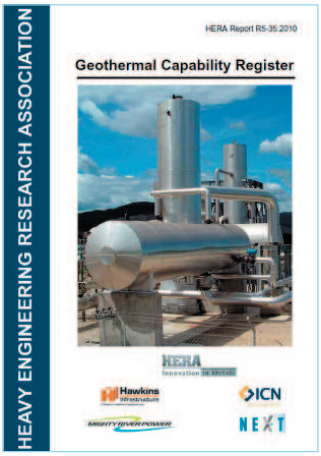
Below: HERA member Farra Engineering celebrates its 150th anniversary this year and has been a HERA member for almost 30 of those years. Congratulations!

FARRA CELEBRATING 150 YEARS OF ENGINEERING EXCELLENCE

Marine Energy Centre (NZMEC) and has been active in promoting the long-term industry opportunities that will accrue from the successful establishment of the centre. He travelled to Inverness in Scotland to meet with the Board of Directors of the European Marine Energy Centre (EMEC), and as result a business case has been developed and submitted to Government based on a joint venture with EMEC.

There are significant niche opportunities for marine energy aside from grid connection, including a Scottish concept for offshore fish farms which are receiving a lot of interest in New Zealand with high prospects for local manufacture.

HERA has continued to champion and support an NZ Inc approach to Geothermal with a particular focus on above ground technologies. A key component of which, is developing the research agenda for above ground technologies supported by the AGGAT Research Roadmap which has been finalised as HERA Report R5-47:2014. The AGGAT programme is governed through a Joint Venture Board which includes representation from universities, industry and end-user companies with the intent of fostering close and targeted co-operation.



The NZ Geothermal Capability Register that showcases the capabilities of NZ companies has been fully reviewed and updated, and is now available as HERA Report R5-35:2014 as a hard copy, and as a PDF and a searchable directory on the HERA and AGGAT web sites.

Kick Starting Metals New Zealand

As the last HERA strategy review showed, the membership wants HERA to play a strong advocacy role. HERA has responded to this task, particularly through the Director's and division managers' actions with industry-wide engagement.

However, based on the fact that HERA is, first of all, an industry research association for the metals engineering industry, advocacy is at the core of many more sector organisations, HERA has been the driver to establish the united industry voice Metals New Zealand.

This year saw the appointment of its first CEO, Gary Hook, and as his report shows, his Metals NZ activities have delivered first results. HERA will continue to support Metals NZ and the *"Securing the Future of New Zealand Metals Engineering"* project.

METALS NEW ZEALAND

Metals NZ CEO
Gary Hook

I joined Metals New Zealand late in 2013 to help further establish it as a respected 'peak body' representing the interests of a broader Metals manufacturing and building industry.

The immediate priorities for me in positioning Metals NZ have been to:

- Progress the *'Securing the Future of New Zealand Metals Engineering'* project
- Responding to numerous Govt Agency discussion papers and policy announcements
- Identify and generate key relationships
- 'Be present' and interact on key issues affecting all member associations
- To demonstrate the value of such peak body efforts
- Develop a Plan to include financing for 2014/15

'Securing the Future of Our Industry' is about various projects in support of MBIE's implementation of new procurement policy, rules, procedures and tools centred aimed at best practice criteria-based balanced decision making.

MBIE and various Government agencies appear to be currently challenged by time in designing and implementing new procurement tools and processes and in achieving decision maker compliance.

We have offered our help on numerous occasions to work with the process developers and practitioners and this was never going to be a short-term project.

In keeping with our supporting this shift, I am in the process of designing a workshop where MBIE and agency procurers will be invited to join our industry members to jointly explore the appropriate decision criteria, and factor weightings in line with the new policy objectives.

This initiative, together with keeping a high energy watch on the policy implementation, significant procurement projects decision making and positive case studies from our sectors, will make up the activities for this project for the coming year.

The All of Government procurement project for Building Materials was announced late 2013. Two material categories were prioritized being steel and timber, and advisory panels created.

A number of collective and individual meetings and visits were held allowing MBIE to openly explore for opportunities to lower cost. It has just been announced that work will stop on the steel supply chain reviews to allow all resources to be focused on timber.

We have been complimented on our efforts to give the MBIE staff a full appreciation for our supply chains and whilst we are not likely to see any structural changes in the short term, there are two perceptions about the steel supply chains that we need to continue to work on collectively being capacity and profitability.

Learning from Fabricated Steel Imports presentation by Kristian Nelson, Engineering Manager at McConnell Dowell Constructors on the Lower Hatea Bridge

Labour Party representatives David Parker and Andrew Little meeting with the Metals NZ Executive members at New Zealand Steel

Establishing connections and building relationships is important and this year we have had a Metals NZ Executive interaction with the Labour Party and numerous Executive interactions with National Party politicians and Political advisors.

MBIE, NZ Customs and WorkSafe have also been targets in Wellington for Metals NZ advocacy interaction on various matters. I have also been working closely with the Building Industry Federation particularly on Building Materials and Policy announcements and have facilitated reciprocal membership with NZCID.

Some form of safety support for our Metals NZ members is under evaluation. It has been identified as a common challenge facing businesses right now, with WorkSafe operating with new vigour and targeting our higher risk work areas.

Our SME businesses will always be searching for efficient ways of at least meeting the minimum standards, and some form of 'clubbing together' could increase learning and reduce cost. I am also exploring this project with the intent of creating a value proposition that may be of interest to the Aluminium metals manufacturing sector.

Metals NZ is planning for a higher level of industry participation for our Conference - Sept 3rd - 5th 2015 in Auckland. The Steel Innovations and Metals NZ Conferences will be run concurrently at a single venue, with an Awards dinner on the Friday evening.

We will be seeking to organize a week of activities across the metals manufacturing, building and construction sectors, culminating with the Conferences that together will assist our efforts in lifting the profile of our industry.

HERA Innovation in Metals

REPORT OF THE INDEPENDENT AUDITOR ON THE SUMMARY FINANCIAL STATEMENTS

To the Executive Committee of New Zealand Heavy Engineering Research Association Inc

The accompanying summary financial statements, which comprise the summary statement of financial position as at 30 June 2014, the summary statement of income statement and summary statement of changes in equity for the year then ended, and related notes, are derived from the audited financial statements of Heavy Engineering Educational and Research Foundation for the year ended 30 June 2014.

We expressed an unmodified audit opinion on those financial statements in our report dated 10 September 2014. Those financial statements, and the summary financial statements, do not reflect the effects of events that occurred subsequent to the date of our report on those financial statements.

The summary financial statements do not contain all the disclosures required for full financial statements under generally accepted accounting practice in New Zealand. Reading the summary financial statements, therefore, is not a substitute for reading the audited financial statements of Heavy Engineering Educational and Research Foundation

Executive Committee's Responsibility for the Summary Financial Statements
The trustees are responsible for the preparation of a summary of the audited financial statements in accordance with FRS-43: Summary Financial Statements.

Auditor's Responsibility
Our responsibility is to express an opinion on the summary financial statements based on our procedures, which were conducted in accordance with International Standard on Auditing (New Zealand) (ISA (NZ)) 810, *"Engagements to Report on Summary Financial Statements".*

Other than in our capacity as auditor we have no other relationship with or interest in Heavy Engineering Educational and Research Foundation

Opinion
In our opinion, the summary financial statements derived from the audited financial statements of Heavy Engineering Educational and Research Foundation the year ended 30 June 2014 are consistent, in all material respects, with those financial statements, in accordance with FRS-43.

nexia new zealand the next solution

CST Nexia Audit
Chartered Accountants
Manukau City, New Zealand

STATEMENT OF FINANCIAL PERFORMANCE FOR YEAR ENDED 30 JUNE 2014

	Note	2014	2013
Revenue			
Levies (Steel & Welding Consum.)		1,614,216	349,245
Government Research – AGGAT		919,076	689,307
Tech NZ – Clean Energy		-	239,588
GRC-Deferred Income		828	1,398
Consultancy and Industry Project		129,591	239,465
Services to 3rd Party		22,441	21,076
Member Subscriptions		165,143	162,254
Interest		8,840	2,804
Other Income		49,662	25,432
Publications		39,487	34,170
Welding Modules		21,262	76,568
Rent		77,411	77,179
Metals Conference		-	32,173
Seminars & Courses		188,259	215,953
HEERF	9	147,031	74,309
Transfer from Backdated Welding Levy		20,320	58,100
Total Revenue		**3,403,566**	**2,797,021**
Movement in AGGAT Deferred Income		29,753	(153,150)
Total Revenue (adjusted)		**3,433,319**	**2,643,871**
Expenditure			
Staff Expenses		1,233,534	1,187,179
Member Services		81,481	63,126
Office & Other Expenses		192,685	177,478
Seminar Expenses		68,581	146,578
Consulting Expenses		299,473	234,460
External Research		675,772	516,313
HERA House Expenses		88,354	84,504
Rent Expenses		206,860	206,860
Metals Conference Expenses		-	2,843
Impairment of property, plant and equipment		58,926	47,956
Depreciation Expenses		27,312	-
Total Expenditure		**2,932,975**	**2,667,296**
NET (Deficit) SURPLUS FOR THE YEAR		**500,344**	**(23,425)**
Equity beginning of Year		44,512	67,937
Equity at the End of Year		**544,856**	**44,512**

BALANCE SHEET AS AT 30 JUNE 2014

	Note	2014	2013
Assets			
Current Assets			
Cash at Bank	2	8,991	50,266
Call Accounts	3	443,166	15,187
Bank - AGGAT		215,599	211,315
Accounts Receivable	4	160,637	213,543
Inventory		10,931	8,148
Other Pre-payments	5	176,978	98,874
TOTAL CURRENT ASSETS		**1,016,302**	**597,333**
Non Current Assets			
Fixed Assets	6	124,109	138,712
NON CURRENT ASSETS		**124,109**	**138,712**
TOTAL ASSETS		**1,140,411**	**736,045**
Equity & Liabilities			
Accumulated Funds			
Accumulated Funds	7	544,856	44,512
TOTAL EQUITY		**544,856**	**44,512**
Current Liabilities			
Accounts Payable		201,517	185,878
GST Payable		31,488	12,164
Holiday Pay Provision		49,064	56,110
Advance from - HEERF		100,000	50,000
Income in Advance		150,485	184,381
TOTAL CURRENT LIABILITIES		**532,555**	**488,533**
NON-CURRENT LIABILITIES			
Loan - HEERF		63,000	203,000
TOTAL EQUITY & LIABILITIES		**1,140,411**	**736,045**

The specific disclosers included in the summary financial statements have been extracted from the full financial report dated 09/09/14. The summary financial statements cannot be expected to provide as complete an understanding as provided by the full financial statements. A full set of the audited financial statements is available on request from HERA.

NOTES TO THE 2012 FINANCIAL STATEMENTS

1. Statement of Accounting Policies

Reporting Entity
New Zealand Heavy Engineering Research Association Inc. (HERA) is an Incorporated Society and these financial statements have been prepared in accordance with the Incorporated Societies Act 1908 on the 30th day of August 1978.

Basis of Preparation
The financial statements of the entity have been prepared in accordance with generally accepted accounting practice and the Financial Reporting Act 1993.

The accounting principles recognised as appropriate for the measurement and reporting of earnings and financial position on historical cost have been used. Reliance is placed on the fact that the Association is a going concern.

Statutory Basis
These financial statements have been prepared in accordance with "Old GAAP" in New Zealand. Old GAAP comprises New Zealand Financial Reporting Standards and Statements of Standard Accounting Practice that existed prior to the introduction of New Zealand Equivalents to International Financial Reporting Standards.

New Zealand Heavy Engineering Research Association Inc. has chosen to apply Old GAAP because it meets the criteria for doing so; that is, it was applying Old GAAP at 30 June 2012, and it is neither publicly accountable nor large as defined in the External Reporting Board's Standard A1: Application of Accounting Standards.

The Ministry of Commerce has approved a new Accounting Standards Framework (incorporating a Tier Strategy) developed by the External Reporting Board (XRB). Under this Accounting Standards Framework, New Zealand Heavy Engineering Research Association Inc. is classified as a Tier 3 reporting entity and will be required to apply Public Benefit Entities Simple Format Reporting Standard – Accrual (PSFR - A).

These standards have been developed by the XRB based on current International Public Sector Accounting Standards. The effective date for the new standards for not for profit entities is expected to be for reporting periods beginning on or after 1 April 2015.

This means New Zealand Heavy Engineering Research Association Inc. expects to transition to the new standards in preparing its 30 June 2016 financial statements.

Revenue
Grants and levies received with no conditions attached are recognised as income when received. Revenues with conditions attached are only recognised when the respective conditions are fully met.

Project Sponsorship and Grant monies are recognised as income in proportion to the degree of completion of the respective project.

	2014	2013
2. Bank Balance - Current Account		
Current Account	8,991	50,266
CSA	943	940
	8,991	**50,266**
3. Bank Balance Call Accounts		
Call Account	443,166	15,187
4. Accounts Receivable		
Trade Receivable	160,637	213,543
Less Doubtful Debt	-	-
	160,637	**213,543**
5. Other Receivables & Prepayments		
Accrued Income	163,266	93,258
Prepayment	13,711	5,615
	176,978	**96,873**

6. Fixed Assets

2014	COST	ACCUM. DEPRECIATION	NET BOOK VALUE
Metallurgy Equipment	12,430	12,430	-
Office Furniture	20,861	20,514	347
Fixtures & Fittings	82,955	82,955	-
HERA House Refurbishment	147,053	109,393	10,348
Motor Vehicles	172,826	119,688	53,138
Office Equipment	222,896	163,211	59,685
Training Equipment	86,399	85,808	591
	745,420	**593,999**	**124,109**

2013	COST	ACCUM. DEPRECIATION	NET BOOK VALUE
Metallurgy Equipment	12,430	12,430	-
Office Furniture	20,306	20,173	688
Fixtures & Fittings	82,955	82,955	-
HERA House Refurbishment	147,053	94,687	52,366
Motor Vehicles	158,649	126,206	32,443
Office Equipment	210,525	157,163	53,089
Training Equipment	86,037	85,911	126
	718,237	**579,525**	**138,712**

	2014	2013
7. Accumulated Funds		
Opening Accumulated Fund	44,512	67,937
Net Surplus	500,344	(23,425)
	544,856	**44,512**

8. Related Party
Heavy Engineering Educational and Research Foundation (HEERF) is a related party to the Association.

It is related by the administrative and management expertise the Association provides to the Foundation, in the form of grants provided to the association for the research projects it undertakes. It is also the Association's landlord, owning HERA House.

9. Income in Advance
Majority of Revenue in Advance represent income in advance from various agencies, which funds the Association for research and services.

The funding received for programmes (projects) that were completed during the year is recognised as revenue in that year. The remaining monies yet to be spent on projects in progress are treated as income in advance.

10. BNZ Bank Account
The Association has a Visa credit card facility with BNZ. The limit on all cards is $29,000. (2013: $26,000)

11. Audit Fees
Audit fees have been included in office and other expenses to the value of $5,000 (2013: $5,000). There was no other remuneration paid to the Auditors.

12. Capital and Other Commitments
As at 30 June 2014 there were no outstanding capital commitments. (2013: $nil)

13. Contingent Liabilities
As at 30 June 2014 there were no outstanding contingent liabilities. (2013: $nil)

14. Levies Income
Steel Levy has increased with effect from 1 July 2013 due to an amendment in Heavy Engineering Research levy (HERL) Act.

15. Post Balance Date Events
As at 30 June 2014, there were no significant Post Balance Date Events. (2013: $nil)

Fixed Assets
Fixed Assets are recorded at historical cost less accumulated depreciation. Historical cost is the value of consideration given to acquire the assets and the value of other directly attributable costs which have been incurred in bringing the assets to the location and condition necessary for their intended service.

Fixed assets are depreciated using the straight line method at rates:
- Office Equipment 15%-40%
- Office Furniture 15%
- Fixture & Fittings 15%
- Training Centre 25%
- Motor Vehicles 20%
- Metallurgy Lab 15%
- House Refurbishment 10%

Accounts Payable
Accounts and other payables are recognised when the Association becomes obliged to make payments in future resulting from the purchase of goods and services or the pledge to award a grant/donation.

Impairment
Annually, the Association assesses the carrying value of each asset. Where the estimated recoverable amount of the asset is less than its carrying amount, the asset is written down. The impairment is recognised in the statement of financial performance.

Goods and Services Tax
All amounts are shown exclusive of Goods and Services Tax (GST) except for receivables and payables that are stated inclusive of GST. The GST receivable/payable to the IRD at balance date is shown in the Statement of Financial Position.

Taxation
The Association is exempt from income tax under the Income Tax Act 2007 section CW 49 (1).

Differential Reporting
New Zealand Heavy Engineering Research Association Inc is not publicly accountable and is not large. Accordingly, it has taken advantage of all differential reporting exemptions allowed under the *Framework for Differential Reporting*, except that items in the Statement of Financial Performance have been recognised exclusive of Goods and Services Tax.

Changes in Accounting Policies
There have been no changes in accounting policies. Accounting policies have been applied on a basis consistent with previous years.

Comparatives
Where necessary comparatives have been restated due to a reclassification of some items between the different categories of the financial statements. These reclassifications do not have an impact on the net deficit for prior year

Noel Davies
HEERF Chairman

Chairman's Report

The Heavy Engineering Educational & Research Foundation (HEERF) is a Charitable Trust established by HERA to promote the study and understanding of the use of ferrous and non-ferrous metals in the engineering industry. HEERF receives income from the property 'HERA House' which HERA settled on the Trust and an endowment fund created in 2005/06, receiving donations from those interested to support the HEERF objectives.

In 2013/2014, the Foundation contributed $127,121 to HERA's research and industry development efforts.

Support included research scholarships supporting HERA steel construction and Above Ground Geothermal and Allied (AGGAT) research programmes. In the AGGAT space, HEERF scholarships covered two PhD students, - one at the University of Canterbury (UC) and another one at the University of Auckland (UoA). In steel construction, focus was on seismic research also with two PhD scholarships one at UC and one at UoA in a co-operative programme with Portland State Univerisity in America.

The HEERF visiting scholar programme supported the well-attended '*Design of Welded Connection – Fatigue and Seismic Applications*' lecture series of US-based Dr. Duane Miller, a recognised world authority on the design of welded connections.

In the industry promotion area, this year HEERF supported mechanical engineering university student awards at the UoA and Auckland University of Technology. For the first time HEERF supported HERA sponsorship of the IPENZ organised New Zealand Engineering Excellence (NZEE) Awards.

This industry sponsorship of the prestigious NZEE Awards has already in its first year raised the awareness of our industry's contribution to engineering excellence.

This year saw the long anticipated start of the HERA House refurbishment. With HERA's funding constraints addressed, the refurbishment planning was completed and it is anticipated that a $1.8M funding contribution from HEERF will bring HERA House up to current office standards, and provide a place for industry to work and meet in an environment which showcases our industry. Work is expected to be completed end of October and we look forward to welcoming our members at the opening.

An exciting research and visiting scholar programme has been outlined to the Trustees for 2014/15-year, and we are looking forward to ongoing top-class research supporting the future of our New Zealand metals engineering industry.

Summary Financial Statement

In line with its objectives, the Foundation funded a number of projects related to the metals engineering industry, including student support for research projects.

Statement of Financial Position as at 30 June 2014

	NOTE	2014	2013
ACCUMULATED FUNDS			
Equity funds at start of year		2,388,694	2,301,096
Net surplus for the year		51,561	87,598
Equity funds at end of year		**2,440,255**	**2,388,694**
REPRESENTED BY			
Current Assets			
Bank		251,012	49,488
Call Account		20,292	40,028
Short-term Deposit		606,348	781,523
STD - N. Calavrias		5,583	5,460
Endowment Fund		457	454
Advance to HERA		100,000	50,000
Accrued Income		6,986	9,007
Accounts Receivable		-	4,000
K.Smith - Bequest		39,601	37,813
GST		14,504	-
		1,044,783	**977,773**
Total Fixed Assets		1,333,672	1,218,083
Loan - HERA		63,000	203,000
TOTAL ASSETS		**2,441,455**	**2,398,856**
Current Liabilities			
Accounts Payable		1,200	7,432
GST Payable		-	2,730
TOTAL LIABILITIES		**1,200**	**10,162**
NET TOTAL ASSETS		**2,440,255**	**2,388,694**

Income & Expenditure for year ended 30 June 2014

	2014	2013
INCOME		
Rent	206,860	206,860
Interest	33,540	31,868
Bequest Interest	1,075	660
N. Calavrias Interest	117	160
City Council Refund	-	6,725
Donation	-	4,000
Total Income	**241,592**	**250,273**
EXPENDITURE		
Blding Maintenance	1,150	605
Blding Managmt Fee	6,000	6,000
Trust Administration	10,000	10,000
Grants to HERA	127,121	87,354
HERA House	-	10,965
Bank Charges	149	140
K.Smith Award	-	2,000
Audit Fees	1,200	1,200
	145,620	118,264
Depreciation	44,411	44,411
Total Expenditure	**190,031**	**162,675**
Net Surplus/ Deficit)	**51,561**	**87,598**

1. Statement of Accounting Policies

(a) General Accounting Policies

The Heavy Engineering Educational and Research Foundation (the Foundation) is a charitable trust established under the Charitable Trusts Act 1957.

(b) Particular Accounting Policies

The particular accounting policies, which materially affect the measurement of financial performance and the financial position, are:

Income Tax

The Foundation has a charitable status from the Inland Revenue Department, hence is exempt from income tax.

Fixed Assets

Fixed assets have been shown at cost less depreciation. Buildings are depreciated using the straight-line method at 1% of the cost price, Air Conditioning Unit at 6% and Roof & Cladding at 10%.

Differential Reporting

The Foundation is a qualifying entity under the New Zealand Society of Accountants Differential Reporting Framework The entity qualifies under the size criteria, and because it is not publicly accountable. The Foundation has not taken advantage of the differential reporting exemptions available to it in respect of FRS-19: Accounting for Goods and Services Tax.

(c) Changes in Accounting Policies

There have been no changes in accounting policies. Accounting policies have been applied on a basis consistent with previous years.

2. Commitments & Contingent Liabilities

There are no contingent liabilities as at 30 June 2014. (2013: nil)

The Board of Trustees of Heavy Engineering Educational Research Foundation (HEERF) is committed to financially support the operations of New Zealand Heavy Engineering Research Association (HERA) to fulfil its financial obligations to its third parties in the foreseeable future and to continue trading as a going concern.

The Board of Trustees has approved the project for refurbishment and extension to HERA House (Atrium). The total capital commitment on this project is estimated at $1.94m (excl GST), which will be funded from the Foundation's cash reserves and bank borrowings.

3. Related Parties

The Foundation is related to New Zealand Heavy Engineering Research Association (HERA). Members of the Foundation are appointed by the HERA Executive.

HERA is the tenant of the land and building owned by the Foundation and pays rent. The Foundation pays fees to HERA for the management and administration of the building. The Foundation during the year has given a loan of $163,000 (2013: $253,000) to HERA.

This includes an advance of $100,000 and will be paid back by HERA in the year 2014-15 hence classified as current. . The remaining balance of $63,000 is an interest-free loan and not repayable within the next 12 months.

5. Post Balance Date Events

There were no significant post balance date events. (2013: $nil)

6. Bequest

The income from the bequest is to be applied to a prize which shall be given bi-annually subject to the term set by the late Mr K.Smith. This bequest is deposited with BNZ. This bequest has been recognised as income.

4. Fixed Assets

	COST	ACCUM. DEP.	BOOK VALUE
Land	244,602	-	244,602
Land Development	24,489		24,489
Atrium Upgrade	93,808	18,762	75,046
Building Upgrade	311,019	149,101	161,918
Air Condition Units	157,300	93,388	63,912
Building	1,049,091	285,368	763,705
	1,880,309	**546,637**	**1,333,672**

HEAVY ENGINEERING RESEARCH ASSOCIATION MEMBERS

Total HERA membership as of June 30, 2014 was 621 members. They are:

AFFILIATE MEMBERS

Fletcher Easysteel
Fulton Hogan Ltd
Hawkins Infrastructure
HTC Ltd
S & T Holdings
TBS Corporation
Vulcan Steel Ltd
Welding Technology Inst of Australia

ASSOCIATE MEMBERS

S.A.F.E Engineering Ltd
A & S Engineering Ltd
A W Trinder Ltd
ABB Power Limited
Acrow Limited
Active Engineering Ltd
Advanced Plasma Technology
Aimecs Ltd
Airwork (NZ) Ltd
All Steel Services Ltd
Alloy Yachts International Limited
ALRO Truck Smash Repairs
Alstom Northern Wagons
Angus Robertson Mechanical
APV New Zealand Ltd
ATCO Controls Ltd
ATI Engineering Ltd
Awesome Awnings Ltd
Axiam Engineering Limited
Bailey Engineering Ltd
Baker Cranes Ltd
BBC Technologies Ltd
Bedford Engineering Ltd
Bernie Jordan
Best Bars Ltd
Bitumen Equipment Ltd
BOP Gear Cutters Ltd
Bradken Dunedin
Brightwater
C J Saunders Engineering Ltd
Calder Stewart Steel
Cambridge Welding Service (1953) Ltd
Campbell Tube Products Ltd
Canco Engineering Ltd
CAS Enterprises Ltd
CFM Engineering Ltd
Christian Church Community Trust
Consolidated Engineering Company Ltd
Contract Connections Ltd
Cook Brothers Construction
Courtney Engineering
Croucher & Crowder Engineering Co Ltd
Cuddon Limited
Culham Engineering Co
D R Howells Engineering Co Ltd
Dan Cosgrove Ltd
Dawn Group Ltd
Dimond
Domett Trailers
Donovan Group NZ Ltd
Drury Construction Ltd
DSK Engineering Ltd
Duncan Agriculture Ltd
Eastbridge Ltd
Eastern Institute of Technology
Ede Engineering
EHL Group
Electropar
Engineering Contractors Ltd
Enterprize Steel
Eric Paton Ltd
Etech Industries NZ Ltd
Fairbrother Industries Ltd
Fairfax Industries Ltd
Farmex Hawkes Bay Ltd
Felix Research Labs
Fraser Fire & Rescue
Fruehauf Limited
Fyran Marine Ltd
Gamman Industrial Componentry Ltd
General Engineering North Shore
George Grant Engineering (GGE)
Gisborne Development Incorporated
Global Engineering Products Ltd
Gray Construction
Greenlane Biogas
Greymouth Petroleum
Harford Greenhouses
Hayes International
HEB Construction Ltd
Honnor Drilling Ltd
Howard Wright Limited
Howick Engineering Ltd
Hydraulink Fluid Connectors Ltd
Hytools NZ Ltd
Iain Codling Stainless Steel
IBA Engineering
Ipsco Ltd
J & D McLennan Ltd
J J Niven Enginering Ltd
J P Marshall & Co Ltd
Jay Cee Welding Ltd
JB Attachments Ltd
Jetweld Engineering
Keith M J Adams
Kernohan Engineering Ltd
Kerry Dines Ltd
Lakeland Steel Products Ltd
Laser Welding Ltd
Leonard Products Ltd
Liddells Contracting Ltd
Linear Design
Longhare Engineering Ltd
Longveld Engineering Ltd
Mace Engineering Ltd
Machine Part Welding Ltd
Maskell Productions Ltd
MB Century
McEwans (Division of Cut & Fold Ltd)
Michael Harris (NZ) Ltd
Mike Christie Sheetmetals Ltd
Millers Mechanical (NZ) Ltd
Milmeq Limited
Mobridge Ltd
Modern Transport Engineers Ltd
Mooloo Stockcrates Ltd
Morgan Engineering
Morgan O'Shea Engineering
Morrow Equipment Co (NZ)
Mouats Engineering Ltd
MSC Engineering
Mulcahy Engineering Ltd
Multi Engineering
Murray Landon
Napier Engineering & Contracting Ltd
NDA Group
Necklen Engineering Ltd
Nelson Reliance Eng Co Ltd
Nelson Stud Welding Ltd
Niemac Industrial Ltd
Noble Engineering Services Ltd
North Shore Towbars 2006 Ltd
NZMP Kauri
Otago Polytechnic
Otahuhu Engineering Ltd
Outside Broadcasting
Pacific Timber Engineering Ltd
Parr & Co Limited
Patchell Industries Ltd
Pearson Engineering Ltd
Peninsula Engineering Ltd
Pet Food Division HW
Phoenix Steel Ltd
Piako Transport Engineering
Pilcher Engineering Ltd
Port of Napier Ltd
Precision Turning & Manufacturing Ltd (Hydraulink)
Pro Custom Concepts Ltd
Pyramid Engineering
Quality Auto Machinists (1988) Ltd
Queenstown Engineering 2009 Ltd
Razos Engineering Ltd
Read Industrial Ltd
Red Steel Limited
Renold New Zealand Ltd
Rex Barnes Engineering
RNZAF
Roadmaster Trailers Ltd
Rocktec Ltd
ROTIG Ltd
Ruakaka Engineering
Service Engineers Ltd
Sharland Engineering
Ship Constructors Ltd
Simpsons Mobile Weld Testing Ltd
Smartweld Ltd
Snorkel Elevating Work Platforms
Southern Cross Engineering Limited
Southern Equipment Centre
Specialised Container Services
Specialist Energy Engineering Developments (S.E.E.D)
Stafford Engineering Ltd
Stainless Down Under
Stainless Engineering Co Ltd
Stark Bros Ltd
StaTec Manufacturing
Steelbro NZ Ltd
Steelfort Engineering Company Ltd
Steelpipe Limited
Stevensons Structural Engineers Ltd
Stewart & Cavalier Ltd
Stud Welding New Zealand Ltd
Superior Pak Ltd
Taslo Engineering
Tasman Engineering Company
Technical Welding Services (1998)
The 4711 Training Centre
The School of Welding
Tidd Ross Todd Ltd
Traction Lab Ltd
Transfleet Equipment Ltd
Transport & Engineering Ltd
Trident 2000 Ltd
Truweld Engineering Kerikeri Ltd
Ullrich Aluminium Co
Verissimo Engineering Ltd
Victoria Park Alliance
Villa Maria Estate
W M Ross Engineering Ltd
Wainuiomata Training Centre
Wallace & Cooper Ltd .T/A Andar Holdings
Waratah NZ Limited
Warner Construction Ltd
Webforge NZ
Weld Fabrication Engineering Ltd
Weld Tests Hawkes Bay
Welding Services Nelson Ltd
Welding Technology Ltd
Wells & Boe Ltd

Westside Welding Ltd
Whangarei Engineering Company Ltd
Wilson Bros Engineering Ltd (SAECOWilson)
Wilson Precast Construction Ltd
Windflow Technology Ltd
Windsor Engineering
Wyma Engineering NZ Ltd
Zealsteel Ltd
Zeanova Ltd

ORDINARY CONSULTANTS

Abacus Engineering Ltd
ACH Consulting Limited
AECOM New Zealand Ltd.
Airey Consultants Ltd
Allan Estcourt Ltd
Amtec Engineering Ltd
Antro Enterprises Limited
Aurecon New Zealand Ltd
Babbage Consultants Ltd
Base Consulting Engineers Ltd
Batchelar McDougall Consulting Ltd
Beca Ltd
Belcher Industries Ltd
BGT Structures (Auckland) Ltd
Bill Cassidy & Associates
Bloxam Burnett & Olliver Ltd
Blueprint Consulting Limited
BPL Group
BSK Consulting Engineers Ltd
Buchanan & Fletcher Ltd
Cameron Gibson & Wells Ltd
Centraus Structural Consulting Ltd
Chambers Consultants Ltd
Chapman Oulsnam Speirs Limited
Chapman Sanders Consultants
Charles Consulting
Chester Consultants Ltd
Chris W Howell & Associates Ltd
Civil Engineering Central Ltd
CLC Consulting Group Ltd
Clendon Burns & Park Ltd
Compusoft Engineering
Coulter Engineering Services Ltd
Create Ltd
David Smart Consulting Ltd
Davidson Group Ltd
Davis Ogilvie & Partners Ltd
Day Consultants
DBCon Ltd
Design Engineering (SI) Ltd
Design Management Consultants Limited
DezignWorks BOP Ltd
DHC Consulting Limited
Dobbie Engineers Ltd
Dodd Civil Consultants
Don Thomson Consulting Engineers Ltd
Dunning Thornton Consultants Ltd
Eastern Consulting Ltd
EMC-2
Engenium Ltd
Engineering Design Consultants Limited (EDC)
ETS Engineers Ltd
Evan Douglas Consulting Engineers
Fairclough and King Consultants Ltd
Fletcher Construction
Forbes Consultants
Fraser Thomas Limited
GDC Consultants Ltd
Geoff Kell Consulting Ltd
GHD Ltd
Gray Consulting Engineers Ltd
GVK Design & Engineering Consultants
Hadley & Robinson Ltd
Hanlon & Partners Ltd
Harrison Grierson Consultants Ltd
Hawthorn Geddes Engineers & Architects
HFC-Harris Foster Consultants Ltd
Hill Design Engineering Ltd
HLK Jacob Limited
Holmes Consulting Group
Hugh Barnes Consultants Ltd
Independent Technology Ltd (ITL)
Index Engineering Ltd
Jacobs New Zealand Ltd - (Formally SKM)
JAWA Structures Ltd
JNG Engineers Ltd
Kerslake & Partners
Kevin O'Connor & Associates Ltd
Kirk Roberts Consulting Engineers
KM-Mechanical Ltd
Kordia Ltd
Les Boulton & Associates Ltd
Lewis & Barrow Ltd
Lewis Bradford & Associates Ltd
LGE Consulting Ltd
LHT Design
LineTech Consulting Ltd
Lough Downey Ltd
M.A. Corkery & Associates Ltd
MacDonald Barnett Partners Ltd
Manktelow Consulting Engineers Ltd
Marino Consultants & Associates
Markplan Consulting Ltd
Matrix Applied Computing Ltd
MEC Engineering Consultants
Metal Test Ltd
MH Design Ltd
Mighty River Power Limited (MRP)
Milward Finlay Lobb Ltd
Mitchell Vranjes Consulting Engineers Ltd
Motovated Design and Analysis Ltd
MSC Consulting Group Ltd
MTL
MWH New Zealand Ltd
Nagel Consultants Ltd
Net Ltd
Nigel Harwood Engineering Consultant
North End Engineering
Novare Design Ltd
OBD Consultants Ltd
OCEL Consultants NZ Ltd
Optimech International Ltd
Opus International Consultants Ltd
PB New Zealand Ltd.
Peter Swan Consulting Engineers
PFP Systems (NZ) Ltd
Plant & Platform Consultants Ltd
Pont Consultants
Powell Fenwick Consultants Ltd
Powerhouse Forestry Ltd
Prendos New Zealand Limited
Protocold Services Ltd
Q Designz Limited
R B Knowles & Associates Ltd
R D Sullivan & Associates
R J Nelligan & Associates Ltd
R W & V Roberts Consultancy
RCR Energy Systems Ltd
Redco NZ Ltd
Richardson Stevens Consultants (1996)
Ruamoko Solutions Ltd
Sawrey Consulting Engineers Ltd
Sigma Consulting Engineers Ltd.
Sigma Ltd
Silvester Clark Consulting Engineers
Southern QA Ltd
Spencer Holmes Ltd
Spiire New Zealand Ltd
Stephen Mitchell Engineers
Stiffe Hooker Ltd
Stiles & Hooker Ltd
Strata Group Consultants Ltd
Stratum Consultants Ltd
Structural Concepts Ltd
Structure Design
Tasman SV Consulting
TH Consultants Ltd
Thorburn Consultants (NZ) Ltd
Thorne Dwyer Structures
TM Consultants Ltd
Tonkin & Taylor
Transport Design & Certification
Transport Technology Ltd
Transtech Dynamics Ltd
Tse Taranaki & Associates Limited
UCOL
URS New Zealand Ltd
Verstoep & Taylor Ltd
W Stringer Consulting
Waikato Engineering Design Ltd
WH & NF Johnston Ltd
Worley Parsons New Zealand Ltd
Zigliani Technologies Ltd

ORDINARY FABRICATORS

A&G Price
Acme Engineering Ltd
Active Welding Limited
Advance Boiler Services NZ Ltd
Allied Industrial Engineering Ltd
Amtec Engineering Ltd
Atco Steel Developments Ltd
Babcock (NZ) Ltd
BDC Engineering
BDS VIRCON
Belcher Industries Ltd
BLM Engineering Co Ltd
Bromley Steel
Burleigh Engineering Ltd
Chapman Engineering Ltd
Combustion Control Ltd
CSP Pacific
Cullen Engineering Co Ltd
D C Weld Ltd
D&H Steel Construction Limited
Design Production Ltd
Dispatch and Garlick Ltd
E B McDonald Ltd
E4 Engineering
East Coast Steelwork Ltd
Eastland Engineering 2004 Ltd
Energyworks Ltd
Equipment Engineering (2008) Ltd
Ewing Construction Ltd
Farra Engineering Limited
Fitzroy Engineering Group Ltd

Gisborne Engineering Ltd
Gray Brothers Engineering
Grayson Engineering Ltd
H J Asmuss & Co Ltd
Haarslev Industries (Formally Flo-Dry)
Hornell Industries Ltd
HSM Engineering (NZ) Ltd
Integrated Maintenance Group Limited (IMG Ltd)
J & R Slecht Limited
J Steel Australasia Pty Ltd
Jensen Steel Fabricators Ltd
John Jones Steel Ltd
Kawerau Engineering Ltd
Kraft Engineering Ltd
Lyttelton Engineering Ltd
Mahurangi Sheetmetals Ltd
Mainarc Engineering Services Ltd
Martin Engineering (PN) Ltd
MaxiTRANS Industries (NZ) Pty Ltd
McConnell Dowell Constructors Ltd (MACDOW)
McGrath Industries Limited
McKenzie & Ridley (Kawerau) Ltd
Mercer Stainless Ltd
MGE Engineering Ltd
Mitchell Vranjes Consulting Engineers
MJH Engineering Ltd
Modern Construction Ltd
Monocrane Zolo Ltd
Morgan Steel
New Zealand Steel Ltd
Newton Weld Equipment Ltd
NZ Army-Trade Training School
Oceania Aviation Ltd
Otahuhu Welding Ltd
P J Hindin Engineering
Page Macrae Engineering
Pakuranga Engineering Ltd
Parfoot Engineering Limited
Patton Engineering Ltd
Pegasus Engineering Ltd
PFS Engineering Ltd
Pipe & Tube Welding Engineering Ltd
Powerhouse Forestry Ltd
RCR Energy Systems Ltd
Rees Engineering Ltd
RNZN Operational Support Group
Roadrunner Manufacturing (NZ) Ltd
Robert Page Engineering Ltd
Sabre Engineering Ltd
SCA Engineering Pty Ltd
South Pacific Industrial Ltd.
Southern Spars Limited
Speedfloor NZ
Steltech Structural Limited
Stevenson Engineering Ltd
Structurflex Limited
Tanker Engineering Specialists Ltd
TankTest NZ Ltd
Taymac Limited
Ten4 Ltd
Tenix
Texco Steel Ltd
Titan Marine Engineering
Track Industries Ltd
Tranzweld
Turnco Engineering Limited
United Engineering Services Ltd
Universal Engineering Ltd
Waikato Steel Fabricators Ltd
Warren Engineering Ltd
Weld IT Ltd
Welding & Engineering Ltd
Welding Inspection Services
Weldtrade Engineering Ltd
Weldwell New Zealand
Weldworks Limited
Whakatiki Engineering (1984) Ltd
Wilkinson Transport Engineers
Wine Country Sheetmetal & Engineering

ORDINARY PRODUCT SUPPLIERS

Advance Boiler Services NZ Ltd
Akzo Nobel Coatings Ltd
Alfa Group Ltd
Altex Coatings Ltd
Amtec Engineering Ltd
Aotea Machinery Ltd
Ballance Agri-Nutrients Ltd
BCD Group Ltd
BOC Gases New Zealand Ltd
Cable Price (NZ) Ltd
Combustion Control Ltd
Crow Refractory Ltd
D C Weld Ltd
Denis Cunningham Ltd
Dexion New Zealand
Digitalweld
Dispatch and Garlick Ltd
Dulux Powder & Industrial Coatings
Enviroservices (2002) Ltd
FiltrationTechnology (Filtec)
S & T Stainless Ltd
H J Asmuss & Co Ltd
Hobeca Trading Co Ltd
Juken New Zealand Ltd (Wairarapa)
KiwiRail Limited
Mainzeal Property & Construction Ltd
Martin Engineering (PN) Ltd
Modern Maintenance Products Ltd
New Zealand Steel Ltd
North End Engineering
Oceania Aviation Ltd
Onesteel NZ Limited
Pacific Steel Group
Pipes NZ Limited
PPT
Sandvik New Zealand Ltd
Speedfloor NZ
Steel & Tube Stainless
Steel Co Limited
Steltech Structural Limited
Tenix
The Fletcher Construction Co Ltd - Trading as Piletech
Traydec (NZ) Ltd
Trustpower Ltd
Wattyl (NZ) Ltd
Weld IT Ltd
Welding Engineers NZ Ltd

ORDINARY SERVICES PROVIDERS

Active Welding Limited
Advance Boiler Services NZ Ltd
AKSA Ltd
Alpha Training & Development Centre Ltd
Altex Coatings Ltd
Amtec Engineering Ltd
Aoraki Polytechnic
Auckland Council
AUT University
Bay of Plenty Polytechnic
BDS VIRCON
CADPRO Systems Ltd
Christchurch Polytechnic Institute of Technology (CPIT)
CSP Coating Systems
D C Weld Ltd
Department Of CorrectionsDispatch and Garlick Ltd
Genesis Energy Ltd
Gisborne Engineering Ltd
Independent Oilfield Inspection Services
KiwiRail Limited
Manukau Institute of Technology
Materials & Testing Laboratories
Meridian Energy Ltd
Metal Tech Education Ltd
Metal Test Ltd
Motovated Design and Analysis Ltd
New Zealand Refining Co Ltd
New Zealand Transport Agency (NZTA)
Nova Energy Ltd
NZ Army-Trade Training School
NZ Welding School
Port of Tauranga Limited
Prendos New Zealand Limited
RNZN Operational Support Group
Robert Page Engineering Ltd
SCA Engineering Pty Ltd
SGS New Zealand Limited
Southern Institute of Technology
Southern QA Ltd
Steel Pencil Holdings Limited
Stork Cooperheat New Zealand Ltd
Structurflex Limited
Survey NZ
TankTest NZ Ltd
Techlogic NZ
Tenix
Transport Technology Ltd
Transtech Dynamics Ltd
Trustpower Ltd
UCOL
Unitec Institute of Technology
University of Auckland & UniServices
Victoria University of Wellington
Waikato Institute of Technology (WINTEC)
Weatherford New Zealand
Wellington Institute of Technology (WELTECH)
X-Ray Laboratories Ltd

RECIPROCAL MEMBERS

American Institute of Steel Construction
American Welding Society
Australasian Corrosion Association
Australian Steel Institute
Bio Energy Association of New Zealand
British Constructional Steelwork Association
Building Research Association of New Zealand
Canadian Institute of Steel Construction
Canadian Welding Bureau
Competenz
Crane Association of NZ (Inc)
DVS - German Welding Society
National Association of Steel Framed Housing
National Library of New Zealand
New Zealand Geothermal Association
NZ Defence Industry Association
NZ Institute of Economic Research
NZ Marine Industry Association
PreFabNZ Inc
Steel Construction Institute
Steel Construction New Zealand
Straterra Inc
Waikato Engineering Careers Association

HERA STRUCTURE

The Association is based at HERA House in Manukau, Auckland. Within HERA House are the offices of HERA and associated organisations Metals NZ, NASH and SCNZ, as well as a conference facility which can cater for up to 120 participants.

Through its specialist staff it provides a combination of research, training, advisory, industry development and promotional services, making it the national centre for metals-based product design, manufacturing technology, inspection and quality assurance. HERA is an accredited training provider under NZQA and the International Institute of Welding (IIW) guidelines.

HERA also performs industry advocacy functions developing HERA member policy on items relating to R&D and heavy engineering industry development and communicates this to Government and other relevant bodies.

Research is selected on the advice of subject-specific industry advisory panels and is usually of applied nature with short- to medium-term implementation. HERA's research activities encompass the areas of steel construction, general heavy engineering, including welding/joining, clean energy technology, industry capability and marketing.

HERA incorporates the activities of the Heavy Engineering Industry Development Division, Structural Systems Division, New Zealand Welding Centre, Inspection & Quality Control Centre, and its Information Centre with the following specific services and activities:

Structural Systems Division
- Sets priorities for NZ steel and composite construction R&D through the Steel Research Panel
- Applied research supporting the use of steel and composite elements and systems
- Input into New Zealand's performance-based *Building Control System*
- Technology transfer mainly in the form of advice, training, consultation and including Finite Element Analysis
- Product and services compliance under '*HERA Verfied*' certification

Heavy Engineering Industry Development Division
- Maintains registry of and promotes capabilities of the membership
- Provides advice on significant issues to the metals industry
- Performs targeted business development initiatives for the heavy engineering sector
- Leads AGGAT research programme

New Zealand Welding Centre
- Specialised welding and joining research, including technology transfer to industry of new processes and techniques
- Welding consultation, including practical welding advice
- Educational courses and seminars, including training leading to NZQA and IIW qualifications
- Providing input into national and international welding-related training
- Provision of educational material for training
- Provides SFC scheme

Inspection & Quality Control Centre
- Courses covering welding inspection and NDT inspection methods
- Inspection-related seminars such as *Management Appreciation in Quality Control and Inspection*

HERA Information Centre
- Library and publication services
- Distribution of HERA and New Zealand and overseas organisations' publications
- Membership management
- Industry capabilities marketing

HERA STAFF 2014

Administration	
Director	Dr Wolfgang Scholz
Accounts Officer	Kam Subramani
HERA Information Centre	
Manager	Brian Low
Resources Officer	Gillian Casidy
Receptionist	Raewyn Porter
Heavy Engineering Industry Development	
General Manager	Nick Inskip
Senior Research Engineer - Clean Energy	Dr Boaz Habib
Inspection & Quality Control Centre	
Manager	Peter Hayward
Structural Systems	
General Manager	Dr Stephen Hicks
Finite Element Analyst	Nandor Mago
New Zealand Welding Centre	
General Manager	Dr Michail Karpenko
Senior Welding Engineer	Alan McClintock
Research Engineer	Holger Heinzel

Standing, from left: Holger Heinzel, Nandor Mago, Dr Boaz Habib, Gillian Casidy, Raewyn Porter, Maud Tacci, Kam Subramani, Franz Thole, Alan McClintock
Sitting, from left: Brian Low, Dr Stephen Hicks, Dr Wolfgang Scholz, Nick Inskip, Dr Michail Karpenko
Inset: Peter Hayward

new zealand steel certification submissions technical inspection development seminars advocacy sustainability export manufacturing welding conformance advice fabrication coatings engineering business government industry bridge technology best-practice research association courses structural publications international design quality-control innovation training review metal

ISSN 1170-3075

HERA House
17-19 Gladding Place
PO Box 76-134, Manukau
Auckland, New Zealand
Phone + 64 9 262 2885
Fax + 64 9 262 2856
email admin@hera.org.nz
web site www.hera.org.nz