

ANNUAL REPORT 2013

*New Zealand Metals Engineering:
Delivering Quality, Value, Certainty through Innovation*

Stainless
NZ
NZSSDA

METALS
NEW ZEALAND

HERA
Verified

iRANZ
MEMBER

TiDA
Titanium Industry
Development Association Inc.

STEELBRIDGE

CTNZ
BCSA

SCNZ
STEEL CONSTRUCTION
NEW ZEALAND

GA
NZ

SUSTAINABLE
STEEL COUNCIL

VRM

ASI

iiw

WTIA
Welding Technology Institute of Australia
Research, Education, Technical Support & Information

NASH
NATIONAL ASSOCIATION
OF STEEL FRAMED HOUSING INC.

BRANZ

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 2012/2013:



Terry Duff



Mike Lehan



Peter Herbert

From left:

Ian Macrae (for Mike Lehan)
Paul Bryant
John Frear (Deputy Chairman)
Noel Davies
David Moore (Past Chairman)
Peter Hutton (Chairman)
Bernard Hill
Dr Wolfgang Scholz
Prof Thomas Neitzert
Gary Hook
Alistair Fussell

Company Affiliation

Page & Macrae
Steel & Tube Holdings
Best Bars Limited
Hydraulink Fluid Connectors
Grayson Engineering
Fitzroy Engineering Group
Hawkins Infrastructure
HERA
Auckland University of Technology
NZ Steel
Steel Construction New Zealand

Membership Representation

Ordinary & Associate Members
Ordinary & Associate Members
Ordinary & Associate Members
Heavy Engineering Educational & Research Foundation (HEERF)
Ordinary & Associate Members
Ordinary & Associate Members
Ordinary & Associate Members
Director
Ordinary & Associate Members
Vice-President NZ Steel
Co-opted representing SCNZ industry

Inset

Terry Duff
Mike Lehan
Peter Herbert

Southern Cross Engineering
Page Macrae Engineering
SC Technik

Ordinary & Associate Members
Ordinary & Associate Members
NZ Manufacturers & Exporters Association



About the Cover - New Zealand Metals Engineering: Delivering Quality, Value and Certainty through Innovation

The widening gap in the import export balance of New Zealand's metals-based engineering industry triggered a comprehensive programme of actions under the name "*Securing the Future of New Zealand Metals Engineering Industry*", including greater action with industry stakeholders. The key message shown is the outcome of this programme.

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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 March 2013 HERA Strategy Review confirmed the HERA focus to 5 drivers as outlined in the diagram below:

Looking back, the review notes amongst others:

- HERA has stepped up to play a greater industry leadership role and achieved recognition and raised industry profile

- Advocacy messages are getting through. Awareness has shifted about the role and value of metals engineering to New Zealand's economy

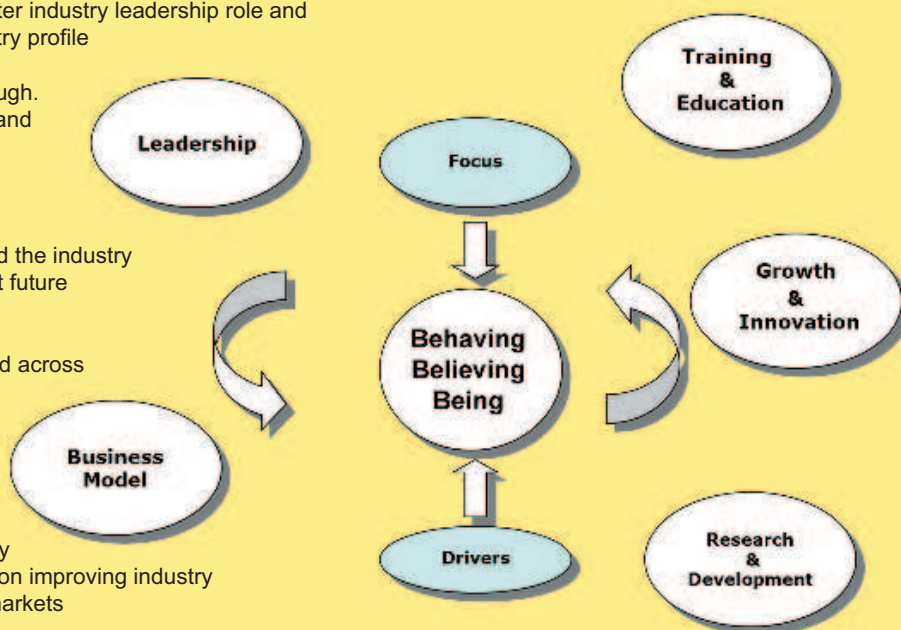
Looking forward, the review states:

- Activity levels are on the increase and the industry has every reason to feel positive about future opportunities

- Higher level of engagement is needed across the industry and we need to achieve greater collaboration across all sectors (Value Chain, Supply Chain, aligned industry partners)

- HERA needs to use the increase in industry R&D funding from the heavy engineering research levy with 'focus' on improving industry competitiveness for local and export markets

- Following years of constrained HERA resources, a period of re-investment is needed to 'modernise' much of what HERA does: Systems, communication, marketing, IT infrastructure, HERA House and re-build capital reserves.





P. C. Hutton

Peter Hutton
HERA Chairman

Industry Activity – Slow Growth

Heavy steel usage in New Zealand rose by 3% compared to last year, bringing the total consumption to 132,000 tonnes. The bottom graph shows this is still 22% short of the pre-2009/10 Global Financial Crisis peak, indicating operations were well below industry capacity.

A Widening Import/Export Gap

The heavy engineering import/export collective showed a concerning trend, export values dropped by 10% and import values grew by 25%, in line with pressure on export competitiveness and the favouring of imports through the high NZ\$ exchange rate.

Our industry realises that in free trade, the only way forward to maintain sustainability and jobs in high-value manufacturing is through increased competitiveness via continued innovation. The consequent implementation of the HERA strategy in support of this is therefore paramount.

Quality as Key Driver – Steel Construction Accreditation Scheme Established

Quality has been identified as the key driver of local competitiveness and a lack of it can be the Achilles heel of the steel construction supply chain, shown by recent failures such as the Southland Stadium collapse.

HERA and SCNZ have taken the lead and developed a Steel Construction Accreditation (SCA) scheme based on AS/NZS ISO 3834. The SCA scheme is ready to commence with many members engaging in in-house quality system improvement and staff training via HERA courses.

Securing the Future of New Zealand Metals Engineering

HERA and Metals NZ partners have taken the threat from imports and lack of growth in exports seriously and engaged in a number of initiatives culminating in the "Securing the Future of New Zealand Metals Engineering" programme.

With the support of strategic adviser Michelle Boag, wide-ranging actions have been put together with the key message that the local industry delivers "Quality, Value and Certainty through Innovation".

Recognising public sector procurement as the key client of our industry, HERA engaged extensively in the Government's procurement reforms. Outcomes included the development by BERL of a tender evaluation tool assisting procurers in making balanced decisions in line with the new "Government Rules of Sourcing".

Other contributions included membership of business reference groups, research on overseas public sector procurement practices and free trade agreements, leading to HERA and Metals NZ now being recognised as a valued industry voice and stakeholder to these reforms.

HERA facilitated through its secretariat role the functioning of the united industry voice Metals NZ and also managed this year's Metals NZ Conference. HERA will continue working 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 – Deficit But Better Than Budgeted

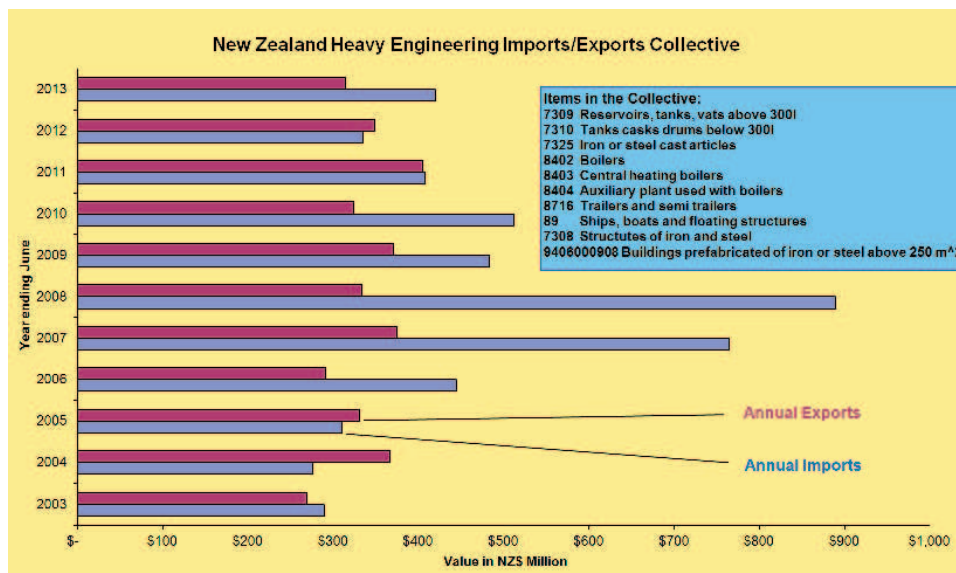
With ongoing delays in implementing the industry-requested Heavy Engineering Research Levy (HERL) increase, HERA is pleased that it managed well through focusing on commercial income generation including export of services to Australia, China and South-East Asia.

While HERA reports an actual loss of \$23k this year, this is better than the budgeted loss of \$75k. The help of HERA's Heavy Engineering Educational and Research Foundation (HEERF) is greatly appreciated in managing HERA's tight finances. And if the HEERF surplus is also taken into account, the asset balance of both organisations stayed roughly unchanged, providing for an overall pleasing performance.

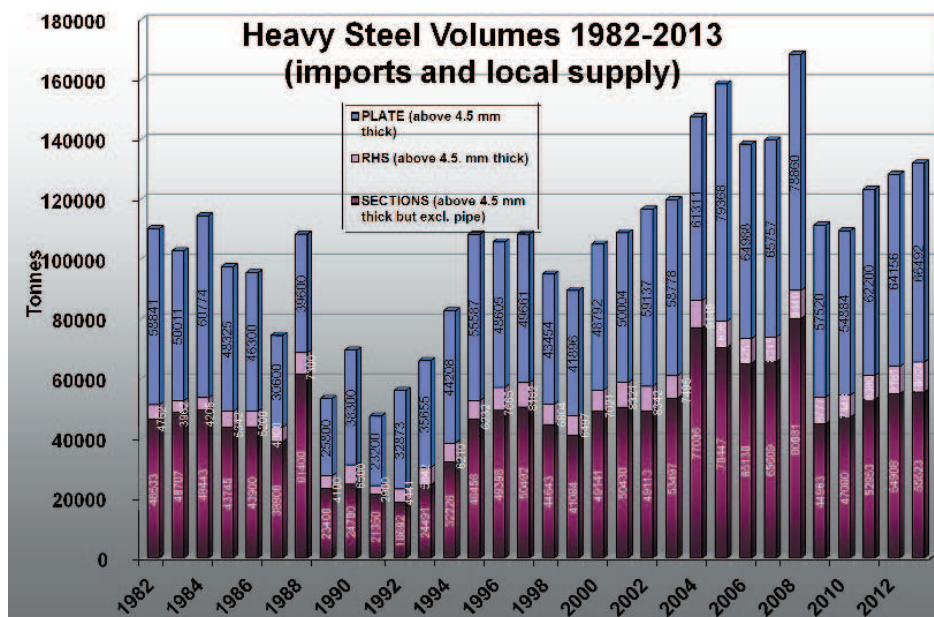
Industry Doubles its R&D Spending

The best news was that in December 2012 the long-awaited amendment of the HERL Act was passed unanimously in Parliament and MBIE Minister Steven Joyce promptly approved the industry request to double industry's research spending which became effective from 1st July 2013.

More industry R&D money is a unique opportunity and HERA's Executive considered this in the annual strategy review. Some additional activities are research and design guide development in damage resisting seismic systems, increasing competitiveness in steel construction; with a focus of competing with imports and manufacturing for export.



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



Equally important is to assist industry transforming from largely tender-based contractors to higher value-added product owners with increased export potential.

R&D Outcomes

• Steel Construction Research

HERA's steel construction research concentrated on steel construction standards development with a focus on increasing competitiveness via reduced resource use through developing design provisions for higher strength steels and concrete in composite construction. In addition design rules were developed for alternative steel materials together with setting acceptable standards of workmanship, ensuring design assumptions are valid.

Another outcome was bringing the joint Steel and Composite Bridge Design Standard AS/NZS 5100.6 to public review stage. Equally the planned introduction of joint Composite Structures Standard AS/NZS 2327 made progress with the intent to replace NZS 3404 Section 13. In response to pursuing more cost-effective performance-based solutions, HERA in co-operation with SCNZ and the Australian Steel Institute (ASI) succeeded in getting approval from Standards Australia to develop a new joint AS/NZS Fabrication and Erection Standard and work will start shortly.

• General Heavy Engineering

About half of HERA's members operate in the diverse heavy and metals engineering industry sectors. Sector over-arching and generic business development services played a key role and included complex multi-capability company registers to demonstrate to clients what the industry can deliver.

Following previous years' priority setting exercises, the R&D focus on renewable energy continued with contributions to the establishment of a New Zealand Marine Energy Centre in co-operation with AWATEA and the European Marine Energy Centre in Orkney and the Above Ground Geothermal and Allied Technologies (AGGAT) programme.

The 2x2 years MBIE co-funded AGAT science programme started this year and brought researchers from the Universities of Canterbury and Auckland together with industry members under HERA research and market development leadership. Research capability was built particularly at the University of Canterbury driven by Associate Prof. Dr Susan Krumdieck, with benefits from two Tech NZ programmes involving HERA member companies with an aim to build two Organic Rankine Cycle (ORC) pilot plants.

The AGGAT initiative's market-driven approach is quite different to the tender-based model traditionally applied by HERA fabrication companies. Its introduction requires a thorough study of the market and is a key contribution

HERA made. It is now paramount that understanding and guidance is provided to industry to successfully transition to a product-owner-ship based manufacturing model.

• Welding Technology R&D

Welding R&D efforts had activities in three areas. The continuation with Konstanz University in Germany of the long-term corrosion research programme of welded lower-cost alternative stainless steel grades delivered the second report supporting confidence in their successful application.

In co-operation with the University of Auckland, the low damage seismic systems research effort investigated welding in cold-formed areas of structural steel members for the purpose of further improving their resistance to seismic forces.

And in the AGGAT research programme, the NZWC undertook the first development steps in setting up the Materials Knowledge Base of the AGGAT Expert Design Tool.

Stepping Up NZ Industry Capability and Credibility

An outstanding achievement this year was HERA's accreditation by the International Institute of Welding (IIW) as an Authorised National Body for New Zealand to oversee provision of internationally recognised welding-related qualifications. This is a significant step towards HERA also achieving accreditation to the IIW Manufacturer Certification System for the certification of companies for compliance with AS/NZS ISO 3834.

Parallel to the IIW accreditation effort, the well-established training programme for welding supervisors was extended with the first IIW International Welding Inspection Course IWI-B. Record attendance in the courses demonstrated again how seriously industry takes quality assurance.

Outlook

Although the predicted activity flurry around the Canterbury rebuild has not happened yet, industry indications are for improving workloads. HERA expects steel volumes for the coming year to at least match this year's figures, so core levy funding is budgeted accordingly.

Despite concerning announcements in respect to wholesale imports of Christchurch cornerstone projects such as the new stadium, our industry is confident in facing up to the import challenge. HERA research indicates when imports are required to fully meet our world-leading seismic design and fabrication conformance requirements, the cost of imports are close to the local offer.

And if whole-of-life costing and the Government's new balanced decision-making criteria of considering the economic, social and environmental impact are applied, New Zealand industry is competitive.

However for this to happen, we need the Government to ensure that the

free trade is 'fair and equal' trade with the new 'Government Rules of Sourcing' applied in a transparent and accountable manner.

HERA's contribution to securing its industry's future is not possible without the incredible support of its members and its partner organizations, as well as from key stakeholders outside the industry, including from Government, its departments and the many research providers we interface with. Our thanks are due to all of those who contributed and this includes HERA's hard working staff.

We look forward to continued close and valued co-operation with everyone involved in our industry during the coming year.



Dr Wolfgang Scholz
Director

2012/13 HERA Success Stories

Industry Advocacy

- Parliament approves new Heavy Engineering Research Levy maximum and Minister Steven Joyce approves industry request to double heavy steel-based levy to \$10 per tonne effective 1st July
- Intensified industry advocacy role on multiple fronts
- Responded to numerous calls for submissions and dealt directly with Ministers on industry issues
- Published HERA/BERL tender evaluation report considering whole-of-life costing and balanced decision-making
- Co-developed with Metals NZ the NZ Industry Participation Plan concept into "Securing the Industry Future"
- Held business opportunities and industry issues meetings

Heavy Engineering Industry Development

- Established AGGAT science base in co-operation with universities of Canterbury and Auckland
- Comprehensive AGGAT market research evaluating export opportunities completed
- Completed 1st phase of two Clean Energy industry projects aiming to build two ORC pilot plants
- Web-based multi-capability company register prototype demonstrated and implemented for geothermal energy capability register.
- Extensive industry support, networking and advocacy programme maintained

Structural Systems

- Sustainable Steel Council web site launched
- Steel Concrete Composite Bridge Design Standard AS/NZS 5100.6 readied for public comment
- Development of alternative steel materials appendix
- Provided input into the third edition of NZTA Steel Bridge Manual
- Preparation for new joint steel concrete composite standard AS/NZS 2327 to replace NZS 3404 Section 13
- Training programme in New Zealand and Australia to prepare designers for introduction of AS/NZS 2327

NZ Welding Centre

- HERA established as IIW ANB for welding-related qualifications and development of SCA scheme
- Record income from welding training - 200+ people attended seminars and courses in 2012-13
- The IIW International Welding Inspection Course IWI-B offered for first time
- 2nd part of research project "Performance Evaluation of Alternative Stainless Steel Grades" accomplished.
- MBIE Guidance Document for the Assessment of Steel Construction Failures developed and submitted for international review

I & QC Centre

- Maintained training and advisory programme with part-time commitment of former Manager Peter Hayward

HERA Information Centre (HIC)

- Successfully organised the Tauranga Metals New Zealand Conference 2013

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.

Standards Development Drives Steel Construction Innovation

In steel construction, the HERA R&D-influenced innovation driver is continued improvements of its design and fabrication Standards.

Over the years, HERA's effectiveness has been outstanding and this was demonstrated in the excellent performance of structural steel buildings in the Canterbury earthquakes, but more generally in the steady increasing market share of multi-storey steel buildings and steel-concrete composite bridge construction.

A consistent feature of recent New Zealand steel construction standards development is its internationalisation. HERA through its specialist staff has world leading expertise and when matched with that of SCNZ, the academic staff of the universities of Auckland and Canterbury, pioneering consulting engineers and fabrication members, this formidable team punched well above its weight for a country of New Zealand's size.

HERA has been particularly successful in facilitating the development of joint Australian/New Zealand standards. Making these standards joint provides benefits in terms of a larger pool of experts as well as funding whilst, at the same time, addressing issues that are specific to New Zealand such as seismic design.

A further advantage is that harmonization provides market access and encourages trade across the Tasman, as well as providing a wider range of software design tools through international software providers.

Steel and Composite Bridge Activities

Scheduled for publication in 2014, the Steel and Composite Bridge Design Standard AS/NZS 5100.6 has been prepared for public comment. Dr Stephen Hicks as Chair of the AS/NZS 5100.6 Committee has been working closely with the NZ Bridge Development Group, NZTA and the Australian Industry. It will be the first harmonized standard between Australia and New Zealand for the design of steel and steel-concrete composite bridges.

HERA provided input into the analysis and design criteria section of the 2013 edition of the NZTA Bridge manual, ensuring greater alignment with AS 5100.6, HERA Report R4-133: 2011 for guidance on corrosion protection systems and R4-97: 2005 for weathering steel, and also ensuring that the forthcoming NZTA Steel-concrete Composite Bridge Design Guide will complement the new Steel Bridge Manual.

AS/NZS 2327.1 Composite Structures Standard

Supported by the NZS3404 Committee and other key stakeholders, Standards New Zealand has confirmed that the Composite Structures Standard AS 2327.1 will be revised as a joint Australian and New Zealand Standard AS/NZS 2327, thereby replacing NZS 3404 Section 13.



HERA member Eastbridge fabricated the 150-metre Tauranga East Link Kaituna River bridge for NZTA

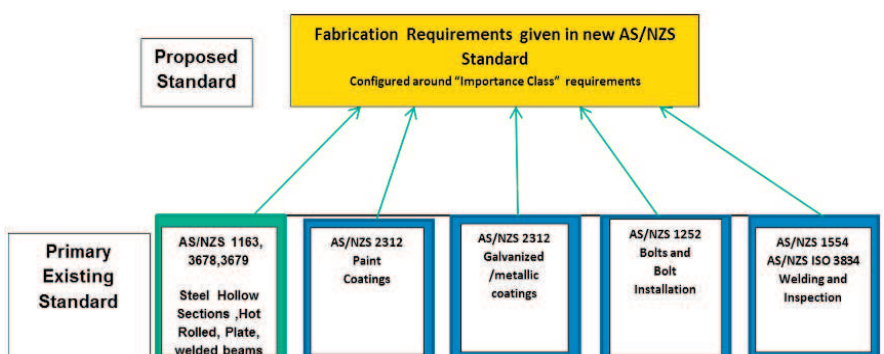
Following on from the work that has been undertaken on AS/NZS 5100.6, the new composite Standard will provide provisions for composite columns and composite slabs. Seismic design provisions for composite construction are also under development. Moreover, following the development of the Slab Panel Method within the HERA fire research programme, the procedure has reached a state of maturity that it is proposed to implement it within the new joint standard.

Joint AS/NZS Fabrication and Erection Standard

Performance-based approaches are used in most modern building codes and standards. They offer flexible alternative fit-for-purpose and cost-effective solutions than more traditional tried-and-tested prescriptive approaches. However, performance-based solutions need to be underpinned by a rigorous risk-based approach.

HERA has been working closely with SCNZ and ASI, in developing a proposal to Standards Australia to develop a new joint AS/NZS Fabrication and Erection Standard responding to the requirements of the performance-based solution approach. This proposal was accepted by Standards Australia and work will soon commence. The intention of this new joint Australian and New Zealand Standard is to harmonize and replace the existing sections within AS 4100 and NZS 3404.

Furthermore, to implement international best practice, the new standard will take inspiration from international standards such as EN 1090 and ISO 10721 and will provide a direct link with the Importance Classes given in AS/NZS 1170 and the required minimum levels of fabrication and erection quality. The new standard will therefore become an 'umbrella standard' that sits above the individual product standards – see schematic below.



Steel Construction Accreditation Based on AS/NZS ISO 3834

HERA in co-operation with SCNZ and industry partners developed the framework for a Steel Construction Accreditation (SCA) scheme.

The SCA scheme is based on the national standard framework of NZS 3404, AS/NZS 1554 and AS/NZS ISO 3834 taking into account international best practice standard EN 1090.1.

It is envisaged that the SCA scheme will initially be implemented on the basis of 'HERA Verified' assessment followed by formal certification once HERA has been accredited by IIW to perform these functions.

To facilitate the company-specific QA assessment process, the NZWC has developed a web-based gap analysis tool that is now available to member companies.

During the year, the NZWC worked closely with a number of companies assisting them to establish the corresponding quality management system. Feedback from members has been encouraging and confirmed that the primary aim of becoming a more cost-effective steel construction supplier is indeed working.

Supporting AS/NZS Welding Standards Development

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, and on-going support work and industry advice is given in this respect.

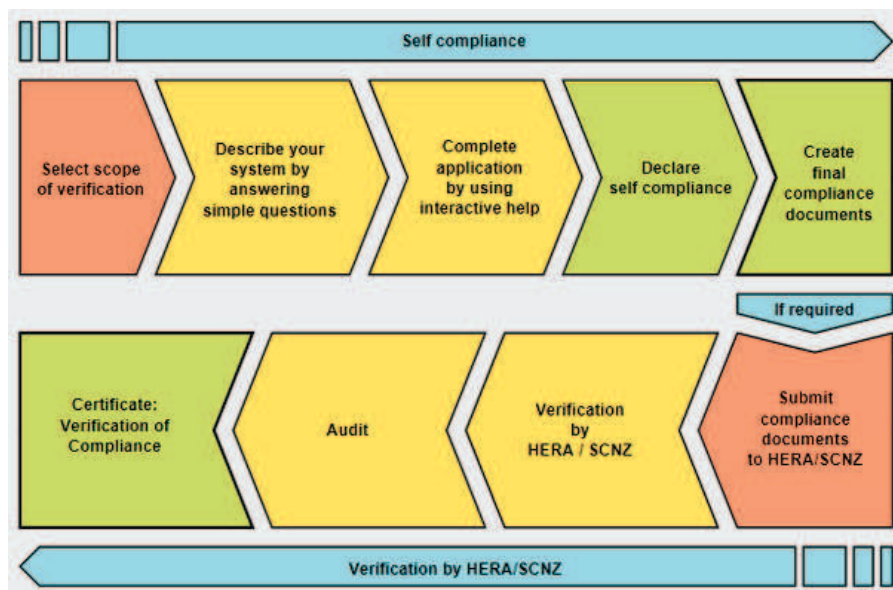
Dr Michail Karpenko has also been involved in the alignment of Section 13 "Fatigue" of the Bridge Design Standard AS 5100.6 with Eurocode 3.

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 Geothermal and Allied Technologies (AGGAT) initiative, and technologies involved in the emerging wave and tidal energy market. required to support the development of products and to provide a pathway to market.

In particular, this process supports companies to transit to becoming innovative, high-value manufacturers of export-oriented, market-leading products. Priority is given to the development of Clean Energy business opportunities under the Above



The HERA/SCNZ Steel Construction Accreditation (SCA) scheme verification process



SCNZ manager Alistair Fussell presenting the HERA/SCNZ Steel Construction Accreditation (SCA) scheme to industry members

Ground Geothermal and Allied Technologies (AGGAT) initiative, and technologies involved in the emerging wave and tidal energy market.

Studies Undertaken to Understand the Clean Energy Market

As HERA member companies focus more on export markets, particularly those in Europe and the USA, there is an increased need to understand required certifications such as the European CE marking and UL Certification in the USA.

An extensive study of CE and UL requirements was undertaken in conjunction with a market analysis of the European and US markets for Organic Rankine Cycle products which resulted in HERA Report R5-52: *Business Models for NZ Manufactured Organic Rankine Cycle Products*.

Different pathways to market were studied and proposed for the New Zealand manufacturers of clean energy products, and summarised in HERA Report R5-54: *Market Planning*. An Organic Rankine Cycle technical review was completed and published as HERA Report R5-50: *Literature Review on Recent Innovations in Organic Rankine Cycle Technology*.

Also completed was a technical report related to heat exchangers entitled HERA Report R5-51: *Design and Analysis of the Condensation Process for Binary Fluids in an Organic Rankine Cycle*.

Building the Network

Building on the successful development of the AGGAT Research Roadmap, HERA Research Engineer, Dr Boaz Habib presented a paper on the AGGAT research agenda at the New Zealand Geothermal Workshop held in Auckland in November.

He also attended the All Energy conference and trade show in Melbourne and in conjunction with the conference visited the Department of Aerospace, Mechanical and Manufacturing Engineering at the Royal Melbourne Institute of Technology.

To explore research collaboration, Boaz met with Professor Akbarzadeh who heads the Energy Conservation and Renewable Energy group which develops a radial inflow turbine and a geothermal project which provides clean energy as well as fresh water from Geothermal Brine.



Dr Boaz Habib (centre) and members of the RMIT Energy Conservation and Renewable Energy group



Structural Systems General Manager Dr Stephen Hicks presenting to a full room of NZ designers, structural engineers and architects at HERA House



HERA member Mighty River Power's Ngatamariki power station will increase the company's geothermal generation to more than 40% of capacity



The AGGAT team members comprising academia, industry and HERA. The collaboration between industry and universities is a good template for growth in the dynamic renewable energy sector



General Manager Industry Development, Nick Inskip attended the *Global Green Hub* conference and trade show in Korea at the invitation of the Korean Government and met with a number of companies interested in collaboration with New Zealand companies.

This included a visit to the Korean Institute of Energy Research in Daejeon to meet with the Directors, Dr Seo Yong-seog and Dr Heon Jung to review their Organic Rankine Cycle research programme for AGGAT collaboration opportunities.



Industry Development General Manager Nick Inskip (right) with Dr Seo Yong-seog at the Korean Institute of Energy Research

And probably more importantly, a significant time element was spent by the HERA team on visiting and communicating with HERA members, potential local clients of clean energy applications and government and other stakeholders with an interest in the clean energy sector.

This work is fundamental to pulling together the network of interests required to support industry as it develops high-value products for export markets.

Promoting Industry Capability

Tariff concession application work passed from the MBIE to Customs during the year demanding the development of a range of new relationships. Customs has taken their role very seriously and works closely with HERA to ensure that tariffs are applied appropriately.

Well-attended business opportunities events linking industry members with potential clients were organised in conjunction with Metals NZ promoting opportunities in Geothermal Energy by Mighty River Power, around the Auckland Waterview Connection by the Well Connected Alliance and the Marsden Point Refinery Extension by Refining NZ.

A presentation by MacDow to a group of local fabricators explaining requirements in conjunction with the Whangarei Lower Hatea bascule bridge section going to China for fabrication was also organised.

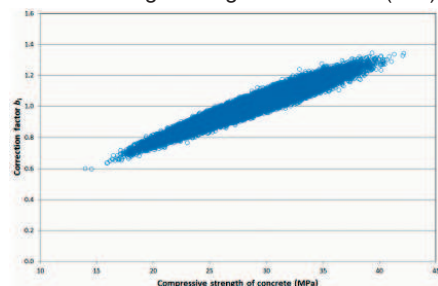
Left: The Learning from Fabricated Steel Imports presentation by HERA member McConnell Dowell Constructors at the Metals NZ AGM on the Lower Hatea Bridge in Whangarei. The moveable bascule bridge section was imported from China and MacDow reported on their experiences gained as a result of importing the section from China. The talk initiated a discussion of what our local industry could learn to make its own offering more competitive and what information and messages to supply to its clients to outline the benefits of procuring local. Inset: McConnell Dowell Constructors Engineering Manager Kristian Nelson

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

Structural Systems Research

New design rules for shear studs in composite construction Research work progressed in the steel-concrete composite area supporting joint Australian and New Zealand standards development. The introduction of concrete compressive strengths up to 100 MPa together with quenched and tempered steels with a yield strength up to 690 MPa presented a number of challenges which required new development work.

For example, Structural Systems division General Manager Dr Stephen Hicks and former HERA Structural Engineer Audsley Jones worked on the development of rules for headed stud shear connectors using structural reliability (see example below of a Monte Carlo simulation comparing stud resistance versus concrete strength), which have recently been published by the International Association for Bridge and Structural Engineering (IABSE) as a peer-reviewed paper in their journal Structural Engineering International (SEI).

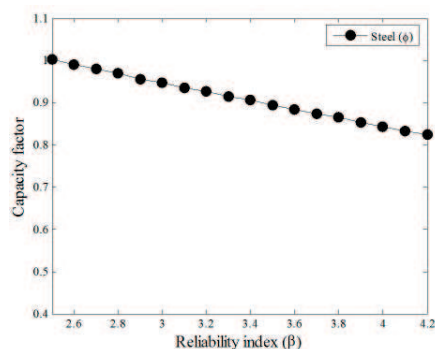


Safety Factors for Steel Products

When Using AS/NZ Design Standards

Perhaps one of the most innovative aspects of the new joint composite bridge design standard AS/NZS 5100.6 is the introduction of an appendix that provides design rules and conformity assessment provisions for steel products that are not sourced from either Australia or New Zealand.

The appendix is underpinned by a rigorous structural reliability study undertaken in a collaborative investigation by HERA, University of New South Wales and University of Western Sydney, which used independent test data together with international technical delivery Standards for steel products to evaluate the required safety factors that should be used in design (see plot below).

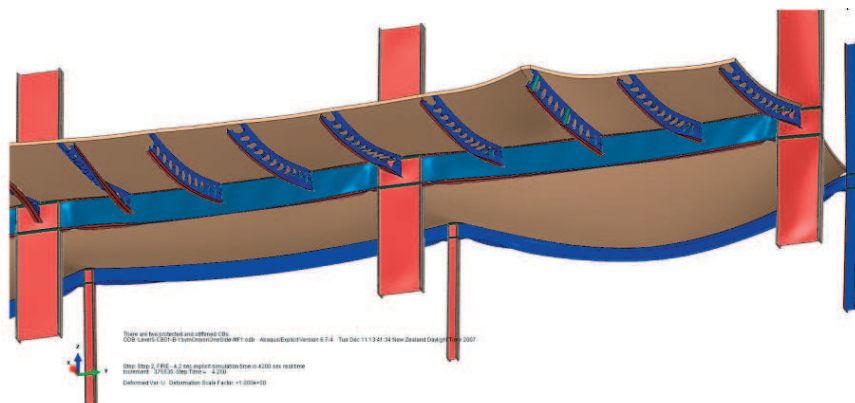


Developments in Multi-storey Buildings Design Standard

As well as adopting the rules for headed stud connectors that were developed for AS/NZS 5100.6, the proposed joint composite structures Standard AS/NZS 2327 will adopt international best practice by providing design rules for structural robustness.

In addition, provisions for designing steel-framed buildings for fire will be given which, inter alia, include the Slab Panel Method to minimize the amount of fire protection applied to the floor beams.

A New Zealand case study of the application of the Slab Panel Method was authored by Stephen Hicks, Martin Feeney (Holmes Fire) and Associate Professor Charles Clifton (University of Auckland) in 2012 and published by the International Association for Bridge and Structural Engineering (IABSE) as a peer-reviewed paper in their journal Structural Engineering International (SEI).



Lateral instability and movement of the bottom flange to the asymmetric cellular beams

Thermal Performance of New High Performance House Product

The Structural Systems division supported New Zealand Steel in the development of their new Warmframe™ building system through three-dimensional heat transfer analyses in order to enhance/optimize construction details to achieve a particular R-value. Designed collaboratively by New Zealand Steel, Fletcher Aluminium, Insul-Pro, Frametek-RFS and Resene, Warmframe™ technology uses Axxis® steel for framing with high performance insulation that minimises heat loss. In combination with thermally broken double-glazing, these products create a wall system with an R-value which is significantly greater than required by the Building Code.



The Warmframe™ technology was implemented within the High Performance House at the HIVE Home Innovation Village in Christchurch

Verification of Design for an Erected Steel-framed Structure with Imperfections

A detailed non-linear finite element analysis was performed on behalf of HERA



This 45m long 20-tonne seismic strengthening truss for the Flaxmere Waterworld Aquatic Centre was fabricated and painted by HERA member Patton Engineering in their Hastings factory. The truss was transported in one piece.

members for an industrial plant with welded columns that had flanges with out-of-flatness issues. The study replicated the column fabrication history, including fitting in the welded stiffeners followed by uneven bolt tightening of the incoming beam end plates.

The numerical study satisfied the designer's concerns in respect to how much plasticity has been developed within the welded columns, beam-to-end plate welds as well as if the connection and column

could withstand the ultimate limit state and serviceability limit state design loads.

Analysis of a New Composite Slab Product in a Standard Fire Test

A complex heat transfer analysis involving convection, conduction and boundary radiation was undertaken by FEA Analyst Nandor Mago as part of a new steel-concrete composite slab product development for an overseas Client. The finite element analysis work is able to reliably estimate the performance of the composite slabs in fire conditions. It was undertaken to optimise the design of a test specimen before embarking on the costly exercise of subjecting it to a loaded fire test according to BS 476-21 and EN 1363-1.

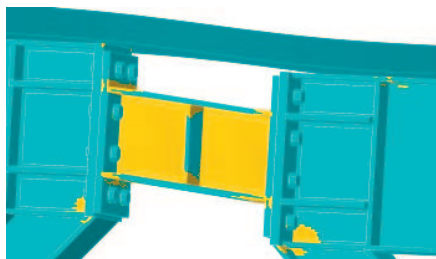
The Finite Element (FE) model represented half of the test specimen, supporting beams and the laboratory furnace arrangement. As well as modelling the concrete and steel temperature dependent material properties up to 1200°C, the detailed numerical simulation even accounted for the thermal contact resistance at the cold-formed steel-concrete interface.

The composite slab top surface temperatures were assessed according to EN 1363-1 insulation criteria, which showed that fire resistance rating

required by the client could be achieved. Following the heat transfer analysis, the temperatures calculated through the composite slab were used to derive the sequentially coupled thermal-stress analysis of an equivalent shell modelled slab. The slab load bearing capacity given by EN 1363-1 was determined from this simulation in terms of a limiting deflection as well as a deflection rate with time.

Verification of Design Rules for Removable Links in EBFs

A method for assessment of the extent of inelastic strain in the active link of an Eccentrically Braced Frame (EBF) has been developed by SCNZ with support from Dr Charles Clifton, Associate Professor of Civil Engineering from University of Auckland. HERA FE Analyst Nandor Mago undertook a FEA of the lower story of a multi-story building with removable link to verify the SCNZ design procedure. The results showed that the design procedure achieves the objectives of suppressing inelastic demand away from the active link, allowing the rest of the structural system to remain essentially elastic under severe earthquake excitation. The work was published as HERA Report R4-145.



HERA Seismic Design Guide Review

The principal guide for earthquake design of steel-framed buildings is HERA Report R4-76. In the interests of developing a document that can be easily maintained in the future, the new edition of R4-76 will be published in several volumes: the first of which will be Eccentrically Braced Frames (EBFs). Volume one of HERA R4-76 is currently being developed in collaboration with SCNZ and University of Auckland Associate Professor Dr. Charles Clifton. This publication will be formally launched in 2013.

Welding Technology Research

• International Corrosion Study of Alternative Stainless Steels

New developed grades of stainless steels offer a cost effective alternative to the traditional Austenitic stainless steels. In order to understand their performance in the NZ coastal environment a long-term study has been performed by the NZ Welding Centre in co-operation with the NZSSDA and a partnership between the University of Konstanz and the German Material Testing Centre (BAM) in Berlin.

2012/13 was the fourth year of the project and the welded samples exposed to the elements at Muriwai Beach have been collected and evaluated by project partner BAM. The results have been described in a second report and will be published in international papers. Interim results were presented at the National Maintenance Engineering Conference in Rotorua in November 2012 and also during seminars.

• The Effect of Welding in Cold-formed Zones of Seismic Structural Steel Frames

It is known that so-called k-areas of

2012/13 Structural Systems Publications:

Hicks, SJ and Jones, A: **Statistical Evaluation of the Design Resistance of Headed Stud Connectors Embedded in Solid Concrete Slabs**, Structural Engineering International (SEI), International Association for Bridge and Structural Engineering (IABSE), 3/2013, pp. 269-277

Hicks, SJ, Feeney, M and Clifton, GC: **Fire Performance of an Office Building with Long-span Cellular Floor Beams – Britomart East, Auckland**, Structural Engineering International (SEI), International Association for Bridge and Structural Engineering (IABSE), 4/2012, pp533-540

Mago, NM: **Finite Element Analysis of Eccentrically Braced Frames with Removable Link**, HERA Report R4-145, Auckland, 2013

Hicks, S & Uy, B: **Structural Reliability Analysis**, Steel Innovations Conference 2013, Christchurch, 21-22 February 2013

Hicks, S: **The New Joint Bridge Design Standard on Steel and Composite Construction: AS/NZS 5100.6**, Steel Innovations Conference 2013, Christchurch, 21-22 February 2013

Hicks, S: **Energy Efficiency of Light Steel Frames**, Steel Innovations Conference 2013, Christchurch, 21-22 February 2013

Hicks, S: **AS/NZS 5100.6 The New Joint Bridge Design Standard On Steel And Composite Construction**, Inaugural Annual Conference of the Institute for Infrastructure Engineering, Sydney, 30 November 2012

Hicks, S: **Proposed Joint Bridge Design Standard AS/NZS 5100.6 for Steel and Composite Construction**, New Zealand Bridges 2012, Wellington, 29 & 30 October 2012

Hicks, S & Jones, A: **Statistical Calibration of Safety Factors for Headed Stud Shear Connectors in Composite Construction**, IABSE Congress Report, 18th Congress of IABSE, Seoul, 2012, pp. 84-91(8)

straightened I-beams may have reduced notch toughness. The extent of the problem and beam sizes affected is however largely unknown for products as typically used in seismic applications such as EBFs.

NZWC seismic research involved a project to investigate the effect of welding on the cold-formed areas of I-beams. The project involves mechanical testing of a number of



Senior Welding Engineer Alan McClintock performs welding trials to verify the effect of welding in k-areas of the rotary straightened I-beams

2012/2013 NZWC Publications:

McClintock, A: **Welding and Corrosion Performance of Alternative Stainless Steels**, National Maintenance Engineering Conference, November 2012, Rotorua, New Zealand

Karpenko, M, McClintock, A and Niedermayer, J: **Weld Design Considerations for Bridge Girders – Weld Type, Quality and Cost**, Steel Innovations Conference February 2013, Christchurch, New Zealand

Karpenko, M and McClintock, A: **Practical Considerations for Demand Critical Seismic Welds**, The 1st Australasian International Welding, Inspection and NDT Conference, March 2013, Perth, Australia

Karpenko, M: **Productivity Opportunities in Welding Fabrication**, Metals Conference, May 2013, Tauranga, New Zealand

Karpenko, M, Hicks, S: **Guidance for the investigation into Building Failures Appendix: Best Practice in Material Testing – Steel Construction: NZWC Technical Report for Ministry of Business, Innovation & Employment**, July 2013



Welding simulator/trainer demonstration by HERA member BOC

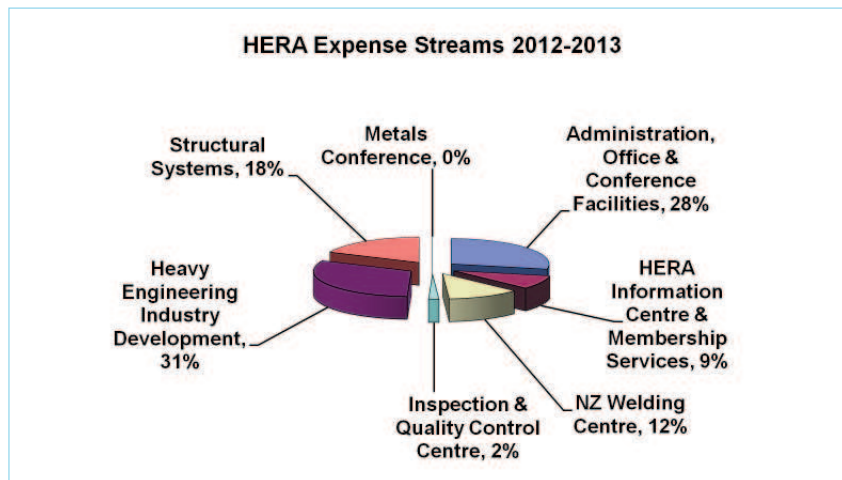
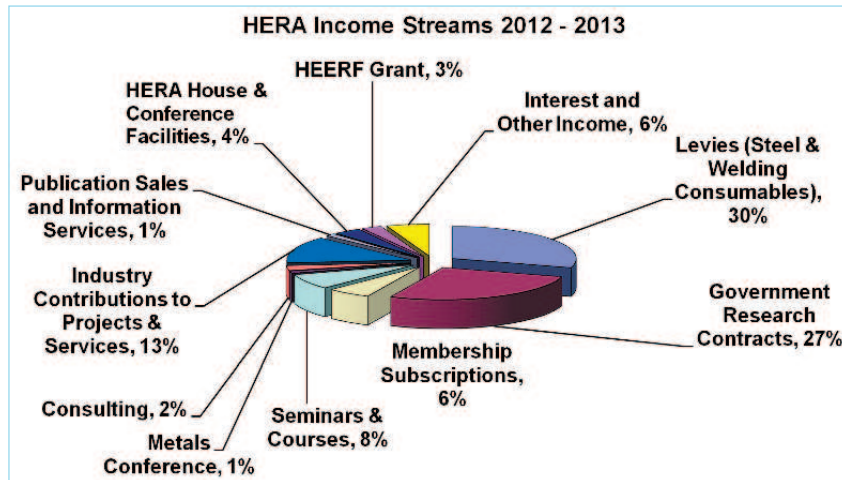
welded beams, FEA modeling of seismically induced strains followed by a fracture mechanics assessment. The project has been performed in cooperation with the University of Auckland. Papers on the subject were given at the 1st Australasian International Welding, Inspection and NDT Conference 2013 Conference in Perth in March 2013 and NZ Metals Industry Conference in May 2013.

• AGGAT Materials Research

The NZWC is responsible for the materials research objective of the project to answer the question of which material performs best for a given application in the AGGAT environment.

The geothermal brine is often highly aggressive and as a result, heat exchangers are known to suffer from scaling and fouling. Selection of materials and surface properties to suite the site conditions can significantly reduce the problem. To verify the relative performance of different material solutions, a conceptual design of a test heat exchanger has been proposed.

It allows connecting test equipment to an existing geothermal field and runs in a bypass configuration to simultaneously test a number of representative material coupons. Further a review of international research reports has been performed and the Materials Database of the AGGAT project updated.



HERA's business model as an industry research, training and advocacy organisation is based on a balanced mix between Heavy Engineering Research Levy (HERL), government and HERA 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.

Due to the ongoing constraints on HERA funding as a result of several long years of delays in implementing the industry-approved HERL increase, in 2012/13 HERA's business focus continued to be on the generation of new revenue streams to lessen the dependency on industry levy, and winning Government-funded research contracts.

This included the development and promotion of the HERA brand as a world-class research and industry services provider in addition

to the export of HERA services. However, income-generating project acquisition requires considerable effort and time, is not always successful and can take resources away from delivering the industry-requested sector-specific R&D tasks.

Therefore, in a generally difficult commercial environment with little R&D investment from member companies due to tight profit margins, HERA is pleased to report it was able to gain a good number of commercial contracts. This included overseas contracts; for example, product development for a South-East Asian client or supporting the British Standards Institute (BSI) delivering a second 3-day seminar in China on the design of steel and composite structures using the structural Eurocodes.

As noted under HERA's financial performance, this contributed to a satisfactory \$51k positive to budget result.



HERA Export to China: BSI's Eurocode course announcement with Dr Hicks

The increased industry need for demonstrated and reliable quality conformance led to accelerated development of HERA provided product and systems verification and certification services. It is anticipated that this will eventually become an additional HERA income stream under the HERA Verified brand. However, to be able to provide these services HERA itself needs to be accredited by an internationally-recognised body.

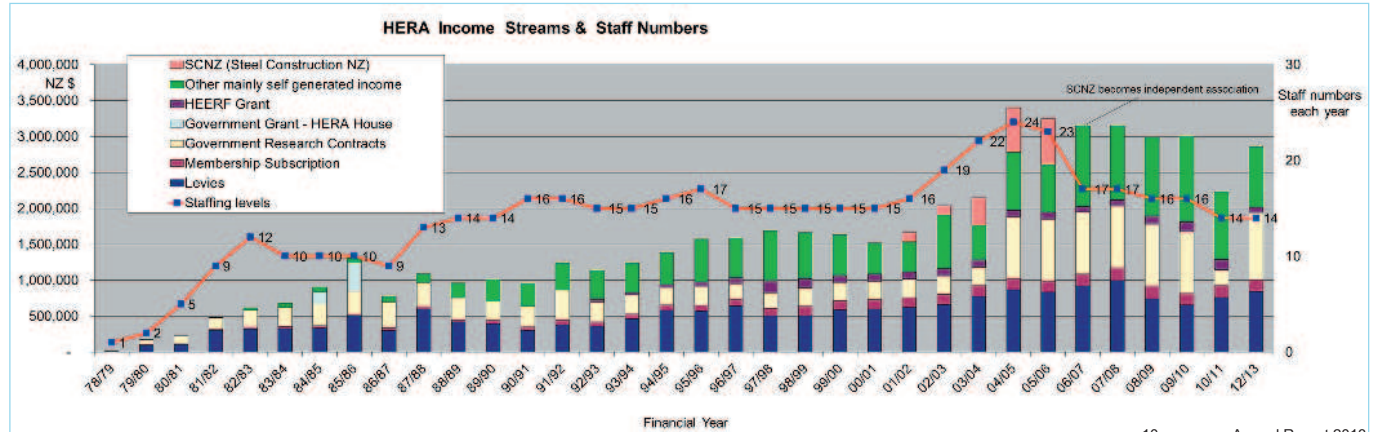
Significant progress was achieved in this respect with HERA becoming the IIW accredited "Authorised National Body" (ANB) for New Zealand in respect to internationally recognised welding-related qualifications (see Education & Training section) and welding fabrication company certification (see Growth & Innovation Section).

The HERA 2012/13 income and expense streams are as outlined in the income and expenses diagrams and the development of the income streams and HERA staff numbers since HERA's inception are shown in the time correlated diagram below.

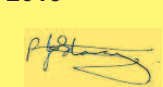
Winning last year's government co-funded AGGAT programme significantly changed income streams, but also the expense stream as HERA is largely performing the research management function in this programme.

Looking ahead to next year, the increase in industry funded research via the HERL will again change this income balance within a total HERA budget of close to \$4.3 million, with HERL representing 36%, government funding 33% and self-generated and other income representing 31%.

However, as outlined in the strategy review, following years of constrained HERA resources, a period of reinvestment is needed to 'modernise' much of what HERA does, systems, communication, marketing, IT, HERA House. HERA also needs to rebuild capital reserves.



HERA ANB Chairman's Report 2013



Phil Stacey
Chairman HERA ANB



A study performed by the NZ Welding Centre (NZWC) a few years ago revealed that in New Zealand an estimated 6,500 people's work involves welding, and a further 800 people are involved as welding supervisors, engineers, or inspectors. The value added of welding as a key enabling technology was estimated to an impressive figure of NZ\$ 813 million to our economy.

To maintain a competitive edge, our industry requires a skilled work force provided through tertiary education. The industry also needs staff with specific technical knowledge that is not usually available within a standard technical education. This is a unique need and a very important niche market that has been successfully filled by HERA in cooperation with the NZIW and CBIP since the mid 1980s.

While following domestic requirements, it is essential that technology-related training and qualifications comply with internationally recognised standards. The International Institute of Welding (IIW) has been a pioneer in this regard by introducing minimum requirements for training and education for personnel involved in welding activities.

In the last 10 years, this qualification system has become truly international through the introduction of the harmonised IIW scheme for qualification and certification of personnel which is now used in more than 43 countries including New Zealand and Australia, and recognised in EN, ISO and AS/NZS standards. The requirements are applied uniformly by all countries involved and the diplomas granted are mutually recognised.

The IIW system is implemented by appointing one organisation in each country, and this organisation is assessed to establish compliance with the IIW Rules and is known as the IIW Authorised National Bodies (ANB).

To provide NZ industry with the best possible training services, HERA this year has established the HERA ANB. A significant staff effort was put into the development of the Constitution and documentation required to operate the scheme. The work was done by the NZWC staff with support of the NZWC Panel in record time. Well done, NZWC team!

The HERA ANB has recently undergone an IIW Audit conducted by an expert team from Germany and South Korea. The audit was successful and the HERA ANB has been recommended for full authorisation that will likely be granted in September.

The training is provided by the ANB approved Training Body (ATB), the HERA Training Centre. The training programme is being continuously updated to include new exciting training schemes.

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 2012/13, seminars and courses accounted for 8% of HERA income.

Relevant International Welding Related Qualification

HERA is committed to providing technology courses that comply with national and international best practice under NZQA and International Institute of Welding (IIW) accreditation.

To ensure that all welding-related qualification activities continue to be delivered at the highest possible level of quality assurance, HERA has applied to IIW to become the IIW Authorised National Body (ANB) for New Zealand (HERA ANB) – see the separate HERA ANB Chairman's Report.

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

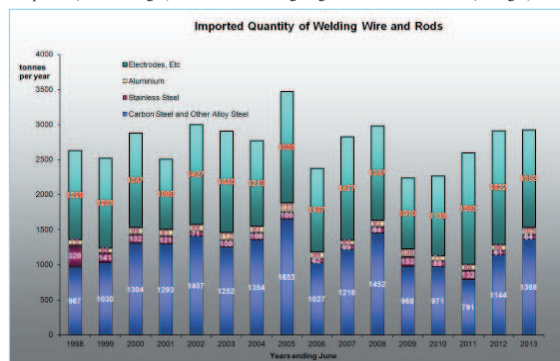
More than 200 people attended NZWC seminars and courses held across New Zealand in 2012/13. The events included a seminar *What Every Structural Engineer Needs to Know About Welding* aimed at providing guidance on the principles of quality assurance for welded steel structures for structural engineers, *Achieving Seismic Performance*

Using *Bolted Connections* with international expert Robert Shaw from the USA, and *Fatigue Design to Eurocode 3* jointly presented by Prof. Adolf Hobbacher and Dr. Michail Karpenko.

The courses included the popular AS 2214 Welding Supervisor Course and a newly-developed Welding Inspector course leading to both International Welding Inspector Qualification IWI-B and national CBIP certification.



Welding Supervisor course attendees in March 2013 with NZWC Manager Dr Michail Karpenko (4th from right) and Senior Welding Engineer Alan McClintock (far right)



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



The Fatigue Design to Eurocode 3 seminar by Prof A Hobbacher gained great interest among New Zealand's designers



Demonstrated industry interest through high attendance of Dr R Shaw's Achieving Seismic Performance Using Bolted Connections seminar



Development and manufacture of new generation mobile grain stacker by HERA member Southern Cross Engineering for Australian grain logistics company. The grainstacker is able to stack grain through a mobile device in excess of 750 tph. Traditional machines struggle to process 220tph.



Representing HERA, Dr Stephen Hicks seated with fellow keynote speakers (second from right) at the IIE Inaugural Annual Conference



HERA member HEB Structures installing the tandem central beam for the Atiamuri bridge in Taupo. Fabricator and designer are HERA members Grayson Engineering and Bloxam Burnett & Oliver respectively



New Zealand-made: HERA member company Windsor Engineering designed, built and exported the air pollution control equipment for this particle board factory to Vietnam



Erection of steel roof for the Bruce Pulman Park Netball Courts, fabricated by HERA member GGE. Total job ended up about 520 tonnes once completed.

Preparation for New Composite Standard AS/NZS 2327

Following the confirmation that the proposed joint Australian and New Zealand steel-concrete Standard AS/NZS 2327 will replace NZS 3404 Section 13, Structural Systems General Manager Dr Stephen Hicks delivered a well-attended seminar series in Auckland and Christchurch as well as in Perth, Adelaide, Melbourne, Brisbane and Sydney on behalf of the Australian Steel Institute (ASI).

The seminars presented both design solutions to the current Standards together with innovations and design guidance on the proposed new inclusions in AS/NZS 2327. Advances through recent Australian and New Zealand research are implemented which, in some cases, result in design provisions that go beyond those given in North American and European Standards.

NZ Bridges 2012



Dr Stephen Hicks was invited to make a presentation at the NZ Bridges 2012 conference in Wellington on the proposed Joint Bridge Standard AS/NZS 5100.6 for steel and composite construction. The conference proved popular with key stakeholders, having 130 attendees.

Keynote Address at IIE Inaugural Annual Conference

Dr Stephen Hicks was invited to deliver a keynote address at the Institute for Infrastructure Engineering (IIE) Inaugural Annual Conference in Sydney in November 2012. In his paper, his paper referred to some of the innovations that will be included in the new *Steel and Composite Bridge Design Standard AS/NZS 5100.6*.



One of four weathering steel bridges totalling a massive 300 tonnes for KiwiRail fabricated by HERA member Culham Engineering on time and on budget

Sustainable Steel Council Web Site Launched



The Sustainable Steel Council (SSC) was formed in 2009 to promote the use of steel as a sustainable building material to the various stakeholders within New Zealand's building and property industries. Following the formation of Metals New Zealand (MNZ) in 2011, SSC supports the wider MNZ activity on the sustainability of metal products.

Through the support of its membership, SSC developed a web site www.sustainablesteel.org.nz, which was launched at the Metals Industry Conference 2013 in May. The web site provides information in the key areas of Sustainable Construction, Steel Production, Rating Tools, the World of Steel, Case Studies as well as Research and Development.

Following the launch of the NZGBC BASE tool, which aims to improve the performance and reduce the environmental impact of new buildings in the Christchurch re-build, the SSC web site also provides guidance to specifiers on where they can obtain responsibly sourced steel.

Welding Connects

The NZWC is closely linked to local partners SCNZ, NZSSDA, and Metals NZ but also to many international partners from the academic and IIW environment. Dr Michail Karpenko represents HERA and the HERA ANB at the IIW. He also performs the Secretariat role for the NZSSDA.

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

Towards a Marine Energy Industry

General Manager Industry Development, Nick Inskip continued to lead the efforts to establish a New Zealand Marine Energy Centre as a catalyst to provide opportunities for industry to participate in this fast emerging sector.

Beyond Business as Usual

HERA's Industry development activities have been heavily focussed on establishing the AGGAT programme that creates a supportive R&D ecosystem for companies wanting to develop high-value products for export markets.

The successful establishment of the AGGAT science base with co-funding from the Ministry for Business, Innovation and Employment has been a key component in lifting this initiative to new levels while providing an excellent template for future development activities.



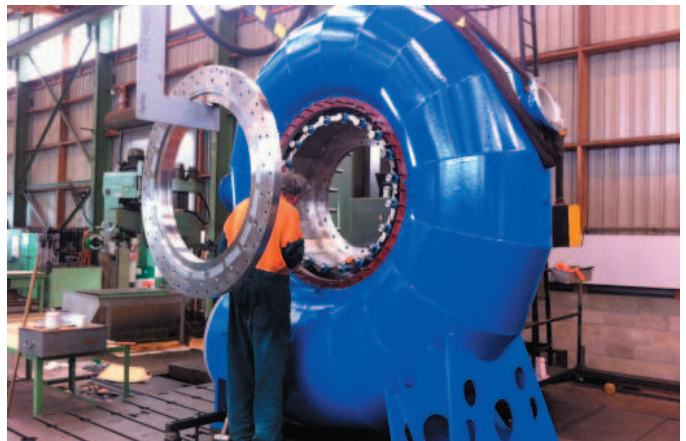
Work on the support structure for the Christchurch cardboard transitional Cathedral by HERA member East Coast Steelwork with design support from HERA member Holmes Consulting Group. While steelwork came in at only 58 tonnes, the structure still stands at 25m tall and holds 700 people



HERA member Grayson Engineering fabricated the support structure for the Anish Kapoor-designed sculpture and now in front of the Guggenheim Museum Bilbao, Spain



Deaerator vessel fabricated by HERA member Fitzroy Engineering and seen here being installed at the Methanex Motonui plant



HERA member AIE supplied mechanical equipment for the Esk Hydro Project, including installation and commissioning of Pelton turbines



Metals NZ Export award nomination: HERA member Page Macrae Engineering fabricated diesel hydraulic grabs for export



HERA member Stainless Engineering fabricated these stainless steel flow plates for export to the USA, making use of CNC profiling and bending

HERA Advocacy – Securing the Future of NZ Metals Engineering

As the 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 actions with industry-wide engagement.

Noteworthy are particularly the actions in conjunction with Metals New Zealand industry partners. As a result of the renewed threats from imports, the most significant outcome was the expansion of the previous New Zealand Industry Participation Plan programme into a stepped up industry-wide programme, with the title "*Securing the Future of New Zealand Metals Engineering*".

Strategic Communications Advisor Michelle Boag has been engaged and made a significant contribution to the industry campaign adding clarity to our key aims, formulating strategies and a comprehensive list of actions to achieve those aims while assisting in formulating key messages.

Having identified serious concerns around imported fabricated metals products and benched-marked these concerns against the key characteristic of our industry of being innovative, fair, trusted, and transparent, a key message was formulated that "*New Zealand Metals Engineering delivers quality, value and certainty through innovation*".

The Metals New Zealand Conference in Tauranga saw these issues dealt with in a workshop facilitated by Michelle Boag with the theme '*Competing with Fabricated Metal Product Imports*'.

The well-attended workshop saw industry unite behind the fundamental message that it has to seriously look at its own competitive offering and equally importantly that Government has to ensure that the so-called free trade in a world of free trade agreements is indeed performed on a fair and equal basis.

Recognising that public sector procurement is the key client of our industry, HERA engaged extensively with the Government's procurement reform programme. Outcomes of this work included the development by BERL of a tender evaluation tool which assists procurers in making balanced decisions in line with the new "*Government Rules of Sourcing*".

Other contributions included membership of business reference groups, research of overseas public sector procurement practices and free trade agreements, and led to HERA and Metals NZ now being recognised as a valued industry voice and stakeholder in these reforms.

Demonstrated Industry Leadership

As recognized in the HERA strategy, industry leadership is paramount for the industry's future, be it in the form of individuals willing to make contributions or of companies driving outstanding efforts.

As an indication for where the industry is heading, the Metals New Zealand Industry Awards Gala Dinner held as part of the Tauranga Conference probably demonstrated more so than previously the outstanding depth in the quality of nominated companies and people.

This year the key individual award, the Keith Smith Award for Distinguished Services to the Industry, went to Noel Davies. Noel served the industry with vision, commitment and great mentoring skills for more than 21 years first as the HERA Executive representative of the NZ Manufacturers and Exporters Association, HERA Chairman, Trustee and Chairman of HEERF, and also as the Inaugural Chairman of Metals New Zealand.

All nominations to the two Metals NZ awards were outstanding and both winning nominations – Southern Cross Engineering for the Exporter of the Year, and the Titanium Industry Development Association for the Innovation Award were deserving winners. Equally the SCNZ awards showed great depth and capability in the industry.



Rugby legend Sir Graham Henry highlighted winning strategies applicable to both the rugby field and the corporate boardroom



American speaker Dr Steven Schmid, associate professor Aerospace & Mechanical Engineering of the University of Notre Dame in Illinois, explained the strategies undertaken by the US Government and steel industry to jump start, retain and repatriate the domestic industries



The atmospheric Classic Flyers Aircraft Museum served as the backdrop for the metals engineering industry who came to learn more about better business, market opportunities, and Metals NZ's advocacy initiatives on their behalf

FOCUS: LEADERSHIP



Keith Smith Award winner Noel Davies (centre) with from right HERA Chairman Peter Hutton, Jean Smith, Wife Heather Davies and HERA Director Wolfgang Scholz



Exporter Award winner Southern Cross Engineering - From left: Rocktec Operations Manager Gary Brown, SCE General Manager of Sales Terry Duff, HERA Chairman Peter Hutton, SCE Service Manager Brad Guy



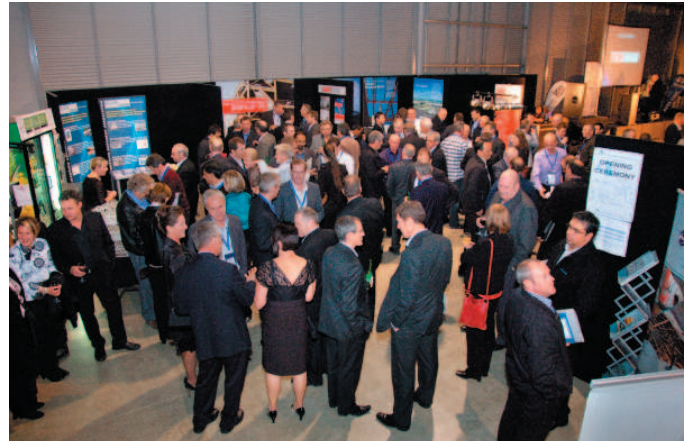
The Friday Competing with Fabricated Metal Product Imports workshop facilitated by strategic advisor Michelle Boag was well-attended and sparked good discussion by the industry leaders present, in particular to the subject of Government procurement and how the new rules applied to the NZ metals engineering industry. Also introduced was the BERL tender evaluation tool



Innovation Award winner TiDA - From left: Science Director Dr Peter Franz, Design Engineer Graeme Smith, Office Manager Angela Werder, Chairman Ian Macrae, Chief Executive Warwick Downing, Research Officer Aamir Mukhtar, Board Member Barry Robinson



MC Jackie Clark and lucky boy Australian Steel Industry Advocate Dennis O'Neill and his hard-won Graham Henry-autographed rugby ball



Delegates viewing the Industry Exhibition prior to the Industry Awards Gala dinner in the main hanger



Chris Kaye of Platinum Sponsor New Zealand Steel welcoming guests



Dinner guests enjoying the atmosphere and laughs at the Classic Flyers Aircraft Museum in Tauranga



Three GH-signed rugby balls were auctioned off to support the HEER Foundation

REPORT OF THE INDEPENDENT AUDITOR ON THE SUMMARY FINANCIAL STATEMENTS

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

The accompanying summary financial statements, which comprise the summary statement of financial position as at 30 June 2013, 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 New Zealand Heavy Engineering Research Association Inc for the year ended 30 June 2013.

We expressed an unmodified audit opinion on those financial statements in our report dated 10 September 2013. 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 New Zealand Heavy Engineering Research Association Inc.

Executive Committee's Responsibility for the Summary Financial Statements

The members 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 New Zealand Heavy Engineering Research Association Inc.

Opinion

In our opinion, the summary financial statements derived from the audited financial statements of New Zealand Heavy Engineering Research Association Inc. for the year ended 30 June 2013 are consistent, in all material respects, with those financial statements, in accordance with FRS-43.

CST Nexia Audit
Chartered Accountants
Marine Parade, Auckland



STATEMENT OF FINANCIAL PERFORMANCE FOR YEAR ENDED 30 JUNE 2013

Note	2013	2012
Revenue		
Levies (Steel & Welding Consum.)	847,245	797,539
Government Research -AGGAT	689,307	-
Tech NZ - Clean Energy	239,588	168,196
GRC-Deferred Income	1,398	1,858
Consultancy and Industry Project	239,465	367,631
Services to 3rd Party	21,076	18,502
Member Subscriptions	162,254	156,550
Interest	2,804	710
Other Income	25,432	41,144
Publications	34,170	31,059
Welding Modules	76,568	27,367
Rent	77,179	75,503
Metals Conference	32,173	-
Seminars & Courses	215,953	244,541
HEERF	74,309	64,733
Transfer from Backdated Welding Levy	58,100	36,637
Total Revenue	2,797,021	2,031,970
Less AGGAT Deferred Income	153,150	-
Total Revenue (adjusted)	2,643,871	2,031,970
Expenditure		
Staff Expenses	1,187,179	1,010,612
Member Services	63,126	66,476
Office & Other Expenses	177,478	155,885
Seminar Expenses	146,578	110,680
Consulting Expenses	160,787	12,709
Metals Conference	2,843	-
External Research	589,986	470,813
HERA House Expenses	84,504	76,980
Rent Expenses	206,860	206,860
Depreciation Expenses	47,956	57,110
Total Expenditure	2,667,296	2,168,125
NET (Deficit) SURPLUS FOR THE YEAR	(23,425)	(136,155)
Equity beginning of Year	67,937	204,092
Equity at the End of Year	44,512	67,937

BALANCE SHEET AS AT 30 JUNE 2013

Note	2013	2012
Assets		
Current Assets		
Cash at Bank	50,266	11,734
Call Accounts	15,187	1,151
Bank - AGGAT	211,315	-
Accounts Receivable	213,543	263,565
Inventory	8,148	7,568
Other Prepayments	98,874	66,364
TOTAL CURRENT ASSETS	597,333	350,473
Non Current Assets		
Fixed Assets	138,712	155,001
TOTAL NON CURRENT ASSETS	138,712	155,001
TOTAL ASSETS	736,045	505,474
Equity & Liabilities		
Accumulated Funds		
Accumulated Funds	44,512	67,937
TOTAL EQUITY	44,512	67,937
Current Liabilities		
Accounts Payable	185,878	119,631
GST Payable	12,164	17,911
Holiday Pay Provision	56,110	33,951
Advance from - HEERF	50,000	50,000
Income in Advance	184,381	86,044
TOTAL CURRENT LIABILITIES	488,533	307,537
NON-CURRENT LIABILITIES		
Loan - HEERF	203,000	130,000
TOTAL EQUITY & LIABILITIES	736,045	505,474

The specific disclosures included in the summary financial statements have been extracted from the full financial report dated 10/09/13. 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

(a) **General Accounting Policies**
HERA is an Incorporated Society and these financial statements have been prepared in accordance with the Incorporated Societies Act 1908.

(b) **Particular Accounting Policies**
The particular accounting policies, which materially affect the measurement of financial performance and the financial position, are:

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.

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.

(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.

	2013	2012
2. Bank Balance - Current Account		
Current Account	49,326	6,891
CSA	940	4,843
	50,266	11,734
3. Bank Balance Call Accounts		
Call Account	15,187	1,151
4. Accounts Receivable		
Trade Receivable	213,543	263,656
Less Doubtful Debt	-	-
	213,543	263,656
5. Other Receivables & Prepayments		
Accrued Income	93,258	63,080
Prepayment	5,615	3,284
	98,873	66,364
6. Fixed Assets		
2013	COST	ACCUM. DEPRECIATION
Metallurgy Equipment	12,430	12,430
Office Furniture	20,861	20,173
Fixtures & Fittings	82,955	82,955
HERA House Refurbishment	147,053	94,687
Motor Vehicles	158,649	126,206
Office Equipment	210,525	157,163
Training Equipment	86,037	85,911
	718,237	579,525
		NET BOOK VALUE
		-
		688
		-
		52,366
		32,443
		53,089
		126
		138,712
2012	COST	ACCUM. DEPRECIATION
Metallurgy Equipment	12,430	12,430
Office Furniture	20,306	19,036
Fixtures & Fittings	82,955	82,295
HERA House Refurbishment	147,053	79,981
Motor Vehicles	158,649	112,001
Office Equipment	178,585	139,540
Training Equipment	86,037	85,655
	686,570	531,569
		NET BOOK VALUE
		-
		1,194
		660
		67,072
		46,648
		39,045
		382
		155,000
7. Accumulated Funds		
	2013	2012
Opening Accumulated Fund	67,937	204,092
Net Surplus	(23,425)	(136,155)
	44,512	67,637

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.

10. 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 \$26,000. (2012: \$26,000)

11. Audit Fees

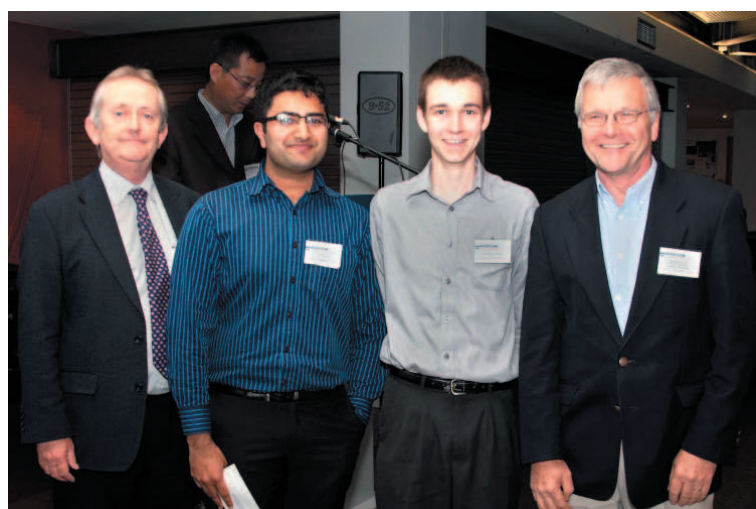
Audit fees have been included in office and other expenses to the value of \$5,000 (2012: \$5,000). There was no other remuneration paid to the Auditors.

12. Capital and Other Commitments

As at 30 June 2013 there were no outstanding capital commitments. (2012: \$nil)

13. Contingent Liabilities

As at 30 June 2013 there were no outstanding contingent liabilities. (2012: \$nil)



University of Auckland Department of Mechanical Engineering Final Year Project Day: Best Judged Final Year Project Involving Metals - From left: HOD Prof Brian Mace, Steve Thomas, Chris Stanton, and HERA Director Dr Wolfgang Scholz. Chris Stanton and Steve Thomas' project related to improvement of tumble dryers, such as those produced by Fisher and Paykel.



AUT University: Best BE Mechanical Project - AUT University Engineering School Sam Connor (left) with HERA's NZ Welding Centre Manager Dr Michail Karpenko at the AUT Awards Ceremony. HERA awarded Sam Connor for his BE mechanical project entitled Thermodynamic Modeling of a Libralato IC Engine. This model includes scavenge and induction models, which have been developed to improve the models accuracy over an air standard cycle.




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 of 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 2012/2013, the Foundation contributed \$87,354 to HERA's research and industry development efforts.

Support included topical research such as the BERL study on the impact evaluation of local versus imported metals fabrication and developing a strategy ensuring our industry's future with guidance of strategy advisor Michelle Boag.

HEERF scholarships covered a PhD at Auckland University in renewable energy generation and another one at Canterbury University in the field of seismic structural research.

In the industry awards space this year, HEERF supported university student awards and in conjunction with the Metals NZ Industry Conference, the prestigious HEERF sponsored Keith Smith Award was also handed out.

As in the last two years and in line with a HERA Executive resolution, HEERF provided HERA with a loan to cover their budgeted loss for the year and also to assist in funding research in advance of its payment through a government grant.

Statement of Financial Performance for Year Ended 30 June 2013

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

Balance Sheet as at 30 June 2013

NOTE	2013	2012
ACCUMULATED FUNDS		
Equity funds at start of year	2,301,096	2,163,622
Net surplus for the year	87,598	137,474
Equity funds at end of year	2,388,694	2,301,096
REPRESENTED BY		
Current Assets		
Bank	49,488	96,973
Call Account	40,028	39,630
Short-term Deposit	781,523	678,343
STD - N. Calavrias	5,460	5,300
Endowment Fund	454	450
Advance to HERA	50,000	50,000
Accrued Income	9,007	7,470
Accounts Receivable	4,000	-
K.Smith - Bequest	37,813	36,347
	977,773	914,513
Total Fixed Assets	1,218,083	1,262,494
Loan HERA	203,000	130,000
TOTAL ASSETS	2,398,694	2,307,007
Current Liabilities		
Accounts Payable	7,432	1,890
GST Payable	2,730	4,021
TOTAL LIABILITIES	10,162	5,911
NET TOTAL ASSETS	2,388,694	2,301,096

Income & Expenditure for year ended 30 June 2013

	2013	2012
INCOME		
Rent	206,860	206,860
Interest	31,868	32,677
Bequest Interest	660	1,826
N. Calavrias Interest	160	176
City Council Refund	6,725	-
Donation	4,000	-
Total Income	250,273	241,539
EXPENDITURE		
Blding Maintenance	605	3,031
Blding Managmt Fee	6,000	6,000
Trust Administration	10,044	10,000
Grants to HERA	87,354	48,733
HERA House	10,965	-
Bank Charges	140	71
K.Smith Award	2,000	-
Audit Fees	1,200	1,200
	118,264	69,035
Depreciation	44,411	35,030
Total Expenditure	162,675	104,065
Net Surplus/ Deficit)	87,598	137,474

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. Capital Commitments & Contingent Liabilities

There are no capital commitments or contingent liabilities as at 30 June 2013. (2012: 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 \$800K, which

3. Related Parties

The Foundation is related to 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 gave a loan of \$73,000 (2012: \$180,000) to HERA. This includes an advance of \$50,000 to enable HERA to undertake sub-contracted research work under the TechNZ Contract.

As this work was performed in advance to payment being received from TechNZ, the advance will be paid back by HERA in the year 2013-14 when the TechNZ payment is received.

The remaining balance of \$203,000 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		84,427
Building Upgrade	151,019	133,999	17,020
Air Condition Units	157,300	83,950	73,350
Building	1,049,091	274,896	774,195
	\$1,720,309	502,226	1,218,083

HEAVY ENGINEERING RESEARCH ASSOCIATION MEMBERS

Total HERA membership as of June 30, 2013 was 602 members. They are:

AFFILIATE MEMBERS

C J Wallis Pty Ltd	Geodis Wilson NZ Ltd	TBS Farnsworth Ltd	Welding Technology Inst of Australia
Fletcher Easysteel	Hawkins Infrastructure	Vulcan Steel Ltd	

ASSOCIATE MEMBERS

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

Whangaparaoa Engineering
Whangarei Engineering Company Ltd
Wilson Bros Engineering Ltd
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
Airey Consultants Ltd
Alan Reay 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
BGT Structures (Auckland) Ltd
Bill Cassidy & Associates
Bloxam Burnett & Olliver Ltd
Blueprint Consulting Limited
BPL Group
Brown & Thomson
BSK Consulting Engineers Ltd
Buchanan & Fletcher Ltd
Cameron Gibson & Wells 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
David Smart Consulting Ltd
Davidson Group Ltd
Davis Ogilvie & Partners Ltd
Day Consultants
DBCon Ltd
Design Engineering (SI) Ltd
Design Management Consultants Limited
DesignWorks 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
Engineering Design Consultants Ltd (EDC)
ETS Engineers Ltd
Evan Douglas Consulting Engineers
Enviroservices (2002) Ltd
Fairclough and King Consultants Ltd
Fletcher Construction - Engineering
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
HCS Engineering Ltd
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
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
LHT Design
Linetech Consulting
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
Mechanical Technology Ltd (MTL)
Metal Test Ltd
MH Design Ltd
Mighty River Power Limited (MRP)
Milward Finlay Lobb Ltd
Mitchell Vranjes Consulting Engineers Ltd
Mobil Oil New Zealand Limited
Motovated Design and Analysis Ltd
MSC Consulting Group Ltd
MWH New Zealand Ltd
Nagel Consultants Ltd
Net Ltd
Nigel Harwood Engineering Consultant Ltd
North End Engineering & Mechanical Ltd
Novare Design Ltd
OBD Consultants Ltd
OCEL Consultants NZ Ltd
O'Loughlin Taylor Spence Ltd
Optimech International Ltd
Opus International Consultants Ltd
Paul Gellatly Consulting Engineer
PB Parsons Brinckerhoff
Peter Swan Consulting Engineers
Peter Walker Consultants Ltd
Peters and Cheung Ltd
PFP Systems (NZ) Ltd
Plant & Platform Consultants Ltd
Pont Consultants
Powell Fenwick Consultants Ltd
Powerhouse Forestry Ltd
Prendos New Zealand Limited
Protocol Services Ltd
Q Designz Limited
R B Knowles & Associates Ltd
R D Sullivan & Associates
R J Nelligan & Associates Ltd
R W & V Roberts Consultancy
Randall & Associates Ltd
RCR Energy Systems Ltd

Redco NZ Ltd
Richardson Stevens Consultants (1996)
Ruamoko Solutions Ltd
Sawrey Consulting Engineers Ltd
Sigma Consultants Ltd
Silvester Clark Consulting Engineers
Sinclair Knight Merz (SKM)
Southern QA Ltd
Spencer Holmes Ltd
Spiire New Zealand Ltd
Stephen Mitchell Engineers
Stiffe Hooker Ltd
Stiles & Hooker Ltd
Strata Group Consulting Engineers Ltd
Stratum Consultants Ltd
Structural Concepts Ltd
Structure Design Ltd
Tasman SV Consulting
TH Consultants Ltd
Thorburn Consultants (NZ) Ltd
Thorne Dwyer Structures
Tonkin & Taylor
Transfield Worley Ltd
Transport Design & Certification
Transport Technology Ltd
Transtech Dynamics Ltd
Tse Taranaki & Associates Limited
URS New Zealand Ltd
Verstoep & Taylor Ltd
W Stringer Consulting
Waikato Engineering Design Ltd
WH & NF Johnston Ltd

ORDINARY FABRICATORS

A & G Price
Acme Engineering Ltd
Active Welding Limited
Advance Boiler Services NZ Ltd
AKSA 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
Consortium Engineering Services
CSP Pacific
D C Weld Ltd
D&H Steel Construction Limited
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
Fabrication & Pipe Services Ltd
Falcon Manufacturing Group Ltd
Farra Engineering Limited
Fitzroy Engineering Group Ltd
Gary Douglas Engineers Ltd
Gisborne Engineering Ltd

HEAVY ENGINEERING RESEARCH ASSOCIATION MEMBERS

Gray Brothers Engineering
 Grayson Engineering Ltd
 H J Asmuss & Co Ltd
 Haarslev Industries
 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
 M J H 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
 Metso New Zealand Limited
 MGE Engineering Ltd
 Mitchell Vranjes Consulting Engineers
 Modern Construction 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 Limited
 Pakuranga Engineering Ltd
 Parfoot Engineering Group
 Patton Engineering Ltd
 Pegasus Engineering Ltd
 PFS Engineering Ltd
 Pipe & Tube Welding Engineering Ltd
 Powerhouse Forestry Ltd
 RCR Energy Systems Ltd
 RNZN Operational Support Group
 Roadrunner Manufacturing (NZ) Ltd
 Robert Page Engineering Ltd
 Sabre Engineering Ltd
 Southern Spars Limited
 Speedfloor NZ
 SPIIND (South Pacific Industrial)
 Steel Drafting Ltd
 Steltech Structural Limited
 Stevenson Engineering Ltd
 Tanker Engineering Specialists Ltd
 TankTest NZ Ltd
 TATA Steel International (Australasia)
 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

Welding Inspection Services
 Weld IT Ltd
 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
 Air Liquide New Zealand 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
 Dulux Powder & Industrial Coatings
 Eastland Engineering 2004 Ltd
 Filtration Technology
 H J Asmuss & Co Ltd
 Juken New Zealand Ltd (Wairarapa)
 KiwiRail Limited
 Lincoln Electric Co (NZ) Ltd
 Mainzeal Property & Construction Ltd
 Martin Engineering (PN) Ltd
 Metal Concepts Ltd
 Modern Maintenance Products Ltd
 New Zealand Steel Ltd
 North End Engineering & Mechanical Ltd
 Oceania Aviation Ltd
 Onesteel NZ Limited
 Pacific Steel
 Pipes NZ Limited
 PPT
 Sandvik New Zealand Ltd
 Speedfloor NZ
 Steel & Tube Holdings Ltd
 TATA Steel International (Australasia)
 Tenix
 The Fletcher Construction Co Ltd
 Traydec (NZ) Ltd
 Trustpower Ltd
 Wattyl (NZ) Ltd
 Weld IT Ltd
 Weldwell New Zealand
 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
 Auckland University of Technology (AUT)
 Bay of Plenty Polytechnic
 BDS VIRCON
 CADPRO Systems Ltd
 Christchurch Polytechnic Institute of Technology (CPIT)
 Contact Energy
 CSP Coatings Limited
 D C Weld Ltd

Department Of Corrections
 Energy Pacifica
 Forman Building Systems
 Genesis Energy
 Gisborne Engineering Ltd
 Independent Oilfield Inspection Services
 INS Inspection Services Ltd
 KiwiRail Limited
 Manukau Institute of Technology
 Materials & Testing Laboratories
 Meridian Energy Ltd
 Metal Tech Education Ltd
 Metal Test Ltd
 Motovated Design and Analysis Ltd
 Napier Sandblasting Co Ltd
 New Zealand Refining Co Ltd
 New Zealand Transport Agency (NZTA)
 Nova Energy Ltd
 NZ Army-Trade Training School
 NZ Welding School
 Oceania Aviation Ltd
 Port of Tauranga Limited
 Prendos New Zealand Limited
 RNZN Operational Support Group
 Robert Page Engineering Ltd
 SGS New Zealand Limited
 Southern Institute of Technology
 Southern QA Ltd
 Spencer Holmes Ltd
 Steel Drafting Ltd
 Steel Pencil Holdings Limited
 Stork Cooperheat New Zealand Ltd
 Structurflex Limited
 Survey NZ
 Swiss Engineering
 Techlogic NZ
 Technical Support Services (MBIE)
 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 (WINTER)
 Weatherford New Zealand
 Wellington Institute of Technology (WELTECH)
 Wells Architect Planners Ltd
 X-Ray Laboratories Ltd

RECIPROCAL MEMBERS

American Institute of Steel Construction
 American Welding Society (AWS)
 Australasian Corrosion Association (ACA)
 Australian Steel Institute (ASI)
 Bio Energy Association of New Zealand (BANZ)
 British Constructional Steelwork Association (BCSA)
 Building Research Association of New Zealand (BRANZ)
 Canadian Institute of Steel Construction
 Competenz
 Crane Association of NZ (Inc)
 DVS - German Welding Society
 National Association of Steel Framed Housing (NASH)
 National Library of New Zealand
 New Zealand Geothermal Association (NZGA)
 NZ Institute of Economic Research
 PreFabNZ Inc
 Steel Construction Institute (SCI)
 Steel Construction New Zealand (SCNZ)
 Stratera inc
 Waikato Engineering Careers Association (WECA)



HERA STRUCTURE

The Association is based at HERA House in Manukau, Auckland. Within HERA House are the offices of HERA and associated organisations such as 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 and 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 Verified' certification

Heavy Engineering Industry Development Division

- Maintains registry of and promotes capabilities of the membership
- Provides advice on international, tariff

and marketing issues of significance 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 International Institute of Welding (IIW) qualifications
- Providing input into national and international welding-related standards
- Provision of educational material for

welding-related training

- Provides SCA scheme

Inspection & Quality Control Centre

- Courses covering welding inspection and NDT inspection methods
- Elevated work platform, and pressure vessel inspection courses
- 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 2013

Administration

Director
Accounts Officer

Dr Wolfgang Scholz
Kam Subramani

HERA Information Centre

Manager
Resources Officer
Receptionist

Brian Low
Gillian Casidy
Raewyn Porter

Heavy Engineering Industry Development

General Manager
Senior Research Engineer
- Clean Energy

Nick Inskip
Dr Boaz Habbib

Inspection & Quality Control Centre

Manager

Peter Hayward

Structural Systems

General Manager
Finite Element Analyst
Structural Engineer

Dr Stephen Hicks
Nandor Mago
Andrew Pennington

New Zealand Welding Centre

Manager
Senior Welding Engineer
Research Engineer

Dr Michail Karpenko
Alan McClintock
Holger Heinzel



Standing, from left: Andrew Pennington, Nandor Mago, Alan McClintock, Gillian Casidy, Dr Boaz Habib, Raewyn Porter, Lena Kotuc, Holger Heinzel, Kam Subramani

Sitting, from left: Brian Low, Dr Stephen Hicks, Dr Wolfgang Scholz, Nick Inskip, Dr Michail Karpenko

Inset: Peter Hayward

HERA

Innovation in Metals



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