

Te Rewa Rewa Bridge

An iconic project proving steel is beautiful.

Interview: Gretta Stephens

NZ Steel Chief Executive gets candid about their challenges to overcome & key strategies for future sustainability.

Welding Centre updates

IIW audits, new brittle fracture provisions and increase in welding levy notification.

MetalBase

January 2019

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Cover:

An amazing shot of the iconic Te Rewa Rewa Bridge in New Plymouth which was designed by our members Novare Design and fabricated by Fitzroy Engineering.

Overleaf:

Celebrating a major milestone! Our Finite Element Analyst, Nandor Mago has marked January with his 20 year anniversary working at HERA!



From our CEO, Troy Coyle

Happy New Year everyone!

It's amazing how time flies so quickly and we are already well into 2019.

This is going to be an exciting year for HERA. Our team have been developing divisional roadmaps and in February, our Executive Board and leadership team will update HERA's Strategy. We have some exciting ideas that we'll be trialling.

I wouldn't say that we were overwhelmed with 'Quick Wins' project submissions, but we did receive a few.

Unfortunately, some of these were relating to company-specific projects, which we can only support via consulting. Others, referenced industry-wide requirements, which we're certainly keen to address.

For example, one suggestion was to revise the standard connection tables by removing as many butt welds as we can and replacing with the appropriately sized fillet welds. This was already on our radar and will be incorporated into our NZ Welding Centre program of activities. Please keep the ideas coming!

Our Industry Panels will be meeting in the coming two months and we have received a number of ideas from members that will be going forward to them. Something we'll do differently this year is announce the successful panel projects, once approved by the HERA Board. That way, you'll have greater visibility of the projects we'll be working on throughout the year and beyond. We'll also share our high level strategy, so you can see where we're headed.

So, what has been happening this month?

Nandor Mago, our Finite Element Analyst hit his 20 year work anniversary with HERA.

We also celebrated the beauty of steel throughout our communications - have you checked out our [new Instagram account](#)? There are some amazing images there that showcase the hidden and audacious beauty of steel - and all from our membership projects!

The increase in our welding levy from 5c per kg to 10c per kg was gazetted. This is aimed to come into effect from 1 February and will support a range of new initiatives coming from the NZ Welding Centre - all designed to catalyse innovation and increase productivity within our industry.

Holger Heinzel, our Research Engineer spent two weeks in Australia being trained on the latest developments in welding automation. This was a collaboration with the Facility for Intelligent Fabrication at the University of Wollongong. We plan to increase our support for members in this area so please [contact Holger](#) if you wish to join our automation cluster.

The International Institute of Welding audited our delivery of IIW training programs, certifications and qualifications. The feedback was very positive, confirming that we meet the highest international standards.

We also released a new procedure to select steel grades manufactured to Australian and NZ standards. This was in collaboration with the Jade University of Applied Sciences & University of Sydney.

And we rounded out the month by hosting students from the Rotary Science and Technology Forum, which gave us the opportunity to hopefully inspire some future Engineers. We were lucky to have Jurgen be able to present to them on his experience as an intern here as well!

As you can see, we've hit the ground running this year!

Stay tuned as we make some exciting announcements regarding our new conference format, communications/training activities and student membership category - all of which we're working on over the coming month.



Connect to your industry, clients and stakeholders via social media!

It's a step in the right direction to market your capabilities, share major milestones and news and promote your projects. And the best part is, it's completely free!

We've been working hard to do just that - so, follow us today!



Notices

Update – Establishing new brittle fracture provisions for the Australasian steel structure standards.

In order to ensure in-service safety of steel structures, design engineers need to select steel grades that will remain ductile under the imposed conditions that include in-service loadings, fabrication induced conditions, seismic actions and service temperatures.

To achieve this, we've developed a new procedure to select steel grades manufactured to Australian and New Zealand standards in collaboration with the University of Wilhelmshaven and University of Sydney. It's based on modified fracture mechanics procedure from the Eurocode, and the method extends to the cryogenic temperature range. It also includes New Zealand specific requirements for seismic loading rates.

This new procedure also presents recommendations for consideration in the development of new brittle fracture provisions for future versions of the Australian and New Zealand steel structures design standards NZS 3404.1, AS/NZS 5100.6 and AS 4100.

Materials selection requirements of NZS 3404.1

The current materials selection procedure is given in the design standards AS 4100, NZS 3404.1 and AS/NZS 5100.6. It's based on test data on the notch toughness characteristics from a previous generation of steel products originally manufactured in Australia or New Zealand. The existing procedure is also limited to temperatures down to -40°C and doesn't consider the effects of welding, detailing, stress utilisation, seismic loading rates, defects and other important factors.

Advanced material selection methodologies, such as



The Regional Science and Innovation Centre (RSIC). Here the steel construction allows a structure with open spaces and free circulation to enhance the collaboration process. The main seismic resisting elements are the Buckling Restrained Braces (BRB) manufactured by our members D&H Steel under license from Star Seismic.

all of the above factors. The basis of this procedure is an Ultimate Limit State verification based on fracture mechanics for an accidental design situation for structural members in tension or bending. This procedure was adopted in order to develop fracture mechanics based selection requirements for AS/NZS steels used in steel structures.

The proposed design procedure considers local requirements for the steel products and specific service conditions such as seismic strain rates. The temperature range was extended down to -120°C, which is much lower than considered in many other international standards, allowing for temperature adjustments due to service and fabrication conditions.

These recommendations were developed by an international expert team including University of Wilhelmshaven, Prof Adolf Hobbacher; our General Manager Welding Centre Dr Michail Karpenko, General Manager Structural Systems Dr Stephen Hicks, and Masters Student Patrick Schneider; as well as The University of Sydney's Prof Brian Uy.

New Zealand's Scott Base project

The procedure has been put to the test on New Zealand's Antarctic Scott Base research station project that [could be set for a \\$150 million redevelopment](#). The project has some serious engineering challenges.



New Zealand's Scott Base project in Antarctica.

Selection of the steel for the redevelopment was challenging as current standards didn't cover temperatures that low. However, our team have successfully developed recommendations for the selection of steel to avoid brittle fracture for Scott Base to overcome this. These recommendations will now form a part of the design manual for this upcoming piece of work.

What does this all mean for you?

At HERA, we're confident that the proposed procedure will give a much more efficient utilisation of material than what is possible in NZS 3404.1, AS/NZS 5100.6 and AS 4100. Users will find that it'll remove a great deal of conservatism that presently exists in current Australasian design practice.

The paper presents selection tables that can be considered for the development of new brittle fracture provisions for future versions of the Australian and New Zealand steel structures design standards. It proposes the fracture mechanics methodology for the selection of structural steel grades that should replace the old notch-ductile method used in current standards. A main limitations of this method is that it's based on old test data on notch toughness characteristics of steels currently made in Australia or New Zealand. The applicability of this method to overseas steels or AS/NZS steels manufactured overseas is also limited (ref. AS/NZS 1554.1:2014 Table B1 Note 2).

Author

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Overall, this new procedure to select steel grades manufactured to Australian and New Zealand standards takes into account a modified fracture mechanics procedure of the Eurocode, and its recommendations can certainly influence the development of new brittle fracture provisions in NZS 3404.1, AS/NZS 5100.6 and AS 4100.

Excitingly, we've also started working on a second part of the paper that will address selection requirements for the overseas steels manufactured to EN, JIS and API standards – so stay tuned.

[View this publication for free!](#)

We've made it available as a resource on our digital library:

<https://hera.softlinkhosting.co.nz/liberty/libraryHome.do#>

And as always, if you have any specific questions related to the implementation of the new steel selection procedure for your project, please get in touch!

Contact our General Manager Welding Centre [Dr Michail Karpenko](#).

NZHERA @NZHERA · Jan 17

This weeks been a busy one! We've had @nugent_kim out & about catching up with our members Page Macrae & NDAGroup, #HolgerHeinzel wing his way to OZ to learn all things #AUTOMATION & #MichailKarpenko in France attending IIW meetings as part of our commitment to #HERAcertification

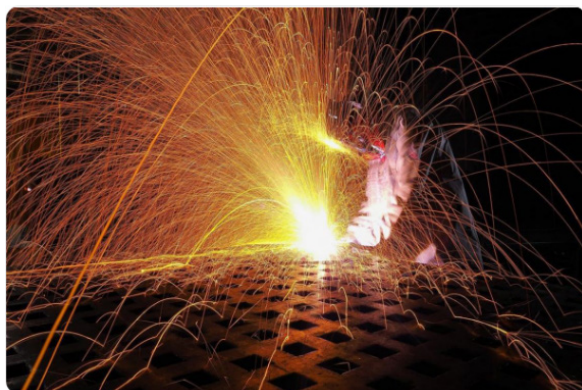


Welding consumable levy increase due to come into effect 1 February 2019



NZHERA @NZHERA · Jan 2

Have you booked to attend our Welding Supervisor/Inspection Part 1 course in Auckland from 4 - 8 March 2019? It's the perfect course to take your #Welding #qualifications to the next level so secure your place ASAP as there are limited spaces available! bit.ly/event-hera



NZHERA @NZHERA · Jan 10

Have you booked to attend our Welding Supervisor/Inspection Part 1 course in Christchurch, 11-15 March 2019? It's the perfect course to take your #Welding #qualifications to the next level! Secure your place ASAP as there are limited spaces available! bit.ly/event-hera



Update on the Heavy Engineering Research Levy Notice 2018.

We're pleased to announce that the Heavy Engineering Research Levy Notice 2018 has now been published and listed on the legislation.govt.nz website.

This means a levy increase from 5c to 10c per kilogram of welding consumables is due to come into effect on 1 February 2019.

During the consultation process we received a lot of feedback from you all, and you might be wondering what will come of it all.

Well don't worry, because we carefully considered it. As a result making the below plans to address them.

01 Helping you gain the right skills for the needs of your business.

We'll continue to work with IIW to deliver high value training courses such as Welding Inspector and Supervisor. Additional training schemes such as International Welding Specialist (IWS) will also be introduced, as well as the development of blended learning training options (a mix of online and in-class training).

02 Developing, meeting and maintaining high industry standards.

We'll collaborate with COMPETENZ to introduce NZQF Level 5 welding fabrication related qualifications (especially around the development of the SFC scheme, AS/NZS 5131 and AS 4458 (which calls for clear career path options for fabrication staff).

03 Facilitating connection, collaboration and knowledge sharing.

We'll support the transition of advanced design and analysis methods for computation and evaluation of welded joints. Setting up an international expert group in collaboration with [world renowned Prof Pingsha](#)

[Dong](#) from the University of Michigan, USA.

We'll also explore the recruitment of a new senior welding engineer to expand our ability to provide technical guidance and training to you.

04 Making it clear NZ fabricated steel products are the safest seismic material choice.

We'll extend our successful seismic welding program in cooperation with Prof Charles Clifton, UoA.

This will look to optimise welded joint details for critical seismic connections so they're more cost effective and performs well in-situ.

05 Supporting and celebrating innovation within the metals industry.

We're establishing a new capability in automation, with our Welding Research Engineer Holger Heinzl having gone to Australia this month!

Moving forward we'll be offering automation assessments – having already created a new Automation Innovation Hub to aid this work.

06 Driving success through the development of pipeline opportunities.

We're looking to review and develop welding-fabrication capabilities within our membership for companies keen to service the defence industry supply chain.

There's huge opportunities here due to [Australia's \\$200 billion dollar investment in defence capability](#) over the next decade – and we want our members poised to take advantage of it!

07 Demonstrating steel is a safe and low risk building solution for future bridge designs.

We'll be identifying opportunities to increase the use of steel /welding consumables in coastal bridge applications.

Evaluating performance of coastal weathering steels in New Zealand's environment to give potential users confidence in NZ fabricated steel for transport infrastructure.

08 Providing cutting edge knowledge to help solve your problems.

We'll upgrade our training facilities to increase efficiency of the training process and introduce advanced welding techniques, testing methods and systems.

This will involve technology such as augmented reality to align our offerings with the Industry 4.0 concept.

Stepping up for our SME's

We want to provide greater transparency on our levy projects and a pathway for members to propose R&D projects through our panel process. However, one comment we constantly received was that many felt we're focused on the "bigger players" only.

- To address this, we'll introduce the following to boost our SME members ability to leverage our support:
- Provide greater help to achieve compliance with applicable standards framework and attain a higher standard in welding productivity and quality management.
- Deliver technical support to SMEs welding fabricators to achieve compliance with AS/NZS 5131 and Steel Fabricator Carbonification (SFC) CC2 through our SFC Beginners training workshops. These have already proved very popular with our Auckland February intake already fully booked, and a few spaces only still available for our March workshop in Christchurch! [Secure your spot quickly if you're interested!](#)
- Deliver technical support to SMEs welding fabricators to achieve compliance with AS/NZS 5131 and Steel Fabricator Carbonification (SFC) CC2 through our SFC Beginners training workshops. These have already proved very popular with our Auckland February intake already fully booked, and a few spaces only still available for our March workshop in Christchurch! Secure your spot quickly if you're interested!
- Trial of the Quick Wins program, where SMEs can propose smaller R&D projects to [address common problems being experienced by all.](#)

Jan 9 2019 HERA's qualification, training and certification services successfully achieve the highest standards in a recent IIW audit

In December last year, our qualification, training and certification services underwent an external audit by expert assessors from the International Institute of Welding (IIW).

Attended by IIW's Mr Henk Bodt from Netherlands and Mr Shoichi Nomura of Japan, these auditors assessed our training facilities. They also visited our member D&H Steel Construction, who were the first New Zealand company certified to IIW MCS ISO 3834.2 and SFC.

The outcome of the audit confirmed that our services deliver the highest standard of training and certification to our NZ metals industry.

The IIW connection

HERA represents our New Zealand industry at [IIW](#) – the world leading network for materials joining.

Here, researchers, industry practitioners and educators, students and young professionals from over 50 countries worldwide come together to form a collaborative working platform.

IIW is also responsible for maintaining a world class qualification and certification scheme for technical personnel and companies to IIW MCS ISO 3834. A system that's administrated via Authorised Nominated Bodies (ANBs) in member countries – of which HERA became New Zealand's in December 2008 when we became part of the IIW training scheme.

At HERA, we believe this is an outstanding qualification system for us to align to, due to its linkage with the quality management standard AS/NZS ISO 3834 Quality Requirements for Welding and supporting standard ISO 14731: Welding Co-ordination Tasks and Responsibilities.

Effective quality management systems for welded fabrication rely on competent staff

Under IIW, we're able to provide education and training for those who have responsibility for the supervision and inspection of welded fabrication, as well as the qualification of welding procedures and welders. This means our members are able to have staff on the ground that are not only knowledgeable, but also have the ability to ensure welding and fabrication operations are cost-effective within their workplace and adhere to standards such as ISO 3834.

This is achieved through our popular Welding Inspector Course which leads to either a CBIP Certified Welding Inspector (CWI), or globally-recognised IIW International Welding Inspector Basic (IWI-B) or International Welding Inspector Standard (IWI-S) – depending on the attendees preferred pathway. We're also able to deliver AS 2214 Welding supervisor qualifications as well.

Compliance with high quality standards

IIW MCS ISO 3834 is an integral part of the [Steel Fabrication Certification Scheme \(SFC\)](#), where fabricators certified to the SFC Construction Category CC3 and CC4 are required to achieve ISO 3834.2 certification.

Compliance with AS/NZS ISO 3834 is also essential under AS/NZS 5131 Structural steelwork – Fabrication and erection, which has been sited on the NZ Building Code Appendix B1.

To facilitate this for our members, HERA Certifications Ltd was formed to be an independent IIW Authorised Nominated Body for company certification under the IIW Manufacturer Certification Scheme (MCS) – a world class scheme that ensures compliance of fabricators to this important standard.

Since SFC's inception, we've seen 29 fabricators (representing more than 80% of New Zealand's structural steel output) become certified under this scheme.

Where to from here?

We'll continue to work with IIW to deliver our existing high value training course offerings. But, we'll also be looking to introduce additional training schemes such as the International Welding Specialist (IWS). We'll also be developing more blended learning training options – a mix of online and in-class training.

We're also committed to collaborating with COMPETENZ to develop a NZQF Level 5 welding fabrication related qualification. This will be especially focused around the development of the SFC scheme, AS/NZS 5131 and AS 4458 – which all call for clear career path options for fabrication staff. This

is because the standards require fabricators to employ competent people that are capable of taking responsibility of their welding and fabrication operations, application of protective coatings, site erection, bolting and inspection tasks.

Take advantage of our training and certification services today!

If you're looking to upskill your welding fabricator team to align to SFC or the latest standards, our next scheduled Welding Supervisor/Inspector courses will take place in Auckland and Christchurch in March 2019.

Spaces are fast running out, so make sure to secure your place as soon as you can!

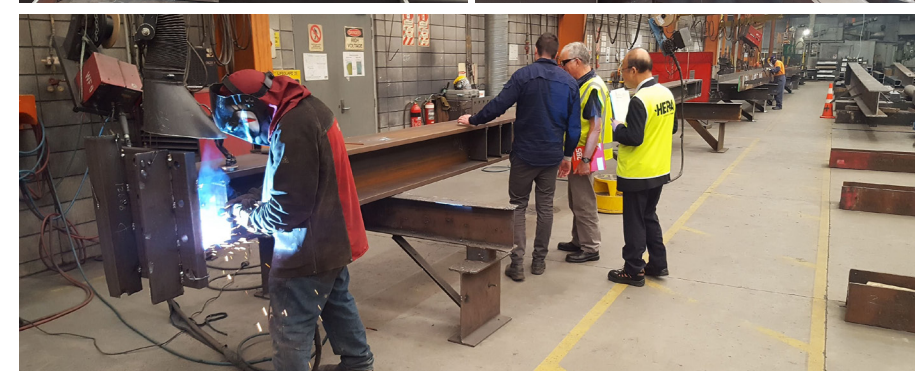
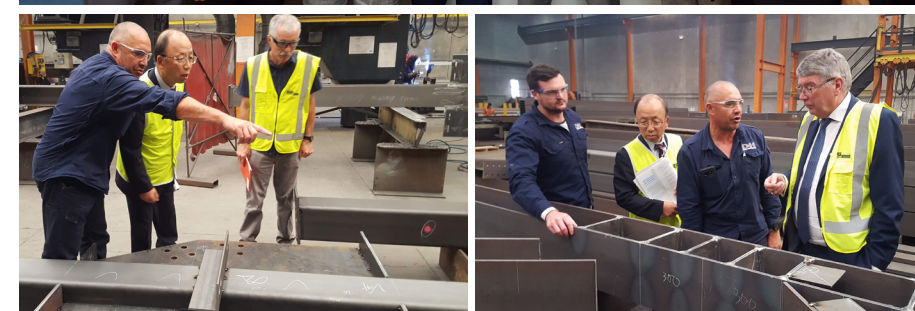
We'd also be interested to hear from anyone keen to join our industry working group which will be focused on developing the requirements for the NZQF Level 5 welding fabrication.

We'd also like to connect with those who are yet to join the SFC Scheme or IIW MCS ISO 3834. We believe it's a huge competitive advantage for local fabricators in the procurement process as it provides confidence in our quality standards and assurance.

So what are you waiting for?! Contact our General Manager Welding Centre [Michail Karpenko](#) and find out more about the above opportunities today!

Update: 17 January 2019

We're pleased to advise that since this article was released, authorisation of HERA ANB and HERA Certificatins Ltd HERA ANBCC has been approved at the IIW IAB Group B meeting on 16 January in France.



Te Rewa Rewa – A Bridge that really connects

For bridges to give dignity to their setting they must first be built with dignity

By Peter Mulqueen: FIPENZ, CPENG, INFIPENZ, Bridge Engineer and Designer; Ironhorse Bridge Ltd, New Zealand



Figure 1: Te Rewa Rewa Bridge with Mount Taranaki in the background. This bridge allowed the extension of the existing New Plymouth Coastal Walkway to cross the Waiwakahito River and be extended to the suburb of Bell Block.

There is very little written about the creative process as it pertains to bridge design. As a designer, I've learned to distrust the thought processes needed to develop a design concept for whichever project is before me. So it was with the Te Rewa Rewa shared pathway bridge.

I have defined the creative process for bridge design as being made up of three advancements. The first is from the mind of the designer onto paper by making sketches. The second is from these sketches to engineering drawings. The third advancement is from the drawing board to the wonder of a wholly completed bridge. It's the first advancement that will be my focus here.

During the first advancement, an engineer must hold multiple visions of the bridge in his mind's eye. These are sometimes described as 'a four-fold vision of the project, simultaneously considering issues of structural form, mathematical analysis, construction methods, and the relationship of the structure to the site.' (1) Personally, I have retained and recorded these to reflect my experience of concept development with the Te Rewa Rewa Bridge. They become structural form, construction method, contextual setting and analytical modelling. These are neither sequential nor simultaneous, but more a series of reappraisals of each vision until the final concept has been developed.

During the structural form vision stage, a designer selects a classical bridge configuration to suit span and deck alignment. Because a clear span of 70m and a minimum deck soffit height of 4.5m above normal water level were needed for the Te Rewa Rewa site, I chose a single through-deck arch. Statistically, this resulted in the lowest steel weight and cost for a span this length. (2) The contract for procurement required an iconic bridge on an extremely modest budget. (3). These two contradictory requirements had significant bearing on conceptual design choices.



Click this image to view or download an in-depth report of this project!

Flashback project: the beauty of steel at Te Rewa Rewa – Novare Design | Fitzroy Engineering

Client: New Plymouth District Council

Duration: 2007 – 2010

Location: Taranaki, New Zealand

Project value: NZD \$2.85 million

Novare designed an iconic pedestrian and cycle way bridge that achieved economy and beauty simultaneously. Not only has this footbridge become a strong community symbol and tourist attraction for the New Plymouth region, but a functional infrastructure asset as well.

Te Rewa Rewa footbridge site stands 300m upstream from the river mouth, and acts as an extension of the existing popular Coastal Walkway and diversion of pedestrian and cycle traffic from public roads between New Plymouth and the suburb of Bell Block.

The bridge itself is 3m wide between 1.2m balustrades. It spans 85m long, stretching across 70m of river with no temporary or permanent piers in the waterway. The deck soffit stands 4.5m above normal river level, and the asymmetric superstructure consists of 85 tonne of structural steel.

Situation

Situated on the sacred land of the Te Ati Awa iwi and Ngati Tawhirikura hapu, Council had a clear vision

for the bridge to be iconic, yet respectful to the local iwi and environment of the area.

This was challenging given the team was charged with creating a notable bridge profile on an extremely tight budget. Two contradictory requirements that would have significant bearing on conceptual design.

The resulting design that took form strongly met client requirements – providing a visually stunning structure to the landscape. It's structural integrity and construction however posed challenges due to its complex geometry and the need for the structure to be transported to site versus built in-situ.

On top of this, prevailing winds coming in over the Tasman Sea caused concern as it meant the proposed structure would be subjected to both pedestrian and wind-induced excitation. It was clear that vibration serviceability criteria would have to be achieved to meet health and safety requirements.

Solution

Novare were very mindful of the history of the land which was the sight of the Musket and Taranaki Wars as well as it's confiscation from the iwi by Crown. As a result, designing a bridge that captured a sense of the prevailing west winds and the idea of transformation and wairua (the spirit of the lives lost on the land). This was achieved through a series of curved ribs that asymmetrically connected the deck to the arch to form a gateway symbolic of entering or leaving sacred land.

Together, the 19 curved ribs and skewed arch alignment provided Te Rewa Rewa with its most unique feature that gave strong links between the structure and nature. It was also positioned to align with the summit of Mount Taranaki to engender a feeling of peace, harmony and connection to the

local environment. The arch itself was designed with a span-to-rise ratio of 10 so that it didn't dominate the low hills of the Pa site as well.

To overcome budget restraints, the project was engineer led, and local engineering company Fitzroy Engineering Group were contracted for the steel fabrication. This ensured strong technical understanding and experience could be leveraged to streamline processes. And, having a team based only 1.5km away from site also reduced travel and associated transport costs. Material costs were reduced through a tiered arch approach so the superstructure could be fabricated in a workshop and transported to site as one element. A large circular hollow core (LCHS) section was used during fabrication as it could be curved by induction bending. Providing a cost effective means to form the parabolic profile while giving sufficient scope to select a suitable diameter and vary the wall thickness according to load demands.

In the exploration of structural integrity and buildability, a series of simple models, manual calculations and finite element analysis were leveraged to understand the behaviour of the concept. This involved classical arch theory to determine axial loads, beam-on elastic foundation models to determine the effective length for out-of-plane buckling conditions, as well as consideration of a low ductility and elastic response for positioning of potential plastic hinges from seismic excitation.

The basic superstructure skeleton was made of three tubes which became the arch, heel and toe tubes to provide lateral restraint to the arch and prevent buckling. They were sized to provide sufficient torsional stiffness in addition to their requirements to carry axial and flexural actions. The fundamental load of vibration was 1.3Hz in the torsional mode with the first horizontal and vertical modes surpassing the

requirements of B55400-2: 2006 Annex B to meet vibration serviceability criteria.

To ensure safe transport to site, a steel springing connected the ends of the arch and deck at both ends of the structure to prevent ends spreading. Distortion due to vertical and transverse eccentricity of the arch were mitigated by temporarily designed diagonal deck bracing and tension ties.

Result

Overall, Novare designed and delivered a stunning example of an iconic bridge sympathetic to it's surroundings and the cultural significance of the sight. As both a functional infrastructural asset and an enduring attraction for the community – it's innovation in construction method, fabrication and material selection kept costs down and allowed strong technical understanding and expertise of local fabricator Fitzroy Engineering to be leveraged.

If you'd like to find out more about this project, contact our members [Novare Design](#) or [Fitzroy Engineering](#).

*** A special thanks to Peter Mulqueen for providing details of this project, who at the time was the lead designer for Novare for this particular project.**

[Have a project you want to showcase?](#)

Contact our Manager Marketing and Communications, Kim Nugent today!

kim.nugent@hera.org.nz

Meet Jürgen Inkoferer – our Welding Centre intern

We can hardly believe it, but Jürgen's time with us is fast coming to an end!

So we thought before he heads back to Germany we'd let you get to know him a bit better and find out about the great work he's been doing whilst in New Zealand!

Winging his way from the University of Applied Sciences in Regensburg Germany back in August 2018, Jürgen has been working with our Welding Centre team on a variety of projects.

This has included investigating the quality of structural steel fabrication as part of our efforts to develop, meet and maintain high industry standards, and the improvement of our administrative process for our welding personnel qualification schemes.

This is important work ahead of the launch of our online exams & training systems in the near future, and it's been great to have Jürgen here to assist in the research & testing of these systems.

We asked Jürgen about his HERA internship...

Germany is a long way from NZ! How did you find your way to HERA?

At my university, a semester of our studies is earmarked for practical work experience. This allows you to find intern and work opportunities to put your

theoretical learning to practice. My dream was always to go abroad during this time, so I started searching for an internship position for my fifth semester.

After gathering information about potential options for students working and living abroad, I came across HERA. My university has a long-standing collaborative relationship with them, and they were listed as having previously supported students from there, so I applied – and here I am!

Was that an easy process?

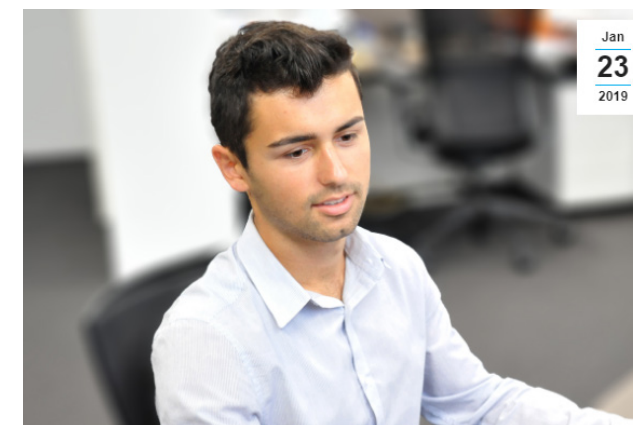
I'd say yes – especially if it's your first time applying for a working holiday visa to come to New Zealand. If you meet certain criteria it's a straight forward process, and luckily, I was pointed in the right direction by student support for which visa to apply for.

I think doing an internship overseas can be quite a daunting experience and it might not be for everyone. You definitely need to travel with an open mind and be willing to play things by ear sometimes.

For example, when I came to New Zealand, I'd only arranged a short term hosted family stay through AirBnB, but I didn't have long term accommodation sorted. I found being in New Zealand made finding this a bit easier as you can get tips from locals and work colleagues about the best areas to base yourself or where to look for listings.

How have you found the experience with us?

This opportunity has meant a lot to me. I'm especially



grateful to HERA's General Manager Welding Centre Michail Karpenko and Research Engineer Holger Heinzl for giving me the chance to be here and mentoring me during this time.

Living and working in such a great environment as New Zealand provides an insight into new cultures and definitely helps to improve oneself. And, as I'd like to work somewhere internationally in the future, I think this has been invaluable for me to experience working in a foreign country. My English has certainly improved too!

A great outcome has been the type of work I've done. It's pushed me out of my comfort zone and got me exploring things I wasn't too focused on such as IT systems development. This has been really interesting to me and allowed me to grow my skill base in this space from a practical perspective.

What are your aspirations for the future?

That's a good question! I'm definitely thinking about it

at the moment – there are so many possibilities out there.

What I do know is that I want to continue my current studies, with a major focus on the economic side of engineering. I'm in my fifth bachelor semester of mechanical engineering and I want to make sure I finish it successfully!

What will you miss the most when you head back home?

That's such a hard question – I've enjoyed so much while I've been here!

I easily can say the people. But I've equally loved being able to hike and enjoy nature here too.

What I do know is I'm definitely not looking forward to going home, although it will certainly be amazing to see my family and friends again!

Interested in an internship at HERA?

We suggest you register your interest so that if something that comes up that suits your capability, we have you on file to contact.

Keep in mind that while we take on students both here in NZ & abroad, we expect applicants have a good level of English & proficiency to deliver reports in English as well. And, for those traveling from abroad – you'll need to obtain the correct visa's to do an internship prior to coming here. Potential candidates are asked to provide a minimum of three to six months commitment.



This month's video: Meet Gretta Stephens - NZ Steel's new Chief Executive.

It's not every day you get to chew the ear off NZ Steel's Chief Executive Gretta Stephens. So of course when our chance came... we jumped at it!

Click on the image to the left, and join us as we hit up Gretta on how she's finding her role so far, why she loves working in the NZ metals industry and their strategic focuses moving forward.

She also opens up on the key challenges they'll need to overcome such as regulatory systems that are asking us to transition to a low co2 economy, pressure from imported steels and sustainability.

The best part? Innovation is a key part of how they plan to overcome them!



NZHERA @NZHERA · Jan 25

Wow! So great to have students as part of the @Rotary Science & Tech Forum at HERA House today. Super inspiring to see our potential #engineers in our midst! It's a privilege to give insights into what we think is a great industry to work in! #innovationinmetals #steelisbeautiful



R&D on expert design tool now complete via Scholarship Recipient Shoulong Dong

After three years of support, HERA Foundation is pleased to report the close out of Scholarship Recipient Shoulong Dong's doctoral project.

Shoulong's R&D was focused on the development of an online engineering framework to aid engineers and researchers to carry out preliminary design exercises and performance evaluation.

Developing an Expert Design Tool (EDT) as part of a past Industry Development program – AGGAT, which was focused on exploring the Organic Rankine Cycle (ORC).

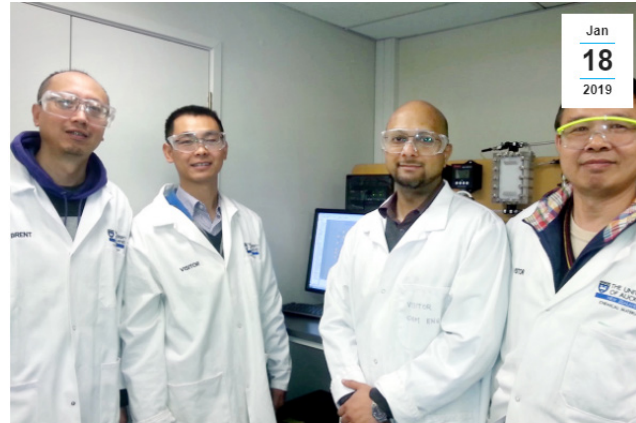
This support has resulted in the delivery of a beta version EDT to give potential ORC developers timely access to relevant data and information during early conceptual stages of design. Giving recommendations for technical based decisions – a step that in the long term avoids costly re-work during the build out phase.

Driving innovation within the NZ metals industry

ORC has long been considered a promising technology for converting low-grade heat sources into electricity. This is an exciting prospect given the increasing demand to reduce fossil fuel reliance and embrace renewable energy resources. However, the ORC design is a knowledge-intensive procedure with a variety of design variables and operation constraints that normally need large-scale expert interventions.

From 2012 to 2017, HERA ran a R&D project to explore the potential ORC might hold for our NZ metals industry. Facilitating a team of experts, universities and industry partners both nationally and abroad to look into the opportunity further.

During this time, creating an internal controls research team with the University of Auckland (of which Shoulong was a part of). This team was focused on



From left: University of Auckland Control System Lead Researcher Dr Wei Yu, HERA Foundation Scholarship Recipient Shoulong Dong, our General Manager Industry Development Dr Boaz Habib, and University of Auckland Controls Technician Frank Wu at the Process Control lab facility at the university.

developing control logic and process control models, and up until December 2018 Shoulong continued to receive scholarship support as part of our commitment to his doctorate deliverables.

This project involved several aspects, such as expertise extraction, modeling and simulation, algorithm development, and software integration.

The expertise came from several research domains including turbines, heat transfer, control systems, materials/fluids selection and process configurations. Different component models were developed and validated in order to simulate various ORC processes and evaluate their performance. And, artificial intelligence approaches and optimisation algorithms were proposed and implemented to support the decision-making during the ORC design procedure. Different modules were then integrated and deployed under a Python programming environment

Supporting and celebrating future engineers

For HERA and it's AGGAT program at the time, this project was about creating a user-friendly design tool for members involved in ORC development in New Zealand. Enabling greater uptake of ORC design capability in our membership and ultimately a competitive design offering as an industry in the energy sector.

General Manager Industry Development Boaz Habib saying "We're very proud of what we've been able to

accomplish through this project."

"Shoulong not only created a beta-version of this design tool but also advanced it into the realms of artificial intelligence applications to increase performance and predictability.

"It's projects like these that stretch our boundaries as an industry and grow us beyond business as usual."

Of his time spent as a HERA Foundation Scholarship Recipient, Shoulong went on to add "I'm so thankful for the support I received from HERA Foundation and Boaz – I feel very happy to have been given the opportunity to be involved in this project."

"During this time I've been able to attend four conferences to present my research work to both domestic and international audiences. I've since completed two conference papers and two journal papers – of which one has been submitted to Applied Energy."

"Moving forward I'll be working on developing an ontology for ORC design. It's a novel attempt in this field aimed at identifying all relevant concepts and their relationships in order for knowledge exchange, reuse, and management to occur. I also have two more journal papers planned for completion in the following few months," he said.

NZHERA @NZHERA · Jan 8
What is the role of clients in transformation? It's a good question and one that this blog from @transforming_NZ helps you tackle. "Unless clients begin to vote with their feet and force a different way, the stimulus for change is absent," @MFarmer_Resi bit.ly/2LX6gpU



Get qualified to become a Welding Supervisor or inspector!

If you aspire to take your career to the next level - why not book in to our 'Welding Supervisor or Welding Inspection' courses.

Designed for those already working in the industry it delivers the learnings necessary for you to upskill and broaden your understanding of your current supervisory role.

It's also perfect for those wanting to progress to a supervisory role, or get the necessary qualifications to become a welding inspector. Providing an in-depth understanding of quality management systems for structural steel welding and its associated standards, and the necessary metrics to meet SFC certification requirements.

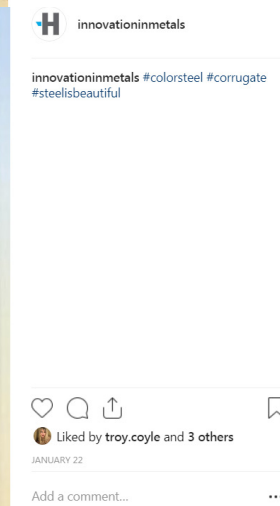
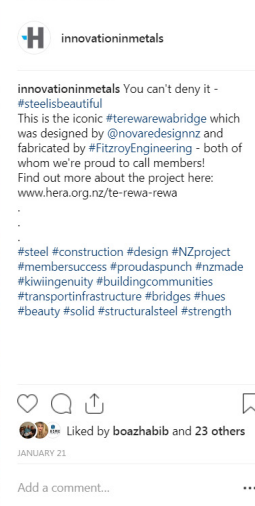
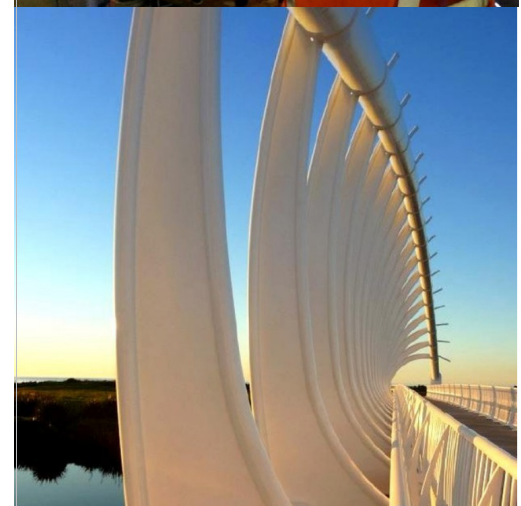
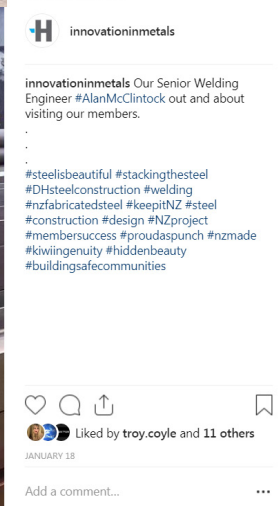
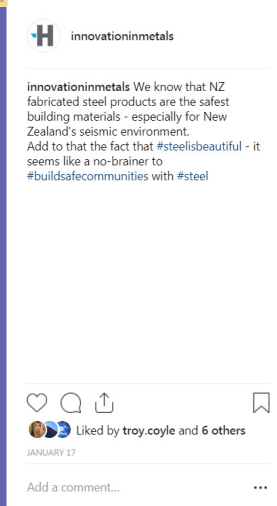
Find out more

We're holding two Welding Supervisor | Inspection Part 1 courses during March:

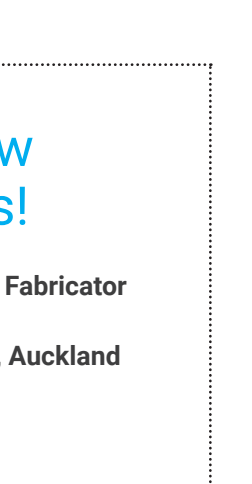
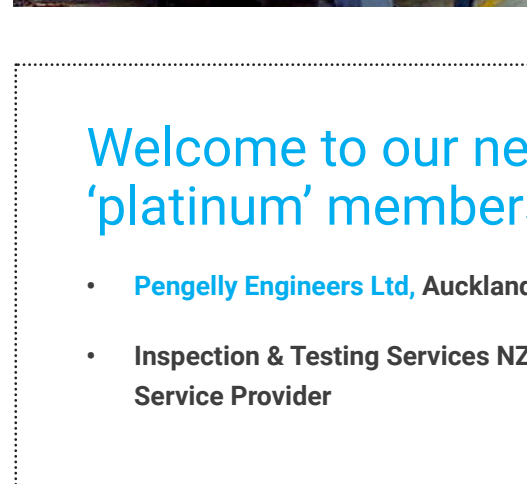
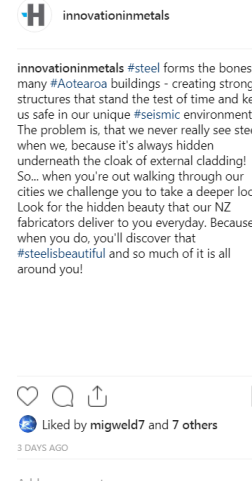
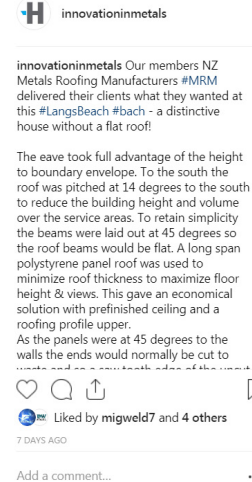
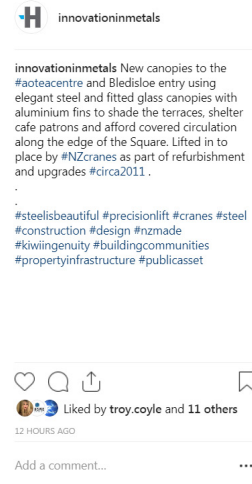
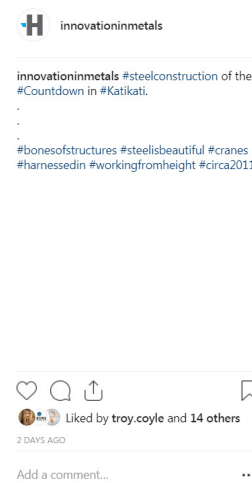
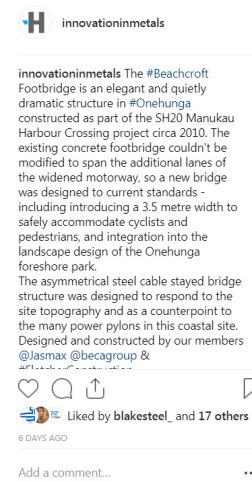
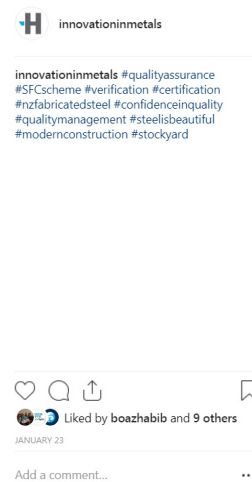
- [Auckland: Part 1, 4 - 8 March, full day](#)
- [Christchurch: Part 1, 11 - 15 March, full day](#)

NB: There are limited spaces available and places book out quickly, so secure your spot as soon as you can!





More from the #grid



Welcome to our new 'platinum' members!

- **Pengelly Engineers Ltd, Auckland Fabricator**
- **Inspection & Testing Services NZ, Auckland Service Provider**

NZHERA @NZHERA · Jan 22
So proud to see our member #HolmesConsulting on NZCN for their great success with the #PerryBridge - an eye catching piece of infrastructure in #Waikato that recently scooped an international award for engineering excellence at @IStructE #SteelisBeautiful bit.ly/2CuYtIc



NZHERA @NZHERA · 3h
Oh yes! #steelisbeautiful all right! Check out this fantastic piece of art work 'hei matou' from one of the team at the #NZweldingSchool - courtesy of our Welding Engineer #RobertRyan who forwarded it on to us! #welding #creativity #beautyfromthemundane #innerbeauty #strength



Do you want free marketing for your business in 2019?

If yes, then we want to hear from you!

Are you looking for a place to call home?

HERA House has a prime office space available for rent!

A 14.5m² office space in the downtown Manukau district, it's a stone's throw from Westfield Manukau.

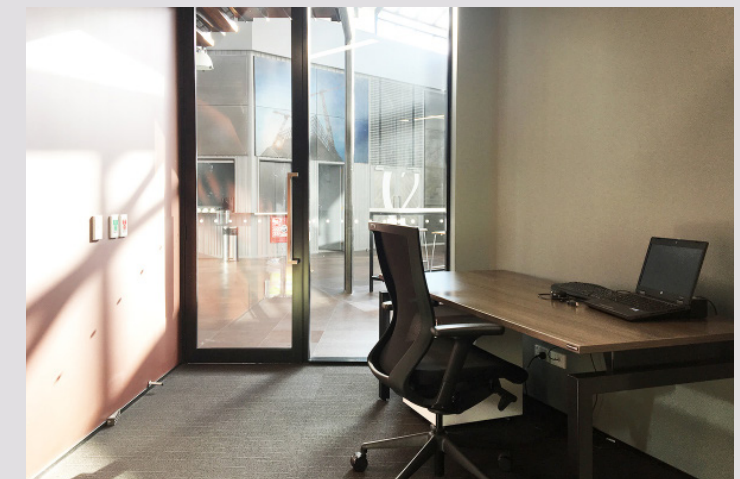
This space is ideal for independent workers who are looking to create presence in their business by developing a hub to operate from.

And, if you're in the metals industry - what better place to start than surrounded by like-minded organisations like HERA, Steltech, Metals NZ and SCNZ who are also based here!

Tenants also benefit with access to facilities such as meeting, seminar and conference rooms at discounted rates. This means you're able to host your key stakeholders on site to numbers up to 60 people!

Rental also includes kitchen facilities, tea and coffee, printer and network access (at a usage cost rate), one car park space and office furniture and storage. We're also willing to provide basic office support.

If you'd like to find out more, or register your interest – contact our Manager Member Services and Support Brian Low by phone at +64 9 262 4845 or by email brian.low@hera.org.nz



Simply send through any client approved imagery you're happy for us to share on our social platforms, website and annual report with a brief descriptor of the project, it's location, and the role you've played.

Or, contact our Manager Marketing and Communications Kim Nugent to discuss further!

kim.nugent@hera.org.nz



Having trouble getting your business SFC certified?

Our expertise at the SFC beginners workshop can help!

Now more than ever, getting yourself SFC certified has never been more important.

Why? Because the citation of AS/NZS 5131 on the Building Code earlier this year, means project specifications are increasingly calling for SFC certified steel constructors. Also, the unanimous resolution by SCNZ members late 2016 for all Steel Constructor members to become certified under the SFC scheme by 2020 means time is running out for fabricators to get aligned.

But this is a good thing! It signals a real industry commitment to reduce risk and ensure quality management systems are in place to consistently produce compliant products to a required standard. And, will ensure NZ fabricators within this scheme have a strong competitive advantage.

Why attend?

On the ground, we're hearing that Steel constructors are finding the SFC certification process overwhelming, time consuming or too costly to do. They need practical advice on where to start, and

guidance to implement all the requirements correctly, effectively and efficiently.

That's why in collaboration with SCNZ we're offering this new SFC for Beginners Workshop – to meet this need.

Who can attend?

This is an exclusive course available only to NZ fabricators who are registered as both a HERA and SCNZ member (or are in the process of becoming one).

Cost

	1 person	2 people	3 people
HERA Ordinary (45% discount)	\$225+gst	\$390+gst (\$195pp)	\$540+gst (\$180pp)
HERA Affiliate or Associate (15% discount)	\$350+gst	\$600+gst (\$300pp)	\$750+gst (\$250pp)
Full price	\$410+gst	\$700+gst (\$350pp)	\$990+gst (\$330pp)

Book today!

Auckland: **Fully booked, no seats**

Christchurch: [Friday 15 March 2019](#)

With support from:



For more information

Contact: Robert Ryan | Welding Engineer
Phone: +64 9 262 4842
Email: robert.ryan@hera.org.nz

With World Braille Day being 4 January this month, it got us to thinking how precious it is to be able to see.

It only takes a small accident to cause irreparable damage to your eyes.

ACC receives more than 9000 claims for workplace eye injuries each year. Many of those injured are left with long-term impaired vision and some are blinded.

Workplace eye injuries cost New Zealand more than \$3 million every year – a figure which doesn't take into account lost productivity.

Under the Health and Safety at Work Act, employers are required to provide appropriate personal protective equipment, such as eye protection, where there is a risk of eye injury. They must also ensure workers are trained in when and how to use their eye protection, as well as how to maintain it. Workers must wear eye protection if required to by their employer and the request is reasonable.

Source: <https://www.sitesafe.org.nz/guides--resources/practical-safety-advice/eye-safety/>

Choosing the right eye protection

Hazard	Examples	Protection
Thrown particles	Grinding, blasting, flying objects.	Faceshield, goggles, glasses with side shield
Thrown objects	Chipping operations, demolition; flying nuts, bolts and springs	High-impact face shields, goggles
Splashes	Molten metals, hot or very cold liquids, corrosive liquids, chemicals or detergents	Goggles and masks
Dusts	Powdered materials, abrasives, dry organic material, chemicals and some corrosives.	Light goggles
Fumes	Potentially corrosive or irritant - may be produced by hot materials, chemical reagents or automotive exhaust fumes.	Goggles and masks
Radiation	Welding glare, furnace work or laser radiation	Goggles, visors, hand-held shields, specific wavelength filter lenses, faceshields

Follow these steps to reduce risk of eye injury:

When to wear eye protection:

- Always assess the risk of work to determine if eye protection is necessary – can the risk be eliminated using other controls? What is the severity of the risk and the potential eye damage?
- Even if not carrying out a task with an obvious eye hazard, you may be at risk from others nearby. Always have your eye protection with you and if in doubt – wear it.
- Remember to protect others from your welding work and never watch any welding processes unless wearing suitable eye protection.
- Always wear eye protection when compressed air, hazardous substances, cartridge-fired tools, power tools, power washers, hand tools such as chisels are in use.
- Think about whether the work requires high impact protection. Some work will require full face shield protection.

What should you do if you do receive an eye injury?

- Seek medical assistance should you get something in your eye or receive any sort of eye injury. Avoid rubbing the eye, as this can make it worse. Minor irritations can be treated by flushing the eye with sterile water (from a first aid kit).
- Record injury in accident register
- Ensure your supervisor is aware of the injury

NZHERA @NZHERA · Jan 7
What are your health & safety goals for 2019? With a new year, should come new intentions to put your staff, contractors & clients safety first - so why not get inspiration from @weeklysafety & their blog on what their top 20 goals are! #SafetyFirst 🧑‍🔧🧑‍🚒🚑🚒 bit.ly/2CSD0Th



NZHERA @NZHERA · Jan 16
This year we're taking our environmental commitment up a notch! Say hello to our new addition, a 3 bay #compostbin - home to our food scraps, coffee grinds, paper towels & next up... our lawn clippings! A special thanks to Nandor & Jurgen for making it! #Embracethenew 🍷🌿🔧



NZHERA @NZHERA · Jan 28
Happy Auckland Anniversary to all of our members in the NZ metals industry! Don't forget to #slipsloplapwrap & keep those sun rays at bay today! #healthandsafety #sunsmart #tehirngahauora And while you're at it... #checkyourspots #skincare @Melanoma_NZ



Be SunSmart

Be sure to protect yourself when you are outside from September to April. Be SunSmart - Slip, Slop, Slap and Wrap.

youtube.com

NZHERA @NZHERA · Jan 9
"Investment in rural infrastructure & #manufacturing , increased outlays for railways & an affordable housing push will boost domestic #steel demand," @EconomicTimes bit.ly/2QvZVIR

Analysts are betting on these 4 steel stocks for the long term

Investment in rural infrastructure and manufacturing, increased outlays for railways and affordable housing push will boost domestic steel demand.

By Sameer Bhardwaj, ET Bureau | Updated: Jan 07, 2019, 11:23 AM IST



The global steel sector is facing challenges due to the recent correction in steel prices. Concerns of slowdown in the Chinese economy and oversupply by Chinese steel firms has brought down prices. Analysts are concerned that such volatility will affect the market of Indian steel players in the short

NZHERA @NZHERA · Jan 10

#StainlessSteel coil suppliers are hoping for recovery in 2019, where in 2018 stainless steel prices (particularly for strip mill products) demonstrated diverse trends in traditional steelmaking regions around the world: #America #Europe #Asia bit.ly/2RGrZrg



NZHERA @NZHERA · Jan 22

Last Friday our team were on a mission to pick up rubbish in our local neighbourhood. The best part? A total stranger from a nearby business joined in, we filled 4 bags of rubbish & we found \$20 (which we donated to clean up charity @sustaincoasts of course!) #goodkarma #local ❤️



NZHERA @NZHERA · Jan 29

If you're visiting workshops respect their safety protocol. Wear the appropriate #PPE for the conditions you're entering & ensure your host briefs you on what that is! #homewithoutharm #healthandsafety #workwise #worksafe #highvisjackets #protectiveeyewear #helmets #safetyboots



HERA
innovation in metals

Innovation Ready, Set, Go!

A leadership program designed to prepare you for your future.

If you can answer 'yes' to any of the below questions, then this course is for you!

- Do you want to do more innovation, but don't know where to start?
- Are you being disrupted by competitor products?
- Do you need to change direction in your production development?
- Do you want to learn more quickly about what works and discard what doesn't?
- Do you have great ideas but don't know how to get them to market?
- Are you spending a lot of time on ideas that are going nowhere?
- Do you have a bureaucratic innovation process slowing things down?
- Has your innovation process gone stale and in need of a refresh?

What you get

Attending this course gives you exclusive access to world renowned speakers in areas of design thinking, innovation mindset, culture for innovation, innovation metrics, strategy, best practice innovation capabilities and more!

Why attend?

Focused on innovation, this program is based on lean start up principles and is an ideal vehicle to inspire entrepreneurship within your company so you can stop wasting time, get products to market faster, and maximise success.

Prepare a next generation of innovation managers for your company or become one yourself - by connecting with high quality presenters who are the perfect tool to help take your ideas to the next level and convert them into reality!

Dates for 2019

Innovation-READY - 6 days over 6 months

- Day 1 13 June - Creating the innovation mindset
- Day 2 11 July - The innovation process
- Day 3 8 August - Innovating through ideation
- Day 4 5 September - Innovation metrics
- Day 5 31 October - Preparing an innovation strategy
- Day 6 28 November - Building innovation & productivity culture

Innovation-SET and Innovation-GO

Following the completion of Innovation READY, attendees then have the opportunity to do Innovation SET and GO modules the following year.

This looks to put theory learned into action through strategic plans and support to commercialise an identified product using lean start up methodology.

This course is exclusively for our members only!

Start date: Thursday 13 June 2019

Location: HERA House, Manukau Auckland

Register online: www.bit.ly/innov-ready2019

HERA

For more information

Contact: Dr Boaz Habib

Phone: +64 9 262 4753

Email: boaz.habib@hera.org.nz

Our General Manager Welding Centre Michail Karpenko in France attending IIW meetings, our Welding Research Engineer Holger Heinzl learning all things automation in Wollongong, visiting NDA Group in Hamilton, talking panel projects with Page Macrae lead team in Mt Maunganui, our HERA House fitness initiative - soccer at lunch and hosting the Rotary Science & Technology Forum at HERA House to connect with our potential future engineers!





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