

## Call for R&D projects

What problems do you need help solving?

## Innovation clusters

Find out more about our emerging automation & defence interest groups.

## Latest materials trends

R&D set to disrupt our NZ metals industry.

**MetalBase**

November 2018

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## Cover:

The University of Wollongong's robotic lab in action during our recent Automation Innovation Cluster tour. Find out more about this in our 'Emerging innovation cluster opportunities in automation and defence' article, page 6.

## Overleaf:

|1 & 2| Shots from the University of Canterbury's Chancellors Dinner in recognition of HERA's contributions to their structural research program |3 & 4| University of Auckland's Chancellors Dinner in recognition of HERA's contributions to their Business School Research program. So great to have our General Manager Industry Development Boaz Habib, General Manager Structural Systems Stephen Hicks and wife Mandy, Manager Member Services & Support Brian Low and guest ACRS Executive Director & Company Secretary Philip Sanders in attendance!



## From our CEO, Troy Coyle

### November was a month of action.

At the beginning of this year, we conducted a membership survey. Since then we've been considering this feedback, as well as seeking more feedback from members. As a result, initiating some changes. You'll already have seen that we've been requesting project ideas for our new Quick Wins program. Thank you to everyone who has already submitted ideas! I encourage you to please keep them coming! We've also called for Panel Project ideas as well.

In the survey, you identified that our library services were very important, especially to our consultant members. It's what has been a driving force for us to make our library services more accessible. We now have a new online system and in coming months, we will continue to get as many of our paper documents converted to digital means as possible.

We have also initiated two innovation clusters. One in automation, with a group of members having already participated in an automation assessment and recently visiting the Facility for Intelligent Fabrication's robotics, VR/AR and automation facilities in Australia. While there, we also learnt about the exciting new opportunities in defence fabrication, which NZ companies are able to participate in.

We would love to hear from you if you have any ideas for HERA to better engage with members. We are just starting our strategic planning process, so now is the time to let us know your thoughts and needs!



NZHERA @NZHERA · Nov 6  
We've been upskilling our lead team to ensure they know what good #governance looks like! Recently, lucky enough to have @IoDNZ Jo Brosnahan facilitate a days training with us so we could do just that - & inviting our Exec Board, HERA Certification & @MetalsNZ\_ceo to attend too!



NZHERA @NZHERA · Nov 15  
Last night we were honoured to have our @BoazHabib @shicks0 & #BrianLow at the @AucklandUni #ChancellorsDinner in recognition of our contributions to their Business School. Together, we hope to drive #research in #innovative business models that harness advanced technologies!



## 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!



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# It's that time of year when we're sending out our feelers for potential R&D project proposals from our membership.

For us, it's crucial that our chosen R&D focuses are industry driven. This is because we 100% want to deliver you value from the outcomes – and we can't do that if you we don't know what you need help with!

We're seeking ideas that fall into the following categories:

1. Quick wins - smaller projects (less than \$50K) and intended to take less than six months to complete. This is open to all our SME members with less than 20 employees only, and
2. Panel projects – these are R&D projects with longer time-frames, and are open to all members.

### Quick wins

This is a new initiative we're trialling based on feedback that our SMEs feel under-represented by us. That's why we've created a special category just for you!

To apply, simply email me your idea and give me a bit of background about what the problem is that you need solved with R&D.

Our lead team will then review to determine if it's feasible (in terms of resources to solve that problem quickly). If we get many ideas coming through that we



think we can deliver on, we'll send out a list of these to our 'less-than-20-employees' companies to vote on. By doing this we aim to democratise the process so we're solving problems that matter to our membership.

One thing to bear in mind is that these are for projects commencing in July 2019, so there'll be a six-month lag.

Please send through your project ideas by 30 January 2019.

### Panel projects

We plan to continue evaluating larger and longer-term research projects through our Panels.

Panel projects are ranked against three criteria:

1. research quality (30%);
2. research impact (40%); and
3. alignment with HERA strategy (30%).

Our 'Guidelines for Panel Assessments' provide guidance on how the projects will be ranked.

To apply, you'll need to complete a [Project Proposal](#)

# Call for interest – tell us your problems you'd like us to solve with R&D!

Form and send it through to the relevant HERA lead team Panel representative:

- Steel Research Panel: HERA General Manager Structural Systems, [Stephen Hicks](#)
- Welding Centre Panel: HERA General Manager Welding Centre [Michail Karpenko](#); and
- Industry Development Panel: General Manager Industry Development, [Boaz Habib](#).

Of course, [feel free to contact me](#) if you're uncertain which Panel should assess your project.

Approved projects will commence in the financial year starting 1 July 2019.

Project Proposals must be sent through to our HERA General Managers by 30 January 2019 to meet the Panel review deadlines. As we operate to an annual budget, project proposals are generally approved at the March/April HERA Executive meeting – so the Panel reviews need to happen earlier!

### Responding to your needs

We're very excited to have closer engagement with our members and to actively focus on problems that our industry is facing. We want to deliver a mix of quick wins, more impactful R&D and leading-edge transformational research.

For us, this is about ensuring we respond to your feedback and continually look for ways to improve our membership engagement and research outcomes.

Please keep your ideas coming! We want to make sure we're not missing any opportunities to help our members and industry solve problems that are commonly being experienced.

NZHERA @NZHERA · Nov 19  
According to @AHURI\_Research #blockchain has the potential to dramatically transform the built environment & social & private housing markets over the next decades. The UK, Russia, & UAE, already exploring it as a solution for centralised property ledgers. [bit.ly/2Dm57G6](#)

Digital planning tools are on the cusp of systematic adoption by councils and metropolitan planning agencies around the world looking to do away with long-standing inefficiencies through data-driven city planning



## #research #Blockchain #materials #innovation

NZHERA @NZHERA · Nov 20  
How confident are you that steel's a #buildingmaterial that can't be disrupted? We're seeing so many material #innovations happening every day. Don't believe us? Check out this #cardboardcathedral in #CHCH - clearly its time to imagine how to evolve steel! [bit.ly/2RGcOeb](#)

### A CATHEDRAL MADE OUT OF CARDBOARD?

Is building a cathedral out of cardboard really a good idea? It might seem like an odd building material, but in the wake of a disaster it can be ideal. That's why, in the aftermath of the 2011 earthquake, Christchurch in New Zealand, turned to world-renowned architect Shigeru Ban to create a new 'transitional' space for the city.





## Interested in joining our Automation or Defence Innovation cluster?

### We'll use these clusters to coordinate services for like-minded members.

Developing assessment programs for fabricators to comply with the requirements of multiple defence projects. As well as exclusive training and sharing of insights.

Or, connecting you to international networks so you can participate in our automation assessment program and more.

So what are you waiting for?! Contact our General Manager Welding Centre [Michail Karpenko](#) today!

# Emerging innovation cluster opportunities in automation and defence

Author

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## This month our CEO Troy Coyle and General Manager Welding Centre Michail Karpenko spearheaded a visit to the University of Wollongong.

### Taking five of our members to their Facility for Intelligent Fabrication (FIF) in Australia.

This was part of our efforts to respond to member feedback which has called for greater support to take advantage of emerging innovation cluster opportunities. The trip was focused on our newly formed 'Automation Innovation Cluster'.

And while there, we also hosted a defence related session in collaboration with the New Zealand Defence Industry Association (NZDIA) to support our recently established Defence Innovation Cluster.

#### Connecting members with impartial expert advice

The University of Wollongong (UOW) FIF is a one-stop-shop. Providing expertise, technology, equipment and training in automating steel fabrication to help manufacturing businesses adapt and compete.

The participating companies on the trip were selected following [welding productivity and automation capability assessments](#) of their workshop conducted in collaboration with the UOW's FIF in October.

#### Exploring the future of automation

The day at Wollongong was full of activity. Starting with a series of presentations and case studies highlighting complex industrial automation projects successfully completed by the FIF team. Visits to their various lab areas were also done to showcasing the advances they're making in several areas.

#### Robotics lab

One of the bottlenecks associated with the use of robots in our industry is the programming time.

However, a trip to their robotics lab and case study demonstrations of robotic welding for complex frame structures with integrated in-process welding quality control put these thoughts to rest.

Showing that the use of advanced software allows automatic recognition of intersecting surfaces, positioning of welds and collision analysis to occur within minutes. Dramatically reducing programming to allow robotic systems to be used in a flexible way.

#### Augmented Reality (AR)

AR is an emerging technology where the perception of the user is enhanced by the seamless blending between a realistic environment and computer-generated virtual engineering objects.

In FIF's AR lab, our members were given a chance to "assess" complex engineering structures in AR mode. Exploring how these systems could also be used for training and factory layout planning, by integrating it into their existing production environment.

FIF using their VR systems to capture the 3D layout and environment of their clients real factories to enable them to virtually install their proposed automation solutions. The benefit being that their client can then experience firsthand how these solutions would interact with their existing equipment and processes without having to invest in its installation upfront.

#### High resolution scanners

Another interesting development explored was the use of high-resolution scanners. These scan and give feedback of precise actual dimensions of site works so fabricators can make accurate adjustments back at the factory. Ensuring no rework is required when delivered on site.

#### Dust suppression technology

Fugitive dust emissions are common in industry and lead to significant financial losses and negative impacts on community health. That's why dust suppression technology is showing great potential to minimise dust emissions in the mining sector and associated infrastructure such as road, rail and port facilities for bulk materials handling.

UOW's Centre for Engineering Mechanics Director – International Solids Handling Research Institute (ISHRI) Professor Peter Wypych touched on this.

Presenting a range of customised solutions to the complex problems of industrial dust control, dust explosions and risk mitigation strategies.

The day closed out with individual follow-up meetings for each of our member companies in attendance, and a discussion of future opportunities.

#### The Australian Defence Project

Our defence related session was organised in collaboration with NZDIA's Defence Materials Technology Centre (DMTC) and Sydney Business School. The objective being to inform our members about the Australian Defence Project. A project considered the most ambitious defence spending program since WWII – with a massive [\\$200 billion dollar investment in defence capability over the next decade](#).

DMTC CEO Mark Hodge highlighted a range of opportunities for New Zealand contractors over the next decade. Clarifying that New Zealand fabricator contractors can participate in these projects as a result of the Australia–New Zealand Closer Economic Relations Trade Agreement.

Michael Mclean from the Sydney Business School supported this messaging. Giving insight into the quality certification requirements and expectations for fabrication subcontractors interested in being part of these programs.

#### Where to from here?

In cooperation with UOW's FIF, we'll continue to offer welding automation and productivity assessments to our members. We'll also continue to provide the option to visit the FIF labs to our first round of members who undertook automation assessments but weren't able to join us on this trip.

In terms of our research, we've already got a project running on data collection and analysis (a Welding 4.0 project) which will be expended. And, we're also in further discussions with FIF to expand our capability in automation and robotics so we can collaborate further in the future.

In cooperation with NZDIA's DMTC we'll be developing a "Defense Ready" program to establish welding fabrication capabilities critical to achieving the industry base for members to participate in projects.

## Our library has gone digital!

### Part of HERA's role is to facilitate connection, collaboration and knowledge sharing for our NZ metals industry.

And while we do this with vigour, we have to admit that access to such information hasn't always been easy.

Well, brace yourself – as things are about to change! Because... our library has gone digital!

#### Why the change?

Our surveys continually tell us that our library resources are one of the key offerings our members value. Ranking as one of our most frequently used resource by both our welding fabrication and consulting engineering members.

But – did you know that we've got over 30,000 technical information resources available for our membership to borrow?

Of course you didn't. That's because up until now, tapping into our resources has been a relatively manual process. Reliant on one of three things:

1. You having the knowledge that we have the resource on hand,
2. You calling us to enquire if we might have resources for the area you're interested in, or

3. For it to be one of the 20 odd resources we actively promote.

Continuing our resource offerings like this wouldn't have been smart. And certainly, wouldn't have portrayed us as the catalyst for innovation we want to be for you. It was clearly time for us to step up! Earlier this year [securing our new Librarian Musarrat Begum](#) to drive this change.

Since then, we've been on a journey to digitise our services to not only arm our staff more effectively in the services they offer, but also our members too.

#### Digital proliferation

You'd have to be living under a rock not to notice that the world is going digital at an exponential pace. As users, we expect information to be easy to find and available at the click of a mouse. And this is exactly what our new online library system allows us to offer you.

It's a powerful feature-rich tool that constantly evolves and upgrades. Giving users access to not only our information resources – but others both locally and abroad. It has also allowed us to convert all our resources into a large collection within a single accurate database for real-time access to information. Providing clear navigation, ease of use, and an efficient operating system.

This is a much more interactive service that allows you to personalise your dashboard, set preferences and receive notifications when new resources of interest become available.

Having this understanding on hand will also ensure we're able to respond promptly and thoroughly to your enquiries – particularly research ones.

#### Test drive our online library platform today!

Libraries like ours play an integral role in informing business and research outcomes. That's why we're so excited to make our information experience for our members more interactive and easier to access so they can work smarter and more efficiently.

The best part – it's ready for you to use today! You can go check it out and give it a test drive by heading here.

#### Next steps

Our digital library is still developing out, so at this stage not all of our resources are in digital format and will still come to you in hard copy form. Moving forward we plan to do future upgrades like electronic formats, custom access to meet different needs, and improved navigation – so stay tuned.

In the meantime, we'd love to get your feedback on your user experience so we can continue to improve. Perhaps there's something we've missed or haven't got quite right?

We'd also like to encourage you to suggest specific resources you think would be beneficial to our catalogue so we can expand our library's value to you.

To do so, get in contact with our Librarian [Musarrat Begum](#).

## Are you looking for a place to call home?

### HERA House has a prime office space available for rent!

A 14.5m<sup>2</sup> office space in the downtown Manukau district, it's a stone's throw from Westfield Manukau.

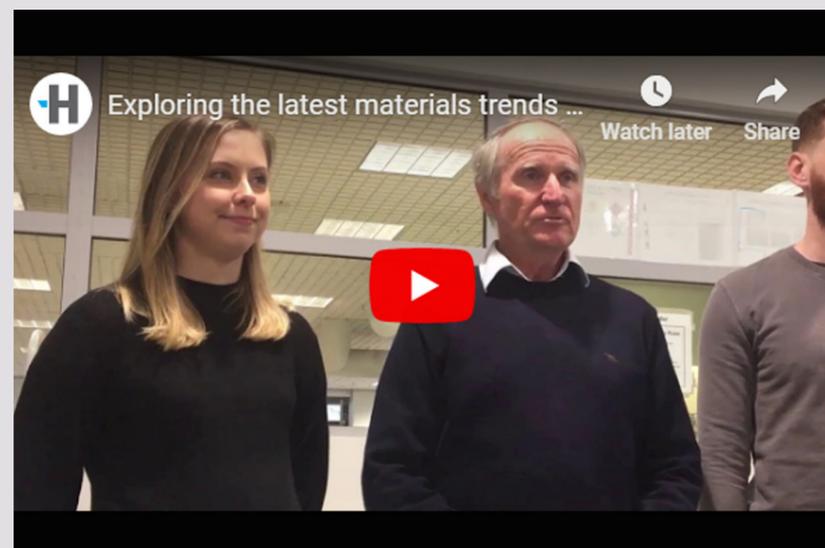
This space is ideal for independent workers who are looking to create presence in their business by developing a hub to operate from.

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](mailto:brian.low@hera.org.nz)



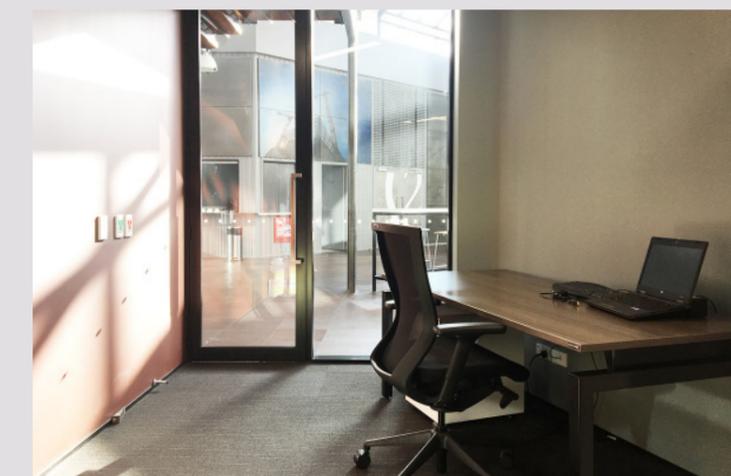
## This months video: Exploring the latest materials trends for NZ's metals industry.



We were lucky enough to spend time at Victoria University to unpick some of the common misconceptions industry may have about working with academia.

This is very important so that in the future we can collaborate more effectively when it comes to R&D to advance our NZ metals industry. And, the benefits of building relationships like this could be endless!

While there, getting a sneak peak into some of the research in new materials Professor Dr Jim Johnston, Post Doctoral Research Fellow Dr Michelle Cook, and Inhibit Coatings CEO Dr Eldon Tate are exploring that have potential to disrupt our metals industry for the better. In particular how their R&D could improve steel's performance capabilities with antimicrobial and antifouling coatings. Or, enhance how metallic metals interact with water by finding inspiration from nature through biomimicry.





**innovationinmetals**

innovationinmetals Another steel structure going up! #calibregroup #engineering . . . #steel #construction #design #NZproject #membersuccess #proudaspatch #nzmade #kiwigeniunity #hiddenbeauty #buildingcommunities #hues #beauty #solid #structuralsteel #strength

9 likes  
NOVEMBER 1

Add a comment...



**innovationinmetals**

innovationinmetals #fabrication in action - #fitzroyengineering . . . #design #beauty #solid #structuralsteel #strength #hiddenbeauty #innerworkings #behindthescenesconstruction

10 likes  
NOVEMBER 2

Add a comment...



**innovationinmetals**

innovationinmetals #RSLSteel working on their #commercial project to construct the #OFCStadium in Mt Wellington, #Auckland . . . #steel #construction #design #NZproject #membersuccess #proudaspatch #nzmade #kiwigeniunity #hiddenbeauty #buildingcommunities #2018 #hardatwork

17 likes  
NOVEMBER 5

Add a comment...



**innovationinmetals**

innovationinmetals A glimpse inside the #faraengineering workshop! . . . #cranes #design #beauty #solid #structuralsteel #strength #hiddenbeauty #hardatwork

10 likes  
NOVEMBER 6

Add a comment...



**innovationinmetals**

innovationinmetals #aucklandharbourbridge #steelstructure #bridgespine #underpinningstrength #infrastructurebackbone

9 likes  
NOVEMBER 7

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**innovationinmetals**

innovationinmetals A large scale version of a traditional #samoanfaile meeting house by our members #markplanconsulting . . . They kept the aesthetic of the traditionally made fale of round timber posts and rafters supporting a thatched dome roof, but achieved with an #innovative structural design with non-traditional materials. This led to a combination of timber and concrete columns, supporting a large dome roof formed with curved steel CHS rafters and steel CHS beams.

#thinkingoutsidethebox #steel #construction #design #NZproject #membersuccess #proudaspatch #nzmade #kiwigeniunity #hiddenbeauty #buildingcommunities

9 likes  
NOVEMBER 8

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**innovationinmetals**

innovationinmetals #BakerCranes #craneline #liftingheavy #heavyengineering #largescalift #defeatingtheodds #anythingpossiblewithtechnology #cranelife #makingworkeasierandfaster strongfireline Direct message us 📩

4 likes  
NOVEMBER 9

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**innovationinmetals**

innovationinmetals @downernz #pipes #steel #construction #NZproject #membersuccess #proudaspatch #nzmade #kiwigeniunity #buildingcommunities #energy #infrastructure #circa2015 @

13 likes  
NOVEMBER 12

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**innovationinmetals**

innovationinmetals #Linetech #consulting #pipes #linedesign #assetmanagement #assetinspection #energyefficiency #projectmanagement #birdseyeview #membersuccess #proudaspatch #nzmade #circa2015

14 likes  
NOVEMBER 13

Add a comment...

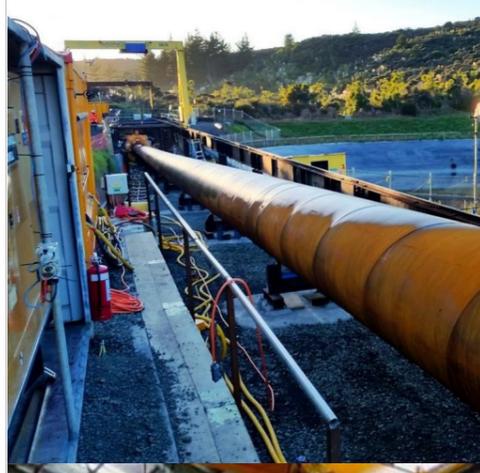


**innovationinmetals**

innovationinmetals Our members #pfsengineering were contracted by #OJfibresolutions to complete the structural, mechanical & piping installation of the new EV3 plant on site at #Kawerau. This included all the piping tie ins to existing plant. . . #energyinfrastructure #steel #construction #design #NZproject #membersuccess #proudaspatch #solid #structuralsteel #strength #energyinfrastructure

14 likes  
NOVEMBER 19

Add a comment...



**innovationinmetals**

innovationinmetals #AimecEngineering working on a 3.5km pipeline project in @Auckland for their client #mconnelldowell & #watercare . . . Using semi-automated programmable orbital #welding which allows fast and consistent high quality pipe welding without rotating the pipe. It's the first gear of its type in use in Australasia allowing them to be #innovative & propose out of the box solutions!

9 likes  
NOVEMBER 18

Add a comment...



**innovationinmetals**

innovationinmetals #welding #steel #seethesparkfly #hues #design #beauty #solid #structuralsteel #strength #circa2010 #howfarwevecome

11 likes  
NOVEMBER 20

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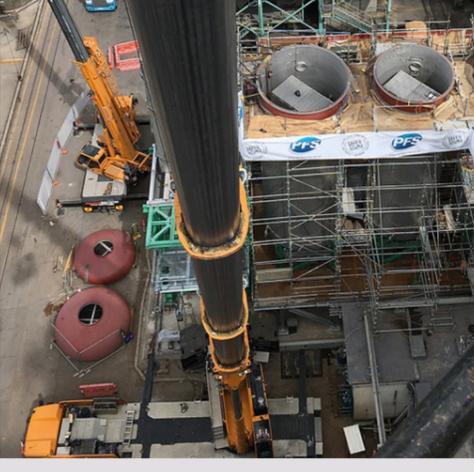


**innovationinmetals**

innovationinmetals #Linetech #consulting #pipes #linedesign #assetmanagement #assetinspection #energyefficiency #projectmanagement #birdseyeview #membersuccess #proudaspatch #nzmade #circa2015

13 likes  
NOVEMBER 15

Add a comment...



**innovationinmetals**

innovationinmetals Our members #pfsengineering were contracted by #OJfibresolutions to complete the structural, mechanical & piping installation of the new EV3 plant on site at #Kawerau. This included all the piping tie ins to existing plant. . . #energyinfrastructure #steel #construction #design #NZproject #membersuccess #proudaspatch #solid #structuralsteel #strength #energyinfrastructure

10 likes  
NOVEMBER 14

Add a comment...



**innovationinmetals**

innovationinmetals #hydrogeneration project #circa2010 from our member #AIE #allindustrialengineering - they're a heavy mechanical engineering service company specialising in #componentmanufacturing #maintenance and more in #kawerau . . . #steel #construction #design #NZproject #membersuccess #proudaspatch #nzmade #kiwigeniunity #hiddenbeauty #buildingcommunities #howthescale

11 likes  
NOVEMBER 21

Add a comment...



**innovationinmetals**

innovationinmetals #lightsteel framing #buildingcommunities #sustainableinfrastructure #straightandtrue #reliableframing #design #beauty #solid #structuralsteel #strength #hiddenbeauty

13 likes  
7 DAYS AGO

Add a comment...

# Showcasing your projects to the world on #instagram

# Cost effective fire solution presentation arms industry with valuable knowledge

In November, HERA was honoured to sponsor a presentation on cost effective fire solutions for steel structures.

We've found it's a growing area of interest to many of our members and to the structural engineering fraternity.

Particularly as it's been captured in the new Australasian multi-storey composite building design standard AS/NZS 2327:2017, where the latest advances in the fire design of composite concrete/steel structure components are comprehensively covered. This, coupled with the increasing use of structural steel framed construction, inspiring us to drive better understanding in this space.

This presentation was in collaboration with the Auckland Structural Group and was presented by Holmes Fire Technical Director [Dr Linus Lim](#), and Principal [Martin Feeney](#) – attended by over 70 people.

The presentation summarised material behaviour under elevated temperature, the most significant aspects professionals need to be aware of when designing steel structures for natural fire conditions, effects of fire, and more.

At HERA we believe it's important to connect our industry with this type of technical knowledge. In an increasingly competitive materials market, it ensures NZ fabricated steel structures continue to be the safest building material choice not only in seismic events but fire conditions also.

Through these industry experts we helped attendees get a grasp of how to put to into use effective solution principles to maintain structural integrity in fire. Giving them insight into areas such as:



Holmes Fire Principal Martin Feeney and Technical Director Dr Linus Lim presenting on cost effective fire design.

- use of simplified structural design procedures,
- creating cost savings through advanced non-linear simulations (finite element analysis) by eliminating applied fire protection on selective steel members, and
- eliminating unnecessary reinforcement and/or concrete slab thickness.

Our Structural Systems team was fully present, with our Finite Element Analyst Nandor Mago saying "This was a great evening which cemented the importance of our technical offerings in fire analysis."

**"We have a proven record in providing cost effective technical solutions both nationally and abroad, saving our clients hundreds of thousands of dollars."**

"Looking back, we started from humble beginnings – assisting in experimental fire testing almost twenty years ago. Today, we're now able to provide advanced sequentially-coupled thermal-stress fire simulations, and have published reports, conference and journal papers," he said.

"I definitely recommend people get in touch if they have a fire related challenge they need to overcome!"

Author

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NZHERA @NZHERA · Nov 8

Did you catch the latest #SCNZ Steel Futures October? There's lots of great content including the Excellence in Steel Awards winners, SFC updates, our @BERLEconomics report findings & updates on the removal of conflict with latest national standards & more! [bit.ly/2JCRZjz](https://bit.ly/2JCRZjz)



NZHERA @NZHERA · Nov 20

So grateful to have our @shicks0 featured in #BuildersAndContractors Issue #113 p42! We truly believe steel is an important engineering & construction material that's more environmentally sustainable than most people realise & this was our chance to say it! [bit.ly/2NPBMy](https://bit.ly/2NPBMy)



NZHERA @NZHERA · Nov 1

Did you catch last month's #NZmanufacturer issue? It features our member #StaffordEngineering who has been part of the #innovative @RevolutionFibre project & our Exec Board member & @TheMFGnetwork CE Dieter Adams speaking on R&D tax credit policy! [bit.ly/2zqMxqs](https://bit.ly/2zqMxqs)



NZHERA @NZHERA · Nov 13

Are you a member interested in breaking into the Chinese market? If yes, check out this in-market research from @theNZstory which reveals how Chinese consumers & buyers view NZ - amazing insights to help you get ahead & overcome market entry challenges! [bit.ly/2zD4AMp](https://bit.ly/2zD4AMp)



NZHERA @NZHERA · 1h

Keen to take part in an industry visit & technical discussion at #OlympusNZ 12 Dec? In association with #NDTA they're opening up their doors to share their expertise in manufacturing opto-digital products & imaging, voice, endoscopy, microscopy, bioanalytics & diagnostics tech.



#SocialStream  
#November

# Future focus

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## HERA sponsors University of Auckland Final Year Mechanical Engineering Project Awards

**HERA is proud to continue our support in fostering student education. Once again stepping up to support this year's University of Auckland Final Year Projects for Mechanical Engineering.**

We're able to do this through our charitable trust HERA Foundation which is focused on the promotion of study and understanding of ferrous and non-ferrous metals in engineering.

With around 180 students and 90 projects on display – our prize was specifically offered for projects involving metals. With our General Manager Welding Center Michail Karpenko forming part of the judging team to review prospective projects. This year awarding students Nancy Zhou and Mildred Wong with our 'Best Metals Project' for our sponsored category.

Their mechanical engineering final year project was centred around developing an immersive Virtual Reality (VR) system to visualise "design margins" in a mechanical design. With a specific research objective to investigate if it's easier to understand geometric design margins when visualised in VR versus a 2D

paper model.

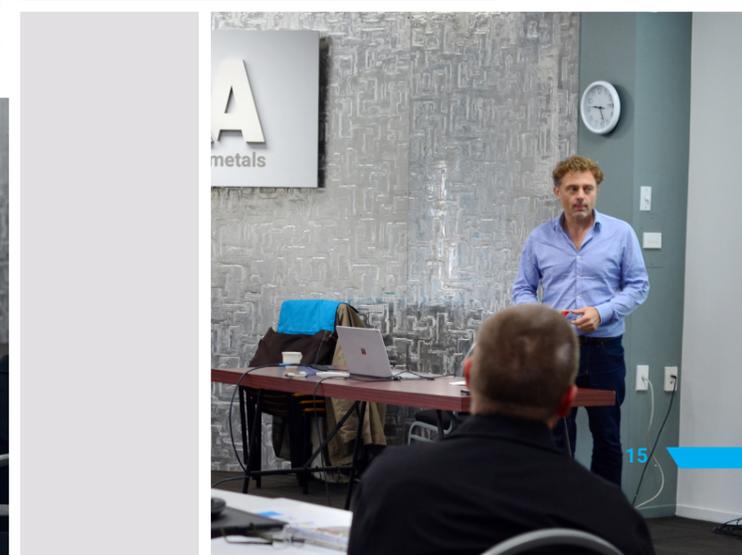
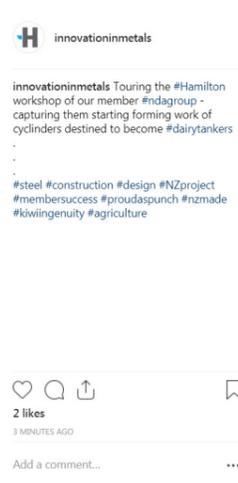
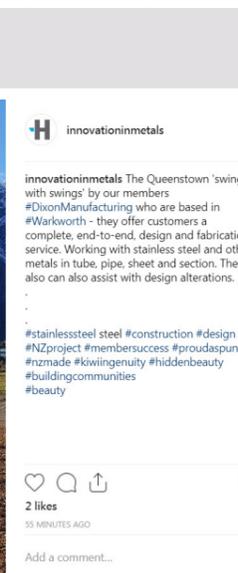
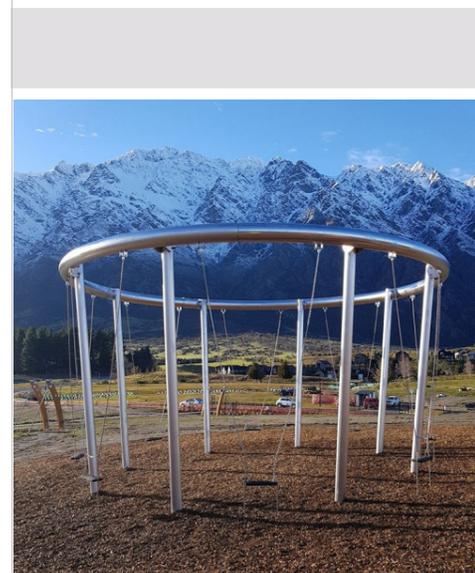
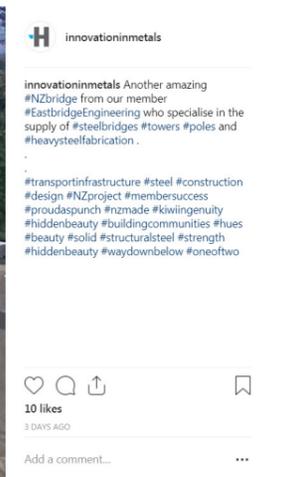
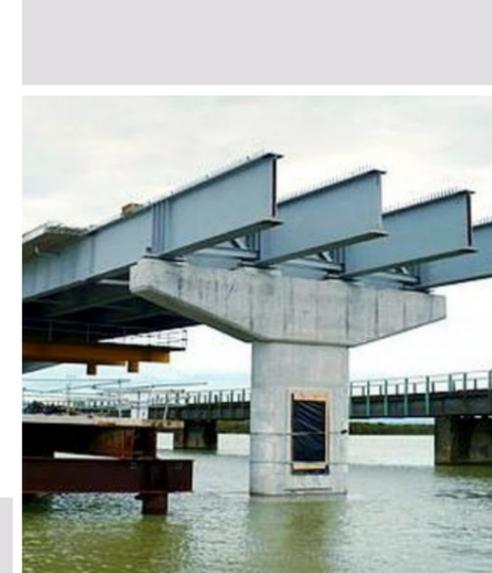
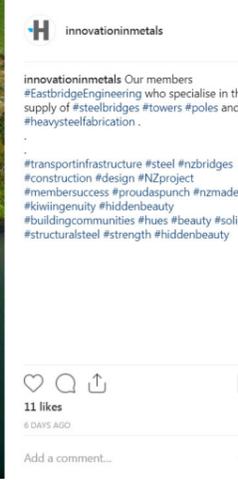
This focus was selected because design margins aren't well understood due to the different interpretations of what they are and why they're applied. Often resulting in them not being communicated clearly between design team members. The upside being that if design margins can be clearly and consistently explained – it has a potential to increase design process efficiency and reduce undesired design iterations.

Nancy and Mildred saying, "We conducted an experiment with 60 voluntary University of Auckland engineering students who were randomly assigned to either the 2D paper model test group or the VR model test group."

"The speed and accuracy of the participants were used to quantify the participant's performance, and individuals were also encouraged to provide qualitative feedback."

"Our results showed there was only a small difference in the accuracy and average response time for most questions between each model. But that significantly, more participants answered the most challenging question correctly when using VR," they said.

Overall, their project showed that the VR model provided an easier way to understand geometric design margins. With potential for further research into the visualisation of mechanical design margins in VR to create clearer communication mechanisms for design margins in the future.



## 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

And again in August:

- Auckland: Part 1, 19 - 23 August, full day
- Christchurch: Part 1, 26 - 30 March, full day

Book at [www.hera.org.nz/events/](http://www.hera.org.nz/events/)

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



## Flashback project: pipe racks for Kupe Gas Field – Grayson Engineering

**Client: Robert Stone**

**Duration: October 2007 – August 2008**

**Location: Taranaki, New Zealand**

**Project value: NZD \$6 million**

Grayson Engineering successfully fabricated one of the largest modular construction projects at the time – working cost effectively within a tight program schedule and to stringent quality assurance and weld connection specifications for the oil and gas sector.

Kupe Gas Field lies 30km offshore in the Taranaki Basin and was sparked into development following a decline in production at the nearby Maui field. Executed under a Joint Venture (JV) between Origin Energy and Technip, Robert Stone were contracted as the main provider for the production plant.

### Situation

To successfully meet program requirements, specialist expertise with facilities large enough to handle the sheer size of the eight pipe racks were needed – all delivered within a strict timeline.

Earmarked for oil and gas use, stringent quality assurance and welding standards were needed due to higher petrochemical test regimes. This also meant appropriate surface protection for fire, insulation, environment, operating temperatures and general wear across the pipelines design life was required.

Once fabricated – the modules running 210m in length, 8m in width and 10m height had to be transported efficiently from Auckland to Taranaki without compromising traffic flows and road safety.

### Solution

With a strong track record in producing heavy section and welding projects, Grayson's confidently handled the 840 tonne of structural steel and 350 tonne of pipe spooling – delivering within a tight 10 month time frame utilising their workshop capability to autonomously and cost effectively process works.

Their project team undertook training to become qualified at NZS 4711 and AS/NZS1554 Part 5 for high risk structure and tolerances, working closely with the JV's quality assurance manager to deliver mandated structures, also securing fully independent third party verification of all works and reporting as well.

Multiple comparative analyses of paint specifications and manufacture guidelines were carried out, with the most cost effective and appropriate coating to mitigate corrosion, fire and heat selected – reducing long term maintenance needs and module design life.

To overcome transport challenges, Grayson's precision fabrication of each module in a top and bottom section ensured a perfect fit on install – while allowing structures to be broken into more manageable sizes for travel to Taranaki. All achieved via a special route overnight to accommodate wide loads – significantly reducing impact to traffic flow.

### Result

Overall, Grayson Engineering were able to complete the eight pipe rack construction within the program schedule – providing cost effective quality works with third party verification.

If you'd like to find out more about this project, contact Grayson Engineering Managing Director [David Moore](#).

## HS+E - Electrical safety

**Working near electricity is dangerous and accidents can often be fatal.**

### Electrical injuries

There are two ways electricity can cause harm.

1. Electric shock - this is when electric current passes through the body. It can cause severe burns and potentially dangerous involuntary physical movements.
2. Arc flash - which is the release of energy. This can result in blast injuries, lung injuries, ruptured eardrums, shrapnel wounds, severe burns, and blindness.

### Electrical Accidents Are Often Fatal

- Use well maintained, heavy duty equipment
- Receive training to operate equipment safely
- Understand how equipment should be used
- Carry out forward planning (task analysis) to avoid tragedy.

### Lifesaving tips for working near electricity

Consider all electrical wires and equipment live until they are tested and proven otherwise. Other important tips to consider:

- Display safety signage.
- Inspect cords, plugs and electrical equipment before each use.
- Secure extension cords to the wall or floor and use ones rated for your type of work.
- Avoid outlets or cords with exposed wiring.
- Warm or hot outlets can be a sign that unsafe wiring conditions exists.
- Use ladders made with non-conductive materials.
- Locate the electrical panel and circuit breakers in case of an emergency.
- Label circuit breakers and fuses clearly.

Source: <https://www.sitesafe.org.nz>





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