Barry Robinson
Full-strength Metal 3D Printing **Barry Robinson**
Full-strength Metal 3D Printing
Not many people know that New Zealand is leading the world in this technology. Materials currently production-printed in NZ are: Inconel 718 (high temperature alloy), Stainless 316L, High-Strength Stainless 15-5-PH, and Titanium 6Al 4V.

Products are made for many industries from deep-well drilling to space, and everything in between, where the main drivers are any or all of the following aspects:
- Complex parts difficult to make by conventional means.
- Design freedom (uninhibited by manufacturing method restrictions)
- High strength but with low mass (esp in dynamic conditions)
- Vastly improved functionality
- Corrosion resistance
- No porosity or crevices allowable (esp food processing and medical)
- High labour input to make by conventional means, including fabrication and assembly costs.
- High MOQ or stock-holding issues

It is common for Metal 3D-printed products to transform into completely unique, game-changing and very disruptive products. The subsequent effect it has on business is also transformational.
And understanding the technology is the essential very first step! Design is Critical.

Craig Carlyle
LEAN MAINTENANCE MADE SIMPLE

You understand Lean Manufacturing so why do you accept tradition and complacency in your maintenance function? How did a manufacturing plant in Hawkes Bay has add $60m a year in turnover to their bottom line via their maintenance department? What could you achieve if you realised your potential?
Maintenance Engineering Society life member and industry expert Craig Carlyle shows how you can evolve your maintenance function to a 2020 model and add real value to the business using nothing more than your own trades intelligence and simple desktop tools. Move your function from fire fighting to Maintenance Excellence and position your operation for the leap to Lean Maintenance

Jason Trantor.

Controlling vibration with tuned mass dampers

Did you know that you can add a metal bar (with a weight on the end) to a machine that is experiencing high vibration and that vibration will be reduced, *potentially dramatically*? Yes, it is true! "Tuned absorbers" and "tuned mass dampers" are widely used in a variety of applications, from multi-story buildings to small industrial pumps, to minimize vibration. It is a tool that every vibration analyst should be aware of as it can help solve problems that you may struggle to solve otherwise. In this presentation, Jason will explain the basic principles, explain the design criteria, and provide a series of examples where they have been applied successfully.

John van Zwienen – Vibration Analyst CAT IV

Just because UNBALANCE is the most common vibration problem it isn't always so!

It is widely recognized that Unbalance is one of the most common vibration problems affecting rotating machinery. However it appears that this fact often gets in the way of properly diagnosing vibrations that occur at 1X running speed frequency. Many times a balance effort is started after the vibration on a machine is measured at 1X Synchronous Frequency and only when this does not deliver the expected results other possibilities are considered.

Vibration Analysis work requires a good knowledge of the fundamentals of rotor behavior. Knowing what the expectations are with regards to Synchronous (1X) motion of the rotor should be the starting point of any analysis of any vibration problems. This means that as much data and information as possible should be collected **and used** to consider all the factors that can affect the synchronous rotor response.

This presentation is based on the author's recent experiences where he was requested to assist with balancing work and none of these cases actually proved to be a balancing problem.
In all cases high 1X Vibration amplitude was measured and in all cases balance work had been attempted but did not produce the expected results.

Proper knowledge of Fundamental Rotor behavior coupled with collecting enough data/information to compare against "what is expected" should allow analysts to make clear distinctions between unbalance and other 1X vibration problems.

Using the simple 1X = Unbalance approach is a gamble with pretty good odds. However for high speed critical machines which are often the main 'money makers' in a plant, taking risks should be avoided as this approach can become VERY expensive. Proper analysis, of what appears to be a fairly simple and common problem, is required to avoid costly mistakes.

John is originally from the Netherlands but has spent more than half his age in South-East Asia. His career has revolved around the vibration business starting as a Service Engineer installing, commissioning and (in some cases) repairing machine protection system. Through company education and self-study ha has attained a Category IV Vibration Analyst Certification.

Mark Foster, Industrial 3D Specialist, Revisia Ltd
Like X-ray vision glasses
See how the latest 3D scanning and visualisation technologies add new depth and dimensions in asset management

Attendees will see practical examples where capturing accurate 3D visuals of physical assets offers a much better understanding of asset condition - enabling key insights when solving complex challenges in plant reliability and improvement.
Learn how 3D visual tools such as virtual reality and augmented reality can provide reliability professionals with greater clarity and confidence when making mission-critical decisions.
Session will include live demonstrations of this exciting technology. Audience participation may be required ☺.

Mike Yardley
Motion Amplification – Visualisation!

Since I first started in this industry the use of the vibration data collector has been the fundamental tool in the VA practitioner's arsenal. With a DC they could collect VA data, troubleshoot and solve vibration issues. With additional tools such as strobes and laser tachometers the use of phase allowed them delve deeper and determine how the machine vibrating. With the use of balloon diagrams and ODS we could, with some imagination, visualise how the machine was actually moving. These methods are tried and true and will always have a part to play for the man on the ground. However applying these techniques can be sometimes challenging. Getting reflective tape onto a shaft requires the machine to be shut down, possibly isolated, covers removed and can mean that the job either doesn't get done or is significantly delayed. If for an ODS the time to set up, mark out test locations and cause significant plant downtime. And there's always the HSE implications that cannot be ignored as well.
Finally a tweak in technology allows us to visualise machinery movement without intruding on plant downtime or HSE issues. Motion Amplification is exactly what it sounds like. Amplifying the motion of the machine so we can visualise how the machine is moving. Sounds simple and it is. What's more we can tune this to discrete frequencies to see what is moving what and how this affects the movement.

Paul Klimuc
Ultrasonic Lubrication.

In the times of the development of self driving cars and cell phones you can literally ask questions to and get guidance to a good restaurant, the nearest pharmacy or directions to a new location, the predictive maintenance world is lagging in assisting human beings to create better reliability for assets.
To increase reliability of assets we need to reduce unscheduled downtime. One cause of unscheduled downtime is failed bearings. Statistics have shown that a very low percentage of bearings will achieve their predicted lifespan. It is also shown that over and under lubrication is a leading cause of premature bearing failure.
This presentation will show how the ultrasonic equipment can be used to assist lubrication technicians to grease bearings correctly. The hardware/software combination will guide technicians through the 5 milestones that will ensure correct lubrication.

Robert Burke
IoT Radios Networks:

IoT (Internet or Things) is said to be the next big technology revolution, which will invade our homes, workplace and public spaces. The expectation is billions of devices collecting information on everything. But the key to this, is the new IoT radio networks which are starting to be deployed. Until now we have been limited to WiFi and Bluetooth for personal short-range IoT devices. Cellular and private radio networks are too expensive, power hungry and just not designed for a small battery powered device, that may only connect once a week.
You may have heard of SIGFox, NB IoT, LaRa just 3 of the networks currently being deployed in New Zealand for IoT communication. These networks will have extended reach, boosting better coverage than the combined cell networks and pricing which starts as low as $1.50 per month.
So, what are these networks, what are the differences and what are the applications that will start to turn up in the reliability markets? This presentation will summarise these network there pro and cons an give example of applications.

Simon Hurricks
Worn out with high vibration but must run

This paper deals with a large steam driven boiler feed pump which is normally refurbished at 50,000 hours run time but because of projected decommissioning of Huntly this was not done i.e. no funds for major maintenance. The pump in question has now done 78,000 hours and is basically worn out. Changing load demands caused by very low hydro storage meant that every available machine at Huntly was

required to run, including this worn out pump with high vibration. This paper discusses the problems encountered including the mitigations put in place to keep this pump running and keep NZs lights on.

Simon Hurricks
Dynamic Vibration Absorbers. Their Application in the Real World

Huntly Power Station has 4 250 MW steam turbo-alternators which were commissioned between 1982 and 1985. During commissioning the vibration testing identified that the generator inboard bearing had high vibration at 100 Hz which is 2X the running frequency. This paper looks at the investigation into the cause of this high vibration and how it was reduced by the application of two tuned mass dynamic vibration absorbers.