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Internationally renowned Powder Metallurgy scientist visits New Zealand

The Titanium Industry Development Association (TiDA) recently hosted a symposium on powder metallurgy industry advances including medical, industrial, aerospace and automotive.

The symposium was lead by Prof. Dr. Bernd Kieback, who is the leading expert in powder metallurgy. Prof. Kieback is the Director of Fraunhofer Institute for Manufacturing Technology and Advanced Materials (IFAM) in Dresden and Director of Institute of Materials Science, Technical University of Dresden.

This symposium provided an opportunity for titanium industry leaders and academics to learn about recent advances in product development and the impact on industry. Bay of Plenty Polytechnic, together with the University of Waikato supported this event.

Warwick Downing, TiDA Chief Executive, said TiDA was thrilled to be hosting Prof. Kieback. "New Zealand is involved in world leading Titanium Powder Metallurgy development and to have a speaker of this calibre in Tauranga supports the research and development we have achieved."

While in New Zealand Prof. Kieback also visited several other key industry organisations to further strengthen industry and academic ties within the international powder metallurgy fields.



Professor Kieback

Photo courtesy
Bay of Plenty Times

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TiDA
Titanium Industry
Development Association Inc

New Hi-Tech equipment installed at TiDA.

New Zealand's world-class titanium and prototyping facility has installed some vital new equipment to help companies develop innovative new products.

TiDA (Titanium Industry Development Association) now has a state-of-the-art particle sizer, sample divider, and press and polisher available for use at its Applied Powder Metallurgy Centre in Tauranga.

"The role of the facility is to help companies develop new products and prototypes and to ensure they are fit for purpose", says Warwick Downing, TiDA Chief Executive. "We already have an extensive range of analysis and testing equipment and these new tools will further enhance the facility and services we are able to offer." A FRITSCH Laser Particle Sizer has been bought from Germany to help accurately measure the distribution of particle sizes within any powder. Knowing how big the particles are within a certain sample is important because it will determine the packing density and ultimately affect how strong a product is.

Particle size distribution also plays a role in quality control. The analysette 22 micro tech plus system and wet dispersion unit uses dual laser technology to measure individual particles between 0.08 and 2000 µm in size.

The second new piece of equipment will also play a crucial role to accurately analyse powders. A key is to obtain a representative sample first. TiDA's new Rotary Cone Sample Divider and Vibratory Feeder will do just that.

For example, when loose metal powders are moved around, the smallest particles fall to the bottom. Simply scooping a teaspoon of powder off the top of the pile for analysis will not give a true picture of how that powder will perform. Accurate sample division is achieved by passing the material to be tested

The sample material then passes over the surface to the rotating cone and is accelerated outwards by centrifugal force of the entire system. From there it is fed into channels and the individual samples are collected in glass sample bottles, ready for analysis or testing.

A 200 tonne hydraulic press has also been installed at TiDA's facility. A hydraulic ram will push titanium powder firmly into both green (cold) and brown (warm) compacts to produce a rough shape which can then be processed further. Exerting extra pressure onto the powder while in these moulds will help the particles bond together more tightly.

Lastly, a new automatic grinder and polisher will help create a perfectly smooth surface on any sample product. TiDA's high-spec optical and scanning electron microscopes can then be used to more accurately view grain boundaries and crystal structure. Once the surface is 'optically flat', the internal structure and composition of powder particles can be seen, as well as grain boundaries using the TiDA EBSD system.

All the new equipment, which was installed in February this year, will ensure companies have 100% confidence in the test results and analysis they receive at TiDA's Powder Metallurgy Centre.

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Top Scientists lends expertise to TiDA.

TiDA is fortunate to have a number of scientific and engineering experts on hand to help develop and promote New Zealand's emerging titanium industry.

One such person is Dr Steven Matthews, Materials and Manufacturing lecturer at Massey University's, Albany Campus. Dr Matthews is widely regarded as one of New Zealand's leading powder metallurgy specialists and a top researcher. Dr Matthews specialises in thermal spray coatings, and has also carried out extensive research on ceramic composite materials, thermal barrier coatings, materials analysis and characterisation and testing.

He is one of the elite few who have this year been awarded Marsden funding by the Royal Society of New Zealand to carry out scientific research. The fund is extremely competitive and Dr Matthews is investigating high temperature oxidation resistant materials technology.

His background and technical expertise make him the ideal person to help guide TiDA's Powder Metallurgy research. Dr Matthews' industry experience working with powder materials means he is keenly aware of safety issues, quality control, raw powder characteristics and the need to conform to recognised standards.

"My main role to date had been assisting with the selection, purchase and commissioning of lab equipment for the TiDA facilities," explains Dr Matthews. "Once the equipment has arrived and installed, I develop SOP for the safe and accurate use of the hardware."

As more projects come onboard, Dr Matthews will play a role in providing technical project management. He hopes to gain exposure to a range of new powder processing technologies, such as laser sintering, metal injection moulding and powder forging, to expand his fields in industrial knowledge and application. "This is a great opportunity to work in cutting-edge new developments in the processing and application of titanium.

My association with TiDA allows me to work with a broad team of go-ahead people on fascinating projects to ultimately produce the next generation of products in a range of diverse applications."

Dr Matthews expertise is highly sought after and the organisation is extremely fortunate to have one of New Zealand's leading scientists working as part of the TiDA team.



Dr Steven Matthews

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Building Titanium Career Paths.

A key step in developing a lucrative titanium industry in New Zealand is ensuring there is a skilled workforce available to support the industry.

TiDA's continued Career Support recently included taking the time to run hands-on demonstrations for secondary school Principals, Staff and students at its Applied Powder Metallurgy Centre on the Bay of Plenty Polytechnic's Windermere campus.

TiDA Chief Executive Warwick Downing says "the aim is to support science, innovation and engineering in the Bay of Plenty by showing students what our organisation's high tech equipment can actually do."

"Engineering is a career path which requires a high level of skill. We want to help promote the many career possibilities and create an awareness of powder metallurgy so students understand what exciting opportunities may lie ahead."

The Priority One Instep programme, which provides training for school students within local industries, organised the visits by secondary school Principals and Staff.

"The Principals and Staff were very impressed with the extent of research equipment we have here." said Downing. "They understand the need to encourage science in schools and now have a better idea of the skills required for the titanium industry in the future."

Students from Katikati College visited and were involved in sample preparation and using the electron microscope. They had previously made some copper metal at school using electrolysis, which was tested for its chemical composition, plus some tensile testing was completed to help promote this research field.

If you are interested in finding out more about visiting the Powder Metallurgy Centre, please contact TiDA Chief Executive Warwick Downing on (07) 577 3030 or email: info@tida.co.nz



TiDA Tauranga Facility

Powder Processing, Consolidation and Metallurgy of Titanium Conference.

TiDA is proud to join sponsors Materials Australia in presenting this international forum. Attendees will discuss recent progress in both fundamentals and applications of PMTitanium and explore future opportunities.

Date: 5 – 7 December 2011
Location: Brisbane, Australia

Please see attached flyer for more details, or contact: angela@tida.co.nz.

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