



Australian Foundry Institute National Conference

2020

Never say NEVER



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AFI Vic - Sofa Seminars 2020

We were very excited to kick off our Sofa Seminar Series – AFI ► *OnDemand* on Wednesday 9th September with Dr Roger Lumley's presentation on The Development of Thin Wall Cast Invar for Satellite Applications. This was the first, of our four presentation series and the first of its kind in Australia, presented by AFI Victoria. We welcomed attendees from all around Australia along with several from overseas.

As promised this presentation was recorded, edited and is now available in a You Tube clip via the link below.

Grab a drink, a comfy chair and enjoy this interesting and educational webcast.

To view this presentation please click on the link below;

https://youtu.be/McX_uyVAWw0

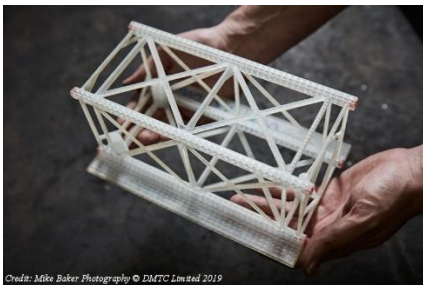
Biography

Dr Roger Lumley is currently Senior Technical Specialist at AWB Bell Pty Ltd. He has over 25 years' experience in materials science & engineering, manufacturing, research, and project management. Roger has a science degree in Metallurgy, a PhD in Materials Science and Engineering, and a Higher Doctorate in Engineering, all from the University of Queensland. He has authored over 110 technological publications including patents, journal and conference papers, and a book. He has been the editor of two books on aluminium metallurgy. Roger is a Fellow of the Institute of Engineers Australia and is chartered in the fields of Mechanical Engineering, Leadership and Management. He is also a fellow of the Institute of Materials, Minerals & Mining and a registered Chartered Scientist and Engineer in the UK. Roger is an elected Fellow of the Australian Academy of Technological Sciences and Engineering (FTSE). Roger was recently elected (May 2020) to the position of National President of Materials Australia.

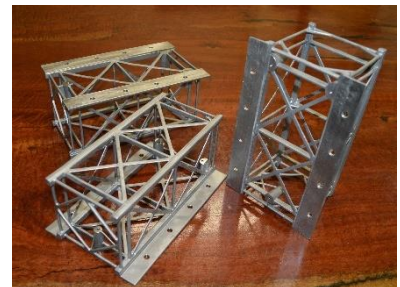


Development of Thin Wall Cast Invar for Satellite Applications

Invar (Fe-36Ni) is an alloy characterised by its extremely low coefficient of thermal expansion over wide temperature ranges. This makes it well suited for applications where thermal drift of sensors is especially problematic. In the current work, the feasibility of manufacturing thin-walled Invar (down to 1mm) for satellite applications has been evaluated using induction air melting. Cube-satellite chassis have been produced by a 3D printing prototyping technique, building plastic parts directly from CAD data using a commercial SLA printer, which were then used as sacrificial patterns and processed as investment castings in Invar. A range of 11 alloys evaluating C, Si, Mn, Mo and Ni were investigated and assessed based on the relationship between alloy composition, castability, Coefficient of Thermal Expansion (α), and propensity to form defects. For the testing conducted, particular focus was on optimizing the thermal expansion to the lowest value achievable over the temperature range -150 to +150°C, therefore suitable for satellite and space applications.



Credit: Mike Baker Photography © DMTC Limited 2019



Acknowledgement

This work formed a part of Defence Materials Technology Centre project 11.62, "High Altitude Sensor Systems", with project partners DMTC, UNSW, La Trobe University, and CSIRO