

Linkage Project- Structure and Properties of Aircraft Alloys Subjected to Equal Channel Angular Processing

Industrial partner:- Boeing Corp, Phantom Works, St Louis, USA

Supervisor:- Dr Peter Thomson, Department of Materials Engineering, Monash University

The project below is available under the Linkage Scheme as a Ph.D. project.

Project

A study of the effects of severe plastic deformation by Equal Channel Angular Processing (ECAP) on the crystallographic anisotropy and the resulting relationships between microstructure and properties.

Outline

1. Perform ECAP of aluminium alloys based on the Al-Mg system. These may include commercially available 5xxx alloys and/or alloys with additions of elements such as Sc. The purpose is to delineate the effects of solid solution hardening and its effects on the stabilisation of substructure with particular emphasis on the influence of the development of texture.
2. Evaluate microstructure, mechanical properties (static, fatigue, fracture), and corrosion properties with specific emphasis on the metallurgical understanding of the mechanisms of development of microstructure and texture and the influence on properties.
3. Evaluate microstructure, mechanical properties, and corrosion properties of friction welded joints of the above materials, with particular emphasis on the stability and restoration mechanisms during joining and post-joining treatments.

Stipend:- Currently \$31,140 p.a. – for three years, including a supplement of \$6,000 p.a.) with an expectation of renewal for a further six months as necessary.

A thesis allowance is payable and removal expenses may be payable.

Qualifications:- First class or high IIA degree in materials engineering, materials science, or physics. Graduates in other engineering or science disciplines with a strong interest in the structure and processing of materials may also be considered.

Applicants must be citizens or Permanent Residents of Australia or citizens of New Zealand.

Closing date for applications:- 19 December, 2008

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