



Wind Turbines Pty. Ltd.

16<sup>th</sup> November 2004

Gridlink Wind Turbines, a manufacturer of small-medium wind turbines wanted to create a new form of blade manufacture which would reduce costs and provide improved structural properties and other benefits.

Following many trials with Vacuum Bag Resin Infusion (VBRI) and Resin Transfer Moulding (RTM) it was found that a UV curing pre-preg procedure provided by Australian Composites was the most beneficial solution.

The use of multiaxial stitched fabrics and polyester resin had not previously been done. The ability to use a prepreg roll that combines high tech glass substrate and a 'B' staged, reduced and consistent resin, meant many difficult and time consuming trials saved. With the Australian Composites prepreg up to 35% resin reduction was encountered, an average of 20%-35% increase in all the major mechanical properties of the blades such as tensile, flexural and interlaminar shear strength was achieved, the wastage was reduced by 50%, the productivity has increased by up to 95% and the environment was radically improved.

Australian Composites was found to be an able and professional member of the development team.

Their perseverance, ability to listen and translate the shop floor demands into a workable product was significant in the successful development of this advanced form of wind turbine blade manufacture.

The material is easy to use, low in odour and with no MEKP in the curing process makes for a safer workplace. The UV curing of the laminate ensures a formal manufacturing program can be undertaken leading to substantial cost benefits.

A blade tested by the University of Melbourne concluded that despite loading to almost twice the proof load no failure of the blade structure occurred. The failure which did occur was yielding of the bolted joint mounting the blade to the support structure.

The factor of safety on stresses in the blade is over 8, which seems excessive. It may be possible to reduce the laminate thickness to about half that in the blade tested but a blade with the thinner laminate should be tested to check that buckling and stress concentration problems do not arise.

The blade structure conforms to IEC 61400-2 Standard.

I am pleased to endorse both the people and products of Australian Composites and believe they would be a valuable partner in the supply or development of fabrics and processes.

Yours faithfully,

A handwritten signature in black ink, appearing to read "Rob Bell", is written in a cursive style.

Manager  
Gridlink Wind Turbines Pty. Ltd.