**The ReCoVeR Projects: Regeneration Of Thermally Recycled Glass Fibre For Cost-Effective Composite Recycling**

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ABSTRACT

The processing and reuse of end-of-life composite products in an environmentally friendly manner is one of the most important challenges facing the industry and community. The global annual production of glass reinforced composite materials is rapidly approaching 10 million tons, of which approximately 60% is thermoset based. A number of processes are available for recycling such GRP composites. Of these possible routes, thermal recycling is probably the most technologically advanced and has been piloted in the UK and Denmark. However, nearly all options deliver recycled fibres which suffer from a lack of cost competitiveness with pristine first-pass materials. A key factor in this equation is that there is a huge drop in the performance of recycled glass fibre (80-90%) in comparison to its original state. Consequently, recycled fibres have a very poor performance to cost ratio, and in most cases are considered unsuitable for reprocessing and reuse as a valuable reinforcement of composites.

In this presentation we will introduce two recently initiated EPSRC funded projects (ReCoVeR) focussed on the enabling cost-effective regeneration of the mechanical properties of glass fibres obtained from thermal recycling of glass reinforced composites from end-of-life automotive and wind energy applications. A breakthrough in the regeneration of recycled glass fibre performance has the potential to totally transform the economics of recycling such GRP composites which would otherwise most likely be disposed of to landfill. This will enable such recycled fibres to compete with, and replace, pristine materials in many large volume composite applications. The development of an economically viable process for regenerating the properties of thermally recycled glass fibres would have major technological, societal, economic, environmental impacts.

This ReCoVeR team of researchers is currently

1. generating fundamental understanding of the degradation of glass fibre strength during thermo-mechanical conditioning (300-600°C)
2. developing cost effective treatments to regenerate the performance of thermo-mechanically treated glass fibres
3. producing examples of composites using regenerated glass fibres

Highlights of the results from these studies will be reviewed with emphasis on the teams’ breakthrough treatments to regenerate the properties of thermally conditioned glass fibres.

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