Level | ***PGR***

Post Fracture Performance of Laminated Glass

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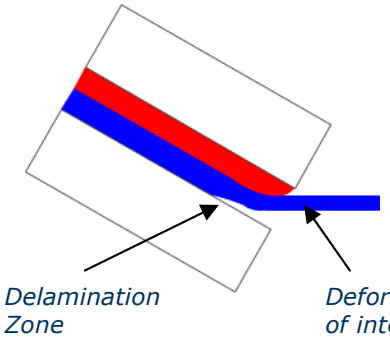

Behaviour of the interlayer includes deformation of the interlayer and delamination at the interface, both properties need to be defined.

Overview | *Laminated glass elements are being increasingly used in situations where a post-fracture residual capacity is required, for example overhead glazing. Laminated glass consists of two or more layers of glass bonded together with a polymer interlayer. The interlayer serves two purposes, firstly to provide a residual tensile capacity to the fractured element, and secondly to prevent fall-out of glass fragments which may cause injury to the public. There is currently no method of predicting the post-fracture performance of laminated glass, which means full scale destructive testing is required in all but the most conservative designs. This is extremely costly and time-consuming, and makes the design of novel glass elements inaccessible to most engineers. The current inability to predict post-fracture performance stems from the lack of knowledge of the viscoelastic-plastic behaviour of the polymer interlayer, most commonly Polyvinyl Butyral (PVB).*

Outcomes & Impact | *This research aims to produce a simple model to be used in the design process of laminated glass elements. The model will predict the post-fracture performance of laminated glass over a 5 day time period. The model will encompass behaviour under a variety of common loading and support conditions, without the need for full scale testing. This will improve both the efficiency of individual designs, and also reduce the costs and time associated with destructive testing.*

Work Involved | *Research will focus on two main areas:*

- *The viscoelastic-plastic material properties of commonly used interlayers, as well as the delamination behaviour at the interface between the polymer and the glass. This would be investigated for a wide range of loading rates, and temperatures, and include the effects due to aging of the interlayer.*
- *Fracture patterns associated with various loading and support conditions.*

Knowledge from these two areas will inform a model which will predict the behaviour of laminated glass units both during and after fracture.

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