

## STRENGTH OF FIBROUS COMPOSITES WITH IMPACT DAMAGE

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Some aspects of a problem mechanical, mainly, impact damage of a composite material and their influence to the remaining abilities of a structure are considered in present article.

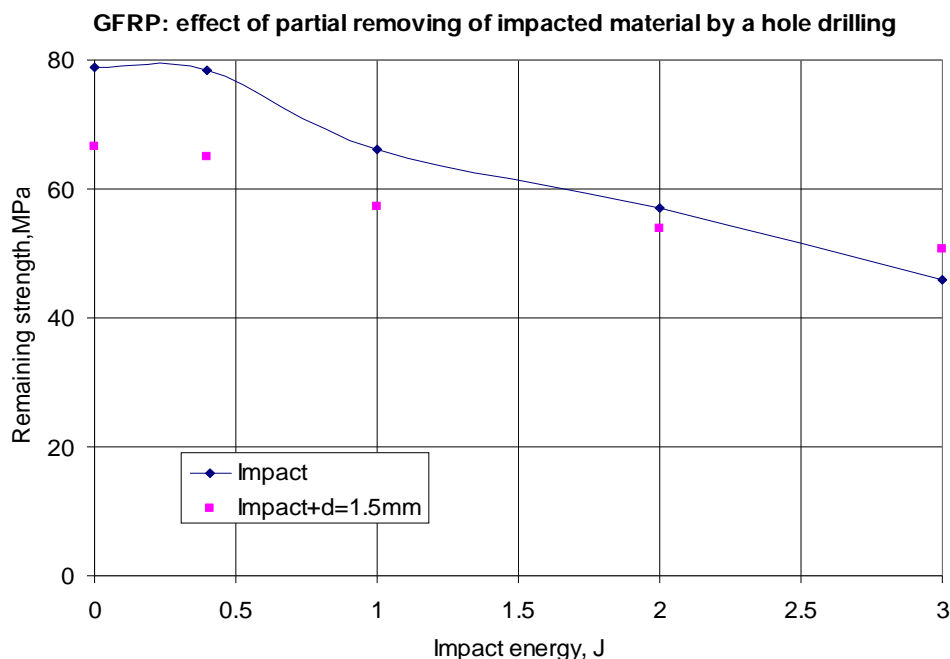
The problem of a prediction of remaining strength and remaining lifetime can be differentiated on two parts:

- 1) Prediction of character of partial destructions at various types of random mechanical actions and their intensity.
- 2) Prediction of the remaining strength and remaining lifetime at known type and the sizes of damage.

The analysis of some aspects of a considered problem in case of initial impact damage is a subject of the presented research.

First of all dimensional analysis allowed to establish some regularities of the stress state in impacted transversal-isotropic composite.

The analysis of the stress state in a zone of impact allows obtaining some qualitative judgments and quantitative estimations of character and the sizes of a zone of impact damage. Different criterions of the stress state as a cause of destruction at impact were used. That analysis can give the sufficient information for the approximate prediction of kind of partial destructions in a material and the sizes of a zone of damage. Research and use of knowledge of the phenomenon of self-supported destruction of the brittle components of a composite is especially perspective. On the one hand this mechanism is one of the most damaging, and with another, for its studying criteria of linear fracture mechanics can be effectively used. It is very important also the experimental result that illustrates existence of an equivalent hole for composites with brittle components.



*Figure 1. Remaining strength of GFRP for two kinds of samples: 1) impacted and 2) impacted sample with 1.5 mm hole in center of damaged zone*