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Numerical evaluation of cohesive zone models for modeling impact induced delamination in  
composite materials

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Abstract

This paper compares four cohesive zone models for modeling delamination caused by impact on composite materials. The four cohesive zone models differ by the way rate-dependent material properties, such as strength and fracture toughness, are treated. The influence of the cohesive zone model formulation on the prediction of delamination size is evaluated using the numerical example of a dynamic punch test. It is demonstrated that the use of strain-rate dependent material models significantly influences the numerical result. It is also shown that both, the rate-dependent strength and the rate-dependent fracture toughness, must be considered.

*Keywords: B. Delamination; B. Fracture; B. Impact behavior; C. Finite element analysis (FEA)*

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