

"Studying crack propagation with the cohesive zone methodology Inventory for 1 piece of hand baggage"

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Résumé :

The CZM approach has become very popular and an increasing number of contributions have appeared in the literature in the last twenty years. This is due to the intrinsic flexibility and easy-to-implement treatment of fracture via the CZM concept, whereby a link between micro-structural failure mechanisms and the continuum deformation field is established by incorporating fracture parameters into the material description. Such parameters are typically the cohesive strength and the toughness, which should be (hopefully!) obtainable safe and sound from experiments in order to calibrate a constitutive law that can be confidently carried on in our own hand baggage.

Because of weight restrictions, we shall concentrate on two basic issues.

First we discuss how to get out from one single standard test the two mode-I parameters of a cohesive law in quasi-static conditions. Results are presented that reveal the crucial role played in the identification by the macroscopic crack progression data. Next, reference is made to dynamic fracture, where crack progression data is the departure point to extend CZMs to simulate fracture over a short time scale. A form of rate-dependency in the CZM is discussed that is directly related to the macroscopic crack speed and comparisons with available experimental results are provided.