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# Interfacial Debonding Propagation in Orthotropic Layered Plates with a Compliant Internal Layer

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## ABSTRACT

The failure of layered plates with internal compliant layers is associated with interfacial debonding mechanisms, whose geometrically irregular propagation is governed by a three-dimensional stress state. This paper faces this challenge by developing a multi-layered, high-order plate theory and a triangular finite element that incorporate cohesive interfaces. The formulation tracks the evolution of two-dimensional debonding areas at the layered plate's interfaces. The model is used to study debonding mechanisms in a narrow plate with initial delaminations. Attention is given to the unstable response along equilibrium paths, the evolving irregular debonding front contours, and their impact on the structural resilience.

## KEYWORDS

Cohesive Zone Models; Layered Plates; Debonding Propagation; High Order Plate  
Theory; Interfacial Debonding

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