



# HELIUS:MCT NOW WITH COHESIVE

ADVANCED COMPOSITES SIMULATION | FIREHOLE COMPOSITES

## Why use a Cohesive *Element-Based* Approach instead of a VCCT *Node-Based* Approach?

Though widely used to simulate composite delamination, there are significant limitations to the VCCT method. The following provides some reasons you should consider using cohesive zone modeling.



|  | Helius:MCT<br>Cohesive Zone Modeling  | VCCT  |
|--|---|---|
| <b>Delamination Initiation &amp; Delamination Propagation</b>      | Predicts both delamination initiation and propagation   | Does not predict delamination initiation; only predicts propagation of existing delaminations   |
| <b>No-Penetration Boundary Conditions for Delaminated Surfaces</b> | Does not require the imposition and management of no-penetration boundary conditions for delaminated surfaces   | Requires the imposition and management of no-penetration boundary conditions for delaminated surfaces   |
| <b>Parallelization of the Simulation Process</b>                   | Is completely amenable to parallel solution (linux cluster) since the global delamination behavior is completely dictated by the independent delamination behavior within each individual cohesive element (no coupling between adjacent cohesive elements) | Is not amenable to parallel solution (linux cluster) since the global delamination behavior at each node depends collectively upon the loads borne by all elements that utilize the node in question                        |
| <b>Compatibility with other Nonlinearities</b>                     | Is completely compatible with any other forms of nonlinearity that are simultaneously present in the solution (i.e., CZM is a generally applicable methodology)   | Assumes linear elastic fracture behavior, thus any other nonlinearities that are present must be fixed (held constant) at any particular point in time where the energy release rate is computed and the crack is advanced. |

### HOW CAN THIS POSITIVELY IMPACT YOUR DESIGN PROCESS?

Present roadblocks to a comprehensive composite simulation that includes prediction of intra-laminar crack initiation *and* propagation need not exist. Cohesive technology can eliminate the need for a priori crack information and provide the capability to simultaneously consider inter- and intra-ply damage evolution.

Helius:MCT offers a complete in-plane and out-of-plane simulation solution.

EXPAND YOUR  
SIMULATION  
CAPABILITY

