Autodesk® Helius PFA
Reducing mesh sensitivity

How does Energy-Based Degradation impact mesh sensitivity?

In this example, a progressive failure simulation was conducted with Autodesk Helius PFA to obtain a load vs. displacement curve for an open hole tension (OHT) specimen with all plies oriented at 90 degrees. The results are shown below for the four varied mesh sizes.

Minimizing mesh sensitivity?

Autodesk Helius PFA software introduces **energy-based degradation (EBD)**, a powerful degradation scheme that accounts for element size and provides you the confidence and efficiency you require for your analyses.

How can this positively impact your design process?

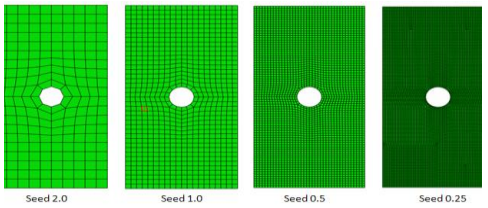
Can you be certain that your progressive failure solution does not differ with varying mesh sizes? Concern over this variability often forces analysts to conduct a detailed mesh sensitivity study to determine optimum mesh size. EBD can help reduce the expense and time associated with these laborious sensitivity studies.

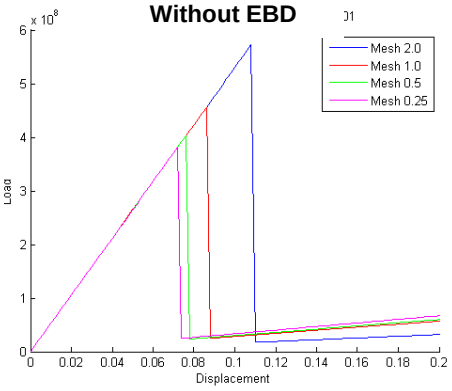
Autodesk Helius PFA with EDB enables you to minimize analysis time while retaining confidence.

Example

Without EBD, the ultimate failure load varies as much as 30 percent. Using the EDB features significantly reduces this variability, demonstrating its ability to decrease mesh sensitivity.

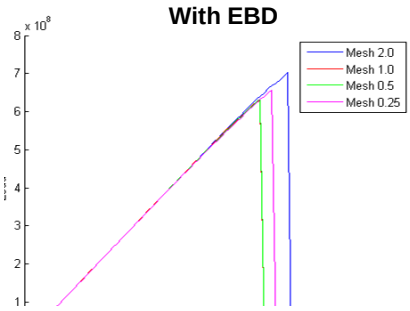
Helius PFA with EDB has been shown to reduce mesh sensitivity for both 2D shell and 3D solid elements, while accurately predicting the ultimate strength.





How is this possible?

Many existing material degradation techniques do not take into account the amount or volume of material that is failed, resulting in progressive failure simulations that are heavily mesh-dependent. EBD enables the property degradation to change proportionally to element size, thereby conserving total energy during damage evolution and accounting for this.



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