StressCheck v10.3 Training Outline

Advanced Training in Laminated Composite Analysis

Objectives:

1) Build and solve problems with Laminate material properties.
2) Define and assign Laminate material properties in 2D & 3D:
   - Assign Laminate material properties using Ply Orientation.
   - Assign Laminate material properties using Mapped Lamination.
   - Assign Laminate material properties using Automatic Lamination.
3) Assign q-Discretization to high-aspect ratio elements (Thin Solids).
4) Post-process problems with Laminate Composite material properties.

Session I (4 hrs) Intro to Laminate Composite Modeling, Mapped Lamination

- Lecture: Laminated Composite Analysis.
- Discussion: *Definition* and *Assignment* of Laminate material properties in 2D (pg 1-4).
- Exercise: Build & solve problem #1 "2D Laminated Composite Beam" (pg 5-10). Save as *ModelProblem1.scp*.
- Exercise: Build & solve problem #2; replace part of the ply stack with a sublaminate layer, solve, and compare results to model problem #1 (pg 10-14). Save as *ModelProblem2.scp*.
- Discussion: *Definition* and *Assignment* of Laminate material properties in 3D (pg 14-16).
- Exercise: Build cylinder as described on pages 15-16. Save model for future use.
- Exercise: Build & solve problem #3 "12-ply laminated cylinder" (pg 16-23). Save as *ModelProblem3.scp*.
- Discussion: Mapped Laminate material property assignment (pg 24-28).
- Exercise: Load *ModelProblem3.scp* and assign laminate properties using Lam-Map-Edge.

Session II (4 hrs) Automatic Lamination Methods, Thin Solids, Post-Processing of Laminate Composites

- Discussion: Automatic Lamination procedures (pg 30-44).
- Exercise: Load *ModelProblem3.scp* and assign laminate properties using Automatic Lamination.
- Exercise: Build & solve problem #4 "Composite T-Stiffener" (handout).
- Exercise: Build & solve problem #5 "Laminated Plate with Countersink Hole" (pg 45-50).
- Discussion: Thin Solid elements (pg 50-54).
- Exercise: Open *ModelProblem1.scp* & solve problem #6 "Laminated strip (thin solid)" (pg 54-59).
- Discussion: Post-processing of Laminate composites (60-70).
- Bonus: Laminated Composite Nozzle (handout).

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