Introduction to StressCheck Workshop

Session I Introduction to StressCheck DAY DATE (TIME)

- ❑ Welcome and introductions
- ❑ Presentation/Exercise: “Introduction to StressCheck”
  - Exercise: Open Eyebolt3D model, GUI walkthrough, solve, post-process
    - Files: Eyebolt.sci (Handbook)
  - The Key Quality Checks for FEA Solutions
- ❑ Presentation/Exercise: “Exploring StressCheck”
  - Exercise: end-to-end StressCheck application
    - File: Arm.x_t
  - Importing
  - Automeshing
    - Global mesh controls
  - Boundary conditions
    - Typical loads
    - Typical constraints
  - Solving
    - What is discretization error?
    - Reducing discretization error
  - Post-processing
    - Check global error, deformed shape, fringe continuity and convergence
- ❑ Presentation: “Why Use StressCheck?”
  - Vision for StressCheck
  - Example engineering applications
  - Strengths & differentiators vs. typical FEA implementations

Session II Model Creation DAY DATE (TIME)

- ❑ Presentation/Exercise: “Model Creation”
  - Discuss model creation techniques, best practices, and common errors.
  - Exercise: Build a 3D lug from scratch
  - Enhancing model flexibility with parameters
  - Exercise: Edit the lug model and mesh to be parametric
  - Formulas and expressions
- ❑ Presentation: “Limiting Modeling Errors: Point Loads and Constraints”
  - Best practices for point loads and point constraints in StressCheck
  - Supplementary Exercise: Wing Support Lug Geometric Singularity
    - File: WingSupport.x_t
- ❑ Presentation: “Tips for Practical StressCheck Usage”
  - Commonly used features for StressCheck productivity
  - FAQ Examples and Support Resources

Session III Advanced Modeling DAY DATE (TIME)

- ❑ Presentation: “What’s New in StressCheck?”
- ❑ Exercise: “Building 2D Geometry”
  - Build a plate with four satellite holes around a central hole.
- ❑ Presentation/Exercise: “Local Mesh Refinement”
  - Discuss mesh refinement best practices
  - Exercise/Demo: Railroad Tie
    - File: RRTie.x_t
- ❑ Presentation/Demo: “FEA-Based Sim Apps”
  - Demo: Satellite Hole simple COM demo
  - Files: SatelliteHoleDriver.xlsm, SatelliteHoles.scp
- ❑ Supplementary Exercise/Demo: Debugging model errors.
  - Associativity errors
  - Meshing errors
  - Solver errors

Session IV Complex Analyses DAY DATE (TIME)

- ❑ Presentation/Exercise: “Multi-Body Contact”
  - StressCheck multi-body contact overview
    - How the algorithm works
    - Model requirements and setup
    - FAQ’s and best practices
    - Quality checks
    - Troubleshooting
  - Exercise: Connecting rod
    - File: ConnectingRod.x_t
  - Supplementary Exercise: Knuckle Joint Contact Example
    - File: KnuckleJoint.x_t
- ❑ Presentation: “Global-Local”
  - StressCheck global-local overview
    - Saint-Venant’s Principle
    - Global-local methods
    - FAQ’s and best practices
    - Example global-local workflow for DaDT analysis
  - Exercise: Bracket stress analysis with imported TLAPs
    - Files: bracket.x_t, fbd_sc.csv