# StressCheck Professional v12.1 Release Notes

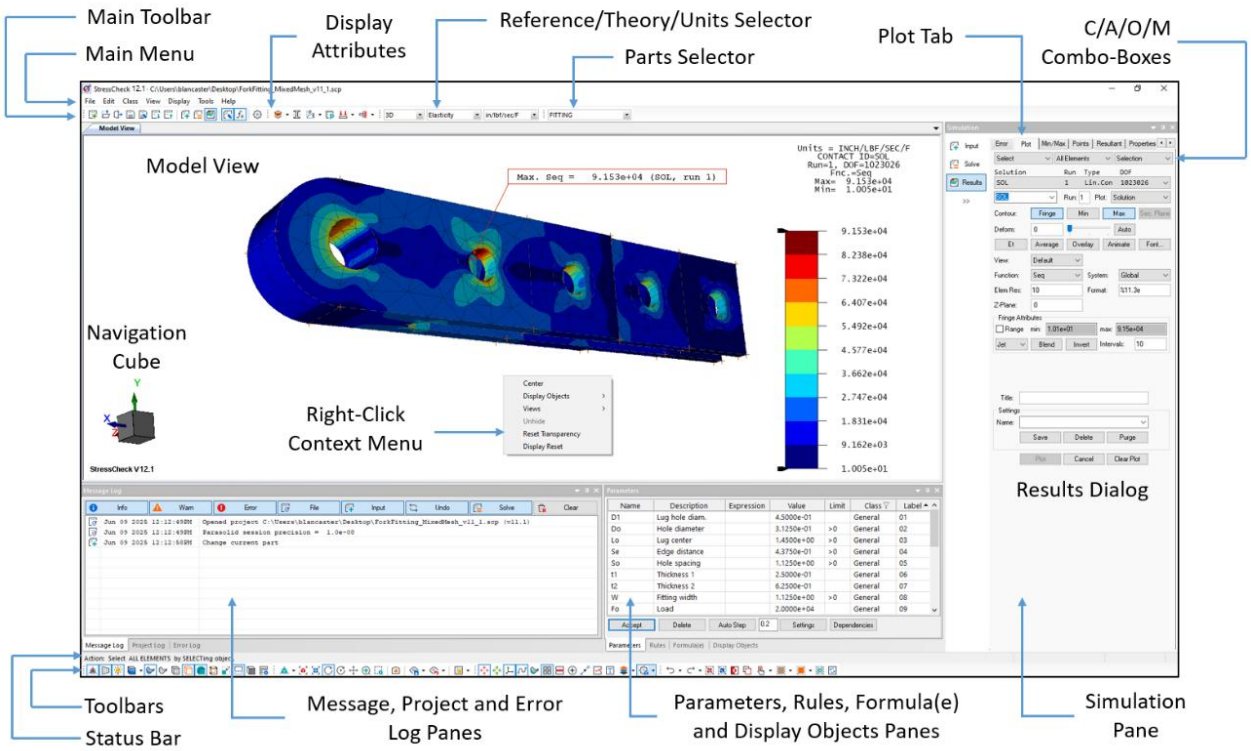
## Highlights

**StressCheck v12.1 includes significant improvements to the overall user experience, including:**

- New Contour Plot “Unplotted Transparency” option.
- Live Formula & Parameter input validation.
- New interactive Navigation Cube for intuitive model orientation.
- Fracture mechanics Contour Integral Method extension to compute Mode III (K3) Stress Intensity Factors.
- Redesigned graphing tool with export options and expanded user design control.
- Added control of element edge transparency.
- New font and formatting controls for all input panes and tables.

## New Features and Enhancements

See What’s New in StressCheck v12.1 video tour.



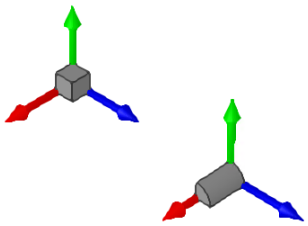
## GUI Additions and Enhancements

**Continued enhancement of the GUI layout, toolbars, controls and pane designs originally introduced with the release of StressCheck v12.0.**

- Improved compatibility and performance with Windows 11 OS.
- Upgraded third party software libraries (HOOPs, MeshSim, Spatial Interop, Parasolid).

**Improved visibility and styling of Coordinate System objects.**

- While maintaining their color scheme, Coordinate Systems are redesigned with a cleaner look and feel.
- System type, be it Cartesian or Cylindrical, is now easily differentiated via a symbolic icon at the base of the system.



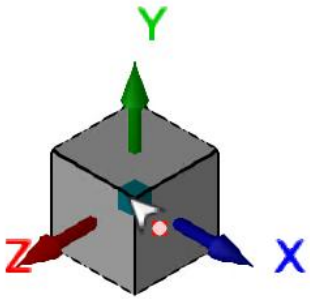
**1D object selection feedback**

- Points, nodes and systems sharing the same location are now well differentiated upon selection.

## Interactive Navigation Cube

**Added interactive Navigation Cube, integrated with the global triad, to deliver intuitive control over model orientations.**

- Click to orient: Instantly switch views by clicking cube faces, edges, or corners.
- Smart rotation: Repeatedly clicking on a vertex rotates the view clockwise by 120°, while clicking on an edge or face rotates by 90°.
- Preselection feedback: A blue highlight appears on the cube under the mouse cursor to preview the expected selection.
- Display options: The Navigation Cube can be toggled on/off via the Navigation Cube icon in the Display Options toolbar. A context menu option also allows hiding both the triad axis and the navigation cube.



## Fracture Mechanics Extraction Enhancements

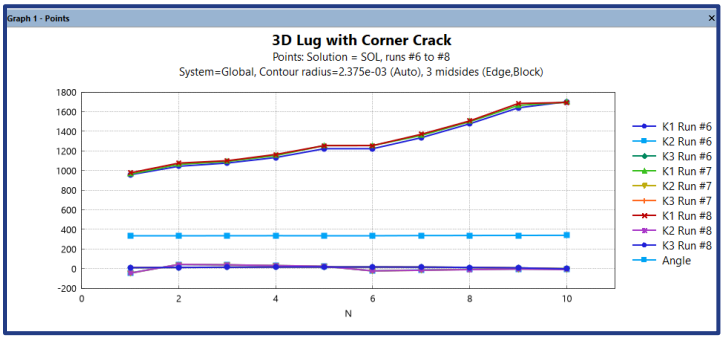
### Extended Contour Integral Method (CIM) support to compute Mode III (K3) Stress Intensity Factor (SIF) in both the Points and Fracture tabs.

- Fracture tab extractions now return K1, K2, and K3 by default.

### Incorporated sign consistency for asymmetric modes (K2, K3) along geometric boundaries.

### Introduced AUTO integration radius for SIF and J-integral extractions.

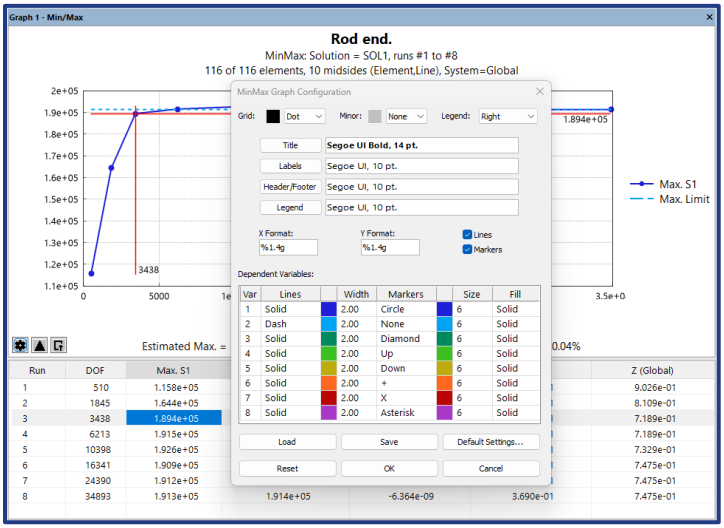
- Unchecking the Radius toggle automatically computes appropriate values for K1, K2, K3 or J1, J2, J3.




## Graphing Tool Redesign

### Redesigned graphing environment with a refreshed UI and greatly expanded user control.

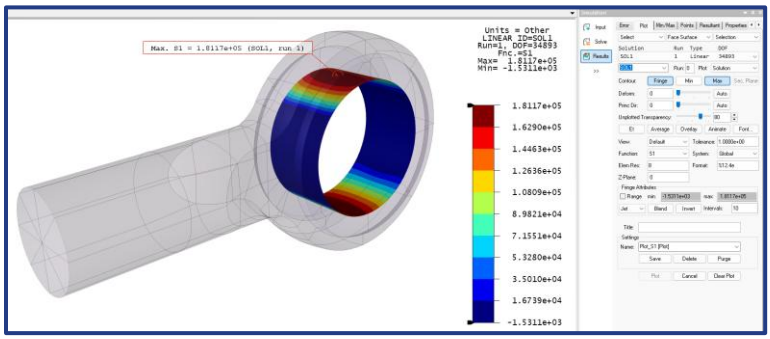
- Configuration controls (gear icon): Grid settings, legends, fonts, axis formatting, line/marker styles, and dependent variable appearance. Configurations can be saved/loaded as *.scgs files.
- Axis controls (triangle icon): Adjustable scaling, auto-ranges, custom intervals, and optional log scaling.
- Table font customization: Right-click any column label for font controls.
- Export options: Save the plot area as images directly from the UI.



## Unplotted Transparency Option for Contour Plots

### Added Unplotted Transparency mode when plotting by Any Element, Face, or Face Surface.

- Renders non-plotted regions semi-transparent (default 80%), while displaying contours only on selected element faces.
- Works seamlessly with Deformed Configuration, applying equal scale to both contours and transparent regions.



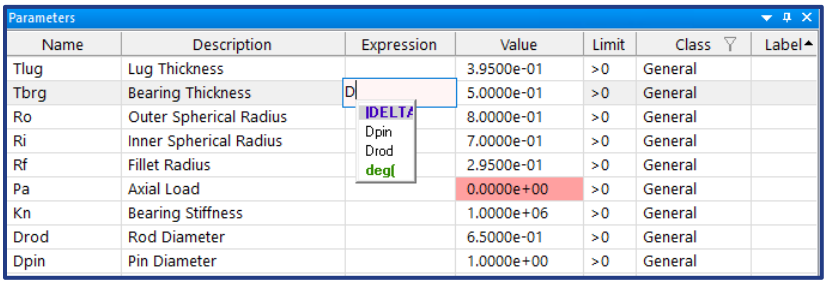

## Font and Text Formatting Enhancements

### Introduced customizable Font Controls for all input panes and tables (e.g., Geometry/Mesh Index, Parameters, Formulae, Nonlinear Events, Design Study).

- Right-click on column labels → **Select Font…**
- Apply font changes globally or to the current table only.
- Use the Default button to restore defaults instantly.

### User validation feedback and pop-up menu assistance for parameter and formula entries.

- Duplicate or invalid parameter names (e.g. reserved names “X” and “Sx”) are highlighted in red.
- Invalid parameter values or out-of-bounds entries are highlighted in red.
- Expression and Formula fields now support autocomplete, pop-up prompts, and live validation for intrinsic functions and existing definitions.

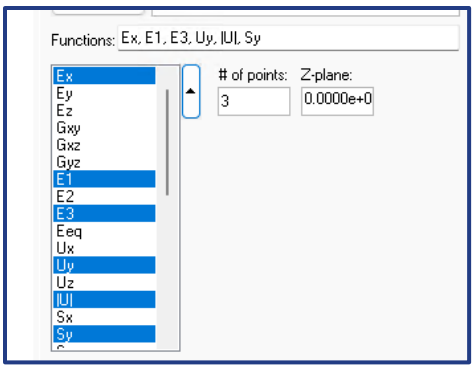



### Formula names are now formatted with bold violet for user generated formulas and bold green for intrinsic and math formulas.

- Implemented for all input fields as well as Expression and Formula fields.

## Enhanced Feedback of Selected Extraction Functions

**Added "Functions:" field to the Results → Points tab, displaying a clear and editable list of all currently selected extraction functions.**




## Element Edge Transparency and Light/Dark Mode

**Added light/dark element edge rendering modes and edge transparency controls (via the Display Controls pane).**

- Users can now toggle between light or dark edge rendering for improved visibility against different model backgrounds.
- Edge transparency can be adjusted to reduce visual clutter and emphasize key features of the model.

## Display Object Pane

**Expanded object list to offer distinct options for "Curves" and "Surfaces".**

- Toggles remain fully synchronized with the corresponding Display Objects toolbar icons.

## Cutting Planes Pane Enhancements

**Added "Display Planes" toggle to Cutting Planes pane, providing direct control over visibility of cutting plane surfaces.**

**Optimized contour plot rendering for improved performance.**

## Notable Resolved Issues

### COM API

- Fixed issues with using AUTO integration radius and splash screen behavior.

### Constraints

- Antisymmetry — Fixed issue allowing antisymmetry constraints to be applied in non-global XYZ planes.
- Attributes — Fixed issue applying constraints to surfaces in Locate Sets and updating parameters.
- Free Method — Fixed issue preventing Free constraints from being applied.
- Auto Contact — Fixed multiple issues related to material assignments, redundant solver errors, contact zone generation and color updates, and switching auto contact types.
- Contact — Fixed an issue where tangent spring symbols appeared incorrectly (visual only).
- Floating — Fixed an issue where floating constraints could be created in non-Cartesian systems.
- General — Fixed an issue where local reference systems were ignored, reverting to global.

### Display

- Cutting Planes — Fixed default reset of cutting plane options and inconsistencies in contour plotting.
- Model View and Objects — Fixed numerous rendering, selection, labeling, and UI inconsistencies related to model view, display objects, element visibility, normal arrows, view labels, and selection colors.
- Solid Colors — Fixed default color reverting after opening a model file.
- Transparency — Fixed several inconsistencies with body and element transparency.

### Formulas

- Plot Formula — Fixed a caching issue requiring replacement of reference formulas to update dependent cache.

### Geometry

- Body Imprint — Added appropriate warning message when deleting a body used in imprint.
- Body Thicken — Fixed several issues and inconsistencies with solid body thickening.
- CAD Convert — Fixed Parasolid schema reference issue when importing non-Parasolid CAD.
- Inputs and Fields — Fixed acceptance of negative box dimensions and display of parameter strings instead of numeric values.
- Parasolid — Fixed several boundary and body number tracking issues.

### GUI

- Errors/Warnings — Resolved multiple issues related to error detection, redundant constraints, logging, highlighting, popups, and body copy failures.
- File Upgrade — Fixed issue occurring when cancelling file upgrade.
- Issues and Inconsistencies — Fixed UI issues with object combo boxes, nonlinear events tables, message log buttons, display options, font colors, long strings, and text copying.
- Non-English Language — Fixed compatibility issue with Korean OS.
- Undo/DeLast — Fixed multiple Undo/Redo inconsistencies, added support for body color undo/redo, and fixed TLAP value reset after undoing deletions.

## Loads

- Global Local and TLAP — Fixed issues with TLAP naming, multiple bearing assignments, unnecessary load updates, and local system creation on failed assignments.

## Meshing

- Contact Zones — Fixed synchronization of contact zone shrinking with Shrink Elements and improved selection/deselection behavior.
- Crack Front — Fixed automatic crack length logic and missing boundary number error handling.
- H-Discretization — Fixed redundant material assignments, face set inconsistencies, and node offset issues on remeshing.
- MeshSim and Automeshing — Improved error and warning messages for meshing failures and distorted elements.
- Thin Section — Fixed unreliable deselection of surfaces during Thin Section creation.

## Parameters

- Expressions — Fixed synchronization and updating issues for Nonlinear Events parameter expressions.

## Results

- AUTO Integration Radius — Improved radius computation for 3D hand-mesh crack cases.
- Calculator — Fixed appearance and behavior issues in the Calculator pane.
- Clear Plot — Fixed element restoration behavior after Clear Plot.
- Fracture Extractions — Improved SIF extraction performance using Aux variables.
- Graph — Fixed multi-row selection in graph table.
- Incremental Nonlinear — Fixed record retrieval for long-named solutions.
- Plot Animation — Cleaned up plot animation logic.
- Plot Auto Deform — Fixed saving of “Auto” toggle state in plot settings.
- Plot Contact Functions — Fixed plotting of multi-body contact solution functions.
- Plot Element Resolution — Implemented input cap at 20 and added warning for higher values.

## Solver

- Contact — Fixed Execute: Restart behavior for multi-body contact workflows.
- Convergence Criteria — Fixed recall of Material Nonlinear Convergence settings.
- Design Study — Fixed numerous issues related to parameter locking, result processing, performance, and cancellation behavior; added Solution Status window with Cancel button.
- P-Discretization — Fixed assignment issues for mixed tri/quad meshes and product space option usage.
- Restart — Fixed Execute/Initialize behavior for upward-p restarts.
- Solution Configurations — Fixed solution ID purging behavior and listing of inactive configurations.