

## Changes to FRANC3D from Version 8.1.1 to 8.1.2

May 16, 2022

- 1) Fix ABAQUS \*boundary, submodel output and allow \*submodel, type=nodes.
- 2) Crack insertion and meshing bug fixes.
- 3) Allow for multiple template radii during crack insertion using library flaws.
- 4) Bug fixes in rainflow and cycle counting.
- 5) Skip internal single element sets in the Submodel dialog.
- 6) Additional checks on user-defined crack boundary points.
- 7) Bug fix in resolved SIF output to file.
- 8) Modifications for crack growth rate model interpolation and plotting.
- 9) Fix Nasgro3 units displayed in the dialog.
- 10) Add button to EditCrackGeom dialog to replace the current crack.

## Changes to FRANC3D from Version 8.1.0 to 8.1.1

Apr 25, 2022

- 1) Fix ABAQUS shell/solid coupling and shell \*Surface.
- 2) Process ABAQUS \*Distributing Coupling.
- 3) Add additional ABAQUS element type strings, including C3D10I.
- 4) Allow ANSYS .db and WB .dat file conversion during model import using the GUI; an ANSYS executable/license is required.
- 5) Fix Nastran crack face traction load ID.
- 6) Bug fix in the import GUI when using the Back buttons and switching FE models.
- 7) The list of analysis file extensions that are deleted has been added the FRANC3D resource file. The list of extensions is recorded to the session log file also and is used during playback.
- 8) Bug fixes in the crack insertion and meshing library.
- 9) A bug in the dynamic rain flow pairing routine was fixed.
- 10) A bug in the transient load schedule load multiplier was fixed.
- 11) Updates made to the crack growth rate model plots.
- 12) An update to the single crystal module allows plots of resolved Kmax along a path.

## Changes to FRANC3D from Version 8.0.3 to 8.1

Apr 5, 2022

- 1) Process ABAQUS \*Amplitude from .inp file rather than passing it through, for amplitude data defined in tabular form and using total time. This Amplitude can be applied to crack face tractions (CFTs). ABAQUS total time is written to the .dtp file, and the time and amplitude values are accessed when computing SIFs based on the M-integral.
- 2) Nodal force mapping is revised to improve the transfer/mapping. In cases where the mesh facets/nodes are retained, a one-to-one transfer of forces is performed. If the surface is

remeshed, the forces are mapped to the new mesh. Note that the force mapping can lead to some differences in results depending on the original and remeshed surface.

- 3) NASTRAN Pload4 and Force boundary condition updates have been made to fix several issues. Note the Pload4 with specified directions are only supported if the Pload4 is attached to the global model portion.
- 4) ABAQUS gravity loading for .inp files with unspecified element sets (or IDs) is fixed.
- 5) Differentiate ABAQUS and FRANC3D non-linear contour integrals and allow the user to choose the ABAQUS integral type: K, J, C or T.
- 6) The crack insertion and meshing library has been revised. Surface meshing and the associated parameters have been modified. These changes mean that Ver 8.0.3 will not read a Ver 8.1.fdb file (unless the MESH\_PARAMS data block is removed or edited). The revised library has preliminary support for non-manifold (branched) cracks. It also now allows crack insertion into a single mesh facet along with other improvements to the template.
- 7) The old crack insertion and meshing library is no longer an option, so the “new library” option has been turned off in the preferences and crack insertion dialogs.
- 8) The advanced meshing tab in the preferences dialog displays the new meshing parameters. The franc3d.rc or franc3d.ini file will be updated with the new parameters; old parameters that are no longer used will be ignored.
- 9) The ellipsoid void sizing is fixed.
- 10) There are additional checks and automated adjustments to crack front fitting and growth for fronts that are approaching a surface or that have split after reaching a surface. An additional parameter “check\_fit” was added to the GrowCrack command to turn the automated checks on/off. By default, the checks are off if using the GUI.
- 11) Add resolved SIF in the maximum shear direction for single crystals.
- 12) There are several edits to the dynamic rainflow counting, including the option to choose  $da/dN$  instead of  $\Delta K$  as the pairing metric.
- 13) Fixed the table display for SIFs and T-stress, specifically for cases where there are no results for a load substep.
- 14) Turn off initial crack length option in SIF history dialog if the start step is not zero.
- 15) The documentation has been updated to reflect the Ver 8.1 changes.

## Changes to FRANC3D from Version 8.0.2 to 8.0.3

Feb 7, 2022

- 1) Updates for handling poor aspect-ratio Bezier surface patches; fixes some crack insertion/meshing issues.
- 2) Allow for crack insertion into a single mesh facet.
- 3) Add support for ANSYS /nolist command in .cdb file.
- 4) Fix issue with ABAQUS \*boundary submodel data.
- 5) Throw/catch pyramid error when using ABAQUS volume meshing.
- 6) Updates to partial crack front propagation; smooth the geometry boundary near the crack front.

- 7) Fix spectrum dialog issues when editing in GUI.
- 8) Check file path for local and global model portions from the SubModel command; this fixes the errant ANSYS /cwd output to the LOCAL and GLOBAL .cdb files.
- 9) Fix resonance blossom integrations when  $K_{max} < 0$ .
- 10) Add the Check-Input-Mesh flag to command language, for batch and Python processing.
- 11) Turn off default translation of user-mesh-void in GUI.
- 12) Disable initial crack length if start step  $> 0$  for SIF history and fatigue cycles along a path.

#### Changes to FRANC3D from Version 8.0.1 to 8.0.2

Jan 4, 2022

- 1) Fix surface pressure mapping adjacent to crack mouth edges.
- 2) Fix constraint mapping at a corner of two lines/edges.
- 3) Use the generate keyword for node and element sets in ABAQUS .inp file.
- 4) Process ABAQUS \*system keyword for mesh-only reader to support user-mesh cracks.
- 5) Process additional ABAQUS commands that include surface or set names to make sure the name is "flattened" for part/instance.
- 6) Add user-mesh voids.
- 7) Prevent user from selecting void type and symmetry crack options in flaw wizard.
- 8) Prevent user from adding symmetry and non-symmetry cracks together.
- 9) Output additional error messages when reading crack growth settings.
- 10) Fix EP J display settings in GUI.
- 11) Bug fix for total passes when  $dK$  is below threshold.
- 12) Bug fix when reading older version .crk file format.