

# NASGRO v9.01 Additions, Changes and Fixes by NASGRO Module

5-Dec-18

Category	Applicable NASGRO Module								Description	
	NASGRO Main Config Control	NASFLA	NASSIF	NASCCS	NASGLS	NASMAT	NASBEM	NASFORM		Users Manual
Addition		X	X	X						Implemented metric unit system M3 [mm, mm/cycle, N, MPa, MPa*sqrt(m)] for constant closure model and strip yield model.
Addition		X	X	X					X	TC37: net-section stress (NSS) checking module was added, which handles six subcases defined by two different boundary conditions and three crack tip locations. The derivations of the NSS formulations were added to the Appendix B of the NASGRO manual.
Addition		X	X	X					X	TC35: net-section stress (NSS) subroutine was added for a newly introduced bending constraint option. Appendix B was updated with pertinent addition.
Addition						X				Warning added to NASMAT when fitting threshold data if the resulting value for Cth+ is outside the following bounds: $-0.50 \leq Cth+ \leq 10.0$ .
Addition						X				Warning added to NASMAT when fitting threshold data if the resulting value for Fth+ is outside the following bounds: $0.0 \leq Fth+ \leq 8.0$ .
Change		X				X				References for da/dN data for 2524-T3 sheet, 6156-T6 sheet, 2099-T83 extrusion, and 2024-T42 sheet/plate were updated to reflect that testing was performed at NASA-JSC for IAI.
Fix		X			X					Due to a code indexing error, the following crack cases were excluded from certain GUIs' cracked body type lists in the Crack Case Library dialog, as follows: -CC20 was missing from cracked body type:plate for NASFLA; -EC05 was missing from "plate" cracked body type:plate for NASGLS.
Fix		X								NASFLA GUI FAD plotting for multi-runs (using the "Do parameter analyses" option on the Computations tab) was not enabled.
Fix		X								TC24 width dimension was not reduced by half when compared with the crack depth resulting in incorrectly terminating the computation.
Fix		X								Output echoes of TC24 applied displacements shown to be zero. It's resolved by revising the display format in scientific format.
Fix						X				Under Windows 10, on the "Curvefit/Plot" tab, clicking any button while a threshold text control (Smax/SIGo th, Alpha th, DK1, CTh+, Cth-, DK1f, Fth+, Fth-) is active resulted in the GUI closing.
Fix		X	X	X					X	TC35: Fixed a bug in NSS force and moment formulation for S2 stress gradient. Revised the Appendix B of the manual accordingly.
Fix		X								Crack cases CC09, EC04, SC06, TC06, TC07, TC08: The Failure Criteria options on the NASFLA GUI Material tab were not being shown, when "New Data" was selected as the Data Source, for the Data Formats "NASGRO equation constants" and "I-D table: da/dN vs dK".
Fix		X								In the NASFLA GUI, when saving user-defined material data to the user material database, the three new fields for the Failure Criteria options for "FAD:API 579 L3 Method A", and "FAD:API 57 L3 Method B": (min yield, mean E, and Lr max), will now also be saved to the material record.
Fix		X								DT & KT models did not run when requesting tabular data to be saved to file. The saved-to-file features were not implemented in v9.0f. The revised version should resolve this issue. This erroneous scenario could be found in all KT and DT models.
Fix		X								SC30 multi-block NASFLA analysis deck working in v8.2 but not working in v9.0f. The issue was identified from the data type in API functions to store the number of cycles per step. It was declared in terms of integers. The truncation for fraction of a cycle resulted in 0 cycles and computation termination. The revision uses the floating data type to resolve this issue.
Fix		X								The saved values of material parameters p, q, DK1, Cth, and Cth- were loading incorrectly, as blanks, from the GUI input file.
Fix		X								Missing crack tip designation names in final "analysis results" session of old OUT1 files for ECXX (four tips) crack models. The scenario was not observed in new OUT files.
Fix		X								The "saved-to-file" option for KT01 NASFLA generated all-zero columns in DATBSI file. The code for the "linear" and "hermite" interpolation options was not implemented for the "saved-to-file" option. The revision includes these updates.
Fix		X								Inconsistent final schedule number when no crack growth is detected. An incorrect variable was printed resulting in this issue. The revision should resolve this erroneous final result.
Fix		X								Computation for two SC04 scenarios could not be completed. A bug was found where the "kind" of crack model was overwritten during the generation of reference solution tables.
Fix		X	X	X	X					Crack case DT01: corrected the default internal interpolation type to be "Linear". The on-screen label showed Linear, but internally, the type was incorrectly Cubic Spline.
Fix		X	X	X	X					GUI plotting of user stress files using commas as separators did not work.
Fix		X								When plotting long block spectrum files, the stress quantity labels were not displaying correctly in the plot legend for Min-Max spectrum plots. Incorrect stress quantities were being shown (S2 instead of S3, for example).

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Fix					X				NASGLS transition problem (SC30 to TC12); analysis never finished. An uninitialized flag inside DLLs for NASGLS was identified to cause the program to run in interactive mode. Initializing the variable resolved the problem.
Fix					X				NASGLS OUT1 file did not print output for every load step. The output statements for the new OUT1 files were implemented to resolve this issue.
Fix			X						When loading an input file with the Block Type "Select file(s) containing long block", "Generate standard long block" and "Generate acceptance vibration block", the "Check if Kmax>Keac" checkbox value will not load properly, defaulting to "unchecked".
Fix			X						GUI crashed when selecting first 8 items in "show selected details" window of NASFLA Computation GUI tab. The pitfall was a redundant data line in new OUT2 file leading to GUI crash as a result of parser error. The update resolved this unstable software crash issue.
Fix				X					Plotting of SC31 NASSIF results was running into an infinite loop. Current plotting function for SIFs in DLLs can only support up to two crack tips. The subject SC31 analysis is a 3D case. The revision added a check in the pre-API routine to capture this inconsistency and terminate the computation, instead of allowing this error to trickle down into post-API and get stuck in the infinite loop.
Fix			X						When the on-screen values of the Cth and Fth material parameters (DK1, Cth, Cth-, DK1f, Fth, Fth-) were changed, an internal issue occurred when saving the input file, causing these new values to not be saved.
Fix			X	X	X	X			There was an inconsistency between GUI polynomial input display and documentation Appendix C. The on-screen column labels in the grid for entering polynomial crack plane stress definitions have been changed from "Coef 1, Coef 2, Coef 3, Coef 4, Coef 5, Coef 6, Coef 7", to "Coef 0, Coef 1, Coef 2, Coef 3, Coef 4, Coef 5, Coef 6", to correctly correspond to the user documentation of the polynomial equation in Appendix C.
Fix			X	X	X	X			When working in metric units systems with multi-temperature data, or converting between US and any metric system, multiple field were being erroneously left unconverted (D1 in SIF compounding, residual stress tables, FAD parameters, some multi-temperature material information) or occasionally double converted (some multi-temperature material information).
Fix			X	X					Crack Case KT03: When changing the crack tip on the "Geom Tables" tab with t1,t2 enabled, the t2 grids are not updating, resulting in only the t1 grid values being retained.
Fix			X	X					Crack Case KT03: When changing crack tips on the "Geom Tables" tab, the grids were not properly updating on screen, leaving users unable to fill in any grids other than the first crack tip.
Fix			X						Missing advisory message in new OUT1 file when SIF ratio R is less than -2. The subject case had computed SIF ratios, R, less than -2, and the old OUT1 file showed the correct advisory message. Additional output statements were implemented in the update to clarify this issue.
Fix			X						When using the Walker equation on the "Material" tab, the a <sub>0</sub> and Dkth fields were not being written to the batchfile, blocking computation. Further, when utilizing the Walker equation with user data selected, the a <sub>0</sub> and Dkth fields were not being displayed to allow users to alter or update the values.
Big Fix			X						Loading multiple input files where the material file cannot be found -- such as a specified user file that does not exist, or does not exist in the location specified in the input file -- can crash NASFLA under some circumstances.
Fix				X					Crack case CC23: an internal indexing issue caused an incorrect value to be written to the NASCCS batchfile for the a/c ratio.
Fix				X					On the "Load Blocks" tab, deleting a "Stress scale factor" entry without replacing it would result in the change not being saved. NASFLA would run computations using the previous value, instead of properly alerting the user that there was a missing value. This would result in users seeing erroneous results and has been fixed..
Fix			X	X					For SIF Compounding, the number of defined tables for a given stress quantity and crack tip was not being saved correctly to the input file. When these incorrect settings were then read from the input file, the number of tables was incorrectly being set to 1 in the GUI, despite there being more table data (second, third tables, etc.), which caused the additional table data to be missed, and not written to the batchfile, thereby affecting the computed output.
Fix				X					Plotting TC32 beta correction factor did not terminate computation and resulted in an infinite loop. An error was found in plotting routines leading to them being stuck in infinite loop requesting more information in interactive mode. It's been resolved.
Fix			X	X					Crack case TC34: an incorrect crack tip assignment for this crack case prevented SIF Compounding data from being entered on the GeomTables tab when SIF Compounding was selected on the Geometry tab.

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Fix			X						Crack case CC20: Geometry edit checks were erroneously excluded for this crack case for the NASSIF GUI.
Fix		X							Fixed the DLL problems with the third metric unit system (M3) in the FAD failure criteria and cyclic shakedown capabilities, where the stress intensity factors were not converted to the correct unit (MPa√m) before da/dN calculation and failure check.
Fix			X						Crack Case TC28: On the "Output Options" tab, the "Select output format" radiobox was improperly re-enabled when loading or selecting TC28 after loading an previous TC28 input file. The "Plot solutions" option is not a valid option in this radiobox for TC28.
Fix		X							Crack Case SC17: Express mode on the "Output Options" tab is not properly re-enabled when changing the Shakedown option to "none".
Fix		X							Crack case TC13: The old OUT2 file shows F0 and F2 for remote tension and pin load instead of F0 and F3. The inconsistency did not occur in new OUT1 files. It's been resolved in the update.
Fix		X							Array overflow caching the code in Debug mode when using a TC12 NASFLA input deck. The array at fault has been expanded to account for four stress quantities and one residual stress.
Fix								X	Table of Contents page numbers of the main manual were out of order. Made corrections and updated pdf and doc files.
Fix		X							On the "Build Schedule" tab, on the "Details" column for the "Summary of distinct blocks already defined" grid, user-entered changes were being erroneously overwritten when changing between blocks. User-entered changes will now only be overwritten when changing block types.
Fix		X							On the "Load Blocks" tab, when using "Input cycles and stresses manually", right-clicking to "Save grid to BLOCKS database" would erroneously generate the error message "Spectrum Error: Some grid cells for block X are empty" even when all grid cells were properly filled, blocking the data from being saved.
Fix		X	X	X					Computation completed with memory crash when Linux version of DLLs was developed. Memory leak from incomplete memory deallocation and pointer nullification was identified resulting in the crash. Both v9.0f and v9.1a RC had the same issue.
Fix		X							FAD assessment line does not plot when limit stress option is selected. The error was found from the inconsistent labels for FAD loci in OUT2 files in accordance with GUI requirement.
Fix		X							Multiple temperature application showing same alpha and Smax/flow stress ratio in OUT file. A section of software code that had been commented out in v8.2 was found not being carried over to v9.0. This error imposed using the properties at first temperature for the subject two parameters.
Fix		X							Large NASGRO load blocks caused NASFLA analysis to crash. The problem was identified to be with the stack size originally allocated to store load spectrums in binary form. It appears converting the program from 32-bit to 64-bit needs to reduce this stack size slightly to prevent overflow.
Fix		X							Long block with CC08 remote load scenario crashed the program. The pitfall was found from the incorrect handling/stacking the long blocks in the routine to determine the initial crack site. The error overflowed the array elements and resulted in program crash. Both v9.0 and v8.2 were fixed for the same root cause.
Fix				X					SC04 NASCCS completed with error showing inconsistency in batch file. The problem was identified that a few statements in the parser located in the pre-API routines were misplaced. Fixing it resolved the issue. This erroneous scenario occurred only when internal pressure is not used.
Fix		X							Values for the Walker equation constant "C" were not being loaded from the input file into the Walker equation constants grid on the NASFLA GUI Material tab.
Fix		X							User constant Kc from Klc input cell did not work; analysis terminated w/o result. For this specific scenario, an error was found in the pre-API routine when parsing the batch file.
Fix		X	X	X					No difference in SIF found for CC19 crack model with one or two symmetric cracks. A typo in the source code resulted in an invalid flag to indicate the crack status. This was identified a v9.0 issue.
Fix		X	X	X					Internal source discrepancy found in CC21 on the definition of "r" and "d". It was found reversed. The fix had been applied in v8.2 but appeared never becoming effective in v9.0.
Fix			X						Computing SIFs using NASSIF for KT models only showed partial output. Uninitialized character strings were found causing GUI's parsing problem to show only partial OUT1 result in Output Windows.
Fix			X						Crack case TC16: Removed extraneous data line from NASSIF batchfile that prevented the analysis from running.

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Fix		X							Enabling FAD analysis option for NASFLA inverse computation. Starting from v9.01, this option is enabled for NASFLA invoking indirect solution approach.
Fix		X							Computed Lr for SC05 subjected to pure bending appeared too small. An error was found in the equation to compute bending moment for SC05. The revision has been applied to v8.2, v9.0 and v9.1.
Fix		X							SC31-CC09-TC12 NASFLA failed to complete once crack transitioned into TC12. The problem was found from internal stress transformation for bivariant crack models, which lead to non-zero coordinate at the stress origin. This caused the OPS routine for univariant stress gradient to behave erratically.
Fix						X			Plot of threshold fit listed incorrect version number and date.
Fix		X							Crack case TC35: When selecting "residual stress" the OPS checkbox is not being properly disabled.
Fix		X							Crack case TC35: TC35 NASFLA results showed no difference for analysis with and without residual stress. The feature was found not implemented in Fortran DLLs during verification. It's now available in v9.0 and v9.1.
Fix		X							Crack case TC28: Klmit values for TC28 were larger than Kmax values even with larger stress scale factors for limit stresses. An inconsistency was found when computing Klmit where the reference crack length was "c2" instead of "c".
Fix			X						Crack case TC28: Tabulated SIFs or correction factors for TC28 contained inconsistent crack tip label "cB." The crack tip label has been corrected in accordance with the designation depicted in GUI bitmap.
Fix		X							Crack case CC11: No echo was shown for the selected post-transition geometry option: TC12 or TC28, for CC11 crack model. The echo statements have been implemented and the revision applies to CC11, CC01 and CC09.
Fix		X							After an analysis completes, GUI would not display Material input data or Spectrum Input data if that analysis used SIF Compounding, due to an internal code indexing issue.
Fix		X							Crack case CC11: If a completed analysis had transitioned to crack case TC28, when viewing the output data in the GUI's "view output" window, the column header labels for c- and c2-related data were reversed: the column 'c' would contain 'c2' data, and the 'c2' column would contain 'c' data.