

A major enhancement for NASGRO™ Version 4.0 is the implementation of **completely redesigned user interfaces** for each NASGRO analysis module using WxWindows 2.0. All input information is now readily available for entry, review and modification. Many options were also added to conveniently allow the user to view, print and plot NASGRO analysis results. Additional new features and improvements in NASGRO 4.0 include:

- **Stress intensity factor solutions were expanded** to include new crack cases based on the 3-D weight function method to deal with arbitrary stress variations. New stress intensity factor solutions include CC05, CC06, and SC15, based on 3-D weight function methods and BE02 and BE03 based on tabular data automatically computed by the boundary element module. The TC05 solution was also completely revised using NASBEM. A new timesaving feature in NASGRO 4.0 allows multiple runs for the same crack case using different geometric parameters or scale factors.
- **Several new spectrum formats** have been implemented. In addition, an option to conduct range-pair or rain flow cycle counting of long, typical aircraft spectra has been implemented. A capability to read long load spectrum blocks in various formats and convert them to the standard NASGRO format was also added.
- An **elastic-plastic module** to analyze crack growth and instability is now available for a limited number of crack geometries.
- **Improvements to the threshold equation** and associated material constants were made based on Delta-K threshold at $R=1$.
- **Revisions to the material database** were made including the addition of a number of new materials and new curve fits.
- An option to **bypass the net-section stress failure criterion** was implemented.