LexTech

AFGROW.NET

AFGROW Workshop 2014

AFGROW Release 5.3 and beyond

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AFGROW.NET

Feature List for the release 5.3

- 64 bit version
- **New weight functions solutions (crack at hole, stress distribution in C-direction for part through cracks)**
- **Using different material data as a function of spectrum**
- **Applying different material data to the different crack directions**
- Ability to Replicate Results From Previous Versions (back to Version 5.01)
- **Option to Save Input File With Retardation State Data for Later Restart**
- Undo-Redo
- **New solution for a corner crack at the countersink knuckle**
- MSD
- **Server based material database – requested by Gulfstream**
- 2-D weight functions
- Convert material data from the AFMAT to useable format in AFGROW
- Crack Growth rate plugin
- AFGROW output post processing
- **New 2 D table of the residual stress data (similar to the 2-D user defined beta)**

Bold – Work started
Red – High Priority

Minor Requests

- Output intervals printed in "hours" if the option to display life in hours is selected in the Output Intervals tab
- Also, the crack length plots should be converted to hours
- In the Propagation Limit tab, the option to stop at a cycle limit should be automatically switched to hours if the User has elected to display the life in hours.
- For the Lug Boundary Conditions tab, it is currently not possible to use the bearing B.C. for through cracks - this needs to be fixed ASAP.
- Add some type of warning in the lug dialog box to let User's know which B.C.s are being used - or at least notify them that the B.C.s are set in the Predict, Preferences dialog.
- Consider adding a failure criterion based on R-curve data
- Consider adding more warning messages to Users about input parameters than could result in poor life predictions. The concern here is for more novice Users who may be tempted to think that AFGROW's User Friendly Interface is a substitute for a good working knowledge of Fracture Mechanics.

Minor Requests

- Consider adding an option to control the % of the axial load solution that is used to approximate the out-of-plane bending solution for straight through-the-thickness cracks.
- Action item for Jim: Compare the current oblique crack solution for the through crack at a hole to the results of differing % of the axial solution for a straight crack at a hole (in terms of the predicted life).
- Add a notification in the weight function dialog box to explain the limitations of the stress distributions for part-thru cracks.
- Add the capability to use the current 2-D User-Defined Beta model for 2, interdependent through cracks that can be assigned different plate thickness values. This is needed to accommodate the NASGRO crack growth rate model that is a function of thickness, but would also allow the local stress state to be estimated independently for each crack. It would also be a quick and easy way to solve additional cases without developing a Plug-In module. An additional crack growth model could be added to the Classic Interface showing an image of an "L" section with a crack defined along each leg with 2 thickness parameters.

Minor Request-Spectrum Tool

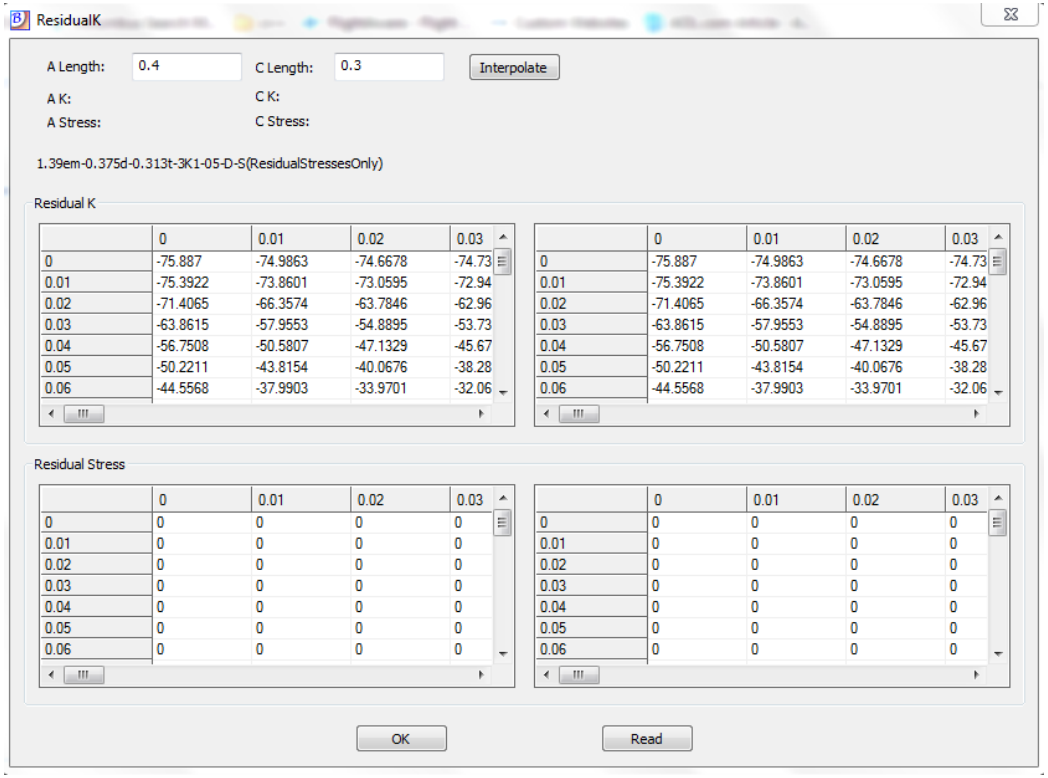
- Add the ability to randomize load levels within a given sub-spectrum.

New weight functions solutions

- Added 3 new solutions
  - Corner cracks with stress distribution along C direction
  - Single through edge crack with symmetry condition at the crack edge
  - Single through edge crack with symmetry condition at the edge away from the crack
- Status: Finished coding the solutions, coding verification is done, testing solutions accuracy and applicability, AFGROW GUI modified
- To do: finish testing the accuracy and applicability of the solutions

New 2-D table of the residual stress data

- Requested and sponsored by APES
- Status: Finished the coding, GUI development, verification, and testing.



New solution for a corner crack at the countersink knuckle

- Based on Jody Cronenberger master thesis
- Tension loading only
- Solution Space:
  - D/T – 0.3 to 2.6;
  - Cd (Countersunk Depth)/T - 0.001 to 0.99 (0.15),
  - C/T - 0.0125(D/T) +0.002 to 2.5(D/T)
  - A/C/T – 0.5 to 4
- Status: Finished coding the solution implementation
- To do: Understand the solution boundaries and do verification runs, add COM API support, finish GUI integration

Using different material data as a function of spectrum
Applying different material data to the different crack directions

- Requested and sponsored by SAFE Inc.
- Status: Finished the Spectrum Tool changes, started working on AFGROW GUI and coding changes
- To do: Finish AFGROW coding, AFGROW testing and verification

Status of Release 5.3

- New weight functions solutions (crack at hole, stress distribution in C-direction for part through cracks) **- 90%**
- Using different material data as a function of spectrum – 7**0%**
- Applying different material data to the different crack directions - **60%**
- Ability to Replicate Results From Previous Versions (back to Version 5.01) – **20%**
- Option to Save Input File With Retardation State Data for Later Restart – **25%**
- Undo-Redo – **0%**
- New solution for a corner crack at the countersink knuckle – **50%**
- MSD – **0%**
- New 2 D table of the residual stress data (similar to the 2-D user defined beta) – 9**0%**