

## AFGROW Workshop 2024

# AFGROW Future Development

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# Agenda

1. Proposed and prioritized future features list
2. Recently requested features
3. What new features would you like to be added to AFGROW?

# Post 5.5 development

Scale: 10 most important

- Countersunk hole solution (10) . **How many B/T ratios do we need? (Probably more than 3)**
- Make changes to allow the use of spectra with three load channels (8.5)
- Implement corner crack – oblique crack at hole solution (7.5)
- Spectrum database similar to the crack growth rate database (7.5)
- Update advanced double corner crack solution with the latest FE data (7)
- Incorporate effective width in the bearing beta calculation (5) (Add check box to update bearing load case width)
- Add a stiffened panel solution? (4)
- Track total damage for each growth rate bin in the crack growth rate chart (4)
- Show initial and final crack sizes after prediction is done (1)
- Add a vertical offset to a centered embedded crack (1)
- Add new Special Case with optional crack on the near side of each adjacent hole (TBD)

# Recently Requested Features

- Set stress state separately for each crack direction (Josh Hodges)
- New bearing part-through crack width correction. The current one is too conservative (Alex)
- Open SpectrumManager from AFGROW to view and edit spectrum, send the updated spectrum to AFGROW from SpectrumManager (Alex)
- Add an “optimization” option (Jake)
  - A lot of the time we want to know the max hole diameter that will yield a 20,000 hour life. So we end up doing multiple runs slightly tweaking the diameter to find the max diameter that still produces a 20,000 hour life. It would be nice if there were an optimization feature where the user could define which parameter to adjust (hole diameter in this example) and which parameter to optimize (flight hours in this example). Another example would be adjusting SOLR to get a life that matches a test.
  - I know this could be done with a COM, but it would be more user friendly directly in the AFGROW window.
- Multiple analysis tabs (Jake)
  - Often times I end up looking at multiple analyses simultaneously. Right now I just open multiple instances of AFGROW, but it would be convenient if I could just have multiple analyses open in a single AFGROW instance.

# Recently Requested Features

- Tabular output view (Jake)
  - I know that tabular data can be copied from the Crack Length vs Life plot, or obtained from the .pl2 file, but often times it would be convenient to just see a table as another tab option next to the Crack Length vs Life tab and the Status tab. That tabular output could be reduced to just cycles/hours and crack length or something to make it fit in the small window area well.
- Further analysis stop criteria in the advanced model (Thierry, Ruag)
  - Define A11, A12, C11, C12 stop lengths separately
  - Define stop criterion as soon as first and/or second crack transitions from corner to through
  - Stop the analysis as soon as any crack reaches a “boundary” (free edge or next hole)
- Add an option to have customizable initial property values for the new advanced model objects, such as crack length, hole diameter (Jake)
- Figure out a better way to install AFGROW folder with examples and spectra (Jake and Alex)
- Make sure that the current examples are working, add new and fresh examples, add more standard spectra (Jake and Alex)
- Change *Predict Preferences* to *Predict Preferences* (effect prediction results) and *Options* (do not effect prediction results, just AFGROW customization) (Alex)

# Updates to a Model Dialog Weight Function Page

Model Geometry and Dimensions

Geometry | Dimension | Load | Stress Distribution

**i** AFGROW uses 'uncracked' normalized stress distribution  $S(x)$  in prospective 'C' crack plane and  $S(y)$  in 'A' to calculate stress intensity factors by Weight Functions.  
 $S(x)$  is used for through crack calculation and  $S(y)$  for part through.

Stress Distribution in X Direction: **ONLY**


It is recommended to normalize  $S(x)$  and  $S(y)$  table by stress value in the crack origin  $S(0.0)$ .

Divide active S table  
by: 0

Operations  
Save Read Undo

X direction | Y direction  
Number of Sets: 2

Set	X	S(X)
0	0	1
1	0.4	0.85



OK Cancel Apply Help

# Spectrum Manager Future Development Plans

- Option to build spectrum from smaller blocks than sub-spectrum (Kaylon)

**What new features would you like to be added  
to AFGROW?**