Review of: "An Approach to Robust Fatigue Life Prediction to Be Used in Early Design Stages"

Vivek Kumar Dubey

Potential competing interests: No potential competing interests to declare.

Overall, this is a good effort on the part of the authors. The authors could think through the following to improve the article.

1. The authors mention that D and R have been chosen as they do not alter the rest of the design. While this is a good start, it may be helpful to suggest an alternate design where some changes to the nearest/immediate components are suggested. For example, the four holes that hold the component attached (to the mating part) could be moved out to ensure increased R provides a higher margin of safety. A sensitivity analysis in this regard could help inform the minimum distance between the hole(s) and the radius R that would ensure stress concentration from the hole does not interact with the stress concentration from the radius R.
2. Similarly, it would help to evaluate the impact of the thickness of the plate (keeping the same D but changing the OD) on R first.
3. Thus, considering 1) and 2) above and the impact on R first, then moving to considering D would ‘isolate’ the impact of the surroundings on the components – by providing a higher factor of safety (with minimal additional materials or increasing the envelope size). This would be helpful in regions where there are short flights. Thus, in such cases, the number of hours on the aircraft may be low, but stress cycles on the component would be high (due to many more flights).
4. Have key failure modes and their effects been considered? This could be formally addressed. Where in Figure 1 could they be considered? What is the basis for the three conditions described on page 450 (1, 2, and 3)? The background could be described to justify these conditions.
5. Figure 12 could use a better explanation. For example, the significance of the X-axis (time) to variable stress loading. So, why were such cycles (4 seconds, followed by 2 seconds, followed by 4 seconds) chosen? Are these simulated loads - using a software?
6. What is the basis for the choice of A1 and A2 – noise? And that for the
7. values A1 and A2. How were they obtained? Data from the field? If so, how many data points?
8. How do you choose the mean and std. deviation for the Figure 15 plots? Please explain this.
9. The basis for the choice of the best design needs further explanation. Why is the std. dev. so high? And do minor differences matter? What if the effect is considered material (is the difference between a mean of 12.9 or 12.19, or 11.3 high or material?)? Some explanation would help put it in context.
10. Would a flow chart for the proposed method help the reader?