Accepted Manuscript

Computational modeling of aircraft lugs failure under fatigue loading

Slobodanka Boljanović

PII: S0142-1123(18)30208-1
DOI: https://doi.org/10.1016/j.ijfatigue.2018.05.022
Reference: JIJF 4694

To appear in: *International Journal of Fatigue*

Received Date: 18 January 2018
Revised Date: 5 May 2018
Accepted Date: 21 May 2018

Please cite this article as: Boljanović, S., Computational modeling of aircraft lugs failure under fatigue loading, *International Journal of Fatigue* (2018), doi: https://doi.org/10.1016/j.ijfatigue.2018.05.022

Computational modeling of aircraft lugs failure under fatigue loading

Slobodanka Boljanović

[1]Mathematical Institute of the Serbian Academy of Sciences and Arts,
Kneza Mihaila 36, Belgrade, Serbia,
e-mail: slobodanka.boljanovic@gmail.com

* Corresponding author; phone: +381 63 805 60 85, fax: +381 11 35 11 282

Abstract

In the present paper, a computational model of failure is developed to assess the fatigue behaviour of damaged aircraft lugs. In such a fracture mechanics-based analytical/numerical research work, the residual strength of lugs with either a through-the-thickness crack or a quarter-elliptical corner crack is estimated, and then, through the experimental observations found in the literature, some applications are discussed. A stress field of pin-loaded linkage is numerically analyzed by using the finite element method. The failure resistance of lugs is quantified through the Huang-Moan crack growth concept in terms of fatigue life and crack path. The relevant crack driving forces are examined through a new analytical model, taking into account the effect of a lug head and the width-to-diameter ratio effect.

Keywords: Aircraft lug, Fatigue strength, FEM, Quarter-elliptical/through cracks, Crack path