

DAMAGE TOLERANCE AND CRACK GROWTH ANALYSES OF ALUMINUM 2024-T3 AND ALUMINIUM 7075-T7351 USING MATLAB SOFTWARE

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ABSTRACT

Fatigue is a type of damage or failure caused by repeated loads. Fatigue failure in aircraft structures has become a very important problem due to its potency in inducing considerable losses. This phenomenon may cause a structural element to decay within a shorter duration than the designed one. This final project analyzes the methods to predict the damage tolerance and crack growth of plates made from aluminum 2024-T3 and aluminum 7075-T7351. The crack types analyzed in this study are single edge crack and center crack tension plate. The analysis aims to create an in-house Matlab-based program which involves initial crack on the analyzed plate.

The outline of this research is described as follows: literature study, comparison of several theoretical methods, crack growth analysis using Matlab-based programs, and comparing the obtained results between Matlab and D'Crack programs. D'Crack is a software used by PT. Dirgantara Indonesia to predict the crack growth of a component.

The research output reveals some differences between the results of Matlab-based program and D'Crack software. The differences are mainly due to the unknown method used in D'Crack software, which may lead a possibility of employing different method between D'Crack and the in-house Matlab-based program. In the case of single edge crack, the difference is 0.439% for Al 2024-T3 and 33.604% for Al 7075-T7351. Meanwhile, for center crack tension plate, the differences are 19.562% and 53.821% for Al 2024-T3 and Al 7075-T7351, respectively.

Keywords: *fatigue, crack, Matlab, D'Crack*