The effect of stacking sequence on foreign object damage to CFRP laminates

R. Higuchi, and *T. Okabe

Department of Aerospace Engineering, Tohoku University, Japan. *Corresponding author: Okabe@plum.mech.tohoku.ac.jp

Foreign object damage (FOD) is one of the most serious problems when we apply CFRP laminates to aircraft structures, and the FOD properties of CFRP laminates usually depend on the stacking sequence. We can thus improve the FOD properties by changing the stacking sequence. Numerical simulation is more useful than experiments for observing the effect of stacking sequence on the FOD properties because there are numerous possible stacking sequences. This study seeks to establish a numerical simulation method for predicting FOD properties and to observe the effect of the stacking sequence on the FOD properties. In this study, three damage models were applied for FEM analysis: the smeared crack model, continuum damage mechanics (CDM), and cohesive element. Finally, we observed the effect of the stacking sequence on the FOD properties of CFRP laminates using the proposed numerical simulation method.

Keywords: Out-of-plane Impact Simulation, Stacking Sequence, Smeared Crack Model, Continuum Damage Mechanics, Cohesive Zone Length