

Vibrational Analysis of a Wing During Cruise Speed

Anas yahya Bin Mahfooz

Institute of Aeronautical Engineering, Hyderabad, India

Abstract:

In our project we are going to analyze the stress distribution over a modern passenger aircraft due to vibration that had been induced during cruise flight. We had taken a subsonic passenger aircraft as a reference flight and analyzed using FEA optimization tool (ANSYS WORKBENCH). Due to high speed the maximum lift force will be produced over the wing surface. Hence due to this lift force and G-Forces the aircraft wing will starts to vibrate this will reduce the stability of an aircraft. The boundary conditions are taken from the passenger aircraft survey reports including maximum lift force distribution over the wing and the G-Forces is calculated. In this project we had taken the maximum load condition because while optimizing an aircraft extreme load condition will be considered. By this analysis we can able to find the natural frequency of an aircraft wing design and from this result we can able to optimize the wing support structures of an aircraft. The main advantages of this project are we can increase the aircraft stability during cruise and also we can increase the life of an aircraft wing and its support structures.

Keywords:

Vibrational analysis, Stress distribution, Finite Element Analysis (FEA), CATIA V5 R19, Subsonic passenger aircraft, Wing stability.