

Vibration Control of Stiffened Plates with Integrated Piezoelectrics

Jin-Young Jung, **Ji-Hwan Kim**

Seoul National University, Seoul, S. Korea

The model is a laminated composite plate with stiffeners and PZT piezoceramic layers embedded on top and bottom surfaces to act as sensor and actuator, respectively. A uniformly distributed blast pressure is assumed over the entire plate surface for the sake of simplicity. The first-order shear deformation theory is adopted and the Hamilton's principle is used to derive the finite element equation of motion. The stiffness of a stiffener is reflected at all nine nodes of the plate element in which it is placed. The modal superposition technique and the Newmark-beta method are used in numerical analysis to calculate the dynamic response. Using linear quadratic regulator control, vibration characteristics and transient response are studied. When piezoelectric patches are distributed on the entire surface of plate, the effect of stiffener's location is investigated. Furthermore, the effect of piezoelectric patch's position on the transient response of the stiffened plate subjected to blast load is also studied.

[View the extended summary](#)