In this study, the vibration analysis of heterogeneous orthotropic plates is investigated using shear deformation plate theory (SDPT). The basic equations of functionally graded (FG) orthotropic plates with account taken of shear deformations and rotary inertia are derived using Donnell theory and solved using Galerkin method. Finally, the combined effects of transverse shear deformations, rotary inertia and material gradient with the variation of plate characteristics on the frequency parameter are studied in detail.