In this investigation, fiber-reinforced composite plates subjected to low velocity impact are studied by the use of finite element analysis (FE). Mindlin's plate theory is implemented into the FE approach in which a 9-node Lagrangian element is considered. Dynamic stress analysis is carried out by the use of a constitutive equation of composite laminates without damage. A parametric analysis shows that the increase in the percentage of the 90 plies increases the contact force implying a reduction in the rigidity of the laminate. Stresses are calculated at nine Gaussian points of each element of each interface and then averaged. At first, threshold velocities are evaluated for different stacking sequence to predict matrix crack initiation. Then, the impact induces damage at a higher impact velocity including matrix cracking is predicted by the appropriate failure criteria. The present results indicate that matrix cracking appears in the upper 90 plies with the dominance of transverse shear stress