Since the isolation of Graphene occurred in 2004, numerous studies attempting to exploit the properties of this carbon allotrope have been conducted. Graphene exists in a 2-D manner with sp2 bonds, which provides the allotrope with great electrical, conductive, and mechanical properties. In this paper however, we will focus on the latter in order to examine the feasibility of graphene composites for bulletproof material in the military. Pure graphene sheets count with high porosity density that leads to structural defects as well as poor mechanical properties due to physical contact being sole retainer. For this reason, the selected composite is poly(vinyl) alcohol (PVA) graphene oxide (GO). A high density of oxygen atoms causes a decrease in the modulus of elasticity within the graphene sheets. However, this constraint can be sidetracked primarily due to the presence of hydrogen bonds between the individual GO sheets that would have been nonexistent if O would have not been present. Additionally, with the aid of molecular dynamic simulations we evaluate the improved mechanical properties that resulted from the composite as well as test the effects the orientation of the individual graphene sheets has on its mechanical and structural properties.