This paper considers damage development mechanisms in composite laminates subjected to tensile loading. The continuum damage mechanics is the most widely used approach to capture the non linear behaviour of laminates due to cracking. In this study, a continuum damage model based on ply failure criteria, which is initially proposed by Ladevèze has been extended to cover all plies failures mechanisms using an accurate numerical model to predict the equivalent damage accumulation. However, this model requires a reliable representation of the elementary damage mechanisms which can be produced in the composite laminate. To validate this model, a numerical application has been carried on the cross-ply laminates of type [0n/90m]s.. A shear lag model was adapted to calculate the average stress of the 0° and 90° plies. The solution presented is obtained by using finite element analysis which implements progressive failure analysis. The effect of the stacking sequences has been done by varying the thickness of the 90° plies