

# **DETERMINATION OF INTER-LAMINAR SHEARING STRESSES USING A SUGGESTED ANALYTICAL SOLUTION IN THE COMPOSITE LAMINATED PLATES**

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## **ABSTRACT**

In this research, it is suggested an analytical study to determine the inter-laminar shearing stress between every two layers of the laminated composite plates, types; symmetrical and un-symmetrical, cross ply and angle ply laminated plates.

To determine the value of inter-laminated shearing stress, firstly: it must find the stress in every layer of the laminated plates by determination the displacements for the plates. So that, it is suggested a solution for the laminated plates to solve the equation of motion for the composite plates by using the First-Order Shear Deformation Theory (FSDT). Also the theory of Navier solutions is used to find the behavior of the plates in two dimensions. Then, by using model analysis method, the equation of motion for the composite plate is solved to determine the values of the displacements as a function of time due to the effect of a dynamical load. As a result, the stress in every layer of the plate layers is determined and then, the inter-laminated shearing stress is found.

The results which obtained are: the frequency, response, and the stress in every layer of the plate layers. Also, it is obtained the inter-laminated shearing stress under effect of the dynamical loads by the effect of plate side-to-thickness ratio, aspect ratio, material orthotropy, and lamination scheme, number of layer of laminated plate. Finally, variable boundary conditions for the plates are studied.

The results of the displacements are compared with those found numerically (FEM) by ANSYS program. It is found there is a good agreement between the analytical and numerical results. In addition, the results are compared with another results for other research.

**KEYWORDS:** Analysis Plates, Dynamic Plates, Composite Laminated Plats, Inter-Laminar Shear Stresses