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Experimental and Numerical Investigation on Delaminated Composite Plate

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Abstract : Composites are increasingly being used in industries due to their unique properties, such as high specific stiffness and specific strength, higher fatigue and wear resistances, and higher damage tolerance capability. Composites are prone to failures or damages that are difficult to identify, locate, and characterize due to their complex design features and complicated loading conditions. The lack of understanding of the damage mechanism of the composites leads to the uncertainties in the structural integrity and durability. Delamination is one of the most critical failure mechanisms in laminated composites because it progressively affects the mechanical performance of fiber-reinforced polymer composite structures over time. The identification and severity characterization of delamination in engineering fields such as the aviation industry is critical for both safety and economic concerns. The presence of delamination alters the vibration properties of composites, such as natural frequencies, mode shapes, and so on. In this study, numerical analysis and experimental analysis were performed on delaminated and non-delaminated glass fiber reinforced polymer (GFRP) plate, and the numerical and experimental analysis results were compared, and error percentage has been found out.

Keywords : composites, delamination, natural frequency, mode shapes
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