

## Documents

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**Effect of Material Properties on the Behaviour of Cross-Ply Laminated Cylindrical Shells under Thermo-Mechanical Load**

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**Abstract**

Aerodynamic heating is a concern for aerospace structures such as composite laminated shells. A structure which is under axial and bending stress due to mechanical loading might fail if the design process does not consider the possibility of additional stress due to thermal load. This work aims to develop 3D elasticity solution for composite laminated shell under thermo-mechanical loading and analyse the effect of material properties. In this work, 3D linear uncoupled thermo-elasticity solution was developed for thermal bending of simply supported laminated composite cylindrical shell under cylindrical bending. The results from the analysis were validated against the existing benchmark solution for both mechanical loading and thermal loading. Useful results for cylindrical shells under thermal loading were presented for three different composite laminate materials at different thicknesses in tabular and graphical form. It is expected that the benchmark results presented herein will serve as reference to select an accurate higher order model for stress analysis of composite laminates under thermo-mechanical loading. © 2024, Semarak Ilmu Publishing. All rights reserved.

**Author Keywords**

composite laminates; cylindrical shells; elasticity solution; material properties; Thermo-mechanical

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