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Buckling and Imperfection-Sensitivity of Axially Compressed Cylindrical Shells with Compliant Cores

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The extent to which the mechanical properties and dimensions of compliant core materials influence the load-carrying capacity and imperfection-sensitivity of axially compressed circular cylindrical shells is analyzed numerically for a wide range of configuration parameters. Excellent qualitative and quantitative agreement with available analytical and experimental results is obtained, and the conclusion is reached that a comparatively thin layer of compliant core material is sufficient to achieve substantial increases in the respective buckling loads while at the same time the imperfection-sensitivity is significantly smaller than for the unfilled shell and similar weight-optimized constructions.

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