

An Investigation on Hybrid Composite Drive Shaft for Automotive Industry

Authors : Gizem Arslan Özgen, Kutay Yüçetürk, Metin Tanoğlu, Engin Aktaş

Abstract : Power transmitted from the engine to the final drive where useful work is applied through a system consisting of a gearbox, clutch, drive shaft and a differential in the rear-wheel-drive automobiles. It is well-known that the steel drive shaft is usually manufactured in two pieces to increase the fundamental bending natural frequency to ensure safe operation conditions. In this work, hybrid one-piece propeller shafts composed of carbon/epoxy and glass/epoxy composites have been designed for a rear wheel drive automobile satisfying three design specifications, such as static torque transmission capability, torsional buckling and the fundamental natural bending frequency. Hybridization of carbon and glass fibers is being studied to optimize the cost/performance requirements. Composites shaft materials with various fiber orientation angles and stacking sequences are being fabricated and analyzed using finite element analysis (FEA).

Keywords : composite propeller shaft, hybridization, epoxy matrix, static torque transmission capability, torsional buckling strength, fundamental natural bending frequency.

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