



ANALYSIS OF TORSIONAL VIBRATION REDUCTION ON AUTOMOBILE CARDAN SHAFT BY USING COMPOSITE MATERIALS

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Abstract

The drive shaft transfers torsional loads from the gearbox to the rear axle for vehicle motion. The dynamics of the drive shaft can be very complex because although one head of the shaft is fixed to the gearbox, the other end can move in the vertical plane when the vehicle is running on an uneven road. The drive shaft is twisted and bent at different rotational speeds. When the torsional oscillation frequency of the drive shaft coincides with one of its natural frequencies, it will induce resonance and therefore causing structural damage.

The paper presents the analysis of the drive shaft's natural frequencies with two different materials, one using the conventional sheet metal and one using the composite material. The calculations can be used as the basis for designing the drive shaft in the vehicle powertrain system of vehicles. The results of the study have shown the effectiveness of using composite materials for the drive shafts in the automotive powertrain system. Based on this study, it is also suggested to use composite materials for some other shaft parts in the vehicle.

Keywords: Cardan shaft, Torsion vibration, Composite material