

## Modal and Stress Analysis of Spur Gear in DC Motor Gearhead using Finite Element Model

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### 초록(Abstract)

In electric agricultural machine the gearhead is needed to convert the high speed low torque rotation motion generated by DC motor to lower speed high torque motion used by the vehicle. The gearhead consist of several spur gears works as reduction gears. Spur gear have straight tooth and are parallel to the axis of the wheel. Spur gears are the most easily visualized gears that transmit motion between two parallel shafts and easy to produce. The modeling and simulation of spur gears in DC motor gearhead is important to predict the actual motion behavior. A pair of spur gear tooth in action is generally subjected to two types of cyclic stress: contact stress and bending stress including bending fatigue. The stress may not attain their maximum values at the same point of contact fatigue. These types of failure can be minimized by analysis of the problem during the design stage and creating proper tooth surface profile with proper manufacturing methods. To improve its life expectation in this study modal and stress analysis of gearhead is simulated using ansys work bench software based on finite element method (FEM). The modal analysis was done to understand gearhead deformation behaviour when vibration occurs. FEM static stress analysis is also simulated on gearhead to simulate the gear teeth bending stress and contact stress behavior. This methodology serves as an approach for gearhead design evaluation, and the study of gear stress behavior in DC motor gearhead which is needed in the small workshop scale industries.

### 키워드(Keywords)

Spur gears, Stress analysis, Modal analysis, Gearhead

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