

Study of Effect of Gear Tooth Accuracy on Transmission Mount Vibration

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Abstract : Transmission dynamics occupy major role in customer perception of the product in both senses of touch and quality of sound. The quantity and quality of sound perceived is more concerned with the whine noise of the gears engaged. Whine noise is tonal in nature and tonal noises cause fatigue and irritation to customers, which in turn affect the quality of the product. Transmission error is the usual suspect for whine noise, which can be caused due to misalignments, tolerances, manufacturing variabilities. In-cabin noise is also more sensitive to the gear design. As the details of the gear tooth design and manufacturing are in microns, anything out of the tolerance zone, either in design or manufacturing, will cause a whine noise. This will also cause high variation in stress and deformation due to change in the load and leads to the fatigue failure of the gears. Hence gear design and development take priority in the transmission development process. This paper aims to study such variability by considering five pairs of helical spur gears and their effect on the transmission error, contact pattern and vibration level on the transmission.

Keywords : gears, whine noise, manufacturing variability, mount vibration variability

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