Abstract

All over the world, gear drives could be found in different mechanical systems and various settings for transmitting motion and power. The bending and pitting stress considered to be the main failure modes of the gears. Thus, analysis of stress and optimization has become popular gear design. This study aims to create a thorough understanding of bending and pitting stresses in spur and helical gears. It involved a comprehensive review and wide assessment analysis of the finite element technique and analytical approach with consideration of American Gear Manufacturing Association (AGMA) for gears on bending and pitting stresses. The spur and helical gears modeled using SolidWorks and a finite element analysis (FEA) conducted using SolidWorks simulation and ABAQUS CAE software, then, comparative analysis performed with consideration of several parameters for example, young's modulus, poisson's ratio, face width, torque and gear ratio. The results reveal a good agreement between FEA and AGMA standard for both gears, furthermore, the bending and pitting stresses decrease with increasing each value of face width and gear ratio, while increase with increasing the torque value. However, as young's modulus increases, the pitting stress increases, while bending stress remain constant. So that, this comprehensive study would be a good approach for designers for optimal gear design.