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Abstract

The authors have worked on pitting failure of spiral bevel gears with special reference to gear boxes used in trucks. spiral bevel gears are commonly used in truck differential. The authors have analysed the fracture of spiral bevel gear by considering the specimens prepared from the damaged gears. Their examination consisted of visual inspection, hardness, chemical analysis and metallurgical testing. Pitting formation on the surface of the gear teeth was observed. low surface hardness values were found. Based on the experiments and results obtained by the authors the following conclusions are drawn.

- In this research, the influence of microstructure, chemical composition and hardness of the gears were investigated and contact stress was calculated. From the experimental observations and calculations, the following conclusions may be made.
- In order to obtain same hardness and microstructure, the gear materials should be of same chemical composition.
- The surface hardness of gears is low. In order to obtain maximum pitting resistance, the gears outer surface hardness should be increased to 58-60 HRC.
- In order to obtain different microstructure between core and surface, carburizing heat treatment should be made using proper conditions, such as time, case depth. The case depth should be under control.
- Due to the high tooth-contact pressure, oil film thickness may not be enough. The lubrication could be difficult, and hence the pitting occurrence increases. On the examination of fractured parts, it can be concluded that the gears expose to overloading. In order to decreasing contact pressure, the gears geometry can be optimized in design stage or the pinion design torque can be decreased.