EFFECTS OF SEED OILS, LOAD AND SURFACE TEXTURE ON SLIDING WEAR OF QUENCHED PINS SLIDING ON CARBURIZED DISCS

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ABSTRACT

The effect of load variations, quenched pin, lubricant oil types, carburized disc and disc surface texture on the sliding wear behaviour of a pin–on–disc experiment was investigated. The experiment was carried out with four pairs of quenched pins, four pairs of un-heat treated pins (to serve as control), four pairs of carburized discs and four pairs of un-heat treated discs (to also serve as a control). Each pin was allowed to run against lubricated rough and smooth surface mild steel and carburized discs respectively. The experimental parameters include: loading conditions (1 kg, 2 kg and 3 kg); sliding speed (750rpm); sliding duration (30 minutes);lubricating oil media (castor, cotton, soya, palm, groundnut and SAE 20W/50 oil samples); and room temperature (33^{o}C) respectively. It was observed that the concentration of wear debris increase with load for all tested samples. Except for quenched pin sliding on smooth surface discs lubricated with cotton oil and SAE 20W/50 oil, a comparatively higher wear concentration is noticed for all tested pins and mild steel discs over the corresponding carburized discs for all disc surface textures and lubricating oil types.However, a comparatively higher wear Concentration was recorded for control mild steel pin over the corresponding quenched pins for all lubricating oil types, disc surface textures and mild steel discs except for quenched pins sliding on smooth and rough carburized discs. Groundnut, soya, cotton and palm oils lubricated discs exhibited higher wear rates than SAE 20W/50 and castor oils which demonstrated better anti-wear behaviour for all loading conditions, pin and disc types and textures. Finally, it was also established that rough textured disc surfaces generated comparatively higher wear rate than their corresponding smooth textured disc surfaces.

Keywords: Seed oil, Slide wear, Quenching, Carburizing, Surface texture, Petroleum oil, Load.