Gear Wear Product Analysis as Applied for Tribological Maintenance Diagnostics

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Abstract : This paper describes an experimental investigation on a pair of gears in which wear and pitting were intentionally allowed to occur, namely, moisture corrosion pitting, acid-induced corrosion pitting, hard contaminant-related pitting and mechanical induced wear. A back-to-back spur gear test rig was used. The test samples of wear debris were collected and assessed through the utilization of an optical microscope in order to correlate and compare the debris morphology to pitting and wear degradation of the worn gears. In addition, weight loss from all test gear pairs was assessed with the utilization of the statistical design of the experiment. It can be deduced that wear debris characteristics exhibited a direct relationship with different pitting and wear modes. Thus, it should be possible to detect and diagnose gear pitting and wear utilization of worn surfaces, generated wear debris and quantitative measurement such as weight loss.

Keywords : tribology, spur gear wear, predictive maintenance, wear particle analysis

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