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Engineering modeling of wear profiles in tooth flank of polyamidespur gears

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Abstract: The present paper is a contribution in developing an engineering model expressing the evolution of tooth flank wear in polyamide spur gears as a function of number of cycles. The method is based on first observing the behavior of wear on tooth flanks in real test conditions. Then progressive flank wear profiles are plotted in order to sort out the corresponding fitting curves together with the associated mathematical equations. The general engineering model controlling the evolution of wear profile is found of the form of quadratic equation where the variable is the circular thickness of a tooth at a given depth from the top land of the tooth. The respective parameters of the engineering wear equation are determined as a function of number of revolutions of the spur gear. A wear correction parameter kw is added in order to catch up the measuring errors when plotting the wear profile curves using the proposed engineering wear model for spur gears. The data are in good agreement with that obtained from experimental measurements.

Keywords : polyamide, Spur gear, wear, Tooth flank, lubrication