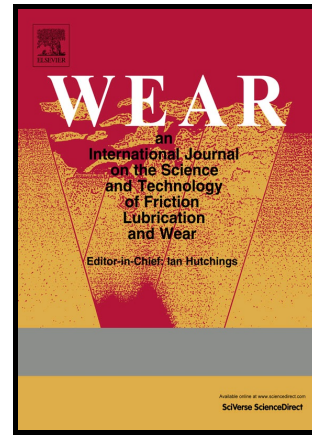


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A new approach to the description of height distribution of plateau honed cylinder liner surface texture during the initial stage of wear

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Abstract

This article presents a new approach to the description of the height distribution of plateau honed cylinder liner surface topography after the initial stage of wear. In the literature, the two-Gaussian model is often used to describe the height distribution of cylinder liner surfaces. However, in the case of plateau honed surfaces, during the running-in period different changes of surface take place, mostly involving truncation or plastic deformation processes of the highest summits located in the plateau area. Therefore, to describe the height distribution of plateau honed surfaces during the running-in or initial stage of wear, an analytical model called three-Gaussian was used. This model was applied to determine the surface height distribution of cylinder liner after the initial stage of wear. Many plateau honed surfaces with traces of wear were analysed using this model, and some of them are shown as typical examples in this paper. The results of use of the three-Gaussian model to describe the height distribution of surface texture after the initial stage of wear are compared with the existing two-Gaussian approach. A comparison of the fit of these two models to the height distribution of plateau honed surface texture after the initial stage of wear shows that the three-Gaussian model fits the data better than the two-Gaussian model. The observed, measured and calculated results are elucidated and commented on.

Keywords: surface texture, height distribution, cylinder liner, wear, running-in

Nomenclature

z Surface texture height

$p_1(z)$ Function describing the height distribution of a one-process profile/surface of the roughest, primary (virgin) component (of Gaussian character) of surface texture (valley part)

$p_2(z)$ Function describing the height distribution of a one-process profile/surface of the second component (of Gaussian character) of surface texture constituted on the truncated tips of the original primary component

$P_1(z)$ Cumulative distribution function corresponding to the height distribution of the roughest, primary (virgin) component (of Gaussian character) of surface texture (valley part)

$P_2(z)$ Cumulative distribution function corresponding to the height distribution of the second component (of Gaussian character) of surface texture constituted on the truncated tips of the original primary component

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