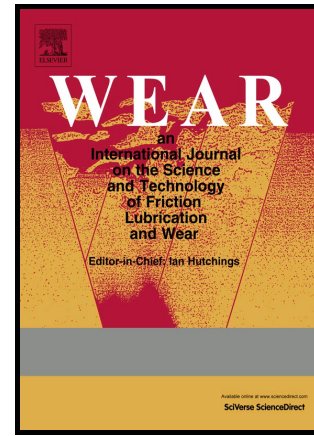


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A simple, fast and low-cost method for in situ monitoring of topographical changes and wear rate of a complex tribo-system under mixed lubrication

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**A simple, fast and low-cost method for in situ monitoring of topographical changes and wear rate of a complex tribo-system under mixed lubrication**

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**Abstract**

This contribution presents a simple, fast, and low-cost method to track in situ and in real time the evolution of the surface topography. The method combines an optical method (collimated light) with image analysis. The method was validated using a complex tribo-system; a reciprocal sliding of a rough cast iron counter-piece under mixed lubrication.

We demonstrated that the optical method is well suited to observe the evolution of the contact areas during sliding. We also proved that the contact area occurs on the highest peaks of the surface roughness. Finally, we estimated the wear rate by combining the information of the contact area and the Abbott-Firestone curve obtained by profilometry. The wear rate was found to be 40 times higher in the early stage of sliding as compared to the steady-state. The running-in of this particular system was found to be approximately 10h.

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