

The effect of oil dimple size on areal form removal in surface topography analysis

Przemysław PODULKA*

**Rzeszow University of Technology,*
The Faculty of Mechanical Engineering and Aeronautics, p.podulka@prz.edu.pl

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Usually the surface topography parameters are calculated after form removal. Selection of reference plane for two-process surface is increasingly complicated as an oil valleys occur. In this research, the influence of oil dimples size was taken into consideration when the reference plane was selected; for areal form removal, commonly used algorithms were proposed: cylinder fitted by least square method, polynomials (from 2nd to 4th degree [1]) and digital filtering (Gaussian and Robust Gaussian filters). The effect of areal form removal on surface topography parameters (from ISO 25178 standard) was also studied.

It was assumed that application of regular Robust filtering (with bandwidth equal to 0.8 mm) not always provided a desired results when the size of oil valley was greater than 1 mm (figure 1-a). Moreover, in some cases, proposal of polynomials and/or robust filtering caused a distortion of oil dimples when they were edge-situated (figure 1-c). For further research selection of filter bandwidth should be taken into account with meticulous attention to the valley size and distribution analysis.

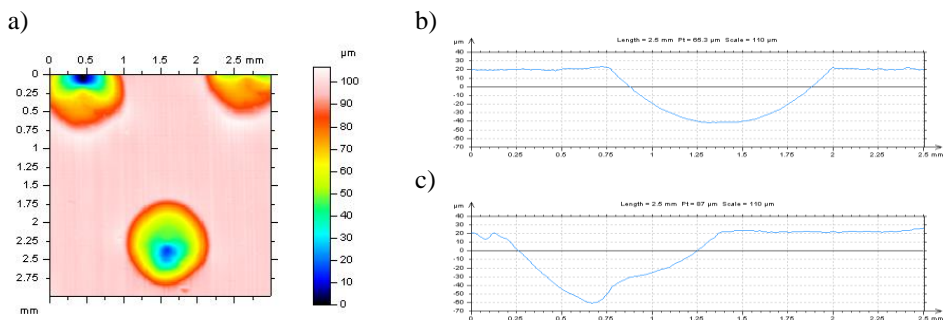


Fig. 1. The isometric view (a) and extracted profiles (b, c) from cylindrical surface containing wide oil dimples after areal form removal by application of Robust Gaussian filter; cut-off = 0.8 mm.

- [1] Podulka P., Dobrzański P., Pawlus P., Lenart A.: The effect of reference plane on values of areal surface topography parameters from cylindrical elements. *Metrology and Measurement Systems 2*, 2014, 247–256.