

Feasibility Study of Measurement of Turning Based-Surfaces Using Perthometer, Optical Profiler and Confocal Sensor

Authors : Khavieya Anandhan, Soundarapandian Santhanakrishnan, Vijayaraghavan Laxmanan

Abstract : In general, measurement of surfaces is carried out by using traditional methods such as contact type stylus instruments. This prevalent approach is challenged by using non-contact instruments such as optical profiler, co-ordinate measuring machine, laser triangulation sensors, machine vision system, etc. Recently, confocal sensor is trying to be used in the surface metrology field. This sensor, such as a confocal sensor, is explored in this study to determine the surface roughness value for various turned surfaces. Turning is a crucial machining process to manufacture products such as grooves, tapered domes, threads, tapers, etc. The roughness value of turned surfaces are in the range of range 0.4-12.5 μm , were taken for analysis. Three instruments were used, namely, perthometer, optical profiler, and confocal sensor. Among these, in fact, a confocal sensor is least explored, despite its good resolution about 5 nm. Thus, such a high-precision sensor was used in this study to explore the possibility of measuring turned surfaces. Further, using this data, measurement uncertainty was also studied.

Keywords : confocal sensor, optical profiler, surface roughness, turned surfaces

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