Influence of Stylus System Configuration on the Variability of Measurement Result on CMM

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The article deals with the measurement on CMMs with tactile stylus system. Accuracy of CMM is mostly indicated by the parameter MPE\(_E\) (Maximum Permissible Error for length measurement). This parameter refers to an errors during the measurement of distance between two points in space. Verification of MPE\(_E\) parameter is described in an ISO standard 10360-2 Acceptance and re-verification tests for coordinate measuring machines. These acceptance and re-verification tests are often conducted with a short and stiff reference stylus which is not and also mostly cannot be used in real measurements. On the contrary in applications such as a measurement of engine blocks and transmission housings very complex stylus configurations are used. The influence of stylus system configuration on the variability of measurement when using long extensions, different materials (aluminium, carbon fiber composites) and high scanning speed in not described. The aim of this article is to design a methodology for testing the stylus systems used in complex metrology applications in quality control of hi-precision mechanical components, to analyze the contribution of stylus system configuration to the measurement system variability in the form of a standard measurement uncertainty described by standard deviation.

Keywords: Coordinate Measuring Machines, stylus system, variability of measurement result

References


