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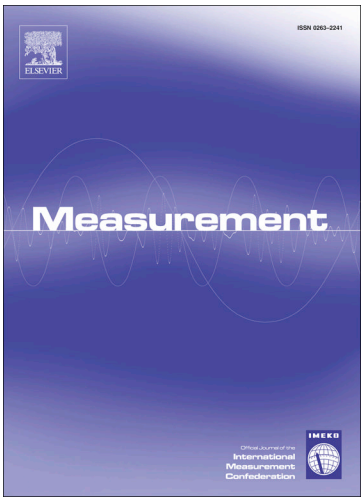

An implementation of measurement system analysis for assessment of machine and part variations in turning operation

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An implementation of measurement system analysis for assessment of machine and part variations in turning operation

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ABSTRACT

Measurement system analysis (MSA) is a useful quality tool used for assessing the adequacy of gauge variation in order to ensure the quality of the measurement system and good quality products. This work proposed a procedure for evaluating a measurement system using gauge repeatability and reproducibility (GR&R). The average & range and the analysis of variance (ANOVA) methods were used to assess the performance of three randomly selected mini CNC lathe machines rather than the performance of appraisers by measuring the same characteristics of the same part produced by different machines with the same measuring instrument and the same appraiser. The ANOVA results showed that the part and the interaction between part and machine affected the diameter of machined parts at the significance level of 0.05. The GR&R study indicated that the proposed MSA can effectively be used for machine performance evaluation.

Keywords: Gage R&R; machine performance; diameter; ANOVA; variance components

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