

## **Analysis of measurement uncertainties in mechanical production and subsequent use for process stability control**

Milena Kubišová, Jana Knedlová, Vladimír Pata, and Oldřich Šuba

*Tomas Bata University in Zlín, Faculty of Technology, Vavrečkova 5669, Zlín, Czechia*

In the current industrial environment, where quality is a key factor of competitiveness, the measurement and control of the stability of production processes plays a vital role. This work focuses on the analysis of measurement uncertainties in mechanical production and their subsequent use for process stability control. Measurement uncertainties are an inherent part of any measurement system, and their understanding and proper management is necessary to ensure the accuracy and reliability of production processes. The MSA (Measurement Systems Analysis) method enables the assessment of the capability of measurement systems and the identification of sources of variability. Emphasis is placed on the standard uncertainties of type A and B and the ways in which they affect the measurement process. The work also includes a description of the implementation of statistical process control (SPC) and its importance for maintaining a stable production process. SPC makes it possible to continuously monitor production processes and quickly identify deviations, which leads to timely correction and minimization of defects. To achieve these goals, quality tools such as the Ishikawa diagram, histogram and Pareto diagram are used. This work provides a comprehensive view of the importance of measurement and data analysis to ensure stability and quality in manufacturing processes.