

Using the Design of Experiment Method to Evaluate Quality of Cuts after Cutting Aluminum Alloy by AWJ

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The article deals with the use of the SPC method, specifically the DoE method – Design of Experiment method, during evaluation of a finished area of aluminum alloy AlMg3 with an abrasive waterjet (AWJ). Design of experiment utilized a basic model, which presents a process as a change in input factors on an output characteristic. The basis of this method stems from the fact that the output characteristic, which expresses a specific measured qualitative attribute has its variability. We can identify numerous factors that affect the quality of finished area when cutting material with the help of an abrasive waterjet. With the help of statistical methods within quality management, we can determine which factors are important. Four input factors, feed speed, thickness of the material, water pressure and mass flow of the abrasives mass flow, were selected to evaluate an output factor, roughness of surface Ra. With the help of the 2^4 experiment, with the help of software, we can observe and evaluate the importance of these processing factors. Based on results from the experiment one can come to conclusions which will help with finding optimal conditions for achieving the most abrasive surface possible after cutting of aluminum alloy AlMg3, using the AWJ technology.

Keywords: abrasive waterjet, surface quality, DoE, SPC, factor analysis.

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