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Project Title

MULTI-RESPONSE OPTIMIZATION OF TURNING PARAMETERS USING TAGUCHI METHOD ON ALUMINIUM ALLOY

Abstract:

Quality and productivity are two important aspects for manufacturing industries. To ensure quality of machined products at minimum machining costs and maximum machining effectiveness, it is very important to select optimum parameters when metal cutting machine tools are employed. Traditionally, for the selection of optimum metal cutting conditions, the experience of the operator plays a major role. However, attaining optimal condition for machining at each level of time is difficult even for a skilled operator. Besides, the non-linear nature of the machining process has compelled researches practiceners and engineers to search for more effective methods to attain the optimization of the process. Also, to understand the process and to achieve optimum turning parameter for responses modeling and optimization, respectively are considered to be the accurate techniques that can be applied to find best manufacturing conditions. So, this study is an attempt that reveals an optimization approach for multiple responses (Material removal rate and surface roughness) in turning of Al alloy work piece using cobalt bonded cemented carbide tool. Gray Relational Analysis (GRA) based Taguchi method has been used to solve multi response optimization problem. Four controllable factors of the turning process viz. coolant employment, cutting velocity, feed and depth of cut, were studied. Optimum parameters setting to maximize material removal rate and minimize surface roughness, have been found out using Taguchi's parameter design. The process parameters have been optimized with concern of all the performance characteristics simultaneously. The analysis of variance (ANOVA) was used to find out the most influential turning parameters for multiple response problems.

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