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Title:	Environmental Friendly Machinability Evaluation on Duplex Stainless Steel
Researcher:	Sharma, Rajeev
Guide(s):	Jha, B. K. and Pahuja, Vipin (/jspui/browse?type=author&value=Jha%2C+B.+K.+and+Pahuja%2C+Vipin)
Keywords:	Engineering Engineering and Technology Engineering Mechanical
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Abstract:	<p>The current research focused on the machinability investigation of duplex newlinestainless steel (DSS) 2205 under different types of cooling environments e.g. dry, newlineflood (wet), MQL, cryogenic (LCO2), and MQL-LCO2. TiAlN-coated solid carbide newlinedrill was used for drilling DSS 2205 because DSS has 31 HRC, so it is difficult to newlinecut material. newlineThe present research is divided into three phases. In the first phase, newlineexperimental investigation was carried out on DSS 2205 under dry, and wet newlineconditions with TiAlN coated solid carbide drill. The set of experiments is made by newlineusing the design of experiment (DOE) Taguchi method. For the design of the newlineexperiment, select three input parameters e.g. machining environment, spindle newlinespeed, and feed rate while Ra is a response variable. Total L8 set of experiments newlinegenerated by the orthogonal array (OA). After parametric optimization, the optimal newlineprocess parameters, e.g. high spindle speed, low feed rate, and wet cooling newlinecondition, were obtained. The mean effect plot and ANOVA are utilized to study the newlineparametric influence on performance outcomes. Furthermore, a confirmation test newlinewas carried out to compare the experimental value to predicated value. newlineIn the second phase, experimental work was carried out under dry, MQL, newlineand LCO2 cooling conditions. In this section, for the design of the experiment, select newlinethree input parameters e.g. spindle speed, feed rate, and cooling environment (dry, newlineMQL, and LCO2) while surface roughness (Ra) and hole deviation as response newlinevariables. For the experimental design and parametric analysis, the Taguchi method newlinein Minitab software. In the present investigation, the orthogonal array (OA) gives a newlinetotal L9 set of experiments. After parametric optimization, it was observed spindle newlinespeed is the most contributing factor for both responses. ANOVA is utilized for newlinemean effect plots and to study the parametric influence on performance outcomes.</p>
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