عنوان مقاله:

An experimental investigation on the effect of machining and MQL parameters on thesurface roughness in finish turning of Al۷۰۷۵ alloy

محل انتشار:

نوزدهمین همایش ملی و هشتمین کنفرانس بین المللی مهندسی ساخت و تولید ایران (سال: 1401)

تعداد صفحات اصل مقاله: 4

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خلاصه مقاله:

Today, with increasing concerns about the harmful effects ofthe cutting fluids on the environment, many efforts have beenmade to reduce the consumption of these fluids. Oneproposed solution to reduce cutting fluid consumption inmachining processes is using the Minimum Quantity ofLubrication (MQL) method. This method improvesmachining conditions by atomizing the cutting fluid andspraying it on the tool surface. In this research the effect ofthe MQL and the machining parameters, including cuttingfluid's flow rate, MQL nozzle's air pressure, feed rate, andcutting speed on workpiece surface roughness in the turningprocess of aluminum alloy ۷۰۷۵, were investigated byemploying the Response Surface Method (RSM). Based onthe results of experimental tests, the lowest surface roughnessobtained using parameters of the fluid flow rate of ۲۷۵ ml/h,the pressure of ۳ bar, cutting speed of ۲۰۰ m/min, and feedrate of ۰.۰۸ mm/rev was measured as ۰.۴۳۸ microns.Evaluating the results showed that the feed rate has a directrelationship with the surface roughness, and as the feed rateincreases, the surface roughness also increases. The effect ofcutting fluid's flow rate, air pressure, and cutting speed on theworkpiece surface roughness does not have a consistent trendand depends on the cutting parameters. Therefore, statisticalor experimental analysis methods can be utilized to .achievethe optimal values of workpiece surface roughness

کلمات کلیدی:

Minimum Quantity of Lubrication (MQL)Parameters, Machining Parameters, Turning Process ofAluminum Alloy ۷۰۷۵, Surface Roughness

لینک ثابت مقاله در پایگاه سیویلیکا: