عنوان مقاله:

Experimental Study on In-Depth Residual Stress due to ۴۲۰ Stainless Steel Creep-Feed Grinding Using the Deflection-Electro Polishing Technique

محل انتشار:

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خلاصه مقاله:

In the current study, the deflection-electro polishing method was used to evaluate through-thickness residual stresses. A modified equation was developed to calculate the non-uniform residual stresses of creep-feed ground plates concerning the three-order polynomial curve fitting of the deflection in the specimens. Employing the current density of ۸۲۵ A/m۲ for the specimens caused stressed materials to be removed from their surface with the corrosion rate of ۱ µ/min, which facilitated estimating the thickness of the removed layers concerning corrosion time. To investigate residual stresses created by creep-feed grinding, three different cooling conditions, i.e. dry, flood, and small quantity cooling lubrication (SQCL) were tested. The literature review showed a dearth of research on through-thickness residual stresses under SQCL creep-feed grinding. The results demonstrated that due to a considerably lower flow rate of the SQCL compared to that of the flood cooling system, considerable performance was detected so that compressive residual stresses were observed in the depth beneath the surface.

کلمات کلیدی:

Residual stresses, Electro-polishing, creep-feed grinding, small quantity cooling lubrication