Grinding of Inconel 713 Superalloy for Gas Turbines

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From the viewpoint of residual stresses and microstructure of ground surface, Inconel 713 superalloy is an attractive material since it is frequently used in high temperature gas turbine applications where residual stresses are relevant for service life. The goal of this contribution is to find whether there exists a relation between grinding parameters and final surface integrity parameters such as residual stresses, roughness, crystalitte size, and generally, microstructure. Highly productive creep feed grinding has been applied to produce both simple flat areas and complex fir three blade root. It has been found that the used grinding method lead to very thin deformed layer on the surface with compressive residual stresses and fine crystallites. Moreover, the detailed analyses have been carried out in order to pinpoint plausible reasons behind crack origination.

Keywords: Grinding, Gas turbine, Casting defects, Residual stresses, Nickel superalloy

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