

## Surface Roughness Formed during Hybrid Turning of Inconel Alloy

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**Abstract :** Inconel 718 is a material characterized by the unique mechanical properties, high temperature strength, high thermal conductivity and the corrosion resistance. However, these features affect the low machinability of this material, which is usually manifested by the intense tool wear and low surface finish. Therefore, this paper is focused on the evaluation of surface roughness during hybrid machining of Inconel 718. The primary aim of the study was to determine the relations between the vibrations generated during hybrid turning and the formed surface roughness. Moreover, the comparison of tested machining techniques in terms of vibrations, tool wear and surface roughness has been made. The conducted tests included the face turning of Inconel 718 with laser assistance in the range of variable cutting speeds. The surface roughness was inspected with the application of stylus profile meter and accelerations of vibrations were measured with the use of three-component piezoelectric accelerometer. The carried out research shows that application of laser assisted machining can contribute to the reduction of surface roughness and cutting vibrations, in comparison to conventional turning. Moreover, the obtained results enable the selection of effective cutting speed allowing the improvement of surface finish and cutting dynamics.

**Keywords :** hybrid machining, nickel alloys, surface roughness, turning, vibrations

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