

# Surface layer of Inconel 718 after laser assisted turning

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## **ABSTRACT**

The dissertation concerns the laser assisted in turning the Inconel 718 nickel superalloy after various heat treatments. The Inconel 718 alloy, with a wide range of applications in the aerospace, chemical and energy industries, is considered to be difficult-to-machine material. The trend in technology of manufacturing Inconel 718 is laser assisted machining.

Experimental research was carried out in work. For the Inconel 718 alloy material after various heat treatments, variable heating and cutting parameters were used in the LAM process. The influence of the heating strategy and mode of LAM on the state of the technological surface layer has been analysed. Quantitative and qualitative indicators of the physical and chemical parameters of the surface layer and the geometric structure of the surface were analysed.

The effect of thermal softening mechanisms of the surface layer as well as the mechanism of melting the cutting layer is described. The application possibilities of using each of those mechanisms for assisted machining in sequential or continuous mode has been shown.

The results of conducted researches confirmed the dissertation thesis stated that the benefits in quality of the surface are improved in laser assisted turning. No changes were found in properties such as microhardness and stress distribution considering both conventional, and laser assisted turning.