MATERIALS ENGINEERING

SEMINAR

"Surface Integrity Characteristics in Mechanical Machining of Nickel-based Superalloy"

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Purdue MSE Preliminary Exam

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ABSTRACT

Nickel-based superalloy are widely used in high-temperature aerospace applications. High safety standards are followed in designing components made from these alloys. Manufacturing them often requires several machining operations such as drilling, milling, turning, boring etc. These operations cause severe plastic deformation of the surface layers, which can significantly affect the part's performance. Surface Integrity (SI) of these layers, which comprises of metallurgical, topological and physical characterization are used to predict its performance. In this review, the fundamental origin of SI features treating machining as a thermo-mechanical deformation process are highlighted. Formation of topographical and microstructural features have been reviewed and their mechanical properties are reported. A correlation of SI with performance is made suggesting higher temperature as the key parameter affecting the part life. Therefore, an experimental study to understand temperature effects is proposed which will further the understanding in this field.

Date: Thursday, April 28, 2022
Time: 2:30pm
Place: HAMP 1113 or by WebEx https://purdue.webex.com/meet/driscol

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