Mechanical & Industrial Engineering
UNIVERSITY OF TORONTO

Thesis Projects (MIE498 H/Y) 2018–2019

Title: Evaluation of the mechanical performance of hardened and coated industrial materials using quantitative thermal-wave radar as a non-destructive imaging tool

Number of Students: 1 or 2

Nature of Work Proposed: Experimental

Project is appropriate for: Mechanical

Description:

Non-contact thermal-wave radar (TWR), a non-destructive inspection imaging technology recently introduced in the CADIPT will be used to evaluate hardness profiles in aerospace, automotive and other materials as well as coating uniformity. The experimental modality to be used involves image acquisition at several laser beam modulation frequencies. The test results will be analyzed with a multi-layer thermal-wave (TMW) model and/or with a new continuous depth ranging model to reconstruct key parameter images such as hardened layer thickness (case depth) or coating thickness. The samples have been provided by collaborating companies in Canada, US and Italy which manufacture automotive and aerospace components and provide protection to substrates.

Notes: For 2-term theses.

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