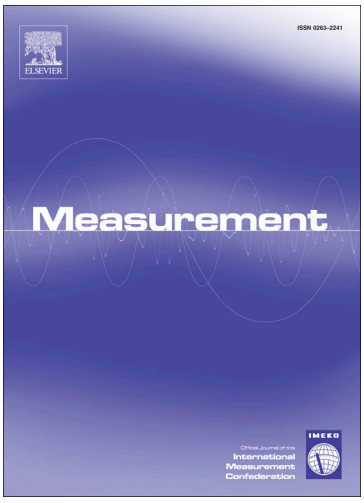

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PII: S0263-2241(17)30689-9
DOI: https://doi.org/10.1016/j.measurement.2017.10.054
Reference: MEASUR 5056

To appear in: *Measurement*

Received Date: 12 June 2017
Revised Date: 29 August 2017
Accepted Date: 24 October 2017

Please cite this article as: V. Vijayaraghavan, S. Castagne, Measurement of surface characteristics of Ti6Al4V aerospace engineering components in mass finishing process, *Measurement* (2017), doi: https://doi.org/10.1016/j.measurement.2017.10.054

Measurement of surface characteristics of Ti6Al4V aerospace engineering components in mass finishing process

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Abstract

Mass finishing is a secondary manufacturing process employed in aerospace and automotive industries to obtain the required surface finish of engineering parts. The finishing process involves interaction of several input process parameters related to the finishing machine, abrasive media and the parts to be finished. A robust empirical model which can accurately predict the system behavior and capture the science of complex interactions between process variables would provide great insights on mass finishing process. To address this challenge, the authors have proposed a novel integrated data analytics model by combining two powerful evolutionary techniques, Gene Expression Programming and Adaptive Neuro-Fuzzy Inference system. The proposed integrated approach was able to capture the dynamics of mass finishing process more accurately compared to that of other commonly available data analytical models. Tribological analysis of the model showed that an optimal surface finish of mass finished part can be achieved in mass finishing process by regulating the process time and media type. It is anticipated that the proposed model can be useful for determining optimal parameters for achieving desired surface finish without the need to conduct experiments, thereby leading to considerable savings in materials and time.

Keywords: Mass finishing, optimization, data analytics.

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