DOI 10.1007/s12647-018-0269-1

Effect of Automation on GRR in Tactile Measurement

A. Dev[1]*, P. K. Jha[2,3] and V. Parkash[1]
[1]Defence Electronics Applications Laboratory (DEAL), Defence Research and Development Organisation (DRDO), Govt of India, Dehradun 248001, India
[2]Department of Management Studies, Graphic Era University, Dehradun 248001, India
[3]Department of Statistics, College of Computing and Informatics, Haramaya University, Harar, Ethiopia
*Corresponding author, E-mail: atuldevji@yahoo.co.uk
Received: 03 October 2017 / **Accepted:** 23 May 2018 / **Published online:** 7 June 2018

Abstract: Gage Repeatability and Reproducibility (GRR) is an inevitable exercise in any precision production environment. The importance of GRR increases manifold when we are carrying out some result oriented quality improvement exercise like a Six Sigma project, where under measure stage we need to validate our measurement system for performance characteristic. Tactile measurement technique is one of the most commonly used measurement technique in industry to ascertain the quality of a manufactured product. The present work is a comparative study to calculate GRR of tactile measurement process, in two different ways, on a co-ordinate measurement machine (CMM). In the present study, GRR has been calculated with four appraisers and four parts and the measurement data has been obtained by operating CMM in manual mode as well as automatic (programmable) mode. Experimental results conclude that GRR improves in a very significant way when measurements are done in automatic mode. This study is especially relevant in R&D environment as in R&D many a times measurement has to be carried out on one or two components only where we avoid writing a program of measurement on CMM and measurement is mostly carried out in manual mode.

Keywords: GRR; Repeatability; Reproducibility; Tactile measurement; Measurement system analysis