Coordinate Metrology Society
Coordinate Metrology Systems Conference 2021
Virtual conference | September 2021

CMS-2021-006

Defect Identification and Characterization

AUTHORS
Edward Morse · R. Gorman · T. DeSear · A. England · M. Hansen · B. Griffith

ORGANIZATION
Center for Precision Metrology, UNC Charlotte, Charlotte, NC; Kansas City National Security Campus

Published by the Coordinate Metrology Society. Reference number CMS-2021-006.
Copyright remains with the author(s). Redistribution requires permission.

Defect identification and characterization

E. Morse, R. Gorman, T. DeSear – UNC Charlotte

A. England, M. Hansen, B. Griffith – KCNSC

The emergence of metrology systems that produce a "point cloud" as opposed to user-selected discrete points permits a more holistic inspection of workpieces. Not only can geometric tolerances be verified, but the increased number of points results in a more comprehensive mapping of the part surface. Due to the greater density of measured points, it is possible to identify small defects and flaws that might have been missed by a sparse set of points. However, some of the common practices used in point cloud collection – such as filtering to remove "noise" – may cause these defects to be overlooked.

This paper (presentation?) describes a series of experiments that investigate the interaction between the filtering of point cloud data, the use of surface preparation techniques (spraying), and the resulting geometry that is induced from the point cloud. A specimen with a variety of surface defects is inspected using both the default instrument settings and a variety of filters available in both the native software and external (MATLAB) code. In particular, we examine how the application of a surface spray influences these results and may be explained mathematically as a filter. Finally we report on how automatic defect detection may be used to either identify potential regions for further human inspection, or for removal prior to the inspection to geometric tolerances, providing the defects do not impact the function of the workpiece.

Corresponding author: Professor Ed Morse
108 Duke Centennial Hall
Mechanical Engineering and Engineering Science
The University of North Carolina at Charlotte
Charlotte NC 28223

Technical Paper ? Yes, we intend to submit a technical paper

Category Applications