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Use of Laser Radar in Automotive Inspection

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Use of Laser Radar in Automotive Inspection

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The advancement of Total Vehicle Validation requires continual evaluation and implementation of new technologies. Before moving into production, each of these technologies and processes must be evaluated for accuracy and the ability of the solution to work in a factory environment at the speeds required to support automotive production.BMW has always been on the fore-front of automation to support the production process. Robots and moving production lines have been standard business practices at BMW. The efforts described in this presentation combine BMW's automation experience with non-contact metrology.

This project was started asking three questions: (1) Can non-contact metrology measure the same geometry as our horizontal arm CMM's and, (2) Can a combination of robot and a non-contact metrology be an alternative to a Horizontal Arm CMM in terms of equal accuracy and increased speed, and (3) Once developed can the newly process be moved to the factory floor?

Development started with testing of the various sensor's on the market. The nest step required the acquisition of a robot and turntable. After testing of various line scanners, rotary scanners and white/blue light systems on the robot the decision was made to perform a more detailed evaluation of the Laser Radar available from Nikon Metrology.

With the cooperation of NIKON (hardware) and Metrologic (software) the first part of the process was to evaluate the Laser Radar repeatability and accuracy against a CMM and determine if the scan mode results required for geometric features worked for sheet metal parts. The results from that testing were favorable. Accuracy and repeatability were found to be equal to that of large horizontal arm CMM's. Feature scanning/measurement/extraction was found to be adequate. The speed of the laser radar was significantly faster than that of the CMM's, with lots of room for improvement on the software and hardware side. From the testing opportunities were identified (hardware and software) which needed commitment for improvement from the two vendors.

With a solid strategy to develop the idea's from our testing, two projects were started: (1) Replace the Laser Radar In a controlled environment with a turntable to hold and rotate the Body-In-White (BIW) and a robot to position the Laser Radar and (2) Using the same techniques developed in project (1), create an inspection cell next to the production line to perform similar inspections with automation to move the body in and out of the production line.

This paper and presentation will discuss the evaluation of the Laser Radar at BMW and the two projects currently supporting production at BMW in South Carolina. The success of these projects has led to the creation of additional projects using Laser Radar as the measurement system. We believe that this technology and the processes developed around it will change the way that BIW inspection is performed in the automotive industry.

There will be a summary of up-coming plans.

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Abstract Guidelines

Important Deadlines for Submission and Publication
Abstract Submission Deadline March 14, 2014
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Technical Papers Due June 6, 2014
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2) The abstract should state the purpose, hypothesis, tools used in research or investigation, data collected, and a summary or interpretation of the data.

3) Abstracts should be submitted in a Microsoft Word 2003 or 2007 format and limited to 500 words. Each author must include their name (no initials please) and include the following “introduction template” at the top of the page.

1) Title of Abstract:

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