Sammanfattning
Analysis of Measurement System robustness in the automotive industry – Adapted for measurement system design for a structural body component at Volvo Car Corporation
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The automobile industry creates products that are made up of thousands of individual components. Each component must maintain a particular level of quality in order for the final product to be of good quality. For numerous years, the A-pillar, a structural body component for Volvo Car Corporation (VCC), has been a topic of discussion. The measurement system analysis (MSA) has not been approved because of substantial variations in the measuring system, and VCC cannot completely trust the system's robustness and effectiveness due to these variations. The aim of this thesis was to try to find factors affecting variations in the measurement system, and reduce these factors. This thesis research used a case study, semi-structured interviews, and tests to analyze this phenomenon at VCC. The master's thesis investigated how the design of a measurement system influences an MSA for the A-pillar reinforcement beam. The experiments in this thesis were created with the aspects impacting the MSA method guage repeatability & reproducibility (GR&R) in mind, such as the reference system, fixture and operator. Analyzing graphs and a thorough review of the numerous tests and observations backed up the findings.

Finally, the thesis developed a detailed mapping of the many sources of variations affecting the A-pillar measurement system by employing all of the information obtained. Furthermore, the testing demonstrated that modifying the heels of clamps, fixture orientation, reference system, and working procedures reduced the measurement system's variations. The thesis finishes with a set of recommendations for dealing with measurement system variations. A substantial amount of data essential for future study has also been shared.

Keywords: Measurement system analysis, Gauge repeatability and reproducibility, Reference system, Root cause analysis, Gauge variations, robust design, Geometry assurance