Abstract

The present master thesis investigates the image sequence analysis from onboard cameras in vehicle safety tests, that are conducted in Volkswagen AG Wolfsburg within the scope of passive safety of the vehicle.

Stationary cameras have been in practice in the industry for years to examine and capture the movements of the tests, however since many hurdles can cause a suboptimum visibility of the object, in many cases satisfactory results were missing. Consequently, an onboard system of high-speed cameras was developed to overcome this issue and even act as an additional accurate tool besides the stationary cameras to increase the accuracy to a higher level.

Due to instability of the vehicle while executing a sled or crash test, the results of an onboard system are not yet reliable enough and therefore, within the framework of this master thesis, different influence factors contributing to the accuracy of the final result were checked. Moreover, different cameras were examined to verify their suitability for this task. It can be seen that newer cameras are internally more stable to handle the vibrations caused during a test.

The goal of this work is for the different cases to be handled in a way to improve the accuracy by eliminating or decreasing the affecting factors and keeping the uncertainty in an acceptable range of $5\,mm$ for safety tests. This allows the use of onboard cameras as optical metrology tool for image sequence analysis in the future.