

**Master 2017**

**Matthias Zilke**

**Conception and integration of a laser-assisted measuring system for acquisition of position data in the fully automatic coil loading on truck trailers.**

***ABSTRACT - Masterthesis***

In cooperation with the company ArcelorMittal Bremen GmbH the automation concept is to be taken up in the framework of a master thesis. In the internal project 'Crane Automation', a measuring system is to be designed, which measures a truck trailer and calculates/determines the position data of the trough from the measured data. Furthermore, these data are to be sent automatically to a higher-level software, which then processes them and provides them for a crane engine. A close cooperation within the scope of the master's thesis is ensured with the company, the developed system is to be put into practice within the framework of the project 'Crane Automation'. The main focus of the work is the development of a measuring system (concept) for providing the position data. For this purpose, firstly physical effects with regard to their suitability for dealing with the requirements of the measuring system are explained and compared with one another. In the next step, taking the requirements into account, a laser is defined as the decisive measuring medium and a measurement method is developed in order to realize a three-dimensional position determination. The final measurement system is a two-dimensional laser scanner, which is pivoted at the hands of a swivel platform, to measure the third dimension. To determine the relevant coordinates, the measuring methods (laser-based) described in Chapter 3 "Measuring methods" are used. Following the measurement procedure, the data evaluation and transmission is discussed. In the practical implementation, care must be taken to the selection of a laser scanner with an appropriate interface for the data transmission (depending on the data infrastructure within the overall system). The transfer of the measured data to a server-based evaluation software is then easily possible. The developed measuring system (concept) is integrated into the overall system as a supplier system for warehouse management and crane control. Taking the laser protection classifications and the applicable company ordinance regulations and accident prevention regulations in the company into account, the use of laser-based measurement systems in the relevant measurement area is possible as long as the conditions set out in Chapter 5 "Safety" are observed. The measurement system conceived in this work is theoretically suitable for the required application and can be implemented.