

Dissertation title:

Method for the management of product safety within the global production network of the automotive industry

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Another all-time record was just broken in the year 2014 as there were 235 automotive product re-calls with around 1,9 million affected vehicles in Germany. Hence, the significance of the topic product safety and its handling within a global product creation processes has increased significantly lately. The main reasons for this development can be found in the increased complexity of manufacturing technologies, the emergence of global value chains and the appearance of stricter laws and regulations.

Global production companies need to be capable of manufacturing exclusively safe parts, regardless of the country in which they were manufactured. Therefore they encounter the challenge that every element of their global value chain needs to be capable of providing the level of safety, is treated in a globally standardized way and is compliant towards all international standards regarding product safety regulations.

Existing solutions for the handling of safety concerns focus almost exclusively on design of technical safety specifications and requirements of products. Departments within product creation processes which are following design and construction processes are oftentimes treated with the same priority regardless of their impact on safety. There are no systematic approaches for steering the available resources to the favor of the manufacturing processes which have a proven impact on product safety or product liability. Furthermore, there are no mechanisms for achieving uniformity across the various levels of product safety worldwide. Based on this there are opportunities to improve product safety and minimize product liability risks for global manufacturing networks.

A quality systematic is being developed, whose application results in intensified quality measures for safety relevant processes within the product creation process. Furthermore, the developed method contains all steps for the implementation and standardization of the defined requirements within a global production network.

Based on an analysis of existing approaches within the fields “global quality production” and “process-oriented risk management”, the parameters of a quality systematic are defined by considering the requirements of global production networks and legal specifications. The quality systematic must contain that the method is capable of prioritizing product creation processes based on their risk for product safety and product liability.

Furthermore, those risk-inherent processes must be eligible for intensified quality measures, in whose development legal requirements, relevant norms as well as quality methods are analyzed and considered. Finally, there is the requirement that the results can be transferred to process descriptions, so that standardization within the production network is possible, and an uniform global level of safety is achievable.

In order to identify the product creation processes, which are eligible for intensified quality measures due to their risks for product safety, the process map of each plant first has to be analyzed. By applying the two-step Product-Safety-Filter the processes with impact can be separated from others and labeled as Product-Safety-Processes.

In order to develop intensified quality measures for Product Safety Processes, it is necessary to consider the company's individual risk strategy and to analyze the methods, norms and solutions previously implemented by production plants. The intensified quality measures need to have either a positive effect on the reliability of a safety relevant characteristic or the effect of minimizing product liability risks. Their application is generally resource intensive and therefore, their usage is only designed for the identified Product-Safety-Processes. The quality measures can then be integrated into the identified processes, formulated within the process descriptions and afterwards transferred into the thereby originating "Handbook of Global Product Safety".

In order to implement the requirements of the handbook at all relevant production facilities within the global network, a preliminary check regarding the actual implemented status of processes relevant for product safety needs to be performed by applying a gap-analysis. Potential deviations from the defined requirements within the handbook need to be worked off by corrective actions.

Based on this, the handbook can be managed as a binding within the global production network. Production plants, which have the legal status of a subsidiary, need to sign a special recognition letter so that the binding character will affect them as well. In order to ensure successful implementation and development of the handbook, close cooperation and alignment is necessary with representatives of all plants. Therefore, the roles of "Local and Global Coordinators for product safety" are developed and implemented.

The quality systematic was implemented, tested, and verified for its applicability on an actual example of a Global Production Network in the automotive industry. The systematic was able to provide a contribution to the standardized and prioritized handling of product safety within globally connected production processes, which enables organizations to improve product safety and minimize product liability risks.