

**Dissertation title:**

**Configuration of a mixed-model assembly line in the automotive industry**

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Nowadays manufacturing companies face an ever increasing variety and change in their environment. Especially the volatility of the product demand and the variety of customized products affect the production sections's ability to produce economically. The assembly system in particular is burdened with complexity and inefficiency in its processes, as it handles a high number of different parts, resulting in numerous and varying assembly operations. As a result, flexible structures for production systems become more important in order to handle the variety while producing efficiently.

Existing approaches for operating mixed-model lines are mostly reactive, while planning concepts focus on early phases of planning. Correlations between planning and operating aiming at the reduction of inefficiency for mixed-model assembly lines are hardly considered. Therefore an integrative view on planning and operating is presented to increase flexibility and efficiency for mixed-model lines, focusing on the product variety's consequences for the assembly line's efficiency. Considering the variety and change, a continuous analysis and adaptations of the mixed-model line facing high variety are presented.

Basically, the systematic approach can be divided into two major parts, representing the analysis and the adaptations of the mixed-model assembly line. The analysis contains as a first step the examination of the processes and resources of the assembly system as well as the examination of the product system with its aggregation in the production program. Following this, a connection of both systems is made to complete the model. This model serves as a basis for the analysis of the variety and the adaptations for the assembly line.

As a next step, the variety-related influences impacting the assembly system are identified and quantified. Doing so, indicators for the assessment are derived from the impact of variety on mixed-model lines harming the efficiency regarding costs, quality and time and resulting in higher capacity needed to fulfill the production task. In particular the variety's impact on the performance of the work stations in the flow assembly line is examined resulting in low utilization rate, phases of work overload needing support capacity, higher process time, higher lead time and higher expenditure for quality.