



Research School for Operations  
Management and Logistics

**Stochastic Optimization Models for Allocation of Quality Inspection in Flexible Assembly**

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Inspection in a complex assembly environment can be done using many types of tests, sensors and technologies, each with their own performance (in terms of precision, speed, sensitivity, specificity), resource requirements and involved operating costs. We also need to decide at which positions of the assembly inspection will be performed, which characteristics of the assembly will be inspected and what inspection strategy to use (full inspection, sampling, ...). It is a challenge to find an efficient allocation of the inspection effort so that the end product conforms to customer specifications at minimal cost. The PhD aims to develop innovative cost optimization models that take into account detailed knowledge of the assembly process such cost of rework, parts and operator time, specifications, warranty cost, bill of materials, but also knowledge of different eligible tests. The outcome is a data-driven decision support system for optimal inspection allocation in the assembly environment. It will also focus on the robustness of the solutions obtained by the model to (unforeseen) changes in the production schedule. This is highly relevant in high-mix low-volume assembly where production runs are short and change frequently in nature. The inspection solutions must be flexible enough to deal with this variability.