Research School for Operations
Management and Logistics

**Robust data-driven spare parts inventory management under uncertain demand/failure**

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Most of the previous studies on spare parts demand modelling relies on the assumed (compound) Poisson distribution. This approach has been successfully applied, but the control model under Poisson demand is relatively simple. In reality, inventory control of spare parts is more complex and challenging: From the whole product life cycle, demand for spare parts is prone to irregular and intermittent. Besides, for a new product, it is hard to fully understand how to control inventories without any history of demand/failure. This project aims to propose a robust optimization (RO) approach come to a new spare parts inventory control policy for better performance. Firstly, a new demand/failure model is established with information on component degradation provided by sensors. The model based on the RO approach does not require knowledge about the probability distribution of the demand. Then the proposed mathematical model is used to introduce a new spare parts inventory control policy. To know how the policy is implemented, we will further investigate the interaction between the spare parts inventory tools and human decision-makers. This will help us to improve the spare parts inventory control model more explainable to users.