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Analysis of Multivariable Reliability for Designing Just-In-Sequence Systems

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Abstract: Assessing the reliability of Goods Delivery Systems operating under a Just-In-Sequence approach means a robust analysis of service level and variation of the availability of a system. Thus, an effective stochastic model to assess the performance and foresee the behavior of a sequential supply process in the automotive industry is here presented. Based on operating times, the model provides information to decision-makers for reducing failures in a goods delivery system, and at the same time, proposes an evaluation of socioeconomic impact of potential failures. A stochastic approach is used to assess the reliability of the supply system, performing the calculation of the probability of carrying out the supply from an origin to a destination in specific delivery times of a sequential demand. This stochastic analysis, based on information about a list of failures during the past, as well as operational conditions and technical data, allows selecting a probabilistic model with the best fit to these data. Thus, the key reliability indicators related to operation times can be computed. The research work is based on a real-life case study in the automotive industry. It allows identifying along the delivery system the processes with high level of failure probability. Thus, it supports decision-makers to systematically reduce the occurrence of failures and unwanted events and their socio-economic consequences. Finally, conclusions are set out as well as future work concerning the analysis on the performance of a Just-In-Sequence system.

Keywords: Reliability, Goods Supply System, Just-In-Sequence, Stochastic Multivariate Modeling.