

Ausfallgerechte Ersatzteilerbereitstellung im Maschinen- und Anlagenbau mittels lastabhängiger Lebensdauerprognose

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Stephan Niggeschmidt
aus Olpe

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Hauptreferent: Prof. Dr.-Ing. Gisela Lanza
Korreferent: Prof. Dr.-Ing. Jan C. Aurich

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Telefon: 02407 / 95 96 - 0 • Telefax: 02407 / 95 96 - 9

Internet: www.shaker.de • E-Mail: info@shaker.de

Abstract

Recent research in the field of mechanical engineering shows that the sale of spare parts represents the core business of the after sales market. The provision of these spare parts, however, is becoming ever complexer due to the fact that customer requirements are rising, the degree of individualization is increasing, the variety of parts is growing and innovation cycles are becoming shorter.

Therefore, the dissertation aims towards the development of a methodology for the identification and evaluation of optimal spare part provision strategies in relation to specific load dependent reliability and cost characteristics.

The intended solution addresses different aspects such as the identification of critical spare parts, the characteristics and type of provision that is most suitable and the determination of the optimal time for providing the parts. Besides a comprehensive cost assessment, this adds a load-dependent reliability analysis and prediction to the field of spare parts management. Achieving a high level of spare part availability while, at the same time, reducing the cost of capital lockup resulting from large spare part inventories is particularly important.

Initially, the basic conditions of the developed optimization process have to be determined by characterizing the individual spare parts and provision strategies by technical, organizational, logistics-related and economic aspects. In the next step the development and use of approaches of load dependent reliability analysis increases the quality of the prediction of spare part demand. Finally, the cost for the provision of a specific spare part can be calculated. The application of the optimization process identifies the cost optimal provision strategies for a spare parts portfolio under the constraints of a defined availability and limited storage capacities.

The calculation steps were implemented in corresponding software environments taking their practical application and functionality into consideration. A practical application of the method to a reference scenario shows its benefit in the form of achieved cost savings potentials.