Monitoring the Degradation of a Linear Axis with the Aid of a Dynamic Bayesian Network Model

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Abstract: In this a paper an approach for monitoring the degradation of a guiding system as a component of a linear axis will be presented. The degradation process is modeled with the aid of a dynamic Bayesian network, which is capable to represent stochastic processes and Markov chains in particular. By periodically recording the values of selected parameters, which serve as indicators for potential wear-out of the regarded component, it is possible to predict the degree of deterioration. It will be shown which results the model is producing under various boundary conditions like with or without stress, with or without observations as well as with or without maintenance activities. It will further be shown that these results seem to be plausible and adequately reflect the real condition of the linear axis.

Keywords: Degradation, Dynamic Bayesian Networks, Reliability