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TIME-VARIANT RELIABILITY ANALYSIS OF CABIN'S DOOR CONSIDERING COMPONENT DAMAGE

Abstract

Damage of mechanism components increases with operating time, which makes degradation of performance for the mechanism or even causes failures. Therefore, mechanism reliability is affected not only by randomicity of influence factors but also by operating time. However, traditional reliability analysis methods always don't considering the time factor. Therefore, with the help of simulation technology, a time-variant reliability analysis method based on the response surface method (RSM) is put forward. Mechanism is simulated by virtual prototype method, and the failure modes and failure mechanism are obtained based on the performance simulation results and other former informations. Simulating the samples selected by Bucher's sampling method, and the relationship between influence factors and dynamic responses is obtained by RSM. Component damage is regard as a random process, and damage degradation law is obtained through failure physics method or test data, then mechanism reliability degradation law with operating time is obtained. Furthmore, reliable lifespan is predicted. The feasibility of the presented method is veryfied by analyzing a Cabin's Door.