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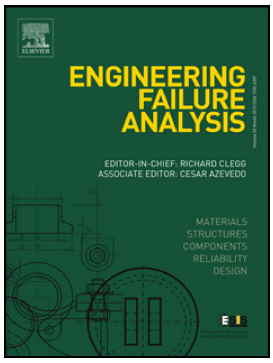

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Efficient Three-Stage Approach to Fatigue Life Assessment for Transport Machines in the Context of Stilt Sprayer Performance

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ABSTRACT

In this study an efficient three-stage method for fatigue life assessment combining multibody dynamic analysis and finite element method is considered in the context of investigating the performance of a serial stilt sprayer. The proposed approach enables accurate simulation of dynamics for a vehicle subjected to real loads and finite element analysis for detailed models and does not lead to high computational complexity of the problem. The two-level finite element model is used for reducing computational costs of the analysis. The fatigue life of the stilt sprayer chassis frame is assessed on the basis of Palmgren–Miner damage theory. All stages of the study are described in detail. The research may be useful for mechanical engineers and specialists in strength and fatigue calculations.

Keywords: Fatigue life, Cumulative damage, Finite element analysis, Dynamic stress analysis.

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