



Determination of Driving Engine Preventive Maintenance Periodicity

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Abstract. The optimization of the maintenance system can be performed by adequate creation of the maintenance model. This problem can be solved if all the significant requirements and restrictions are precisely determined. The basis of the methodology, presented in this paper, consists of reliability parameters of the analyzed engine, which were obtained by monitoring its behavior, from the aspect of appearance of failure in real exploitation conditions, as well as the maintenance costs. Results of determination of the optimal maintenance periodicity are presented for the two criteria: maximum availability of the driving aggregate and minimal costs of its maintenance. Since those two criteria produce different solutions for the engine maintenance, the compromise – acceptable solution for the given exploitation conditions and restrictions must be sought by the multicriteria optimization process.

Keywords: Driving engine, optimization, maintenance, reliability, availability, costs

1. Introduction

In order to plan the motor vehicle's maintenance, to predict its working life and to estimate quality of its parts, as well as the vehicle as a whole, it is necessary to determine its reliability parameters. The most frequently determined reliability parameters are: failure appearance frequency, unreliability, failure intensity and failureless operation time. If it was possible to determine the law of the reliability distribution function variation it would be possible to determine all the mentioned reliability parameters. The law of distribution function variation can be defined if the data exist on appearance of vehicle failure, based on which one can determine variation of failure appearance with time. Determination of adequate mathematical model, which would represent that variation, from the aspect of failure appearance, is one of the fundamental elements for predicting the vehicle's behavior and optimization of the maintenance system. Taking into account that all the maintenance measures depend on adequacy of defining the vehicle's reliability distribution model, special attention should be devoted to this part of analysis. Based on the established distribution model one could plan dynamics of spare parts purchase and the conclusions could be drawn about the cause of failure appearances.

2. Determination of Driving Engine Preventive Maintenance Periodicity According to the Maximum Availability Criterion

In the special purposes vehicle was built the four-stroke "V" Diesel engine OM403 with 10 cylinders at an angle of 90° and with direct injection, with the chamber in the piston and cooled by liquid. It is placed within the engine-transmission space, parallel to the vehicle's longitudinal axis, fastened by four elastic supports to the holder that is welded on the vehicle's floor. The engine is positioned so that its back side (flywheel) is facing the front side of the vehicle.

Applying the usual methodology for determination of the reliability distribution law [1, 2] and based on deviation of the theoretical distribution results from the values estimated based on

