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Doctoral dissertation: An expert model of the vehicles exploitation process focused on minimizing the downtime of the vehicle

Abstract

The doctoral dissertation presents an expert model of the vehicles exploitation process focused on minimizing the downtime of the vehicles. The model was built based on analyses of real data collected over three consecutive years regarding the operation and maintenance of vehicles within the fleet of Polish Post company in Lublin.

The exploitation data used to create this new expert model were gathered from various independent information systems within PP and were not originally intended for constructing vehicle exploitation models. Therefore, they needed to be appropriately prepared for this purpose.

The vehicle exploitation model in question was created in the form of an application made in the KNIME program. This application executes all the processes for processing the collected data, leading to the determination of vehicle reliability characteristics and indicators. It also includes indicators that allow an assessment of the impact of driver driving style on the time a vehicle spends in repair.

Reliability characteristics and indicators were determined based on basic reliability models of motor vehicles described in the literature. These can be utilized for planning maintenance activities more efficiently and for comparing different vehicle models performing the same transport tasks, particularly in terms of reliability, e.g., to select the most reliable model for future purchases.

The assessment of the impact of driver driving style on the time a vehicle spends in repair revealed that the higher the percentage of aggressive driving styles, the longer the downtime of vehicles in repair. Therefore, it can be concluded that it is justified to enhance driver competencies in vehicle operation to reduce the downtime of vehicles in use.