

*Instytut Lotnictwa, Warszawa*

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### **Streszczenie rozprawy doktorskiej**

**Temat pracy: „Model oceny efektywności eksploatacyjnej samochodu ciężarowego w warunkach wynajmu długoterminowego przy uwzględnieniu wskaźników niezawodności”**

*Obszar i dziedzina nauk technicznych*

*Dyscyplina: budowa i eksploatacja maszyn*

*Promotor: dr hab. inż. Marcin Ślęzak prof. ITS, Instytut Transportu Samochodowego*

The paper presents the analysis of the reliability and cost of the risk of non-operating vehicles used in long-term rental. The main objective of the study was to develop a model for assessing the truck's operational efficiency, including both economic and reliability criteria.

The additional objective of the study was to compare three brands of medium-payload trucks used for long-term rental.

On the basis of literature analysis and practical experience, it has been shown that the methods used to evaluate the efficiency of the car operation in many cases are not sufficient. Under the conditions of high competition in the transport services market, it is important to manage the operational risk and anticipate car damage and to anticipate the cost of these damages. From the standpoint of the operational efficiency model, revenue discrepancy and lost customer trust are of great importance.

The dissertation includes:

1. Theoretical study on the development of a mathematical model of car performance,
2. Simulation studies - numerical modelling of operational efficiency,
3. Experimental operational research on the reliability and the cost of repairing of three selected brands,
4. Expert tests of vehicle reliability and maintenance costs.

On the basis of conducted experiments, numerical and expert investigations, an authoritative model of the efficiency assessment of trucks was developed and validated. The model is based on a cost effective formula. The key feature of the model is that it takes into account the risk of losing customers' trust in the event of unforeseeable failure of the vehicle due to damage and taking into account the risk of accidental loss of revenue due to truck repair. The efficiency factor presented in the dissertation is a measure of the risk of discontinuity of the vehicle during the rental period and can be

used for scientific research as well as for the operational practice of brand choice and truck model. It has been shown that when selecting a vehicle for a rental hire, the investor should, in addition to the price of the vehicle, take into account its reliability, which significantly affects customer service quality and vehicle maintenance costs.