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ANALYSIS OF THE VEHICLE EXPLOITATION SYSTEM WITHIN THE FRAMEWORK OF LOGISTIC PROVISION TASKS ACCOMPLISHED BY THE TACTICAL AIR BASE

SUMMARY

This doctoral thesis is devoted to assessment, research and mathematical model development of the vehicle exploitation systems in the Tactical Air Base (TAB). Its primary goal is to develop an algorithm that indicates how to increase the efficiency of the Tactical Air Bases exploitation system, which can be used by the system manager in the decision-making process.

As part of the literature review, tactical aviation was defined and its development in Poland and in the world was presented as well. The applicable classifications, divisions and structures were presented. The main tasks of Tactical Air Bases were determined, focusing on logistics tasks. The applicable doctrines describing the military vehicle exploitation system were thoroughly analyzed. Indicators characterizing the vehicle exploitation systems have been distinguished. Applicable spare parts supply system in the Polish Army was also described. At the end of this part, the thesis was formed and specific tasks necessary for its analysis were determined.

In the next stage of the doctoral dissertation, in order to accurately describe the research object, the transport tasks carried out by TAB were identified, organization of vehicle exploitation system was described and the car fleet of the BLT was presented.

The main part of the work began with the determination of selected operational indicators by the test method which can assess the vehicle exploitation systems. As part of the evaluation, the time of vehicles waiting for maintenance (repair) was additionally determined and its impact on the previously determined indicators was examined. Service and repair have been identified as two different processes for restoring the readiness of vehicles. Aiming to learn about functioning dependencies, many statistical studies were conducted. Results obtained were presented in the form of a time chart. Correlation indicators were also calculated, which indicated mutual cause-effect relationships between some exploitative quantities. Due to reported opinions regarding the wait for spare parts, the impact of the supply system on the BLT vehicle exploitation systems was examined. The research was completed with careful analysis of the results. Operational problems and dependencies were identified.

The research conducted made it possible to create a mathematical model mapping the vehicle exploitation systems. As part of the mathematical model development, input and output variables were determined, mathematical functions describing previously indicated relationships were determined.

Using the developed mathematical model and Microsoft Excel, computational experiments were carried out to create a probable image of the vehicle exploitation systems. The experiments were conducted with changes of input parameters.

The mathematical model created was verified based on the values of indicators obtained as part of previous researches.

The work ended with a summary containing conclusions, possibilities of further development of the subject and arguments proving the validity of the formed thesis.