Author: -2-   Igor Betkier

Title: **Computer-aided method of transport planning process for abnormal vehicles**

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Keywords: oversized transport, mathematical modelling, routing problem.

The dissertation is devoted to the abnormal vehicles route planning problematics with the use of modern information technologies, graph databases and contemporary implementations of searching algorithms. To the dissertation needs the mathematical model-based method was developed, which is the synthesis of knowledge resulting from the author's experience and the needs set out at the stage of literature analysis. Based on the said model, the web application was built with the use of Angular 7, Java 11, Python 3.9.0, Flask 1.1.2 technologies and external Web Services. Furthermore, in cooperation with the Warsaw Unit of the General Directorate for National Roads and Motorways, the structure of national roads in Masovian Voivodeship was mapped in the graph datebase form, in the Neo4j 3.5.11 technology.

The arrangement of the dissertation contents results from the adopted objective and the research problem.

The first chapter presents the subject genesis, the analysis of subject state and the review of existing solutions. The next chapter is devoted to present the description of determining factors of the abnormal vehicles routes indication, along with the identification of problems resulting from their occurrence. It was shown that the complexity of the abnormal vehicles route calculation is essential and requires the automated methods, whose description is not available in the literature of the subject. In chapter three the research problem was defined and the methods for its solving were described. Moreover, the dissertation objectives and thesis were formulated. The chapter four is devoted to the analysis of existing algorithms for the optimal route calculating, based on the graph theory. Furthermore, the criteria of the best solution selection were defined in terms of the considered problem. The next chapter presents the developed mathematical model of the abnormal vehicles route calculating method and its formulated operation algorithm. The chapter six is a presentantion of the description of original solution implementation – the web application along with its verification. For this purpose, the case study research was conducted, for which the validity of the results was evaluated by the author.

In summary of the dissertation the conclusions drawn from the research results were discussed and the analysis of objectives degree of realisation was carried out. Furthermore, the solution of the formulated research problem was assessed and the dissertation thesis was confirmed. Based on the research achievements, the directions of scientific work continuation were defined with regard to the improvement of solutions supporting the planning processes of the abnormal vehicles movement.

PRZEWODNICZĄCY
RADY NAUKOWEJ DYSCYPLINY
INŻYNIERIA LĄDOWA I TRANSPORT

dr hab. inż. Konrad Lewczuk, prof. uczelni