Abstract

The aim of the doctoral dissertation is to analyze the possibility of achieving a satisfactory coefficient of determination R^2 by comparing the values of the dynamic deformation modulus obtained during the testing with a lightweight dynamic plate and the secondary deformation modulus obtained during the testing with a static plate on an aggregate foundation with a fraction of 0/31.5 mm for road categories: KR1 - KR2, KR3 - KR4, KR5 - KR7.

For the purpose of the study, 350 in situ comparisons were performed on 16 different road constructions. The tests were divided into traffic categories and flexible and semi-rigid substructures. Dolomite aggregate from the GZD Siewierz plant was used on all construction sites. Each individual comparison involved one test with a static plate and three tests with a dynamic plate. The obtained results of the tests were compared to evaluate the values of the dynamic and static modulus of deformation. Two comparison methods were used.

The execution of individual tests was based on Polish standards (BN-64/8931-02, PN-98/S-02205), catalogs developed by IBDiM (KPRNPP, 2013) and recommendations of the manufacturer of the lightweight dynamic plate by ZORN (Instruction ZFG3.0 2013) and the German standard (DIN 18134).

The dissertation consists of 11 chapters. The first chapter justifies the need to undertake the topic defines the goals of the doctoral dissertation. The second chapter presents a literature review on the comparison of the static and the applications of these modules in constructions works. The third chapter discusses: the classification of roads in Poland, road components and road Pavement structures. The fourth chapter presents types of Road bases and the requirements for aggregates used for foundation layers. It mainly focuses on the crushed aggregate of 0/31.5 mm, which is used in the bases studied in this work. The fifth chapter describes the tests used for the comparative analysis in this dissertation, namely the static plate test and the lightweight dynamic plate test, and the tests of the aggregate with a fraction of 0/31.5 mm. The sixth chapter describes the methodology of the obtaining results, experimental fields and summarizes all tests with results for the 16 road constructions. The following chapters include the methodology, analyzes and summaries of all tests with a summary of the results for road structures divided into: traffic categories (KR1 - KR2, KR3 - KR4, KR5 - KR7) and flexible and semi-rigid structures. Chapter 11, the last one, presents conclusions.

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