

Summary

The usefulness of the structural soil for the development of trees in urban areas

Observing the problem of decreasing number of trees in urban areas, research was undertaken. It aimed at improvement of this deteriorating situation occurring in urban areas. It was decided that research shall include examination of the suitability of structural soil for planting trees in urban areas.

The tests were carried out on an experimental plot with four types of substrate, i.e. a structural soil (a mixture of broken stone with an appropriate grain size and substrate), soil present in the field (control plot), heavily compacted soil (simulating urban soils) and a mixture of soil and debris (simulating very difficult urban conditions). The materials from which the structural soil was made were chosen from those found on the local market. The physicochemical properties of the structural soil were tested by a specialist laboratory of the Research Institute of Roads and Bridges in Warsaw. The next step was to carry out load tests on the experimental plot using a static plate (VSS).

The usefulness of the substrates was also evaluated based on the condition of the trees planted in it. In each substrate the same group of trees was planted, with every tree very similar in appearance and parameters, coming from one lot, prepared for research by a specialized plants nursery. The species chosen for the study was silver linden (*Tilia tomentosa*).

A year after planting, during the entire growing season, the physiological parameters of these trees were tested using modern, non-invasive tools, demonstrating their health condition.

In load tests, it was found that the experimental structural substrate meets the criteria even for heavy traffic, for which the minimum value of the secondary deformation modulus (E_2) is over 120 MPa, and the prepared substrate – 132 MPa. After analyzing the test results, it was found that the condition of trees planted on a plot in a structural substrate is better than trees planted in other types of substrates.

Taking into account the results of physicochemical tests and the load-bearing capacity of the structural soil as well as the physiological condition of the trees planted in it, it can be concluded that the use of structural soil for tree planting in urbanized areas will effectively contribute to the increasing of the urban areas' greenery.

Keywords: structural soil, trees in urban areas, stress, habitat conditions, physiological parameters of trees, soil compaction