Summary

The main objective of the dissertation is to analyse the influence of glass fibre mesh reinforcement on asphalt concrete pavements, located in an area of mining subsidence. Falling Weight Deflectometer's results were used to determine the bowl of deflection on two test road sections. The first is a 400 m long section of the district road, rehabilitated in 2008. The existing asphalt layers were mild and the new ones were applied. One lane was additionally reinforced with a glass fiber mesh applied at the bottom of the asphalt layers, while the second lane was left without the reinforcement. Deflections were measured in 2019 and 2021, as a continuation of the state of cracking analysis performed in 2018. The second test section is also a district road, 1200 m long section, rehabilitated in 2020 and reinforced with exactly the same glass fiber mesh.

The dissertation consists of 7 chapters. The first describes the genesis of the work and formulates the main goals of the research. In the second chapter, the mining influence on communication objects was described. The third chapter presents the pavement constructions divided by types and design methods, including the influences of the mining subsidence. In the fourth chapter, different examples of geosynthetics together with the application in road engineering were shown. The fifth chapter consists of laboratory research performed on a large-scale apparatus. It was focused on the investigation of mining influences on the values of the coefficient of lateral earth pressure. The sixth chapter focusses on researches and analyses carried out in the test sections, together with a description of the methods used. This is the essential chapter of the dissertation that presents the investigation of the ground conditions, analyses of a state of cracking and deflections, backcalculation of pavement moduli layers and a determination of deflection bowl parameters together with their relations to the mentioned moduli. The mechanistic approach was used to determine pavement fatigue for a predicted traffic load. The last chapter presents the conclusions and recommendations for further research.