POLITECHNIKA ŚLĄSKA

WYDZIAŁ GÓRNICTWA I GEOLOGII
KATEDRA EKSPLOATACJ ZŁÓŻ

ROZPRAWA DOKTORSKA

OCENA MOŻLIWOŚCI WYKORZYSTANIA LASEROWEGO SKANINGU LOTNICZEGO DO MONITOROWANIA PRZEMIESZCZEŃ PIONOWYCH TERENU NA OBSZARACH OBJĘTYCH WPŁYWAMI EKSPLOATACJI GÓRNICZEJ

KAMILA KUZIA

PROMOTOR

dr hab. inż. Violetta Sokoła-Szewioła

GLIWICE 2019

Abstract of doctoral thesis

"Assessment of the possibility of using laser airborne scanning to monitor vertical displacements of the area in areas affected by mining exploitation".

Regarding the fact that mining enterprises increasingly use the ALS (Airborne Laser Scanning) method for cyclical measurements of the terrain, an important research problem is the assessment of the possibility of using the ALS measurement results for observation of vertical displacements of the mining area and verification of land subsidence forecasts. This thesis deals with that subject, opening the field for discussion and showing the need for further more detailed research.

In order to conduct the research work, data were obtained from two areas: the former hard coal mine KWK Centrum and KWK Pniówek. Then:

- Qualitative analysis of the ALS method based on the analysis of the results of measurements of vertical displacements of the mining area made with the use of the ALS method and analysis of the results of measurements of subsidence obtained using classical geodetic methods (precision levelling).
- Estimate of the accuracy of the ALS method in the area of measurement of land subsidence by comparing the vertical displacements measured by the ALS method with the values of subsidence determined by the precise levelling method.
- Verify the prognosis of land subsidence by comparing the decreases measured using the ALS method, with the values of the calculated decreases obtained by assuming three strategies for determining the parameters of the influence theory.

On the basis of conducted research, there have been formulated conclusions regarding:

1. Assessment of the accuracy of monitoring of vertical displacements of mining areas using the ALS method.
2. Evaluation of differences between vertical displacements measured using the ALS method, and the reductions determined by numerical modelling and explanation of their causes.

The results of the conducted research and verification of the subsidence prognosis confirm the adopted thesis that the ALS method significantly extends the monitoring of vertical displacements of the area, as well as verification of prognosis of depressions in areas affected by mining exploitation.

Kinga Kamela