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Nove metode za sodobne tehnologije ocenjevanja prostorskih parametrov podzemnih objektov

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POVZETEK

Pri pridobivanju geometrijskih podatkov v geoznanosti smo običajno omejeni na pred določene opazovane točke ali antropogene ali naravno izpostavljene vidne objekte. Čeprav se lokacija opazovanih točk se v podzemnih prostorih, s klasičnimi geodetskimi metodami, določa sistematično oz. na mestih kjer se po strokovnih interpretacijah pričakujejo manifestacije naravnih ali antropogenih vplivov, v kamnini točnih dogajanj nikoli ne moremo zagotovo napovedati. Prav tako se pogosto pojavlja problem nezadostne natančnosti in pomanjkljivih načrtov po izvedenih delih oz. izkopih, ki so pogosto osnova za nadaljnje upravljanje z objektom.

Rešitev za celovito tri-dimenzionalno izmero, z visoko mersko natančnostjo, je tehnologija s 3D terestričnim laserskim skeniranjem. Neposredni rezultat tovrstnega zajema podatkov je zgoščena množica prostorsko lociranih točk – oblak točk, ki z nekaj primarne obdelave opisuje natančno obliko kompleksnega inženirskega objekta. Raster skeniranja je določljiv in prilagojen zahtevam ter lahko dosega tudi do milimetrske razpone.

Ena od metod, ki se nanašajo na omenjeno tehnologijo je monitoring in analiza deformacij, zaznanih na vidnih opazovanih površinah. Poleg deformacijskih analiz smo razvili metodo za 3D kartiranje razpok in posledično napovedovanja optimalnih napredovanj. Metoda je predstavljena z eno terminsko izmero na primeru podzemnega kopa Doline z zajemom t.i. tarč za razpoke (FT – *eng. Fracture Targets*) in simulacijo napredovanja.

Ključne besede: 3D model, monitoring deformacij, terestrično 3D lasersko skeniranje, kamnolom, razpoke.

ABSTRACT

The process of acquiring geometric data within geoscience is usually limited on predetermined observation points, anthropogenous or naturally exposed visible objects. With classical geodetic methods of measuring underground constructions location of observed points is being determined systematically or on spots where manifestations of natural or anthropogenic influences are expected according to professional interpretations. Activities in rocks cannot be entirely predicted. At the same time problem often of insufficient accuracy and inadequate plans after implemented activities or excavations, which are often a reference or null condition for further management with a construction.

Solution for comprehensive three-dimensional measurement with high metric accuracy is 3D terrestrial laser scanning technology. Direct result of such data capture is condensed crowd of spatially located points – point cloud, which describes accurate shape of the complex engineering object building with some primary data processing. Raster of scanning is definable and adjusted to the demands and can reach also millimetre spans.

Monitoring and the analysis of deformations detected on visible watched surfaces is one of the applications of the mentioned technologies. Besides the deformation analyses a method for 3D registering of the fractures was developed and consequently prediction of optimal excavation progress. Application is introduced with one epoch in the case of underground excavation of Doline with capture of Fracture Targets (FT) and simulation of progress of excavation..

Key words: 3D model, deformation monitoring, terrestrial 3D laser scanning, quarry, fractures.