British Journal of Global Ecology and Sustainable Development
Volume-13, Feb., 2023
ISSN (E): 2754-9291

STAGES OF USING GEODETIC METHODS IN OPEN MINING CONDITIONS

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Abstract
The mining process and its possible impact on the environment. The created model can be used for design rehabilitation and reclamation of open-pit mines after closure. For open pit modeling, geodetic dimensions and coordinates of the mine from two stages of geodetic measurements were used. The graphical presentation of the geodetic measurements was compared with the data calculated from the area of the deposit boundary area photogrammetry. The measurement and processing results were used to visualize the space changes in the open pit required for remedial action landscape affected by mining. According to the calculations, the mine has been mined during the exploitation period, and the geodetic dimensions will be updated and moved to the next stage. under intelligence. It was found when calculating the average excavated volume per working day geodetic and mine map should be updated daily between monitored periods. When It was determined by comparing the initial surface of the open mine and the created model. Mining the entire top of the mountain range, where the dimensions of the general mining should be recorded on the geodetic and map of the mine, was completely removed. Attention is divided into two factors, the land surface temperature and plant condition.

Keywords: Geodetic dimensions of the mine, Geodetic measurement, cartography of the mine, mining process, open pit, geodetic dimensions, 3D model of the mine, geodetic coordinates, surface temperature, photogrammetry.

Introduction

The ever-increasing demands and possibilities of modern technologies of the world technologies and theoretical advances, with geodesy Techniques capable of implementing the International terrestrial data frame with an accuracy of several millimeters caused many geodetic difficulties neglected in the past. Now users have to do the migration (dynamic) coordinates, various local, regional and global periods that are reference systems as well as measurements applies to different types of data sources origin and quality and a long list of frustrating questions, These issues can ruin their

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work if mistreated Open source libraries like GeographicLib are more accurate when using machine precision. thus, the solutions are no longer numerically affected reductions. Another point to consider is this In some applications, it is possible to work directly in a 3D earth-centered coordinate system and avoid it. problems with map projection distortion, and for other applications they can compute or visualize data. becomes too complicated and needs to be simplified work on a flat surface. In this article, we offer a collection of useful facts, general misconceptions and assumptions (quant uncertainties) and potential measures as well as addn a guide for aspiring cartography users Current geodetic accuracy includes parts per billion (that is, a few millimeters per thousand kilometers) into them the work. Given the list of topics that can be covered undoubtedly huge, we focus on manufacturers.Let's take a look at the most common misunderstandings (or the biggest mistakes). In mining enterprises, the general coordinates of the mine are determined based on geodetic maps. Hence, Geodetic measurements and mine mapping play a key role in mining enterprises. The main idea of scientific research is to apply geodetic methods to catch the flow open pit mining volume. This is an overview of the measurement technologies used, implementation of geodetic measurements, processing of measured data (data), evaluation the spatial distribution of the quarry and the impact of mining on the landscape. The The expected results of the research will create a 3D model of the open mine as a result of geodetic works measurements taken at two time intervals, determine the volume of mined mineral. Mining in protected areas is also a problem in Uzbekistan, which focuses mainly on industry. materials (including limestone). The locations of these raw materials are ecological important because they are mainly karst areas. A recommendation for the future is a complete analysis conflicts of interest, revision of forecasts and reclassification of mineral reserves. Mustapaevich D. K. et al. GATHERING COORDINATES OF THE GEOLOGICAL AND GEOTECHNICAL LOCATION OF THE MINE //British Journal of Global Ecology and Sustainable Development. – 2023. – T. 12. – C. 58-66. There must be a basis should be based on strict adherence to mining limits and applicable regulations. The beginning may be a geodatabase containing mineral and protected area maps to assist in spotting potential conflicts in strategic planning for mining projects. to highlight environmental application, scientific research presents a collection of surface assessment results based on temperature and the peak period of growth and development of forest complex plants the reflection of multispectral radiation in the acquired satellite images. area was analyzed using two indicators, i.e. surface temperature and vegetation index Regarding the main points of the research direction, the research is devoted to the following. experts in geodesy, geology and environmental engineering.

Results and Discussion

Assessment of the state of open pit spatial distribution and the impact of mining a 3D model of the open mine was created using landscape, CAD and GIS systems. Mine map coordinates provided opportunities to model, analyze and display phenomena related

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to relief and topography, as well as to observe geomorphological features at various levels. The processes that occur on the surface of the earth are used as a basis in several scientific works of mining enterprises to capture specific changes caused by surface mining. In mining enterprises, it also contains several analytical data, Visualization approaches that support the creation of 3D models and mining objects. To calculate the volume, it is necessary to create geodetic dimensions of the Mine from the existing point clouds. These are It can be represented using a geodetic calculation model or contour lines. Entering dashes has no effect placement of land points, but changes the way triangles are joined, increasing accuracy Calculation of the volume of 3D irregular solids. Mustapaevich D. K. et al. MONITORING THE CONDITION OF THE DEPOSIT IN MINING ENTERPRISES. MODERN METHODS OF DETERMINING THE LOCATION OF MINERALS //Innovative Technologica: Methodical Research Journal. – 2022. – T. 3. – №. 09. – C. 111-115. It can be done according to the volume calculation the whole area or only in a certain part. The accuracy and time of calculation depends on the size fence. The main procedure for calculating the size of the software:

___> Create a 3D drawing (*.dgn) of the boundary part of the mine area.

___> Create at least two reliefs by importing a list of coordinates (the boundary area of the mine should be set as the center of the coordinate).

___>Individual visualization of models, their inspection and editing using triangles Discontinuities should be set at a distance to the measurement limit.

___> Calculate the volume of the irregular body between the two surfaces/grounds, and the boundary is calculated by subtracting the length of the area section.

The size of a solid body on a 3D mine geodetic map is more accurately determined if:

#The chosen measuring method and measuring instruments are more accurate,

#More points are distributed morphologically in a 3D solid;

#The surface of a 3D solid is more geometric,

#The approximate surface of a 3D body is as suitable as the mathematical relation,

#There are more elementary solids that decompose as a 3D solid a result of geometry.

Visual representation of geodetic measurements in an open pit

Unrealistically created parts of the contour models of the open pit during the mine detection period modified using break lines. Before calculating the volume, a comparison of contour models from and done in the next section. Second period and visualization of contour model from measured data contour model from points obtained from aerial photogrammetry was compared. Based on A Comparing the graph of the stone wall of the lower deep benches, it was found to be an antenna photogrammetry was performed prior to the ground survey of the open pit (Picture 1). A a graphic comparison of rock wall models is shown on an orthophoto map. The stone wall in the open pit can be divided into two zones. The first is the zone of the mountain wall that is not affected by mining. This shown in black as the same graphics area. The second is the zone of the affected stone wall mine It is shown as an area of incompatible graphics in green. Shown with the same field minimal differences in position and height. 1, 3 and

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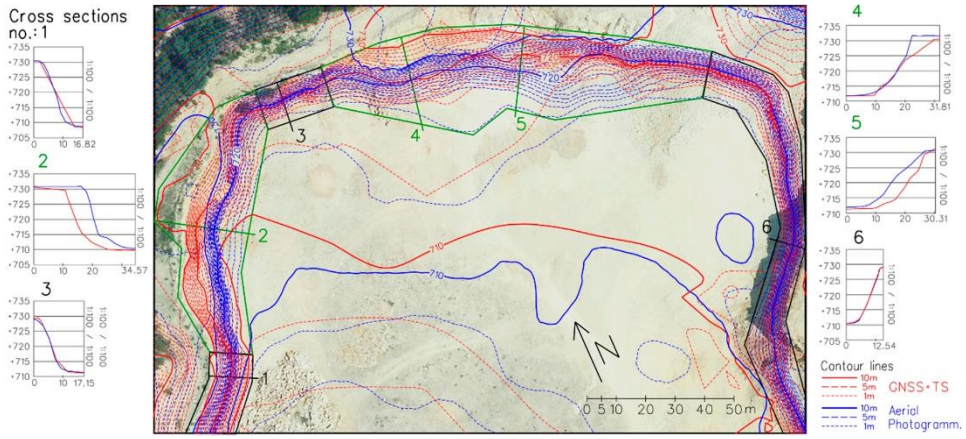
transverse profiles of the stone wall with symbols 6 of these regions are shown. Aerial photogrammetry results confirm correct location the stone wall in the open pit is calculated based on the location dimensions. This calculation can also be considered as the height of the boundary area of the mine between the points of location of the coordinates of geodetic dimensions. Incongruent areas of the stone wall marked in green already described from mining. Graphical representations show large differences in location and height proportions of the stone walls of the pit bottom. Traffic can be monitored in green areas The analysis pushes forward the extraction of the stone wall. Cross-sections are shown to confirm this They are designated by the numbers 2, 4 and 5. This image shows the dimensions of the geodetic model of the mine. In this model, the map of the Mining enterprise is depicted in geodetic dimensions.



Picture 1. Graphic representation of the stone wall contours of the deep bottom of the open pit mine is depicted on a mining map from aerial photogrammetry and total station tachymetric measurement data.

According to the volume calculation, it was found that 145,266 m3 were mined in almost 4 years. Comparison of changes in mining between 1st (green contour lines) and 2nd. (orange contour lines) periods are shown in Picture2a. There were 1400 days between them measurement periods, of which 900 working days. Alisher o'g O. A. et al. MINING TECHNOLOGICAL EQUIPMENT THAT DETERMINES THE SLOPE ANGLES OF THE MINE BY MEANS OF LASER BEAMS. – 2023. It was average mining per day estimated to be approximately 150 m3. This volume corresponds to approximately 510 t = 0.51 kt/day at a density of 2.6533 t/m3 dolomite limestone. Mined weight of limestone 378,422 kt between two periods. The resulting limestone weighs 378,422kt corresponds to a volume of 142,774 m3 at a limestone density of 2.6533 t/m3. Sound difference from two sources is 2300 m3, which is about 1.74% of the total volume. differences in results may arise from generalization of land in geodetic surveying and geodetic map coordinate determination.

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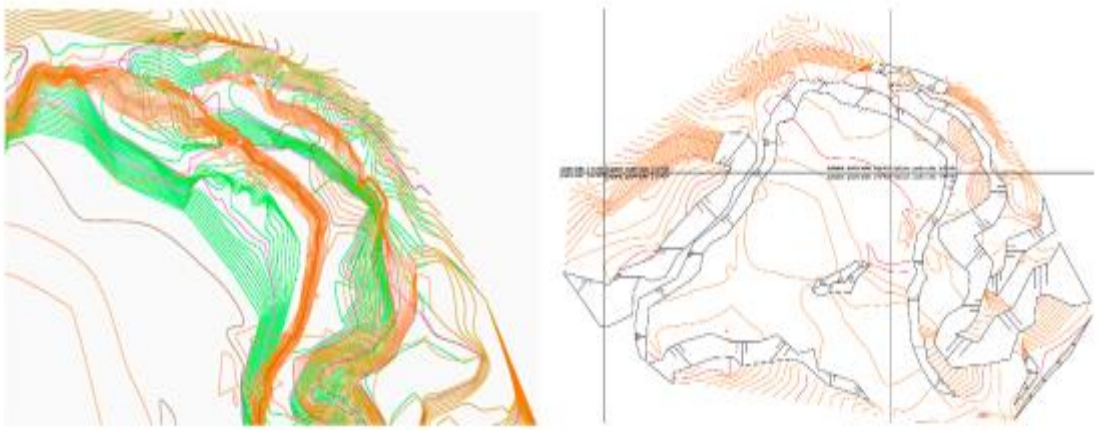
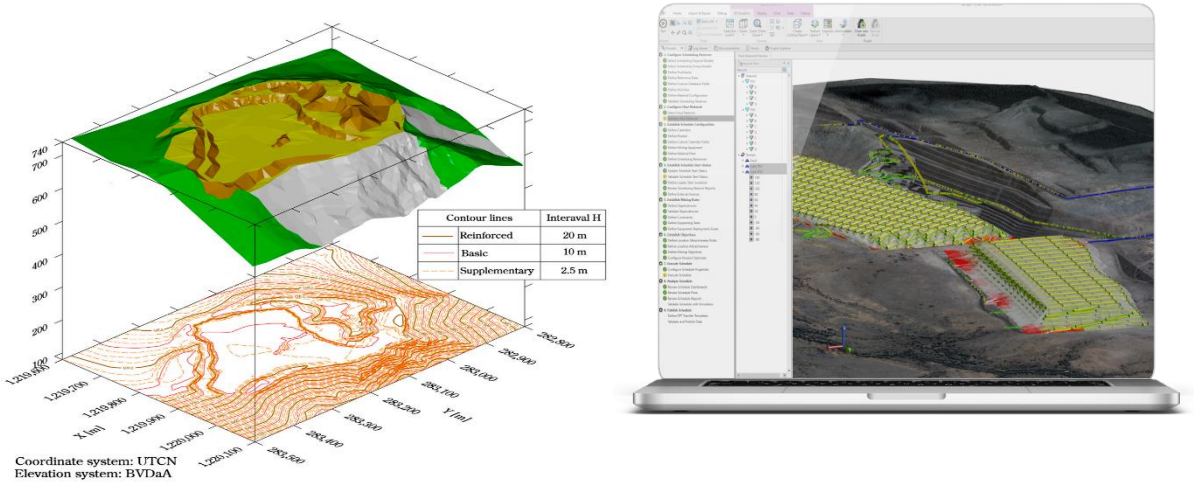


Picture2. A graphical representation of the mining process between two periods from a geodetic coordinate representation of data and technical dimensions with contour lines (1 m interval). (a) green - Day 1; brown - 1400. observation day; (b) 1400. condition on the day of observation.

Contour lines are replaced by very dense and technical ones on stone walls on the mine map dimensions in the slope direction (Picture 2b). The current model of the second geodetic survey period was used for further visualization. by digitizing the mine map at scale From the previous scale 1:1000, 1020 relief points were taken from the surroundings. open pit. These points were used to create a complete 3D model of the open pit mine the environment. A triangular AutoMining3D Scheme model can be created by applying a color type we can mark the type of area by colors. The exact dimensions of the mine are indicated in the coordinate drawing. Axmet o'g'li M. N. et al. Determination of mineral location coordinates in geotechnology and mining enterprises //Global Scientific Review. – 2023. – T. 11. – C. 8-14.



Picture 3. Open pit outline and a graphical representation of the Mining3D model apply the color dimensions of the area type(It is described on the basis of the technological model of determining the location coordinates of the mineral).

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Conclusions

High-level mining plans help the industry create a sustainable planning framework term deposit. It is important to understand that existing mining areas may be depleted and therefore geological Research is needed to further open new sites. Horizontal and vertical results measuring the current state of the open pit only highlights their application for:

* If the geodetic dimensions are accurately obtained in the current open-pit mining operations, long-term mining processes will be carried out in the mine,

*Optimization of open-pit mining processes, which can lead to increased safety and cost-effectiveness in the process of surface mining, it is necessary to accurately enter the structure of the map of the mine and the dimensions of the geodetic coordinates,

* Identifying and eliminating the negative effects of surface mining processes environmental impact should be considered,

* Resolution of possible legal disputes in the field of mineral extraction for real mining it will be necessary to check the real estate cadastre documents.

The result of processing and modeling the measured data is a 3D model of the open pit. The created 3D model is visualized using different color scales. Parts of the open pit, its boundary area dimensions, this model is created based on a sufficient amount of data direct measurements (satellite and ground) and pre-mining digitization obtained a map is created in an analog form. Aerial photogrammetry data should be used to compare geodetic measurements. The created model is a suitable basis for completing the mining process in the following years and monitoring the impact of the site on its natural environment. After closed mining, it can be the basis for modeling the final reclamation method the formation of geodetic dimensions of the mine must meet certain technical conditions:

> the angle of inclination of the newly formed solid must be stable;

>safe drainage of surface water;

>prevention of drying out of the area,

>separation of stone fragments from the walls of the open pit should be controlled.

>In mining, groundwater must be controlled.

In short, it is impossible to create the best simple single evaluation method. A simple assessment method is not mutually exclusive because software systems and cartography have many different characteristics. Depending on will objectives, environment and processes, evaluations It differs from a complex evaluation method such as CartoEvaluation. just one measurement is not enough to represent software quality. The quality of the software is very high like aspects and need different dimensions Here is reliability, stability, error rate, etc as well as values that cannot be measured, such as user satisfaction. it is a valuable result of the CartoEvaluation method an extensive list of aspects (objectives) in the cartographic field function. That method applies to very deep and detailed cartographic functions and this complex assessment not yet available. u weight and inal score not the most important. The CartoEvaluation method he proposed helps users choose from a wide range of options various GIS software and its

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subsequent use maximum for fast, convenient and accurate digital map output. In mining, geodetic maps should be entered into geodetic dimensions by cartographically calculating the coordinates of the mine.

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