AJLISI
GLOBAL RESEARCH NETWORK

Information Horizons: AMERICAN Journal of Library and Information Science Innovation
Volume 2, Issue 3, 2024 ISSN (E): 2993-2777

Dimensioning of Excavation-Loading and Transportation Transport Routes at Open-Pit Mining Enterprises

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Abstract. *Information is given about the stages of designing the dimensions of the open-pit mining and loading transport and the initial movement of the transport transport. In this case, the dimensions of the digging-loading and transport vehicles, the distance of movement and the scheme drawings of the movement path are shown as an example. Transportation of overburden and mineral raw materials in surface mining is one of the most complex and expensive operations. today's processes. Good transport routes are essential for successful open pit truck transport. Inadequate road design and maintenance has a major impact on high transport costs and potential hazards. from a security point of view. Numerical modeling was performed to analyze the effect of the installed features materials used in the construction of roads, the thickness of the layers and the interaction of tires with the road surface.*

Keywords: *Open pit mining, working area, geotechnological location, mining transport road, loading transport road, topographic maps, intermediate distance, period of exploitation, minimum width.*

Introduction

In mining operations, the ore body is mined from top to bottom in a series of horizontal layers, and this is called a preliminary mining project. Mining begins after the upper steps and sufficient floor space. A road or ramp should be created to access the various steps. Depending on the type of width and steepness of this ramp, the number and size ratio of the equipment to be placed is taken into account. Stable slopes must be created and maintained. The slope angle is an important geometric parameter. Open pit mining is highly mechanized according to projects where each piece of mining machinery has a geometry related to its physical size, but also the size required for efficient operation. There are several problems with moving around. There is an additional drilling kit, loading and transportation equipment that requires a certain amount of work space is difficult to carry. When measuring the dimensions of these so-called work steps, space requirements are taken into account. From an operational and economic point of view, there must be certain volumes, at least. These volumes have a certain minimum size and an optimal size. In this thesis, aspects related to the planning and design of open pit mines are considered, trying to fully cover various geometric objects. One of the initial processes is the preparation of the mining area, and the excavation and loading processes are carried out based on the dimensions of the step formation. The stress and stress distribution found in road construction depends on the characteristics of the road and the structure and mass of the truck. Therefore, digital modeling and computer simulation is a very suitable method in road design because in a short time and a low-cost calculations are possible to build a large number of models and the best model available is selected. The optimal construction is at least one that is low construction costs and low maintenance allow for efficient use of transport equipment for a longer period of time period of exploitation. Many accidents happen due to road mishaps mines are felt.

Greater power to increase productivity trucks are used. However, for the use of large trucks, there must be shipping lanes adapted/improved to prevent and reduce accidents. that is why improving the structure of transport routes is important because. This leads to increased truck efficiency, increased productivity, reduced maintenance costs, and significant growth safety of truck operators and other mine personnel to drag road design consists of two main aspects, which are constructive and geometric design. Constructive design of roads implies determination thickness of different layers of the road, special combinations of structural materials and load configuration. Geometric the design of traffic routes involves physical measurements, e.g width, cross-sections of slopes, height and height of channels safety berms.

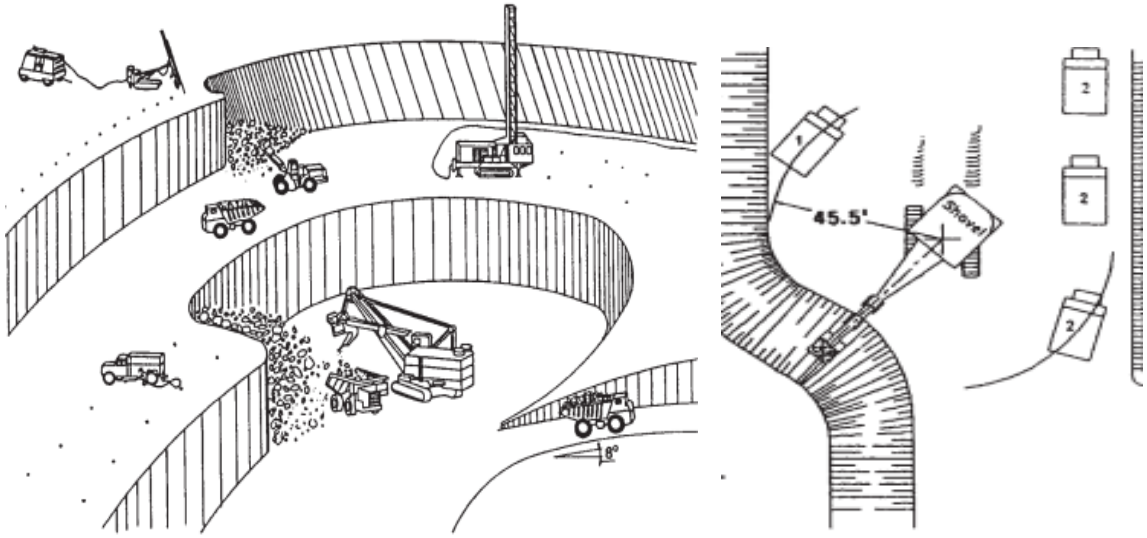

Figure 1: Movement scheme of mining transport in open-pit mining enterprises.

Study the importance of the problem empirical methods of road design using past experience are commonly used in mines, but this approach does not always lead to optimal road design. This therefore, the possibility of data entry should be explored in the decision-making process, choosing the optimal project solution for opening and developing technology and surface mining. Numerical modeling and computer simulation are well-studied methodologies in various fields, each discipline having its own characteristics. In this using the finite element method to simulate the the construction of transport roads in surface mines is checked due to the previously mentioned confirmation that it constitutes transport largest share of total operating costs. Price reduction use of minerals and meet the basic conditions human and ecological environmental safety is the main task of any person mining company. Determining the optimal road construction would certainly go a long way towards achieving such a goal. The design of the haul road for an open pit mine can have a major impact costs associated with transporting ore and waste to the surface. This study proposes a new method open pit design of traffic lanes to support efficient freight operations road layout showing the radius of curvature recommended in road design manuals. Finally, by combining the road, a three-dimensional model is created that represents the results of the road design layout changes, resulting in the slope of the open pit and the design of the machine. Invited Programming the road to the gold mining area made it possible to design a freight road open pits thus supported efficient shipping operations; Also, the time required for work it was possible to predict the movement of trucks along the road. The proposed method is expected to be useful facilitate the improvement of open pit planning and existing design and road design functions mining programs. The purpose of this article is to study in the context of the concept scheme for using strategic mine planning activities in open pit mining. In the first part, the concept includes examples where the thrust size is determined and the number of blades is changed. The second part includes a discussion of motivations and limitations mine planner in design. Multiple oar and tackle configurations at the same thrust a In such cases, it is difficult to design a circuit mainly due to the limited loading space and optimization tools can be useful; however, models must be able to represent reality restrictions affect the productivity of different levels of shovels. Generally aggressive and Expensive schemes are rarely used by mining companies

with high ambitions and low performance operating costs. However, choosing the appropriate operating system should be appropriate the main goal of mine planning activities, namely: to create value through the exploitation of minerals source.

Materials and methods

During the design of the initial measurement processes in open-pit mining processes at mining enterprises, it is necessary to form the movement paths of digging-loading vehicles based on the geological and geotechnological location of the mine. Based on the geometric map of the mine and the location of the ore body, we need to calculate the dimensions of the mining area and the transport route. When calculating the dimensions of this space, the main focus is on determining the dimensions of the operation area necessary to accommodate the large trucks and shovels involved in loading. This width (synonymous with the term "working area") is defined as the distance from the top of the steps that provides the mining area for loading operations, which is related to the dimensions of the machine being created during the advance of the parallel section. the minimum amount of the pickup area limit varies depending on whether one or two are used to determine the size of the trucks, and the latter obviously requires a little more. Mainly open pit geotechnical engineering about evaluating the stability of individual benches and avoid catastrophic failure, ie. landslides across slope Since the excavation and disposal of the material added to the cost of mining and carbon footprints, operators tend to make pit slopes just as steep. the volume to be mined can be reduced. This goal must be balanced against the upside the steeper the slope, the more likely it is to fail causing major disruptions in mining operations. Theoretical foundations of decision making are used slope stability risk management to ensure safe and economic operation. Systematic risk assessment requires an assessment of the properties of materials on the slopes, an understanding of structural flaws in the mine, and calculation. stability and monitoring for different slope geometries slope performance as deeply developed, whereas risk management involves decision making and countermeasures. Slope stability refers to the ability of an inclined slope withstand its own weight and external forces is undergoing a shift. It depends on the specific characteristics of the stone, such as its strength, availability and hardness fractures and joint sets, as well as external factors explosion, rainfall intensity/duration, infiltration etc and surface current. Although mining geology is usually is well known about the geotechnical properties of soils and rocks are often limited - especially cohesion to resist gravity load - and these parameters can vary significantly in a small area. So, risk management necessarily involves decision making with incomplete information. It's more complicated according to water level and underground flow regimes (hydraulic conditions) as percolation of pore fluids may occur has a major impact on stability. Traditionally, site description requires regional geology and interpretations inductive reasoning is required, combining topographic maps, well logs, and other data with visual observations.

Conclusion

Based on the simulation results using the model proposed in this paper for evaluation and Excavator operating hours evaluation, maintenance and service rules should be and work customized indicators and maintenance and repair tables of the EKG-5 excavator adaptation allows you to increase the repair and maintenance schedules of the named excavators determines the actual operating conditions and operating time of a complex technical system. The structure of the repair cycle adapted to the nature and aging and factors of the excavator it is recommended to use depending on the use of natural and man-made effects conditions. Processes that take into account the operation of mining machines in the assessment of the effects of external impact conditions and natural phenomena processes. Relevant factors to consider the decline in activity is the actual time of the mining excavator conditions relative to nominal and reduce the aging factor. The second accepts Taking into account the nominal working time of the quarry excavator for the decline in activity conditions, taking into account the natural aging of the car and determined as a ratio and the operating hours of the excavator in the estimated operating year The estimated operating time of the ratio is calculated for the first year of operation. for this determining maintenance intervals during machine operation monitoring the data obtained during the computer modeling and regulation process. At the initial

stages of the design and planning stages of open-pit mining enterprises, it is necessary to ensure the movement of digging-loading and transportation vehicles without interfering with each other, based on the geological and geotechnological location (scale) of the mine. Based on accurate dimensions and geometric analysis, the correct size of the circular road in the step-shaped part of the mine ensures the continuous operation of digging-loading and transportation vehicles. Here, determining the dimensions of the design part of the work area is a complicated process. The reason is that several processes are carried out at the same time in the field of work. Based on the considerations and analysis presented in this thesis, several mining engineering problems can be calculated.

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