UDK 622

PLANNING AND WASTE DUMP IN ORDER TO SOUND ENVIRONMENTAL

Prof. S.V. Borshchevskyi , lecturer E.V.Prokopenko, assistant S.V.Maslo, stud. Kuznetsov P. A., Donetsk National Technical University (DNTU), Donetsk, Ukraine

Abstract

Relevance of the study of man-made deposits due, above all, their high environmental harmfulness and danger for cities and towns. Furthermore, dumps occupy large areas that can be used for other purposes. Along with this, heaps of potential interest as a source of secondary minerals for some time will lack of mineral resources. Currently, advanced nanotechnology allow a secondary resource availability obtain materials with high quality properties. Having technically nohenne field, knowing where the required chemical element, you can retrieve it from the developed tools and methods of technological fields. Thus, the study of structure parameters of rational planning of waste heaps under the laws of their formation with a view to possible use as a man-made deposits.

The Essence and the status of the problem. High rates of industrial production in the XX century were accompanied by intensive mining of mineral resources. This process led to the accumulation of large amounts of rock mass in the dumps. Raised from the depths and stockpiled rock contains minerals, and the older dumps, the richer they are useful components, so that the development of technology allows us to develop a less conditioned mineral reserves. As a result, attention is focused on industrialists technological fields crust-mennyh minerals, which are waste dumps of mining companies.

The analysis of last researches and publications. The issue of monitoring the use of waste heaps Donbass coal mines as minerals for the national economy, the problems of disposing of rocks and mine heaps, heaps modeling the extraction of coal deposits studied and examined in the present [1,2]. The issues dealt geometrization technological fields such scholars as [3]. The issues of technology and technological schemes of man-made mineral extraction in the current slime deposits, placing piles of overburden in the contours and career management as arrays of rocks involved in [4].

Based on the analysis of the literature, we can conclude that preferably the majority of cases examined issues related to the stability of external piles, their overall environmental safety, waste management and ignition dumps

The aim of the research. Development of methodology for planning the formation of waste heaps considering the order cut and coal seams for their sustainable use. To achieve the goal of posed and solved the following problem to-gation: analysis of the impact of mining rock dumps on the environment; analysis of modern technologies vidvaloutvorennya to identify pro-spatial structure lithology mine waste heaps; development lithological model in which the blade is seen as a complex system of regularly distributed properties of rocks ; develop a framework methodology management process of forming terricons including geological conditions of mining for cancer with regional placement of rocks in the dumps for further storage and disposal; develop database structure properties of rocks from the proposed dump hronolitolohichnoyi model.

Materials and methods. Coal industry - complex multi production complex. It is a heavy industry, both in content and in the high risk to the environment. Coal mining is associated with destructive effects on the atmosphere, land, water, flora and fauna. Particularly active invasion of the coal industry in the natural environment is in a restructuring of the industry and the transition to new forms of market economy. The economic activities of the coal enterprises leads to significant distortions in the landscape designated lands. Many mines pose the question of the allocation of new land allotments in connection with the fact that most of the dumps have exhausted their resources or require a re-formation of a flat cone.

Waste dump - is an array of man-made, designed for the storage of waste rock and tailings, as well as very complex engineering structure, within which there are complex physical and chemical processes due to the presence in the composition of the rocks of almost all the elements of the periodic table, including radioactive

Discounted waste dumps, intense dust and gas of air, hydraulic structures, ponds, and tailings ponds, water pollution, developed underground space, the earth's surface subsidence, artificial flooding, water logging, and more, connecting with the object of the coal industry, are sources of environmental hazards .

On the surface waste dump is demolition dust and fines, storm water runoff breed in Hydroficated network area, moldboard slide individual pieces of mass from the surface waste dump, dust and gases during operation of mining machines.

Numerous studies have found that the major factors adversely influence waste dumps on the environment are:

- Violation of the natural landscape of the earth's surface
- Dust and gas pollution;
- Violation of the hydro geological regime of adjacent lands;
- Chemical and radiological contamination of soils and waters.

On the territory of Donbass has more than 1.5 thousand heaps of coal mines, each of them focused on the average 1100 m3 rock

In Ukraine, more concentrated waste deposits. This is due to the fact that complex and not yet well established method of translation "of waste disposal sites" in the "man-made mine." At present there is no approved method of advance planning of technological fields, although research in this area conducted. Solution to the problem of industrial uses of different rocks waste deposits associated not only with the possibility of demand for mineral resources in the market over time, but also the need to create a focused perspective of their sources. In this regard, the formation of man-made deposits of paramount importance.

Technology for forming waste dump is provided with the implementation of measures to prevent spontaneous combustion moldboard mass. In forming the tiers based on:

1. Opening hours of the mine
2. The maximum height of the blade

Number of levels projected waste dump form the mine, given the fact that the maximum height of the blade shall be 100m.

Designing dumping should be implemented taking into account all possible factors and features an array of field stripping, substrate conditions, which may affect the stability of the blade and its impact on the environment.

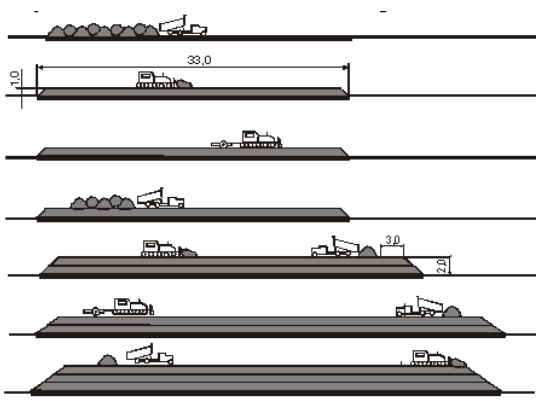


Fig.1. Formation tier waste dump

By stacking technology (Fig.1) is poured on the rock dump is not random, but for a certain time and place, that is discrete, which means the change that occurs at intervals

Stacking technology, the breed is poured on the blade discretely. Designated in this chain is the frequency of performing surveying filming waste dump. Between filming Δ t determines the location of a mine site according to planogram development work, and also determines the composition of the rocks in this place above ground, that is," chemistry" rock. Consequently, the flow chart of the chain allows you to find the location of a particular breed of mining area to the specific characteristics of litho logy rocks pour on the blade.

Due to the fact that each layer has its geological structure, it is possible to predict chemical reactions in contact of various elements in different layers, that is, pre-identified adverse zone on a separate layer and in general on the heap.

Thus, as a result of the construction of three-dimensional and two-dimensional model tier waste dump sites over a period of time, you can get a three-dimensional model, which shows the structure of the heap. Based on this model, you can accomplish the following:

1. Set the time of a dumping site of tunnel works.
2. Determine the composition of the rocks on the plots.

3. According to the composition of rocks and their properties to assess the possible foci of spontaneous combustion of individual sites and dump a whole.

4. Establish areas where rocks are folded, suitable for use in industrial purposes.

5. Establish areas where possible development to doizvlecheniya useful component (formed technogenic deposit).

In Fig. 2 shows a block diagram of the dynamic model created waste dump.

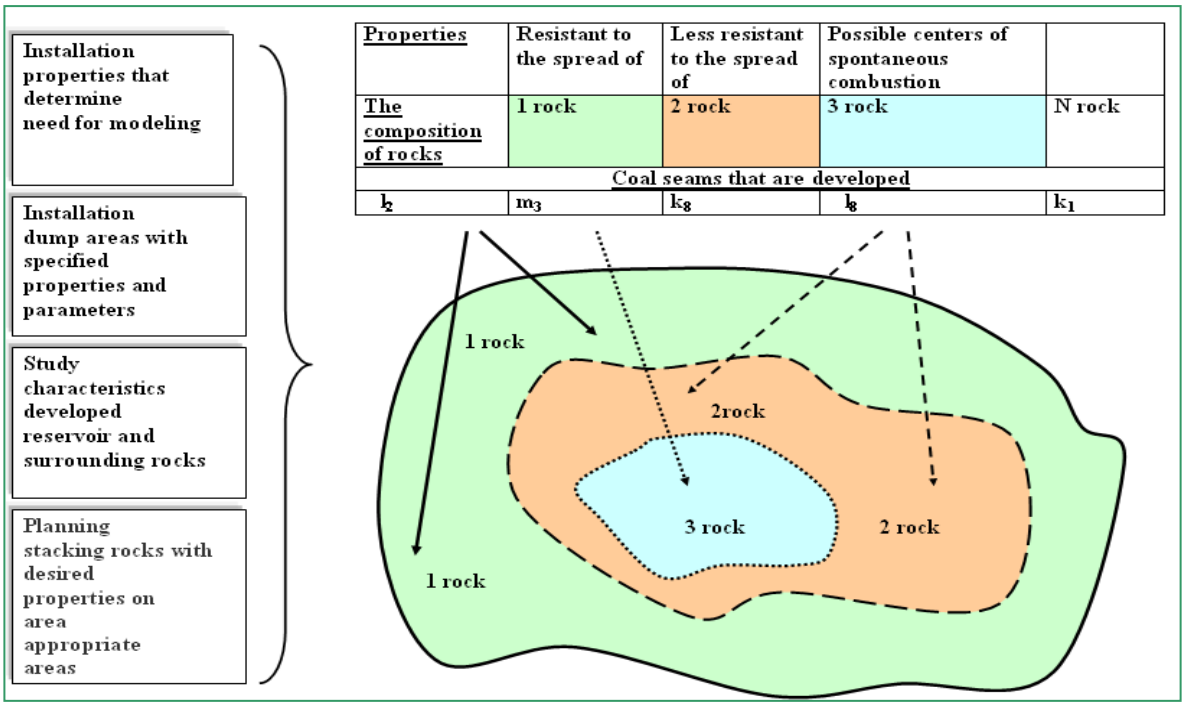
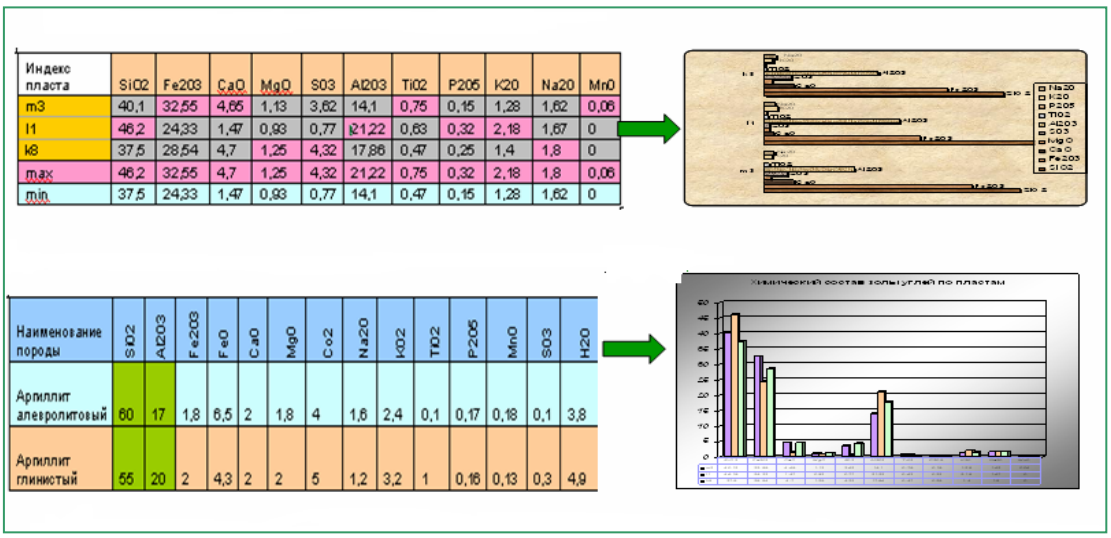


Fig.2. Block diagram of the dynamic model created waste dump.

As in mine tailings, typically come rock extracted by passing the development workings, by lithology is dominated by clay difference - about 80%. Thus, the chemical reactions and the consequences of these reactions play an important role in building a dynamic model.

After the analysis of the chemical composition of the surrounding coal seams breeds considered to be on the chemical composition of coal seams. For the analysis of the coal enterprise has the information presented in the form of a table that contains data about the chemical composition of coal ashes on the seams. This analysis is presented in Fig.3.



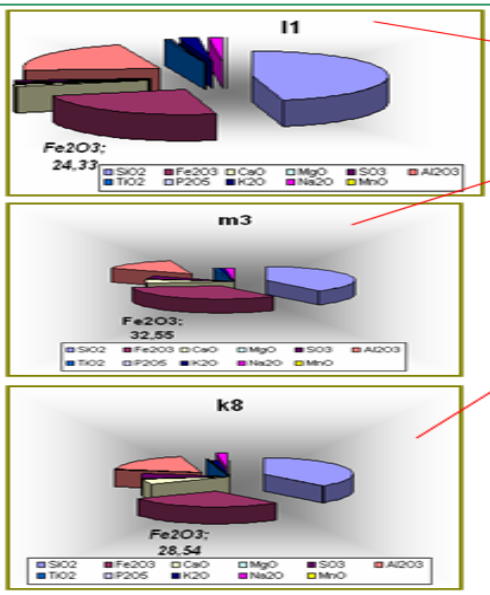
Индекс пласта	SiO2	Fe2O3	CaO	MgO	SO3	Al2O3	TiO2	P2O5	K2O	Na2O	MnO
m3	40,1	32,55	4,65	1,13	3,62	14,1	0,75	0,15	1,28	1,62	0,06
l1	46,2	24,33	1,47	0,93	0,77	21,22	0,63	0,32	2,18	1,67	0
k8	37,5	28,54	4,7	1,25	4,32	17,86	0,47	0,25	1,4	1,8	0
max	46,2	32,55	4,7	1,25	4,32	21,22	0,75	0,32	2,18	1,8	0,06
min	37,5	24,33	1,47	0,93	0,77	14,1	0,47	0,15	1,28	1,62	0

Наименование породы	SiO2	Al2O3	Fe2O3	FeO	CaO	MgO	Co2	Na2O	K02	TiO2	P2O5	MnO	SO3	H2O
Аргиллит алевролитовый	60	17	1,8	6,5	2	1,8	4	1,6	2,4	0,1	0,17	0,18	0,1	3,8
Аргиллит глинистый	55	20	2	4,3	2	2	5	1,2	3,2	1	0,16	0,13	0,3	4,9

Fig.3. Chemical composition of coal ashes on the seams

Because of the reservoir rock components are presented in the first column of the table, knowing the actual volume of the rock, which comes from the reservoir, it is possible to calculate the maximum value of the component to the reservoir. Figure 4 on the underside of the table with the characteristic of the components and the value of the volume of rocks formations.

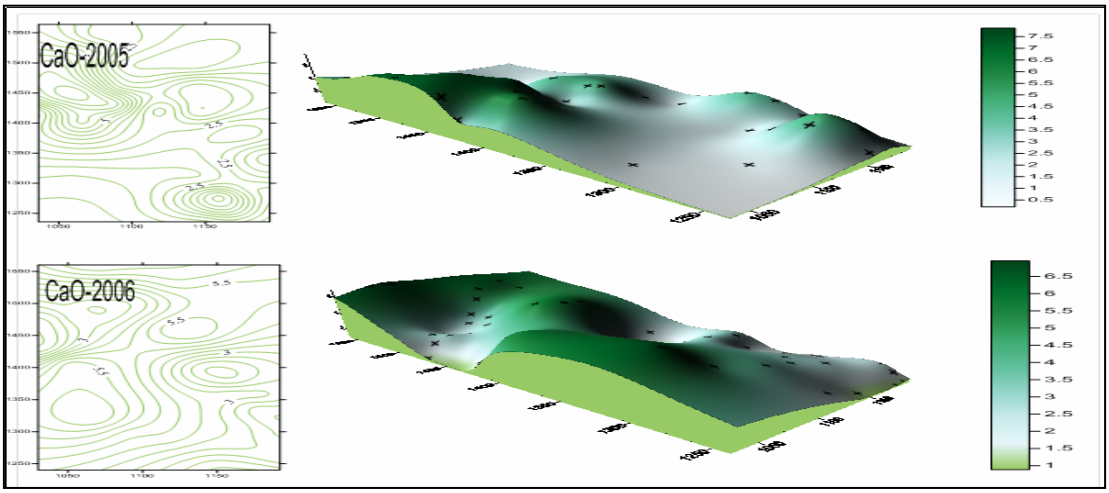
Using the obtained amounts, it can be concluded about the composition of the components contained in the reservoir, that is, what components are in greater volume of rock to sleep off blade, depending on the schedule of development workings. In Figures 4 is a diagram describing the contribution of each component in the total paved rocks on blade, depending on the name of the formation.



	m3	l1	k8	V	максимальное значение
	82368,75	11804,8	8125,6		
SiO2	40,12	46,14	37,5	4154018	46,14
Fe2O3	32,55	24,33	28,54	3498,742	32,55
CaO	4,65	1,47	4,7	321,2606	4,7
MgO	1,13	0,93	1,25	12,4966	1,25
SO3	3,62	0,77	4,32	10,2067	4,32
Al2O3	14,1	21,22	17,86	144,5366	21,22
TiO2	0,75	0,6	0,47	31,7012	0,75
P2O5	0,15	0,32	0,25	0,422	0,32
K2O	1,28	2,18	1,4	1,2396	2,18
Na2O	1,62	1,67	1,8	8,2342	1,8
MnO	0,06	0	0	0,0972	0,06

Fig.4 Diagram the contribution of each component in the total paved rocks on blade

Thus, knowing the location of the component on the heap, its share in this volume, we can make recommendations for further use of the component, such as: if the blade action, it is rolled in accordance with stacking technology, the greater the concentration of the component to be installed on the sides as possible blade, if the blade in the design stage, the coating and laying rocks on the blade with a maximum content of a component depends on the storage management of the breed. All of the above may be considered on the charts for three isolines chemical components SiO2, Fe2O3 and CaO3. Quality indicators of these components were derived from the experimental samples obtained during the Dumping rocks on blade. The construction was carried out using the package "Surfer", which is constantly being improved and adapted to new operating systems. These graphs are constructed for the option if the pedigree breed blade slept from one reservoir. Also, the model provides for the construction of such graphs, if the pour volume includes components from different layers. In that case, to plot contours content average is taken the necessary components. Thus, one can construct contour maps for all the components and taking into account the interaction of different layers developed (Fig.5) and find the difference in volume between the shootings, in which the components are concentrated alleged (Fig.6).



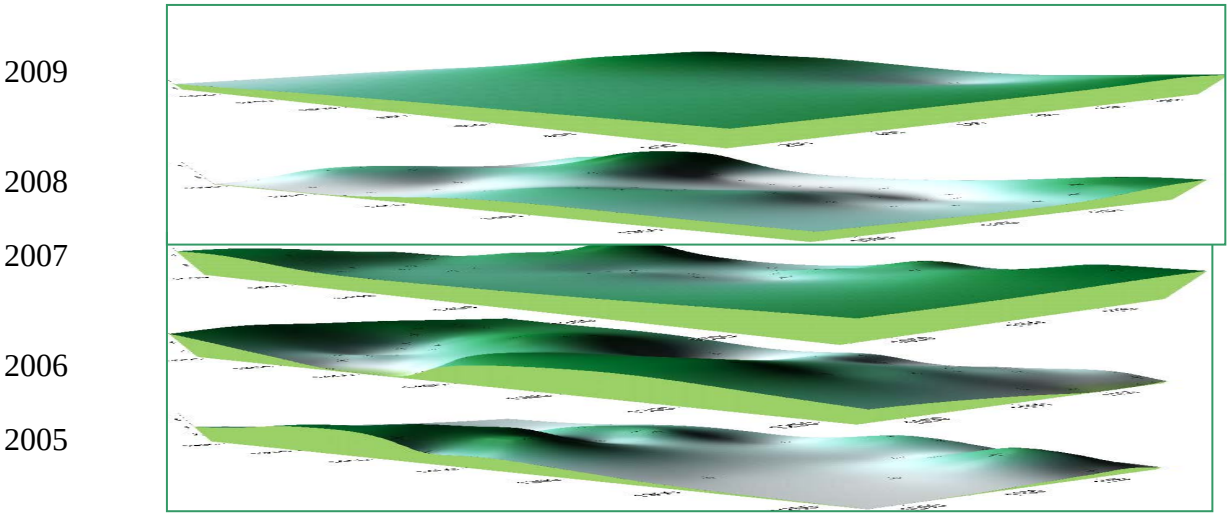


Fig.5. Building on the blade surface tier component CaO for 2005-2009 years

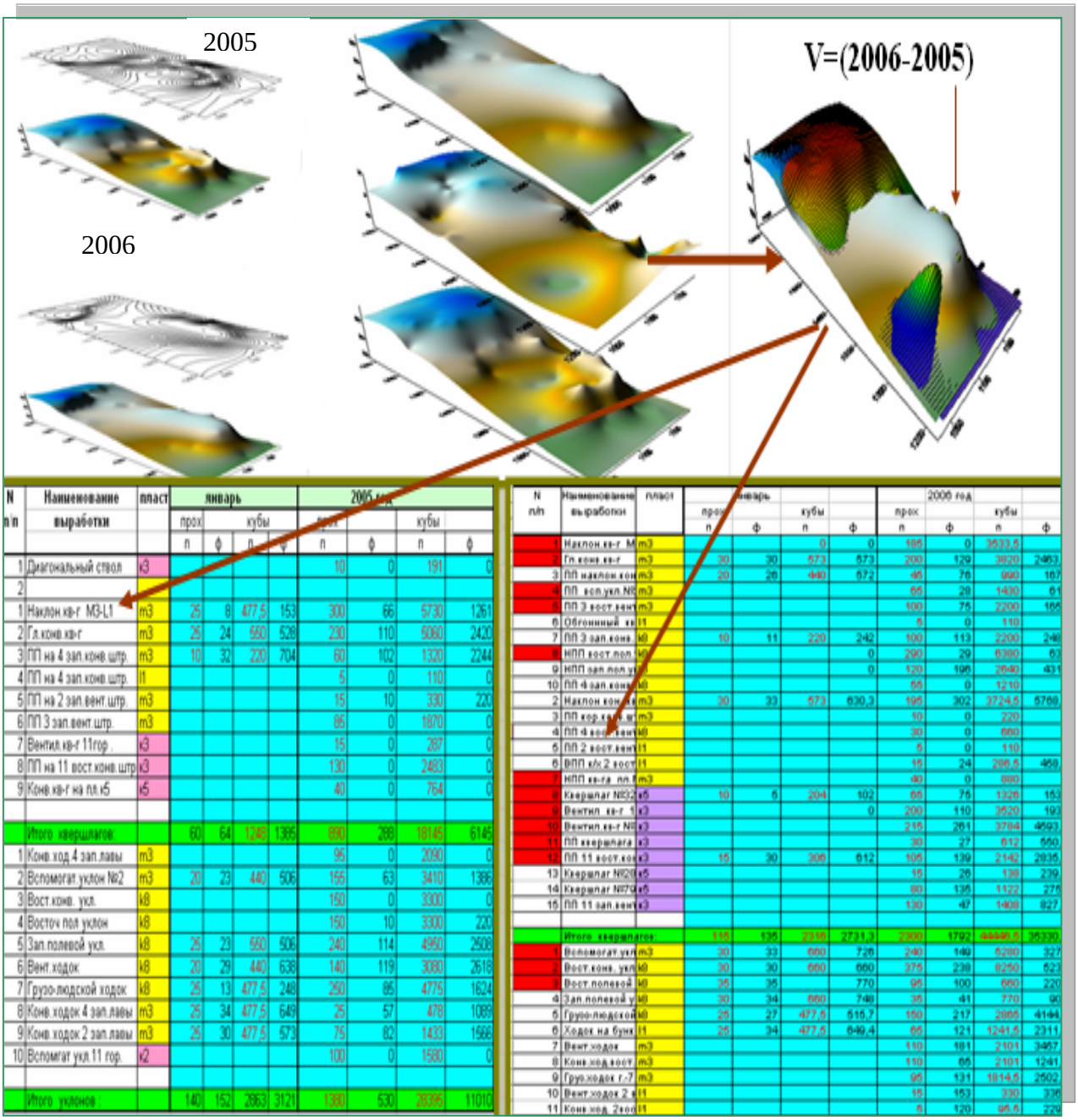


Fig.6. Block diagram of determining the volume of excavated rock in between filming

Proceeding from the above, we can formulate the following problem: under the rock dumps that a certain area of land. But not always, this area is in the form in which it is scheduled. Change in the area is due to a lack of control over the rational distribution of species in the heap. Therefore, waste dumps" crawl", capturing more and more space of productive land, thereby reducing the environmental conditions surrounding areas

This actual area can affect nearby buildings or structures, not to mention the environment.

As you know, heaps - is the composition of rocks, which is dependent on mining and mining activities themselves depend on the time and place to be, that is, from the schedule of passage tunnel workings. If you do not manage to place rocks and irrational in the heap, leading to the so-called" sprawl" blade.

Thus, we can conclude the following: due to" Chemistry" species deteriorating land and water around the blade and emit into the atmosphere, that is, you need to efficiently predict and manage stacking rocks on the dump. This is achieved by constant angle of repose, where the area under plow is not increased, and the rock volume increases due to its efficient storage on the heap. The figure 6 shows a red border line of urban land, which is near the blade. Thus, if not rationally manage waste dumps, the big problems of environmental pollution and water in urban land.

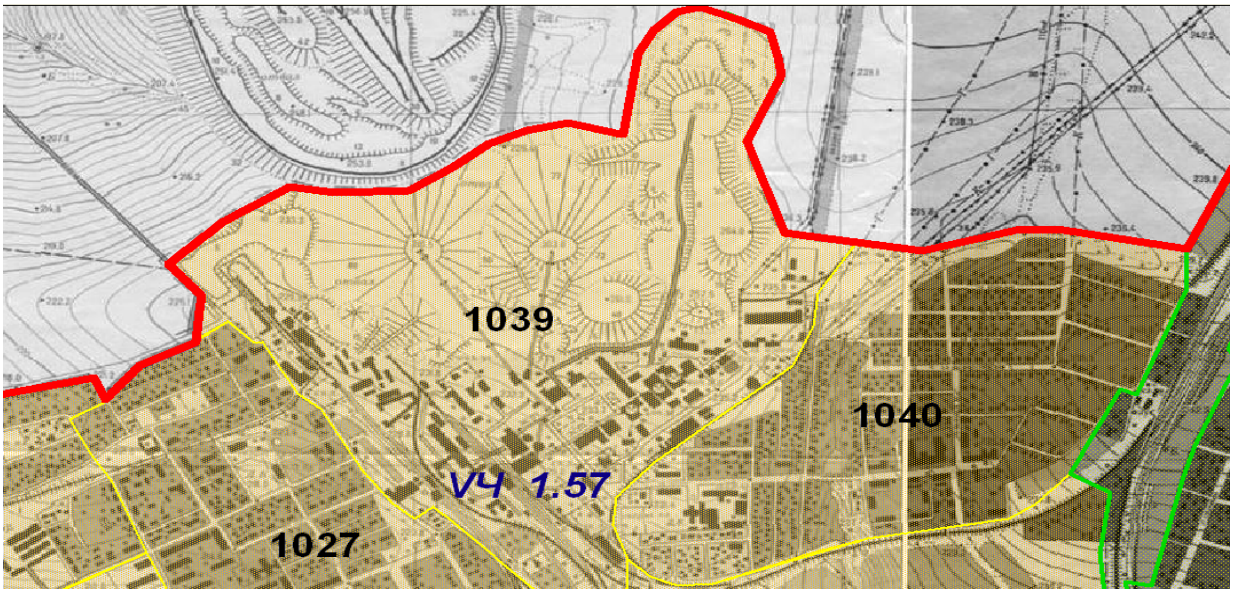


Fig.7. Border waste dump with urban land

With reference to the information received as a result of data processing for the study of the mine waste dumps, it was necessary to organize the data. In any field of endeavor often have to deal with large volumes of data. The main operations are in this collection of information, processes it (search the required data), creating forms for viewing. One of the most popular software products that provide all of these features, is recognized database management system Microsoft Access.

Waste dumps provide a flow in the atmosphere, soil and water of harmful toxic substances that have a negative impact on the environment [5]. Using these indicators database on waste dumps, you can go to the development of preventive measures and management strategies for the rational storage of rocks in the heap with the localization of chemical components entering the composition species for environmental protection of the environment and human health.

The application of this model to work in the environment of Microsoft Access makes it possible to consider a variety of options requested options available in the database, and based on that make up the relationship of all the required modules as a whole to make complex decisions on mining operations in connection with their recycling. Input data and tables generated by waste dumps are shown in fig.8.

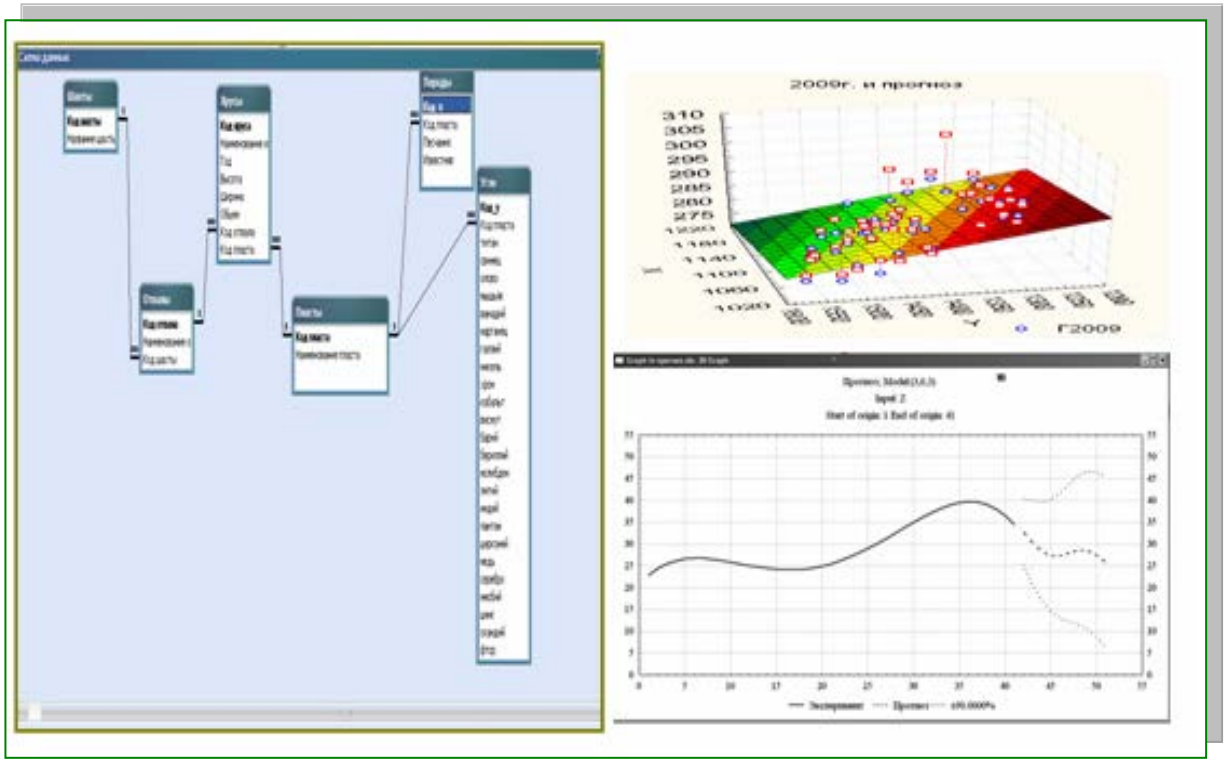


Fig.8. Input data and tables generated by waste dumps

Conclusions:

1. To implement litologoprognoznoy features blade and to produce three-dimensional images of tiers blade was chosen software package Surfer.

2. Systematic dumping of rocks in a certain pattern allows you to find the specific location of mining area with the simultaneous characteristic of the rocks, pour on the blade.

3. Building activities dumps are appropriate in terms of the preservation of existing ecosystems due to decrease in the area under the piles of seized land.

4. To study the waste dump developed dynamic model.

5. With this model of "Blade - mining" you can set a specific localization of the rocks in tiers on the heap as a whole ..

6. Using the software SURFER, please separate sections tier blade on which solved surveyor-cal mining and geological problems.

7. Developed a database on waste dumps in the environment of Microsoft Access, which allows you to use custom queries to find the best options for the analysis of geological and lithological and chemical characteristics of the rocks, scattered on the blade for a certain period, and create connection between these characteristics.

References

1. Панов Б.С. Некоторые проблемы экологии Донецкого бассейнов./ Панов Б.С., Проскурня Ю.А. Тез.докл.Межд.Научно-практичекой конференции [“Стратегия выживания и развития Донбасса ”]./Донецк.— 1996.—с.56.
2. Пашковский П.С. Контроль теплового состояния породного отвала/Пашковский П.С., Попов Э.А., Яремчук М.А./ Журнал ″ Уголь Украины″.—2000.—№6. —С.27—29с.
3. Гавриленко Ю.Н. Техногенные последствия закрытия угольных шахт/ Гавриленко Ю.Н., Ермаков В.Н .- Норд-Пресс— Донецк—2004.1—477с.
4. Шаклеин С.В. Рогова Т.Б. Практические вопросы геометризации мощности и основных показателей качества угольных пластов: Учеб. пособие / Кузбас. гос. техн. ун-т. —Кемерово, 1997. —61 с.
5. Прокопенко Е.В. К вопросу создания базы данных породных отвалов/ Е.В.Прокопенко, С.В.Масло, Кочемазов А.С// Материалы международной научно-технической конференции студентов, аспирантов и молодых ученых.- ДонНТУ, 2010.— №16.—С.126—128.