

ESTIMATION OF CONTENT OF QUALITY INDEXES OF MINERALS IN ARRAY OF ROGITINUMS OF MAGNETITE AND IN STREAM OF IRON-ORE MASS

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Abstract

Considered basis of the surveyor providing of management content of quality indexes of minerals in the array of Rogitinum of magnetite and in iron-ore streams. For the different stages of the surveyor, providing of management content of quality indexes of minerals used primary signs that got as a result of the surveyor-geological monitoring, office computations of scales 1:500–1:5000 mountain works, mining holes and assay of content of indexes. Analysed forming of content of quality indexes of minerals in the stream of iron-ore mass from the array of balance-industrial supplies that belong to one class, but have different charts of assay of content of indexes, the absolutely identical and alike charts of assay of signs have enterprises that for classifications attribute to the different classes.

Determining the amount of minerals in the stream of iron-ore mass executed by means of weighing, account, measuring, surveys and mountain graphic surveyor documentation of different scales. Statistical analysis and control of content of quality indexes of minerals in the array of Rogitinum of magnetite and in the stream of iron-ore mass, exposure of actual oscillation of descriptions and creation there is an actual task on this basis of rational chart of prognostication of by volume of-quality indexes of minerals. Offered rational chart of collection of information about content of quality indexes of minerals in the array of Rogitinum of magnetite and in the stream of iron-ore mass in those points, where transformation of by volume of-quality indexes of minerals took place, and for enterprises with the linear models of forming of content of quality indexes of minerals in the stream of iron-ore mass the charts of assay of signs are recommended where measuring of descriptions is envisaged on an entrance and exit of system.

The designs of content of quality indexes executed by means of vector-content of quality indexes for the decision of practical tasks, that plugs in consideration each of consumer properties. Study is undertaken in relation to the components of minerals in the array of Rogitinum of magnetite and in the stream of iron-ore mass.

The constituents of signs forming of content of quality indexes of minerals differentiated on the stages in the stream of iron-ore mass taking into account the features of different periods of planning of mountain works and booty of balance-industrial supplies. The complex sign of content of quality indexes of minerals in the array of Rogitinum of magnetite and in the stream of iron-ore mass allows in one estimation to take into account the different groups of indexes of setting, technologicalness, static and dynamic descriptions of exactness, reliability and stabilities.

Entry. Productive work of every extractive unit at the booty of ferrous quartzites arrive at an open method, if certain accordance sticks to between the different project technological types of mountain works. Planning of development of mountain works in the process of exploitation of balance-industrial supplies of areas of array of hard minerals of deposit is the important stage in the decision of questions of technology of mountain production that provides plenitude of mastering of balance supplies of bowels of the earth [1].

At the annual planning of development of mountain works go into detail and specify perspective plans, and also decide concrete technological questions: establishment of volumes of pre-production mining and threaded works taking into account norms on the degree of preparedness of the prepared and ready to the booty balance-industrial supplies exposed, and also task on the volume of commodity products; set experience works that is sent to the improvement of booty of balance-industrial supplies from the bowels of the earth; determine the rational amount of simultaneously working extractive units with the aim of providing of necessary amount and quality of commodity products; set the optimal loading, fold the calendar graphic arts of booty of balance-industrial supplies of ferrous quartzites on every extractive unit and determine terms their redemption. Provision of every extractive power-shovel the industrially-balance supplies prepared to the booty with the different degree of preparedness to the booty, and quarry on the whole, depends on a time domain between loosening of array of ferrous quartzites. Effective work of quarry will be in that case, when time domains between the mass loosening of array of balance-industrial supplies and loosening of array of ferrous quartzites in coalfaces gather, then, when time of mass explosion coincides in all extractive coalfaces. An optimal time domain between the mass loosening of array of balance-industrial supplies in iron-ore careers is in limits from two to three weeks [3–5].

An aim of work is development of methodology of setting of norms of ready of the booty of balance-industrial supplies. For the achievement of the aim such tasks are untied: it is an analysis of present methods of setting of norms of ready to boot of balance-industrial supplies; it is an improvement of existent methodologies of setting of norms of the balance-industrial supplies prepared to the

booty; it is establishment of norms of the balance-industrial supplies prepared to the booty.

An idea of work is an analysis and determination of methods of calculation of optimal of the balance-industrial supplies prepared to the booty for development of economy of ore-mining enterprises and indexes of plenitude of the use of resources of bowels of the earth at present labour and material sources.

A research object is the balance-industrial supplies of ferrous quartzites prepared to the booty.

The article of research is methodology of setting of norms of ready to the booty of balance-industrial supplies.

The system of receipt of primary information is at the surveyor providing of management content of quality indexes of minerals in an array.

Basis of the surveyor providing of management content of quality indexes of minerals in the stream of iron-ore mass is information about a volume and standards of minerals in the array of Rogitiums of magnetite and in iron-ore streams.

For the different stages of the surveyor providing of management content of quality indexes of minerals used primary signs that is got as a result of the surveyor-geological monitoring, to documentation of scales 1:500–1:5000 mountain making, mining holes and charts of assay of indexes. Determining the amount of minerals in the stream of iron-ore mass executed by means of weighing, account, measuring, surveys and mountain graphic surveyor-geological documentation of corresponding scale. The objects of mountain graphic surveyor information are areas of ore bodies and beds deposits of balance-industrial supplies, that is exposed by the mountain making and mining holes. On results documentation studied the structure of areas of ore body and bed put the deposits of Rogitiums of magnetite, feature of morphology and structure [1–5].

A basic method of estimation of content of quality indexes of minerals is an assay of signs of indexes chemical and mineral component minerals and containing breeds, фізико-механічних and technological properties. On the different stages of secret service, booty of balance-industrial supplies, assay it is carried out in mining holes and mountain making. In the process of exploitation executed the assay of signs of indexes of array of Rogitiums of magnetite (in

the mountain making and blastholes) and in the stream of iron-ore mass (in transport and capacity elements).

Minerals were subject a commodity assay in the stream of iron-ore mass, that shipped to the consumer on the exception of content of quality indexes of the iron related to magnetite, Fe_{mg} .

At determination of content of quality indexes of useful components used chemical and mineralogical analyses and geophysical methods of express-analysis. A capture of basic data is about the amount of balance-industrial supplies and content of quality indexes of minerals in a stream in the stream of iron-ore mass, carried out in the process of receipt of mountain graphic surveyor-geological information, documentation and assay of signs of indexes at the industrial and operating secret service detailed, directly during exploitation of areas of ore body and bed of deposit of balance-industrial supplies and assay of the prepared products.

Totality of all processes of receipt of primary mountain graphic surveyor information in scales 1:500–1:5000 there is realization of functions of the surveyor providing of management – measuring and determination of location of points of assay of signs of indexes and estimation of amount of minerals in the array of Rogitinums of magnetite and in the stream of iron-ore mass.

Amount of obtained and the shipped minerals determined gravimetric and statistical methods, surveyor providing of works at monitoring and stowage of mountain graphic surveyor documentation and determination of volumes of mine-out space or on compositions of averaging of content of quality indexes of minerals. Weighing of trolleys with minerals executed on mine, quarry and mine scales that are on operating horizons, in around barrel court and on compositions of averaging of content of quality indexes of minerals. In default of executed a statistical account trolleys with minerals, coming from a carrying capacity, degree of filling, coefficient of loosening of mountain mass. The methods of determination of volumes of the obtained balance-industrial supplies and bits and pieces of minerals on compositions of усреднения of content of quality indexes of minerals executed on the basis of the surveyor measuring, surveys and mountain graphic surveyor documentation [3–5].

Secret service of areas of ore body and bed of deposit of balance-industrial supplies was subdivided into detailed, industrial and

operating. The detailed secret service is conducted to exploitation of areas of ore body and bed of deposit of Rogitiums of magnetite by geological exploration organization. The closeness of reconnaissance network was determined by complication of geological structure of areas of ore body and bed of deposit of balance-industrial supplies, majority from that is difficult (**II** and **III** of group for classifications of the State committee of supplies). The detailed secret service was carried out by the ore-bore systems with detailed that does not exceed the category of **B**. Information was used for the current planning of mountain works and content of quality indexes of minerals in in the array of Rogitiums of magnetite and in the stream of iron-ore mass and at the perspective planning of booty of balance-industrial supplies.

Industrial supplementary exploration conducted on areas ore bodies and beds of deposit of Rogitiums of magnetite, applying the boring and the ore-boring systems of secret service for networks and lines. At the irregular location of making on the areas of ore bodies and beds of deposit of balance-industrial supplies found out on categories **B**, **C₁** and **C₂**, and for the separate districts of Krivbass on categories **A**, **B** and **C₁**. Distance between makings to one direction consistently twice condensed in transition from subzero to the higher categories reconversion. An iron-ore zone was tested on all power. Length of tests hesitated from 0,1 to 3 m. conducted Operating secret service the mountain, boring systems irregularly, for networks and lines at distance between making, that answers the maximal closeness of industrial secret service and length of tests presents about 1 m in middle.

A chemical assay on the ore-minig enterprises of Krivbass is complemented by geophysical. On the stage of industrial secret service distance between making approximately answers the sizes of operating blocks or proceeding units. Operating secret service was carried out on more thick network, so that distances between reconnaissance cuts far fewer sizes of operating blocks and answers the parameters of structural elements of proceeding unit.

These assays on these stages of secret service provided information for the perspective and current planning of content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass.

The structure of the system and methodology of operating assay was determined by changeability of standards and properties of balance-industrial supplies of hard minerals, complication of technology and organization of process of booty, by the requirements of consumers to content of quality indexes of the iron related to magnetite, Fe_{mg} . The assays of signs of indexes of minerals conducted in the array of balance-industrial supplies and in the stream of iron-ore mass. The points of assay are transport and capacity elements of technological chain. Information about content of quality indexes of minerals in the stream of iron-ore mass on all stages, where her transformation was is the ideal chart of assay, however on enterprises such chart of assay fully is not realized. A rational chart, leaning against a limit number of points of assay, gives necessary and sufficient information for the effective surveyor providing of management content of quality indexes of minerals in the array of Rogitinums of magnetite and in a stream in the stream of iron-ore mass on all stages, where her transformation was is the ideal chart of assay, however on enterprises such chart of assay fully is not realized. A rational chart, leaning against a limit number of points of assay, gives necessary and sufficient information for the effective surveyor providing of management content of quality indexes of minerals in the array of Rogitinums of magnetite and in the stream of iron-ore mass.

Existing on careers and mines of Krivbass the system of assay of signs of indexes of minerals in the array of Rogitinums of magnetite and in the stream of iron-ore mass is oriented to the receipt of information about content of quality indexes of minerals of streams of iron-ore mass from the array of Rogitinums of magnetite of coal-faces, blocks, areas, quarries, mines, shipped on the exception of content of quality indexes of the iron related to magnetite Fe_{mg} .

About content of quality indexes of minerals in the stream of iron-ore mass from the array of Rogitinums of magnetite, coalfaces information was obtained by the assay of signs of indexes of ore array (mining holes and making), iron-ore mass in invasions, boxhole (or at producing from boxhole), flitting transport.

The points of assay of sectional and district streams of iron-ore mass are invasions and transport vessels. Content of quality signs of minerals in the stream of iron-ore mass from the array of Rogitinums

of magnetite of quarries and mines was determined by the assay of signs of indexes of iron-ore mass in transport vessels before getting up or then in bunkers. The assays of the shipped minerals in the stream of iron-ore mass executed on compositions averaging of content of quality indexes of minerals and in transport capacities. Minerals in the stream of iron-ore mass tested on a thundershower the classifiers of ore mining and processing factory and on conveyers after growing shallow. Operating on careers and mines of the system of assay of signs of indexes does not depend on complication of processes of forming of content of quality indexes of minerals in the stream of iron-ore mass and does not answer the task of optimal informative result of processes of the surveyor providing of management content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass.

By a main defect them there is an incommunication with complication of processes of forming of streams of iron-ore mass from the array of Rogitiums of magnetite, that represented the models of content of quality indexes of minerals in the stream of iron-ore mass. A rational chart envisages collection of information about content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass in those points, where transformation of by volume of-quality indexes of minerals took place. For enterprises with the linear models of forming of content of quality indexes of minerals in the stream of iron-ore mass recommended the simple charts of assay of signs of indexes that envisaged measuring of descriptions on an entrance and exit of the system.

At presence of local into complex or intercomplex complications set the additional points of assay of signs of indexes of minerals in the stream of iron-ore mass. Enterprises with the consilient or different models of forming of content of quality indexes of minerals in the stream of iron-ore mass have these assays of signs of indexes on an entrance and exit of the system, and also in those points, where single streams meet or a general stream goes away on single. In points assays controlled the results of local transformations of content of quality indexes of minerals in the stream of iron-ore mass.

On enterprises with the combined models of content of quality indexes of minerals in the stream of iron-ore mass of chart of assay is

difficult. There is a necessity to envisage control of content of quality indexes of minerals in iron-ore mass in those points, where streams meet, go away or yield to local transformation of content of quality indexes of minerals in a stream iron-ore mass the concrete structure of chart was chosen in accordance with the features of model of enterprise. At the observance of the considered requirements of chart of assay of signs of indexes does not provide necessary information the system of the surveyor providing of management content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass, as a number of levels limit. In this connection the task of statistical analysis and control of content of quality indexes of minerals becomes actual in the array of Rogitiums of magnetite and in the stream of iron-ore mass, exposure of actual oscillation of descriptions and creation on this basis of rational chart of prognostication of by volume of-quality indexes useful minerals.

Structure, base, statistical and dynamic signs of content of quality indexes of minerals.

The surveyor providing of management content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass of ore-mining enterprises contains establishment and forming of optimal structure of indexes of content of quality indexes of minerals in the stream of iron-ore mass by a systematic and purposeful study and influence on terms, factors and parameters of secret service of areas of ore body and bed of deposit, booty of balance-industrial supply and exception content quality index iron, related to magnetite, Fe_{mg} in iron-ore mass [8,11].

Content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass, them quality indexes description a multidimensional vector with the components of C_1, C_2, \dots, C_K , that influence on motion results of technological processes of exception of content of quality indexes of the iron related to magnetite, Fe_{M_2} in iron-ore mass. Design of content of quality indexes of vector-content quality indexes plugs all consumer properties in consideration, but for the decision of practical tasks the account of possible consumer properties is unacceptable and researches conducted in relation to any component of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass [9,10].

An ore mining and processing factory or metallurgical plant is interested by those properties of content of quality indexes of minerals, that determine the nomenclature of eventual products and parameters of process of exception of content of quality indexes expressed by single indexes, rarer – group. At the surveyor providing of management content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass, that is sent to providing of requirements of exception of content of quality indexes of the iron related to magnetite, Fe_{mg} used the single signs of content of quality indexes of minerals.

In accordance with a theory [1,6], the system of signs of content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass reflects properties and specific of products in relation to the certain modes of production and terms of consumption. The constituents of signs forming of content of quality indexes of minerals differentiated on the stages in the stream of iron-ore mass from taking into account the features of different periods of planning. Being based thereon, examined systematization of indexes of content of quality indexes of minerals in the stream of iron-ore mass for the use of them in a theory and practice of the surveyor providing of management content of quality indexes of minerals in the array of Rogitiums of magnetite.

Content of quality indexes of minerals in the stream of iron-ore mass in the process of the creation exists in forms that transformed consistently one in other at forming of iron-ore stream. The different forms of content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass described different indexes that differ in the quality indexes of static objects (minerals are in balance-industrial supplies) from the quality indexes of dynamic objects (minerals from the array of Rogitiums of magnetite loosening, obtained, and shipped). Today the component assays of signs of indexes are not reasonable for description of forms of existence of content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass.

In relation to properties of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass, coming from an aim, estimation of assay of signs of indexes and terms of exception of

content of quality indexes of iron related to magnetite, Fe_{mg} in iron-ore mass, distinguished groups: setting, technological, transportable, maintenance, exactness, reliability and stability. The indexes of setting of minerals play a leading role at the estimation of level of signs of indexes of minerals included in the criterion of optimization of process of the surveyor providing of management content of quality indexes of minerals in the array of Rogitinums of magnetite and in the stream of iron-ore mass. To the indexes, setting took basic and concomitant minerals or connections.

The technologicalness characterizes efficiency of exception of minerals at enriching and metallurgical redistribution of content of quality indexes of the iron related to magnetite, Fe_{mg} . To them took content of harmful admixtures, oxidized phases, durability, granulometric composition of minerals, grain-size distribution, humidity and other. Characterized the capacity of minerals the indexes of transportability for moving transport vehicles. In this group enters: granulometric composition of minerals in the stream of iron-ore mass, humidity, adherence and solidifying. To the indexes adherence of maintenance take oxidization of minerals and inclination them to solidifying.

Characterized the indexes of exactness, reliability and stability with the set probability an error, authenticity and changeability (in time or in space) of values of the enumerated indexes of substance. To it group standard deviation, error of middle, dispersion, coefficient of variation, scope and other, enters. Without establishment of these indexes estimation of substance indexes of setting, technologicalness and loses definiteness.

At the estimation of content of quality indexes of minerals in the array of Rogitinums of magnetite and in the stream of iron-ore mass, as well as any industrial products, the measured indexes compared the assay of signs of indexes of minerals with base. Base is content of quality indexes of minerals in the array of Rogitinums of magnetite and in the stream of iron-ore mass of some эталона, normative or plan index [1,7].

The choice of the system of base assay of signs of indexes of minerals depends on the aim of estimation, form of existence of content of quality indexes of minerals, phase and period of the surveyor providing of management content of quality indexes of

minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass. For the estimation of assay of signs of indexes of minerals in the stream of iron-ore mass as base used industrial standards that present by a soba totality of requirements to content of quality indexes of minerals in the bowels of the earth, mining-and-geological (industrially-balance supplies, system of development) and other terms of development. Numeral these are the maximum values of taken for standard parameters that establishment for the areas of ore body and bed of deposit of Rogitiums of magnetite.

The observance of standards allows to divide the supplies of minerals by folk-economic value on balance and balanced. Composition of standard indexes, what applicable for the concrete areas of ore body and bed of deposit, depend on the type of minerals, features of method of his development (exposed, preparation, ready to taking out, unindignant, indignation, passive and active). In accordance with materials of inspection, the basic index of standards is minimum industrial content of quality indexes of useful components in a block, that is calculated and will be used on the areas of ore body and bed of deposit of Rogitiums of magnetite.

For formation of balance-industrial supplies the value of side content of useful components was taken in a test. All other indexes of standards used as base. Requirements to content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass of preferentially. Such indexes are: it is side content of quality indexes useful components in a test for forming supplies; it is minimum industrial content of quality indexes of useful components in making, that was formed; are requirements to the selection of types and sorts of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass; it is a possible coefficient of ore-bearingness; contain minimum quality indexes of passing components.

Researchers [1,7,11] mark, that standards, what stated for the areas of ore body and bed of deposit of balance-industrial supplies, on the whole enumerate in 5-15, not fully answer the task of the optimal use to content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass.

On the stage of project of development it is conditioned by that geological standards do not take into account the features of

mastering of areas of ore body and bed of deposit and order of working off the supplies of different content of quality indexes of minerals, and on the stage of exploitation the set standards that used as base indexes at the estimation of assay of signs of indexes of minerals in the stream of iron-ore mass. In works [1,7,11], reasonably constituents of maximum indexes of content of quality indexes of minerals are in the array of Rogitiums of magnetite (operating standards) on mines. Basic setting of that – to set in the concrete mining and geological conditions developments are a standard of industrial supplies of separate areas of ore body and bed of deposit of Rogitiums of magnetite and standard of iron-ore stream on the different levels of his forming.

Nomenclature of maximum indexes of content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass (operating standards), from that it is recommended as base at an estimation assays of signs of indexes of level of content of quality indexes of minerals in the stream of iron-ore mass following:

a - minimum industrial content of quality indexes of useful components at the balance-industrial supplies of виймальної unit (to the block) prepared to taking out - $C_{m.in}$;

б - side content of quality indexes of useful components on the contour of balance-industrial supplies of виймальної unit - $C_{б.in}$;

в - minimum industrial content of quality indexes of useful components in the stream of iron-ore mass is $C_{m.p}$, for the division of loosening minerals in the stream of iron-ore mass on a standard, for the exception of content of quality indexes of the iron related to magnetite, Fe_{mg} , and unstandard, that left in the array of Rogitiums of magnetite or transported in a dump;

г - minimum-normative content of quality indexes of useful components in the array of Rogitiums of magnetite and in the stream of iron-ore mass for planning period (average annual, middle quartal, average monthly) - $C_{n.p}$.

First two indexes of "a" and "б" - base for determination of level of content of quality indexes of minerals in the stream of iron-ore mass in within the limits of units, and two other - "в" and "г" estimation of level of content of quality indexes of minerals on the stages of forming and different periods of the surveyor providing of

management content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass.

By base indexes for determination of level of quality indexes of the prepared products of quarries and mines – content of quality indexes of minerals in the stream of commodity iron-ore mass is requirements of standards and technical requirements.

As marked [16,17], standardization of content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass is at low level that is determined by complication and unicity of geological terms of areas of ore body and bed of deposit of Rogitiums of magnetite (especially content of quality indexes of minerals in the stream of iron-ore mass).

In the technical requirements of ore-mining enterprises (given on 6 careers and 8 mines of Krivbass) the next maximum indexes of content of quality indexes of minerals are envisaged in the array of Rogitiums of magnetite and in the stream of iron-ore mass, that is today taken for basic: normal-planning content of quality indexes of valuable useful components on all inspected careers and mines; content of brack of quality indexes of minerals; legitimate values of humidity and granulometric composition of minerals in the stream of iron-ore mass; contain possible harmful admixtures, additions, oxidized phase et al. Operating on mines and careers of Krivbass the system of base signs of content of quality indexes of minerals in the stream of iron-ore mass plugs only the requirements of geological standards in the quality indexes of minerals in the balance supplies of bowels of the earth and requirement of technical requirements to the minerals in commodity iron-ore mass.

A process of creation of content of quality indexes of minerals is in the stream of iron-ore mass both on phases and periods of the surveyor providing of management and on the forms of existence out of control, as management criteria, base indexes of content of quality signs are abscent. Rational system of base indexes, that provides the effective surveyor providing of management content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass, except the requirements of geological standards and technical requirements plugs the maximum operating signs of content of quality indexes of minerals in the stream of iron-ore mass. Minimum industrial and side content of quality indexes of

components in releasable unit determines the level of content of quality indexes of minerals in the array of Rogitiums of magnetite at the current and perspective planning of mountain works. By means of minimum-industrial and planning contents of quality indexes of components in the array of Rogitiums of magnetite and in the stream of iron-ore mass estimated the level of quality indexes loosening, shipped and закладованих of minerals for different phases and management periods.

The lack of the existent system of base indexes is absence in her structure of indexes of exactness in the system of base signs causes the necessity of receipt of them reliability and stability and for the actually measured sizes. Forming of content of quality indexes of minerals in the stream of iron-ore mass that presents by a soba from the mathematical point of view casual process, on the separate stages of process, that answer the certain forms of existence of content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass. Description statistical distribution casual sizes – measuring quality indexes of descriptions of minerals in the stream of iron-ore mass.

An estimation of content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass is estimation of parameters of distribution verification of accordance of empiric distributions is preceded that to the theoretical models of content of quality indexes of minerals in the stream of iron-ore mass.

Undertaken studies [12,15,17], all variety of content of quality indexes of minerals in the stream of iron-ore mass is erected to three basic theoretical models of distribution of content of quality indexes of minerals in an array Rogitiums of magnetite and in the stream of iron-ore mass there is an estimation of parameters of distribution verification of accordance of empiric distributions is preceded that to the theoretical models of content of quality indexes of minerals in the stream of iron-ore mass is erected to three basic theoretical models of distribution of content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass – normal, logarithmic normal (lognormal) and reflected lognormal (Fig. 1, table 1). The choice of these models is comfortable that all statistical criteria and tables are built for the normal law of distribution of casual sizes. Verification of accordance of empiric

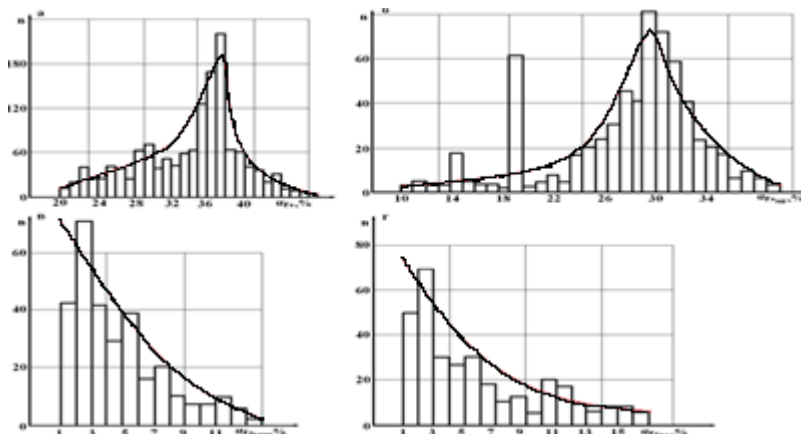


Fig. 1. Content of quality indexes of Rogitunums of IV of area of quarry of "ПівдГЗК" and is iron a common; δ – is the iron related to magnetite, Fe_{mg} ; θ – in is an anhydroferrite; ϱ - carbonate silicate

distributions to these models was conducted by means of comparison of estimations to asymmetry A also excess of S with basic errors, and for the criterion of accordance χ was used control of the got conclusions 2 of Pierson [7,13,14].

For homogeneous totalities for known formulas the selective estimations of statistical parameters of distribution of indexes χ of functions of $\ln\chi$ and $\ln(c-\chi)$ are calculated: position of center of distribution (AV), description of dispersion (dispersion, standard deviation, standard error of middle, coefficient of variation, asymmetry and excess).

As the convincing, reasonable, undisplaced and effective estimation of center of empiric distribution (at нерівноточних supervisions) sizes are accepted middle self-weighted arithmetic for normal distribution and maximally plausible estimation middle self-weighted arithmetic for asymmetric distributions (lognormal and reflected lognormal).

The considered indexes are attributed to statistical descriptions of oscillation of content of quality indexes of minerals in the balance-industrial supplies of bowels of the earth or iron-ore streams that is describe content of quality indexes of minerals in in the balance-industrial supplies of bowels of the earth or iron-ore streams that is describe content of quality indexes of minerals in the stream of iron-

Table 1 - Statistical characteristics of the content of qualitative indices of minerals in an array of magnetite cornices and in the flow of iron ore by the levels of formation of iron ore masses at the Kryvybas mining enterprises

Enterprise (mine, quarry)	Levels of formation of content of qualitative indices of minerals in a stream of iron-ore mass from an array of magnetite cornices					
	coalface		mine, quarry		Mining or concentrating factory	
	Coefficient of variation, V , %	Kind of model	Coefficient of variation, V , %	Kind of model	Coefficient of variation, V , %	Kind of model
Quarry ПрАТ «ІнГЗК»	18,4	L	12,7	1- L	19,4	N
Quarry ПрАТ «ПвдГЗК»	25,5	1- L	26,4	N	25,9	N
Quarry № 2-bis, ПрАТ «НкГЗК» «ArcelorMittal Kryviy Rib»	17,8	L	16,3	1- L	18,8	N
Головатський quarry ПрАТ «ЦЗК»	24,1	1- L	27,8	N	25,7	N
Ганнівський quarry ПрАТ «ПвнГЗК»	18,7	1- L	17,6	N	17,3	N
Гернівський quarry ПрАТ «ПвнГЗК»	21,4	1- L	20,3	N	21,5	N
«Mining control department under the underground mining method on mine rights» ПрАТ «ArcelorMittal Kryviy Rib»	41,7	L	20,2	N	22,6	N
Mine «Жовтнева» ПрАТ «КЗРК»	21,3	N	22,5	N	23,4	N
Mine «Орджонікідзе» ПрАТ «ПЗЗК»	21,8	1- L	24,1	N	21,7	N
Mine «Батьківщина» ПрАТ «КЗРК»	34,3	L	23,5	N	26,6	N
Mine «ім. Фрунзе» ПрАТ «КЗРК»	43,7	N	26,5	N	21,5	N
ПрАТ «ЕВРАЗ «Суша Балка»	23,5	L	22,3	N	28,1	N
Mine «Гернівська» ПрАТ «КЗРК»	17,9	1- L	18,2	N	15,6	N
Mine «Гвардійська» ПрАТ «КЗРК»	16,6	N	16,7	1- L	16,2	N

Note. Types of models: N – normal, L – lognormal, 1- L – reflected lognormal

ore mass. The process of his forming is one-sided – from the point of view of dispersion of descriptions of content of quality indexes of minerals in the stream of iron-ore mass in the fixed-static states of iron-ore stream in relation to the center of distribution.

Dynamic indexes gave complete description to content of quality indexes of minerals in an iron-ore stream, as reflect temporal changeability of content of quality indexes of minerals in the stream of iron-ore mass on all interval of iron-ore stream or in separate temporal intervals. Examining an area as industrial supplies for that the temporal sequence of loosening of minerals is set, as an initial iron-ore stream of Rogitiums of magnetite. Spatial changeability of minerals in the balance supplies of bowels of the earth on certain directions characterize the same dynamic indexes.

Oscillation of content of quality indexes of minerals in the stream of iron-ore mass (in relation to some component of X) presented by the function of $X(t)$ of temporal or spatial changeable t . An estimation of dynamic signs of content of quality indexes of minerals in the stream of iron-ore mass is being of statistical descriptions of casual function of $X(t)$. Non-stationary casual sequences over are brought to stationary by deduction of linear тренда from the initial row of values. The estimation of structure of changeability of casual sequence of dynamic row of content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass is certain statistical descriptions: the expected value, dispersion and autocorrelation function [15-18]

$$\tilde{M}(X) = \frac{1}{n} \sum_{i=1}^n X(t_i), \quad (1)$$

$$D(X) = \frac{1}{n-1} \sum_{i=1}^n [X(t_i) - \tilde{M}(X)]^2, \quad (2)$$

$$\tilde{K}_x(h_m) = \frac{1}{n-m} [X(t_i) - \tilde{M}(X)] [X(t_{i+m}) - \tilde{M}(X)], \quad (3)$$

where $h_m = t_{i+m} - t_i$

An autocorrelation function characterizes the degree of dependence of values of casual function in cuts that is taken to different t , that gives the evident picture of that, how dependence between the members of dynamic row of content of quality indexes of minerals in the stream of iron-ore mass diminishes with an

increase to distance or temporal interval between them. For the considered class of mining-and-geological tasks express the autocorrelation function of $K_x(h)$ экспонентною dependence [1,18]

$$\tilde{K}_x(h) = \sigma_x^2 e^{-\frac{|h|}{h_0}}, \quad (4)$$

where σ_{2x} is dispersion; h_0 is an interval of correlation.

A maximal interval of correlation of h_{max} is that time domain, for what chart of estimation of autocorrelation function (correlogram) will enter the area of permissible errors, id est $|K(h_{max})| \leq \delta$. In this consideration for δ the area \pm of $2\sigma_r$ is accepted. In accordance with formulas (1)–(3) on results the discrete assay of content of quality indexes of minerals in the stream of iron-ore mass built an experimental autocorrelation function that was then smoothed out on a least-squares method. The type of autocorrelation function, value of coefficient of correlation of r_{kk} and size of maximal interval of correlation of h_{max} allowed to estimate character of changeability of dynamic row of content of quality indexes of minerals in the stream of iron-ore mass. In works [1,7] changeabilities of content of quality indexes of minerals are investigational in balance supplies and iron-ore streams of Rogitiums of magnetite. Paid attention to the spectrology of dynamic rows of content of quality indexes of minerals in the stream of iron-ore mass, but spectral the closeness of $S_x(\omega)$ is related transformations of Fourier to the autocorrelation function to correlations

$$S_x(\omega) = \frac{1}{2\pi} \int_{-\infty}^{+\infty} e^{-j\omega h} K_x(h) dh = \frac{1}{\pi} \int_0^{\infty} K_x(h) \cos \omega h dh. \quad (5)$$

For the casual process of $X(t)$, that has a function of kind (4), have

$$S_x(\omega) = \frac{\sigma_x^2 h_0}{\pi(1 + h_0^2 \omega^2)}. \quad (6)$$

The spectral going near research of parameters of averaging of content of quality indexes of minerals in the stream of iron-ore mass on careers is successfully used in [2]. Limit nature of range of frequencies that present the process of vibrations of content of quality indexes of minerals in the stream of iron-ore mass allows for the areas of ore bodies and beds of deposit to find the spectral closeness of $S(\nu)$ and determine numerical descriptions of vibrations: standard deviation σ and midfrequency of vibrations after formulas

$$\sigma = \sqrt{\int_{\nu_1}^{\nu_2} S(\nu) d\nu}, \quad (7)$$

$$\bar{\nu} = \frac{\int_{\nu_1}^{\nu_2} \nu S(\nu) d\nu}{\int_{\nu_1}^{\nu_2} S(\nu) d\nu}. \quad (8)$$

In the spectral closeness of spectrum and autocorrelation function used mountain graphic surveyor information about statistical properties of spatial and temporal changeable dynamic rows of content of quality indexes of minerals in the stream of iron-ore mass. Each of them was got by means of transformation to Fourier and knowledge of cross-correlation function of process of equivalent spectrum. Autocorrelative function was used for the building model of dynamic row and for prognostication of content of quality indexes of minerals. Set physical sense of harmonious constituents of dynamic row of content of quality indexes of minerals in the stream of iron-ore mass. At prognostication of content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass used cross-correlation approach.

A process of forming of content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass is the casual function of time, that on an eventual interval has it is certain number of rejections, minimums and maximums, with a different value that exceeds level of technological norms or technical requirements on the booty of Rogitiums of magnetite (pic. 2).

A rejection of casual function of $C(t)$ for this level ν is graphic arts of this function after a horizontal line, that falls behind from the axis of C in the distance ν . In the theory of casual functions an analysis of rejections of temporal process is from normative levels it is known as a "task about extrass". The general view of her decision is considered in [6]. For a normal process simple calculation formulas are got, what suitable for determination of parameters of rejections of dynamic rows

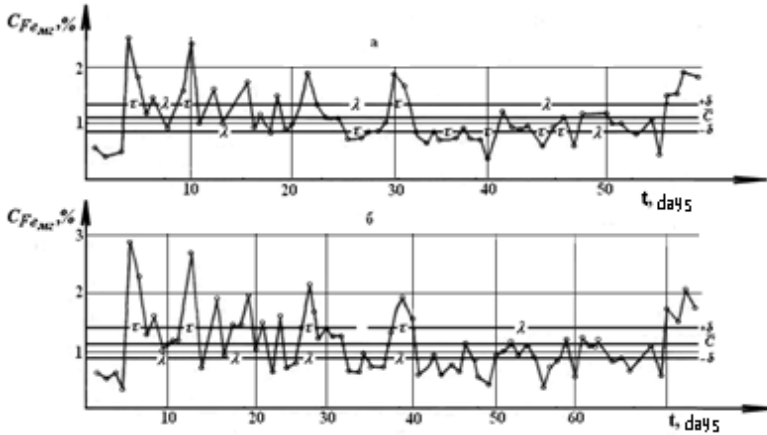


Fig. 2. Dynamic range of contents of qualitative indices of minerals (random function) $C(t)$ and parameters (τ, λ) , which characterize its deviation from the normal level $\pm \delta$ (a, b – respectively, the content of qualitative mineral indicators in the flow and commodity iron ore mass)

of content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass. Speed of changeability of ordinate of casual function v and ordinate of casual function of C for the same moment of time are uncorrelated and independent by casual sizes for a normal stationary casual process. The two-dimensional closeness of probability of $f(C, v)$ distribution equals the product of normal consistence distribution for C and v

$$f(C, v) = \frac{1}{\sigma_C \sqrt{2\pi}} e^{-\frac{(C-\bar{C})^2}{2\sigma_C^2}} \frac{1}{\sigma_v \sqrt{2\pi}} e^{-\frac{v^2}{2\sigma_v^2}} \quad (9)$$

where dispersion of speed of changeability of ordinate of casual function equals the value of cross-correlation function of speed in a zero

$$\sigma_v^2 = -\frac{d^2}{d\tau^2} K(\tau) |_{\tau=0}, \quad (10)$$

and the expected value $v(t)$ as a result of stationarity of casual process equals a zero. Probability of that a rejection takes place in the infinitesimal span of time of dt , located near-by the point of t , numeral answers the middle number of rejections in time of size of C unit higher level δ and determined after a formula

$$P(\delta) = n_{\delta} = \frac{\sigma_v}{2\pi\sigma_c} e^{-\frac{(\delta-\bar{C})^2}{2\sigma_c^2}} \quad (11)$$

Middle duration of rejection was determined from expression

$$\bar{\tau}_{\delta} = \pi \frac{\sigma_c}{\sigma_v} e^{\frac{(\delta-\bar{C})^2}{2\sigma_c^2}} \left[1 - \Phi\left(\frac{\delta-\bar{C}}{\sigma_c}\right) \right], \quad (12)$$

where $\Phi\left(\frac{\delta-\bar{C}}{\sigma_c}\right)$ – integral function of Laplace.

Estimated a middle interval an analogical method between rejections λ_{δ} . Examining a rejection for a "zero level", when $\delta=C$, a formula (12) assumes a simplified view

$$\bar{\tau} = \pi \frac{\sigma_c}{\sigma_v} \quad (13)$$

The calculated value is necessary \bar{n}_{δ} be doubled, if scope of vibrations of parameter limit symmetrically both from above, and from below by the size $\Delta_c = |\delta - \bar{C}|$. Knowing the AV number of rejections for period of T and middle duration of one rejection $\bar{\tau}_{\delta}$, determined mean time of stay of casual function of dynamic row of content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass outside the set level (general duration of rejections) $\bar{t}_{\delta} = \bar{\tau}_{\delta} \cdot \bar{n}_{\delta}$. Sizes $\bar{\tau}_{\delta}$ i \bar{n}_{δ} and proportional to the period of T , and middle duration $\bar{\tau}_{\delta}$ of one rejection does not depend on a period T .

Nomenclature of signs of content of quality indexes of minerals. The nomenclature of signs of content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass includes middle for a substance descriptions of setting, technology, maintenance and transportability. Paid attention to consideration of indexes of setting, that express content of quality indexes of minerals in the stream of iron-ore mass, metals and their connections (oxides), and also static and dynamic indexes of exactness, reliability and stabilities, that characterizes the degree of dispersion, spatial or temporal changeability of values of content of substance of quality indexes. The estimation of signs is got on the

basis of treatment of these points of assay of content of quality indexes of minerals in the balance supplies of bowels of the earth and in an iron-ore stream. Research of level and stability of content of quality indexes of minerals in the stream of iron-ore mass is executed at base, static and dynamic balance-industrial supplies of substance (groups of indexes of exactness, reliability and stability).

The nomenclature of indexes is differentiated on the stages and management periods, on the forms of existence of content of quality indexes of minerals in the stream of iron-ore mass. Offered system of indexes of content of quality indexes of minerals in the stream of iron-ore mass and statistical description of content of quality indexes of minerals in the stream of iron-ore mass for on the гірничовидобувних enterprises of Krivbass it is driven the levels of forming of streams of iron-ore mass to the table. 2.

For the estimation of level and oscillation of content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass from data of the detailed secret service in the complement of base indexes of standards possible deviations are included maximum from the rationed sizes.

The statistical signs of oscillation of content of quality indexes are used for comparison of content of quality indexes of minerals in the stream of iron-ore mass in the different objects of balance-industrial supplies (bed, ore body, area, block, test). On the stage of exploitation next to static the dynamic signs of oscillation of content of quality indexes of minerals are used in the stream of iron-ore mass is an interval of correlation, indexes of rejections of values for the set norms. Corresponding limits are included in the complement of maximum operating signs of content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass (operating standards) as for pseudo dynamic (content of quality indexes useful minerals in array of Rogitiums of magnetite on directions of working), offso for the veritable dynamic rows of content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass (quality indexes of loosen, obtained and warehoused minerals from the stream of iron-ore mass).

To enter the analogical quality indexes of *требє* in the complement of standards and technical requirements. Differentiated

Table 2 - System of indications of the content of quality indicators of minerals in the flow of iron ore

Forms of content of qualitative indicators	Selective Indicators				Basic Indicators			
	assignment	accuracy, reliability, stability		assignment	accuracy, reliability, stability		dynamic	
		statistical	dynamic		statistical	dynamic		
Development of sections of the ore body and deposits of magnetite corneas								
Content of qualitative indices of minerals in balance-industrial subsoil reserves; pseudodynamic series	The average content of the qualitative indices of minerals in the extracting unit \bar{C}_g Content of qualitative indices of minerals in the contour of the extracting unit C_k	Standard deviation $\pm S_g$; coefficient of variation V_g ; asymmetry A_g ; excess E_g Standard deviation $\pm S_g$	Deviation: – average \bar{g}_g ; – duration \bar{t}_g ; – total duration of deviations \bar{t}_g	Minimum industrial content of qualitative indices of minerals in the ore array of the extracting unit C_{ak} On-board content of the qualitative indices of minerals on the contour of the extracting unit C_{gn} Minimum industrial content of qualitative indices of minerals in the flow of iron ore – in a dose C_{uo} – for the planned period \bar{C}_n	Limit values: - $\Delta_{ug}, V_{gk}, A_{gk}, E_{gk}$ Extremely permissible deviation $-A_{gk}$ Extremely permissible deviation $-A_{go}$ Limit values: $\Delta_{un}, V_{gn}, A_{gn}, E_{gn}$	Limit values $\bar{h}_{g,n}; \bar{t}_{g,n}; \bar{t}_{g,m}$		
Content of qualitative indices of minerals in loose, extracted, constituting iron ore mass; dynamic series	Average content of qualitative indices of minerals in the flow of iron ore; – in a dose \bar{C}_d – for the planned period \bar{C}_n	Standard deviation $\pm S_n$; coefficient of variation V_n ; asymmetry A_n ; excess E_n	Deviation: – average \bar{h}_n ; – duration \bar{t}_n ; – total duration of deviations \bar{t}_n	Regulatory content of the extracting unit C_{un} Minimum industrial content of qualitative indices of minerals in the flow of iron ore – in a dose C_{uo} – for the planned period C_{un}	Limit values: $\Delta_{un}, V_{gn}, A_{gn}, E_{gn}$	Limit values $\bar{h}_{g,n}; \bar{t}_{g,n}; \bar{t}_{g,m}$		
Removal of the content of qualitative indices of iron associated with magnetite, $F_{e_{agg}}$ in iron ore mass								
Content of qualitative indices of minerals in commodity iron ore mass (dynamic range)	Average content of qualitative indices of minerals in an array of ferruginous quartzites (for the planned period) \bar{C}_m	Standard deviation $\pm S_m$; coefficient of variation V_m ; asymmetry A_m ; excess E_m	Deviation: – average \bar{h}_m ; – duration \bar{t}_m ; – total duration of deviations \bar{t}_m	Regulatory content of qualitative indices of minerals in commodity iron ore (for the planned period) C_{nm}	Limit values: $\Delta_{um}, V_{gm}, A_{gm}, E_{gm}$	Limit values $\bar{h}_{g,m}; \bar{t}_{g,m}; \bar{t}_{g,m}$		

estimation of level and stability of content of quality indexes of minerals in the array of Rogitimums of magnetite and in the stream of iron-ore mass by means of single indexes effective not enough.

At comparison of content of quality indexes of minerals in the array of Rogitimums of magnetite and in the stream of iron-ore mass on different enterprises estimation of затруднена. In such situation the complex methods of estimation of content of quality indexes of minerals are used in the stream of iron-ore mass. Complex index of content of quality indexes of minerals in the array of Rogitimums of magnetite and in the stream of iron-ore mass determined after a formula

$$Q = \sum_{j=1}^m b_j \sum_{i=1}^{n_j} q_{ij} a_{ij} ; \quad \sum a_{ij} = \sum b_j = 1 , \quad (14)$$

where q_{ij} - is a single sign of content of quality indexes of minerals in the array of Rogitimums of magnetite and in the stream of iron-ore mass of j - group that is conditioned by attitude of actual index toward base; n_j - is an amount of single indexes in j group; a_{ij} - is ponderability of i -to of single content of quality indexes of minerals in the array of Rogitimums of magnetite and in the stream of iron-ore mass in j group; m - is an amount of groups of content of quality indexes of minerals in the array of Rogitimums of magnetite and in the stream of iron-ore mass; b_j - is ponderability in j group of indexes of minerals in the stream of iron-ore.

The complex sign of content of quality indexes of minerals in the array of Rogitimums of magnetite and in the stream of iron-ore mass allows in one estimation to take into account the different groups of indexes of setting, technologicalness, static and dynamic descriptions of exactness, reliability and stability. Ponderability of single indexes in a group and ponderability of every group of indexes are set by statistical and heuristic methods. The use of complex sign of content of quality indexes of minerals in the array of Rogitimums of magnetite and in the stream of iron-ore mass results in erroneous conclusions, if it is unsatisfactorily appraised to ponderability of single signs of content of quality indexes of minerals in the array of Rogitimums of magnetite and in the stream of iron-ore mass and their groups. Accepting equivalent all groups and indexes that is included

in the estimation of oscillation of content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass expression (14) simplified and it is presented as a product of relative sizes of single signs of content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass. Determination of ponderability of indexes or simplification of expression (14) it is set after the detailed study on every quarry and mine of character of oscillation of content of quality indexes of minerals in the stream of iron-ore mass and the educed role of every group of indexes in a general estimation.

Depending on the put aim separate groups of indexes are setting, static or dynamic descriptions of stability of content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass – will be excluded from an estimation. Weight of corresponding content of quality indexes of minerals in the stream of iron-ore mass and groups for comparison of different enterprises is accepted by identical, as a sum of bar of single signs of content of quality indexes of minerals in the stream of iron-ore mass and separate groups is taken for unit.

Size of complex sign of content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass at near accordance of values of parameters of content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass aspires base to unit. In this relation consider an estimation (14) the complex sign of evenness of content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass.

A volume and sign of statistical researches of content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass depend on the put tasks and group of complication of enterprise. Limit to the study of simple objects the analysis of functions of distribution of indexes and estimation of descriptions of substance and statistical of oscillation of content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass, and for difficult objects are dynamic vibrations of content of quality indexes of minerals.

Comparisons of different enterprises and different levels of forming of streams of iron-ore mass conducted by means of complex

sign of content of quality indexes of minerals in the stream of iron-ore mass, that characterize accordance of actual values of single indexes normatively-base. The amount of levels of statistical analysis, estimation and control of content of quality indexes of minerals determines complication of charts of forming of streams of iron-ore mass and content of quality indexes of minerals in the stream of iron-ore mass. On mining enterprises with the difficult charts of forming of content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass statistical studies are undertaken on all levels, where got at an assay the dynamic row of content of quality indexes of descriptions of minerals in the stream of iron-ore mass.

Certain connection of statistical complication of quality structure of coalfaces with the type of minerals in the stream of iron-ore mass or type of deposit, bed, ore body or areas of balance-industrial supplies educing is not succeeded. In separate cases on a career or mine one component can have high vibrations of content of quality indexes of minerals, and in other – subzero.

At level career and mines distribution of content of quality indexes useful to the component (content of quality indexes of the iron related to magnetite, Fe_{mg}) submits to the same laws, but there are cases, when on a career and mine different components have the different appearances of distribution. Vibrations after the coefficient of variation on the whole below, than at previous level of iron-ore stream. Distribution of content of quality indexes useful to the component (content of quality indexes of the iron related to magnetite, Fe_{mg}) in the minerals of commodity iron-ore mass that supply with on crush or ore mining and processing factory, submits only to the normal and lognormal laws. Thus, as well as on the previous levels of forming of iron-ore stream different constituents on a career and mine have the different appearances of models of distribution of content of quality indexes of minerals in the stream of iron-ore mass. Characteristically, that in minerals and in commodity iron-ore mass statistical vibrations of content of quality indexes of useful component, judging on a coefficient there are variations, below, than in loosen and the obtained balance-industrial supplies. On most quarries and mines size of coefficient of variation less than 40 %. The study of type of functions of distribution and statistical

parameters gives information about changeability of level and stability of content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass in the process of forming of commodity products of mining enterprise.

Increase of stability of content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass in the process of her forming on careers and mines expresses reduction of values of coefficient of variation and accompanied by transformation of asymmetric distributions of content of quality indexes of minerals in more symmetric even in normal. In the array of Rogitiums of magnetite and in the stream of iron-ore mass only for quality indexes useful to the component, that it is used as a criterion of content management of quality indexes of minerals in the stream of iron-ore mass.

Implications

1. Statistical control as a function of the surveyor providing of management content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass consists in a decision-making about the process of forming of content of quality indexes of minerals state in the stream of iron-ore mass and necessity of influence in case of his discord on the basis of statistical analysis and estimation of sample data. A volume and sign of statistical researches of content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass depend on the put tasks and group of complication of enterprise.

2. Limit to the study of simple objects the analysis of functions of distribution of indexes and estimation of descriptions of substance and statistical of oscillation of content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass, and for difficult objects are dynamic vibrations of content of quality indexes of minerals. In the rational statistical checking system on every stage of forming of single and incorporated iron-ore streams in accordance with requirements envisage control of content of quality indexes of minerals in the array of Rogitiums of magnetite and in the stream of iron-ore mass.

3. Control methods on ore-mining enterprises and levels are different, depending on changeability of level and stability of content

of quality indexes of minerals in the array of Rogitinum of magnetite, in the stream of iron-ore mass and volume of information. The complex sign of content of quality indexes of minerals in the array of Rogitinum of magnetite and in the stream of iron-ore mass allows in one estimation to take into account the different groups of indexes of setting, technologicalness, static and dynamic descriptions of exactness, reliability and stability.

4. The use of complex sign of content of quality indexes of minerals results in erroneous conclusions, if it is unsatisfactorily appraised to ponderability of single signs of content of quality indexes of minerals in the array of Rogitinum of magnetite, in the stream of iron-ore mass and their groups. Size of complex sign of content of quality indexes of minerals at near accordance by the base value of parameters of content of quality indexes of minerals in the array of Rogitinum of magnetite and in the stream of iron-ore mass aspires to unit.

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