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GIS MONITORING OF LANDS DISTURBED BY OPEN-CUT MINING

The development of mining and industrial complexes leads to the increase of negative impact on land resources. It can cause mechanical damage of lands and geochemical pollution of the territory. Open-cut mining influences a complete or partial destruction of primary vegetation and soils, as well as sharp breakdown of ecological productivity. The restructuring of pre-existing relief and the creation of new non-specific man-made forms of the territory occur in the process of minerals extraction under the influence of technogenesis. The processes of exogenous relief formation take place on disturbed and remediated lands, as well as in a zone of the mining influence. Monitoring of these lands is necessary for the development of measures for limitation and elimination of mentioned above processes.

Monitoring tasks are solved by creating a GIS project that includes cartographic and attributive information. The analysis of monitoring data results in a cartographic conclusion, showing the map, the stages of monitoring, attributive and additional information. The use of GIS technologies for land monitoring allows you creating maps directly in digital form by coordinates obtained as a result of land measurements, or in the processing of the remote sensing data.

The process of creating maps in GIS is simple and flexible, unlike the traditional methods of manual or automatic mapping. Also, geospatial modeling can be performed in GIS environment. The flexibility of the process of creating maps in GIS is ensured with: the convenience of input and editing coordinated data; the possibility of making the required number of attributive and geometric information; scale transfer; the general and multiple data usage. It is possible to copy and transfer data over local and global networks quickly.

The remote sensing is a set of various methods for recording natural environment with a scanner, with photographic, radar and other special equipment, as well as visual observations. The main qualities of the remote imaging are the following: zoom, simultaneous coverage of large territories, possibility to get repeated pictures, the study of inaccessible areas, the information possible in any scale and the wide range of registered parameters.

The Earth's remote sensing is carried out by a large number of shooting systems that allow obtaining images of spatial resolution from 10 to 0.5 m in different spectral ranges. The choice of remote sensing data type depends on the task.

The key components of the monitoring are the monitoring indicators (values or ranges of object status). These indicators are needed to interpret the monitoring data, to support the decision-making in the area of resource management and for objective assessment of the state (when compared with normative indicators). The benchmarks should take into account the ecological potential of the landscape.

One of the main tasks of monitoring is the need to create and maintain an informational database on lands disturbed by open-cut mining which will detect, in fact, unrecorded land plots that are being used and include them into the taxable base; to create a monitoring system for these lands and for their recultivation using GIS technologies; to form a grounded system of measures for rational land usage and the development of mechanisms for regulation of the effective usage of lands in the district.