

Materials of Conferences

**CONCEPTUAL PRINCIPLES
OF THE ENSURING SYSTEM THE
GEOLOGICAL SAFETY
OF THE LARGE CITIES**

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Developed the Concept of the geological security of a large city, its realization is offered on the basis of the following principles:

1. Gradual solution of geological-ecological and engineering-geological problems; the establishment of short-, medium – and long-term goals and tasks; planned, consistent with gradually increasing the detail study of the geological environment of the city on the basis of the engineering-geological and geoeological mapping.

2. System approach to the mapping involves research on different hierarchical levels and scales: an overview and regional – outside the city (1:200 000), the city and the suburbs (1:100 000) town (1:50 000), district (1:25 000), microdistrict (1:10 000) quarter (1:5 000).

3. Priority – the identification of geological risk and solution of the tasks on its reduction at the sites of potential geological hazards (the principle of «hot spots»).

4. Priority is development and implementation of measures to ensure the geological safety for the territories of the enterprises and objects of the critical or clearly unfavorable geological situation (the principle of «concentration of efforts on local problems»).

5. Optimization is ensured by the minimally sufficient volume of research and data (quantitative aspect) and the correct choice of the objects of research, observation points and routes (qualitative aspect).

6. Complex approach involves the study of all the components of the geological environment, with application of a wide range of methods, with a priority on engineering-geological mapping.

7. The objectivity of the works implementation is ensured by the construction of the accurate cartographic model of the geological environment, which should fairly and adequately reflect the engineering-geological, hydrogeological and geoeological conditions.

8. Criteria and ecological compatibility of mapping – is ensured by objective criteria and indicators of the state of geological environment on the basis of a system of ranking the degree of engineering-geological complexity and environmental standards.

9. The efficiency and dynamism assumes unification, the systematization of the data, creation of

information banks; modeling on the basis of a continuously updated electronic database, to reflect the current state of the geological environment.

10. The versatility of the system of provision of geological safety – is the ability to perform the functions of providing information, analysis, assessment, forecast.

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**GEOLOGICAL-ECOLOGICAL PROBLEMS
OF THE LARGE CITIES
AND THE CONCEPT OF THE
GEOLOGICAL SAFETY**

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The main and common problems for geological safety of the large cities are: development of geological processes (flooding, swamping, erosion, landslides, suffosion, karst, etc.); increase seismic danger, especially in the geodynamic active zones with a high degree of fracturing; chemical pollution of all natural environments and the accumulation of waste; the problem of underground spaces of cities, etc. On an example of the Perm, the largest industrial city of the Western Ural (800 sq. km. – the third in size city in Russia after Moscow and St. Petersburg), developed the Concept of the geological safety of the city, which shows the ways of overcoming of geological and environmental problems. The main purpose of the Concept – formation of the system of provision of geological safety at the complex development of the city, the creation of a scientifically grounded system of the forecast geological hazard reduction of geological and other risks, rational use of underground space, the decision of questions of ecology, creation of geologically safe environment for present and future generations of people.

There were developed principles and criteria for the creation of unified geo-information system of the geological environment of the city, containing the database of the engineering-geological, hydrogeological and geo-ecological information, compiled an Atlas of special geological maps. Developed a Program of geological study to 2030, with the system of program activities:

1) theoretical and organizational fundamentals of creation of the system of geological safety: theoretical, legal and methodical maintenance; cartographical provision and creation of the required