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Engineering and geological audit in design and construction of linear transport facilities

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Abstract

At present the quality assessment methodology of engineering and geological researches results does not exist. The article describes this problem on the example of linear facilities. To deal with this problem we propose to use the methodology of engineering and geological audit. It will allow regulating different types of activities on the design and construction stages. It will also let getting objective information about studied facility. Through the establishment of quality system we are reaching the needed quality level of engineering and geological investigations. This system is a set of management solutions and methodologies. The system allows exploring the engineering structures without risks. Besides, in this work we give the reason of the audit using. We demonstrate it on the basis of the analysis modern methods of control surveys and their main disadvantages. Practical importance of the audit is given on the example of linear object design and construction. The audit allow to reduce material costs and increase the safety of engineering structures maintenance, regardless of their responsibility level and complexity of engineering and geological conditions.

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1. Introduction

Engineering and geological investigations include a wide complex of researches. The last one is realized on various steps of human economic activity. Actual data obtained in the investigations process have a decisive influence on design, construction and facilities' maintenance. This information also helps to work out engineering defense measurements and environmental protection. Thus heavy demands are imposed on accuracy and reliability of engineering and geological information. In the engineering field the following means and methods are used to provide the required quality grade:

- complex of observations over the state and functions of natural and technical system (monitoring);
- required data presence/absence certification in technical accounting (state/not state expertise);
- qualitative control on a concrete stage (for example geotechnical control);
- directional researches on field, laboratory, cameral works reliability and quality (technical control) assessment.

According to SS (sanitary standard) 47.13330.2012 item 4.20-4.21 the quality of engineering investigations is determine by inner and outer (technical) control. As well examination the research results as to the normative document requirements is realized by expertise. Moreover geotechnical control of construction quality assurance is used in engineering field. It also applied to engineer man-made ground planer's preparation. Existing natural and technical system monitoring is usually used on the exploratory stage. At first seems that the quality control system exists in the field of engineering geology and separate enterprises. However this system is not perfect. It also could not maintain high quality of engineering investigations.

The main goal of this work is justification of improvement the existing quality system. It is planning to realize by introduction to the engineering field the new term «engineering and geological audit». Theoretical demonstrative base is founded on the existing control methods comparison with audit. The differences between control and audit are used to match them as well as disclose the main terms connected with new procedure. The practicality of developed methodology is shown on the existing linear transport system example.

2. The idea of engineering and geological audit

Engineering and geological audit is a procedure of independent estimation geological or building company's activity. The audit checks deviations in design documentation and detects conscious degradation in final product quality [4].

This term is planning to introduce into categorical base and practical engineering geological field. The audit will allow evaluating and managing construction /geological firm or their contractor's activity. All these kinds of works are made through the only one procedure utilization. Moreover audit may be used on different stages (planning, design, construction and exploration of facilities). To deal with such situations prospector's realized as technical as geotechnical control nowadays. Due to the audit it will be also possible to solve the follows problems:

- carry out state/not state expertise of technical accounting;
- economical expediency and the estimated cost assessment of have carried out and being executed investigations;
- economic risk reduction;
- prosecution the researches on the facility's territory.

According to above-said the engineering and geological audit objects are exploration/constructional/financial structures. The subjects are report information; design plans; technical and economic decisions; activity on different stages of engineering investigations; measurements of engineering defense and risks decline [2].

The substance of the audit is data accessing. However the confirming information while engineering and geological audit is various. It differs in contents and quality. The engineering and geological information quality depends on properly chosen exploration methodology. It also dictated by executed time, kind and volume of works. High quality of checking information defines the engineering and geological investigations quality. In this article is offered to work out the mechanism, which will manage the engineering and geological works methodology. It seems to help providing the needful quality level. To achieve this goal the qualitative control system should be created. It will consist of:

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