

Harm of Bad Hydrogeology and Preventive Measures

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Abstract: Hydrogeological investigation is one of the important components in geotechnical engineering investigation. Hydrogeological investigation is helpful to clearly understand the geological environment of the construction area. The construction environment of most projects is unstable. Mastering the corresponding geological environment can effectively avoid the risks in the construction process and ensure the safety and efficiency of construction. In the past, various engineering accidents caused by bad hydrogeological problems not only damaged people's interests, but also exposed many geotechnical engineering problems. Therefore, people need to fully understand the harm of adverse hydrogeological problems and take effective preventive measures to ensure the safety and stability of the project. This paper expounds the content and significance of hydrogeological investigation, and deeply analyzes the harm and preventive measures of bad hydrogeological problems, so as to provide reference for relevant people.

1. Introduction

The development of geotechnical link is inseparable from the application of groundwater, which is related to and affects the quality and safety of building engineering to a certain extent. It is an important link in basic engineering, which affects the change of geotechnical characteristics and has an important impact on the durability and stability of buildings [1]. Hydrogeology is one of the contents of geotechnical engineering investigation, which mainly studies geotechnical engineering problems and adverse geological phenomena related to groundwater activities, and determines whether hydrogeology will affect the excavation of building foundation and threaten the quality and safety of buildings. In the past, various engineering accidents caused by geological problems not only damaged people's interests, but also exposed many geotechnical engineering problems. Therefore, people need to fully understand the harm of adverse hydrogeological problems and take effective preventive measures to ensure the safety and stability of the project.

2. Necessity of hydrogeological investigation in engineering investigation

In the development stage of construction work, geological survey and engineering research have a unified purpose, and this work is also the initial stage of building construction work and the most critical core. Through the research on existing engineering projects, scientific prediction is put forward, and all kinds of bottlenecks that may appear in the future construction stage and key problems that affect the improvement of construction quality are analyzed, so as to effectively put forward correct and reasonable solutions and countermeasures and effective preventive measures for related work [2]. In the specific investigation, it is necessary to collect the regional hydrological conditions, comprehensively analyze the hydrogeological conditions through modern exploration technology and equipment, and analyze its impact by using scientific and reasonable demonstration methods. The main contents of investigation include hydrogeological parameters of aquifer, groundwater level, geological environment, physical geography and so on.

In the current engineering design and construction, if the influence of hydrogeology is not paid enough attention, it will bring many dangers to geological engineering. By analyzing the hydrogeological survey data, people can take corresponding preventive strategies according to their risks and hazards to ensure the smooth development of engineering construction [3]. Hydrogeological investigation is helpful to clearly understand the geological environment of the

construction area. The construction environment of most projects is unstable. Mastering the corresponding geological environment can effectively avoid the risks in the construction process and ensure the safety and efficiency of construction. At the same time, effective preventive measures are put forward for the possible problems in the future, so that the relevant technologies of geotechnical engineering can be used to eliminate them in the actual construction stage, thus effectively reducing the possible harm of groundwater to the whole project implementation. Therefore, hydrogeological investigation of geotechnical engineering is necessary.

3. Harm of bad hydrogeology

3.1. Groundwater corrosion hazard

In the process of geotechnical engineering project investigation, the main hazard of groundwater corrosion is the abnormal pH value of groundwater. The pH value contained in groundwater can reflect the overall salinity of the whole groundwater [4-5]. In order to avoid the threat of groundwater, it is necessary to measure the acidity and alkalinity effectively. If the groundwater level is high and the pH value is below 7, it will lead to certain corrosion hazards in geotechnical engineering projects. At the same time, the high salt content of groundwater will also corrode geotechnical buildings, accelerate the corrosion rate of concrete and reduce the service life of construction projects.

3.2. Hazard of groundwater level change

The hydrogeological hazards caused by groundwater to geotechnical engineering mainly include two aspects [6]: one is caused by the fluctuation of groundwater level; The second is caused by the fluctuation of groundwater level. There are two reasons for the rise of groundwater level: one is caused by the rise of water level in nearby lakes and rivers; The second is caused by the leakage of underground drainage pipes and the discharge of industrial wastewater. This greatly reduces the stability and safety of the building. There are many factors that affect the decline of groundwater level, and the most important one is human factors. For example, pumping a large amount of groundwater will lead to the decline of groundwater level, affect rock characteristics, and even the phenomenon of ground collapse, which seriously threatens the ecological environment. Cause the pressure change of groundwater, which will lead to the collapse of engineering buildings in serious cases. Therefore, in the process of engineering geological exploration, we should attach great importance to the threat of groundwater factors to the quality of engineering construction.

The rise of groundwater level will also cause the softening of foundation, the sliding of slope and river bank. The decline of groundwater level is caused by man-made in many cases [7]. With the increasing corrosivity of groundwater, the overall structure of building construction is seriously damaged, and finally the safety and service life of building construction are affected. When the groundwater level drops, the surrounding ground will have a settlement problem, and even a serious problem of ground fracture will occur, which poses a great threat to the safety of engineering construction and also has a negative impact on the personal safety of surrounding residents.

3.3. Geotechnical engineering hazards

At present, the development activities are increasing, the scope of activities is expanding, and the demand for life is increasing, which makes it difficult to maintain the original balance of the water circulation system. With the passage of time, the stable groundwater level fluctuates, which affects the construction of various geotechnical projects and causes the engineering quality to fail to meet the standards. In the foundation of building engineering, when the groundwater level changes within the range of compression layer below the foundation bottom, it can directly affect the stability of the building [8]. If the water level rises in the range of compression layer, the foundation soil will be softened, so that its strength will be reduced and its compressibility will be increased, and the building may have large settlement deformation. If the water level falls in the range of compression layer, the dead weight stress of rock and soil will increase, which may cause additional

settlement of foundation.

4. Preventive measures of hydrogeological hazards in engineering investigation

4.1. Improve the workflow

During the development and implementation of geotechnical engineering investigation, it is necessary to understand the hazards caused by hydrogeology and formulate effective preventive measures. If there is no perfect investigation mode, the accuracy of investigation results can not be ensured, which will adversely affect the effective development of prevention work [9]. Therefore, in practical work, it is necessary to focus on perfecting and perfecting the exploration work mode to provide guarantee for effective prevention of hydrogeological hazards. That is to say, it is necessary to improve the effect and quality of the overall work in a specific unified environment, which can fundamentally improve the actual effect and overall level of exploration work.

First of all, we should standardize the hydrogeological exploration system and clarify the exploration work flow. During the hydrogeological exploration, the construction team should strictly follow the current implementation norms and standards in China, and adopt corresponding norms and standards for hydrogeological exploration in different engineering areas.

Secondly, we should attach great importance to the evaluation relationship. For geological research, it is mainly based on the impact on the building itself. Therefore, it is necessary to collect the basic geological data of the project in detail to ensure high-quality hydrogeological evaluation. If the engineering design and hydrogeological investigation find this phenomenon inconsistent, it should be re-evaluated and analyzed.

Finally, when carrying out the survey, the supervisor should give some guidance to the technicians on site. The biggest problem existing in the actual work of survey technicians is that the relevant workflow is not clear, which leads to frequent errors during operation, and the main problem is the sequence problem. Supervisors should provide some help to survey technicians, clarify the work flow and standardize the operation behavior, which is also the basis for ensuring the smooth progress of geological exploration and ensuring the quality of the project.

4.2. Using advanced technology to ensure the accuracy of hydrogeological exploration

In the hydrogeological survey, the survey unit should pay attention to the introduction of equipment, technology and talents to ensure the smooth development of the survey work. Engineering departments need to cooperate with relevant state departments, regularly carry out technical training and equipment operation learning, and master new survey technologies. Survey staff should be good at using GPS technology to divide the survey area, and then survey the divided area to narrow the scope of work, which is convenient for data collection and analysis, and at the same time, the data error can be controlled within a certain range. Refer to Figure 1 for the specific detection mechanism.

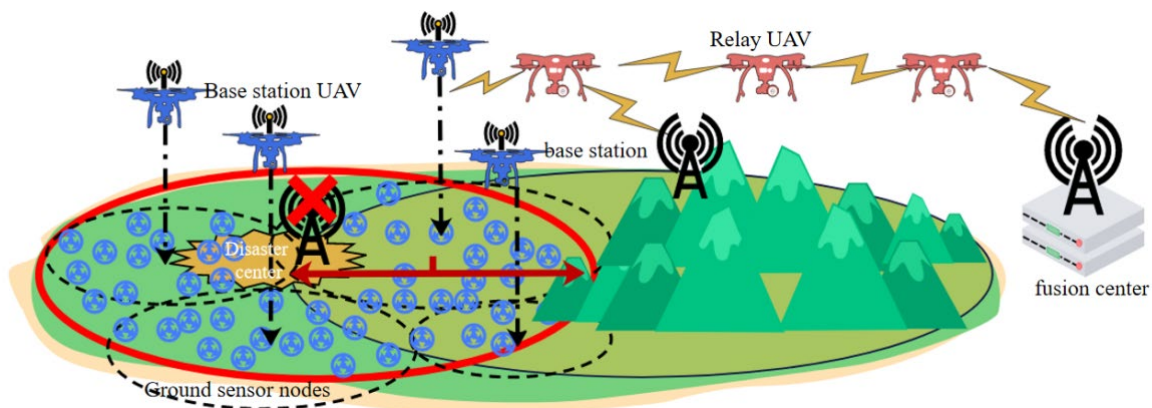


Figure 1 Geological detection mechanism

Managers of institutions need to select relevant workers and go to the site for actual investigation,

especially for the data involved in aquifers, which need to be accurately recorded, and the way of testing water pressure needs to be determined by permeability, so as to avoid affecting the overall quality of building construction due to errors in subsequent data.

4.3. Do a good job in supervision and management of geological survey

Geological survey is a technical type of consulting work, and supervisors should have solid professional knowledge and rich working experience to fundamentally ensure the survey effect. In the process of engineering geological survey, the execution and professional quality of surveyors are very important. Relevant departments and management personnel should strengthen the training and supervision of the survey staff, so that the survey staff can strictly abide by the operating rules, standardize their own work, and improve their professional quality and survey technical level [10].

Based on the relatively perfect engineering geological survey mechanism, the survey staff carried out overall and detailed monitoring of the water temperature geological work, thus ensuring the accuracy of the engineering survey data. In order to make complex engineering geological exploration carry out in an orderly way, enterprises should improve the corresponding standard system and clearly define the process of engineering geological exploration, so that the responsibility of geological exploration can be implemented to individuals and the rationality and scientificity of geological exploration work system can be ensured.

4.4. Improve the technical level of geological prospecting personnel

In terms of hydrological exploration system, we need to use a comprehensive knowledge system to scientifically analyze local geological engineering data and design according to the final results of geological research. In this case, we need to carry out all-round in-depth analysis and effective investigation on the geological situation that can be presented in this area. In the process of review and analysis, it is also necessary to carry out various work contents, including the research and analysis of geological and geomorphological characteristics, in combination with the different characteristics of this area.

Workers can monitor and analyze the groundwater level in their area for a long time, grasp the changing law of groundwater level, and then select and design reasonable foundation position and structure, so as to minimize the impact of groundwater on building foundation, which is also the key point to ensure the safety and stability of construction. In the process of reviewing local hydrogeological data, a lot of professional knowledge should be used, which is why the selection of technicians is very important. For the construction team, regular training and technical evaluation are necessary to continuously improve the level and knowledge of technicians. Geological survey departments should pay attention to the multi-directional training of survey technicians, strengthen cooperation with universities, recruit more professionals, and ensure the smooth development of geological survey work.

5. Conclusions

Hydrogeology is one of the contents of geotechnical engineering investigation, which mainly studies geotechnical engineering problems and adverse geological phenomena related to groundwater activities, and determines whether hydrogeology will affect the excavation of building foundation and threaten the quality and safety of buildings. By analyzing the hydrogeological survey data, people can take corresponding preventive strategies according to their risks and hazards to ensure the smooth development of the project construction. In rock engineering investigation, scientific methods should be adopted to provide a favorable data base for the follow-up work, thus ensuring the stability of the engineering structure. It is necessary to master the relevant theoretical knowledge of hydrogeology, make a detailed investigation and careful evaluation, and put forward reasonable and effective suggestions on prevention and control measures.

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