

Initiative on Promoting Technological Innovation in Engineering Geology Survey

IAEG China National Group

National Standardization Technical Committee of China Railway Society

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(Released on the 2nd SXFRG)

The main work of engineering geology survey is field investigation, testing and information collection. However, the technology of geo-engineering survey has been lagged far behind the demand of the industry. In view of this situation, Engineering Geology Commission of China Geology Society (IAEG China National Group), National Standardization Technical Committees of China Railway Society and Shaoxing University jointly advocated, together with relevant enterprises, universities and institutes put forward the *Proposal on Promoting Technological Innovation in Geo-engineering Survey*.

I. Technical Background

1. Basic Estimation of the Technical Level of Geological Engineering Survey

Though new technology has been continuously applied, the global technical level is still lagged far behind the demand of the industry, which mainly revealed in

- The remote sense and GIS have provided efficient means for geo-engineering mapping, however, the working model is still carried out on manual labor.
- Prospecting: geophysical prospecting has been a helpful way for geo-engineering prospection; various measuring and testing techniques have improved the efficiency of boring data collection. However, geo-engineering prospection is mainly relying on exploration of drilling, adit and trenching for data acquirement. The equipment is not only old, but also heavy, which has not been changed for the past decades.
- The continuous improvement of laboratory testing equipment and technology has greatly improved the reliability of geotechnical engineering testing, but the procedure of on-site sampling, transportation, sample preparation and testing are tedious, laborious, expensive and time-consuming. Furthermore, the on-site testing equipment is relatively old and bulky, and the improvement of testing technology is slow.
- The collaborative space-air-ground monitoring technics has been developed in recent years, and the technology of sensor and information transmission through internet has been widely applied. However, the precision of positioning and multi-factor monitoring are still in exploration.

- The current R & D (Research and Development) on technical improvement of geo-engineering survey is in fragmented state, the industrial organizing is still a short slab.

Technical standards of the industry seem to be insufficient in leading nature.

2. The background for the technical revolution of the industry

At present, the continuous progress of science and technology in the world, better science and technology innovation policies of nations, and the growth of scientific and technological talents have created favorable conditions for the innovation of geological engineering survey technology. The blowout-like new techniques, such as satellite positioning, integrated electronics, sensors, new materials, robot, drone, mobile phone, internet of things, cloud calculation, big data, artificial intelligence and advanced software have provided rich resources of times for the integrated innovation of the industry.

There is a strong demand for scientific and technological innovation in the world, and many countries have issued incentive policies for technological innovation. In addition, many countries pay great attention to education and personnel training, aiming to create a better policy and psychological environment for supporting technological innovation.

II. Tasks of the Technological Innovation of Engineering Geology Survey

1. The aim of the Technological Innovation of Engineering Geology Survey

The Technology Innovation aims promote more convenient and more intelligent geo-engineering survey, reducing labor intensity, as well as the consuming of time and money, but raising working efficiency.

2. The basic contents of the Technological Innovation of Engineering Geology Survey

Technology Innovation is a major undertaking, an overall reforming and raising of the techniques of the industry, through absorbing modern techniques and integrated innovation. The techniques to be improved mainly include:

- Space-air-ground mapping;
- In-situ testing and integrated data acquisition;
- Advanced prospecting and data collecting techniques;
- High -performance computing and analyzing;
- Internet-of-things Monitoring;
- Modern technical standards;

- Professional education and training, etc.

III. Promoting Measures

1. To establish a technical **directing** committee for innovation of engineering geology survey technology. The sponsor and technical directing committee of this initiative will promote the exchange of new technologies in geological engineering survey, promote the establishment of technology and product R & D platform, and coordinate the product technology appraisal, technical standard formulation and implementation.
2. To set up a technical **working** committee for innovation of engineering geology survey technology. The technical work committee and each R & D team will apply for various funds, from their own unit to industry, local and national level, to guarantee the basic financial support for technical R & D, technical exchange and standard setting.
3. The initiating units and technical working committee will actively promote the policy and financial support of local governments for the innovation activities of engineering geology survey technology and the construction of R & D bases.

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October 20, 2019