

Development and Application of Innovation and Technology in GEO

Key Message: The Government is committed to promoting innovation and technology (I&T) for the betterment of Hong Kong. Riding on this, the GEO has treated the development and application of I&T as priority tasks; and dedicated strategies and resources are drawn up to pursue suitable I&T to enhance our services, as well as bringing transformation to the practice.

Introduction

The GEO always looks for initiatives to promote and apply innovation and new technologies to enhance our services. In the past, the GEO has implemented a number of initiatives to drive the application of innovation and novel technologies, many of which have been successfully put into practical use. Some notable successes include the time domain reflectometry method for enhancing the built quality of soil nails, airborne LiDAR survey for building an accurate Hong Kong digital terrain model, the development of Geotechnical Infrastructure as the central repository of GEO spatial data, the integration of advanced numerical tool in BIM/GIS platforms for modelling debris flow, smart barriers for resisting and detecting natural terrain landslides, etc.

Having recognised the role of innovation and technology (I&T) as drivers for economic growth and the key to enhance competitiveness of our industries, the Government is determined to boost the capability in I&T and make Hong Kong a smart city. Riding on this, the GEO has accorded high priority on the development and application of innovation and novel technology. It is one of the GEO's 2020-25 Strategic Goals aimed at taking a lead in implementing I&T to meet new challenges and transform industry practice. A Steering Committee has been established to formulate the strategy for the respective applications in slope safety management and oversee their implementation. It is intended to coordinate resources, talents and efforts in pursuing suitable I&T projects to enhance GEO's services, as well as to create synergy in applying I&T to geotechnical practice.

Key Technological Areas

There are plenty of innovative technologies that are readily available in the construction industry and many of them have already reached market maturity for regular use. The GEO has identified the key technological areas that would have good potential in revolutionising the construction industry and enhancing the productivity, efficiency and safety in geotechnical design and construction. These can be grouped into four core areas, namely (i) automation and robotics (ii) digital technology, (iii) artificial intelligence and (iv) novel technology. Under each core area, the GEO has been implementing various I&T projects, which include application of BIM in Landslip Prevention and Mitigation projects, use of artificial intelligence and machine learning technique, development of automated systems for steel rebar tensile tests and concrete cube compression tests, use of drones, 3D scanning and printing, virtual and augmented reality, application of advanced construction materials, etc. The GEO aims to adopt these technologies to boost productivity, streamline process and enhance quality and safety.

Strengthening the Collaboration with Stakeholders and Industry Partners

The GEO recognises the importance of engaging industrial partners and stakeholders in the development of suitable I&T in geotechnical engineering works and transforming them into practice. We have been actively driving Government-industry-academia collaboration to bridge the gap between research and practice for geotechnical innovations. Cross-sector platforms have been established to identify needs and common interest, formulate technical development initiatives and undertake collaborative actions. The GEO would explore diverse sources of funding, such as the TechConnect Block Vote established by the Innovation and Technology Bureau, various funding schemes under the Research Grant Council and the Construction Innovation and Technology Fund overseen by the Construction Industry Council, for implementation of suitable projects.

Facilitator for Applying Innovations in Geotechnical Practice

The GEO has a regulatory role in exercising control on geotechnical works, the primary objective of which is to protect public safety. The checking of submissions involving new innovative solutions generally takes longer time. The GEO has established an Expert Panel with the objectives to encourage and facilitate practitioners in bringing new innovative solutions into the practice. The Panel will examine geotechnical submissions involving the use of new materials, new designs and/or unconventional construction methods in geotechnical engineering, endorse the key technical aspects of the submissions and give directive on the approach in auditing the detailed designs, so as to facilitate the adoption of innovative solutions while ensuring public safety.

Open Data Policy

In line with the Government Open Data Policy, the GEO releases suitable spatial data in the public domain. The released data include the ground investigation records of public projects, geological maps, landslide inventory, cavern master plan as well as features registered in the Catalogue of Slopes. The public can access the GEO Data Portal (<https://www.ginfo.cedd.gov.hk/geoopendata>) for downloading these datasets. For voluminous datasets, such as the GI and laboratory testing data and territory-wide airborne LiDAR survey data, the public can approach the Slope Safety Division of the GEO via email hkss@cedd.gov.hk to arrange for the acquisition of the datasets.

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