

Land Reclamation Work Underway for Hong Kong Airport's Third Runway



Hong Kong International Airport, one of the world's busiest airports, was built in the late 1990s on reclaimed land. It is now expanding to include a third runway. In preparation for this expansion, the Airport Authority selected Fugro to carry out the necessary site characterisation investigations. The initial building of Hong Kong International Airport was one of the biggest infrastructure operations in the industry. Covering 12.48km² of reclaimed land between the two islands of Chek Lap Kok and Lam Chau, the airport increased the land area of Hong Kong by 1%.

Fugro has been closely involved with this significant project from the beginning and has gained detailed knowledge of the local geology from its previous work experience at the existing airport and associated infrastructure.

As the expansion requires further reclamation of land, Hong Kong's Airport Authority had specific objectives for the site investigation of the expansion. These were to understand the geological profile of the area, and to trial a proposed deep cement mixing technique to minimise the amount of dredging required, thus reducing the local environmental impact during the construction phase.

Geotechnical Surveys

Fugro conducted several site investigation surveys, including drilling, geotechnical testing, soil and water sampling, geophysical surveys and water quality monitoring at nearly 800 locations in the waters north of the present airport. Much of the work related to investigating the engineering properties for preliminary design and environmental assessments of the proposed third runway systems.

The fieldwork included specialist techniques such as BAT gas sampling, Begemann sediment sampling and marine seismic cone penetration testing (CPT). These specialised marine site investigation services are not readily available in the region. Fugro was able to offer them through its global network of companies and, in addition to the fieldwork, also carried out extensive laboratory testing, including triaxial extension tests, at its Hong Kong facilities.

Technology Used

Fugro has undertaken six projects related to the proposed third runway at Chek Lap Kok in the last five years. These have involved up to eight vessels on site, sinking 267 marine drill holes and 345 marine CPTs.

Working within a few hundred metres of the runways of one of the world's busiest airports requires careful planning of the location of the two barges and six jack-up rigs that were working around the clock for much of the contract period. The marine CPTs were carried out with a Fugro SEACALF® wheeldrive rig deployed from one of the barges. Pushed into the soil by rotating wheels at a controlled rate, the SEACALF acquired data as it penetrated the seabed, communicating back to the barge in real-time.

The team is specialised and the team of about one hundred people is 95% local Hong Kong Chinese, with the balance from the UK, Turkey, Germany, New Zealand and The Netherlands.