

Principle Business Activities and Products

We are a geotechnical instrumentation service provider, where we provide piling, structural and geotechnical related services, covering instrumentation, testing and monitoring services to construction projects as well as completed buildings and infrastructures.

Our service offerings can be categorised into 2 segments, as follows:

- i. Provision of pile instrumentation and static load test services to construction projects; and
- *ii. Provision of structural and ground instrumentation and monitoring services to construction projects as well as completed buildings and infrastructures.*





History and Development of Our Group and Business Operations

Upon the incorporation of Spectest in 1992, we commenced our business at a rented office located in Taman Salak South, Kuala Lumpur. In 1993, through Spectest, we secured our first major service engagement which involved the provision of pile instrumentation services as well as structural and ground instrumentation and monitoring services for the construction of the Petronas Twin Towers. In the same year, we also secured a major service engagement involving a hillside development at Genting Highlands, Pahang for the provision of structural and ground instrumentation and monitoring services for the construction of a new hotel and car park building.

In 1995, we relocated our office to a terrace factory in Serdang Lama, Selangor. Over the years, between 1995 and 2004, we provided pile instrumentation services as well as structural and ground instrumentation and monitoring services to numerous construction projects, including the construction of Pavilion Kuala Lumpur, Securities Commission Malaysia and Securities Industry Development Centre, light rail transit ("LRT") stations in Kuala Lumpur, KL Sentral, Kuala Lumpur International Airport and Ministry of Finance office, as well as multiple residential buildings, office buildings, hotels and amenities such as schools and hospitals, mainly in Malaysia.

In 2004, Glostrext Technology was incorporated. Following which, we continued to secure service engagements involving the construction of residential buildings, shop houses, office buildings, industrial buildings and power plants in Malaysia.

In 2009, Glostrext Singapore was incorporated. Since then, we have completed numerous pile instrumentation service engagements which involved the construction of residential buildings (including public housing developments), hotels, office buildings, industrial buildings, universities and schools, as well as infrastructure such as roads and highways in Singapore. Amongst the notable construction projects in Singapore that we have been involved in includes Johor Bahru – Singapore Rapid Transit System, New State Court Complex, Jewel Changi Airport and polder construction at Pulau Tekong.

In 2012, we expanded our service offerings to include the provision of pile static load test services using Bi-directional Static Load Test (BDSLT), where we provided BDSLT pile static load test service for the construction of a mass rapid transit ("MRT") station in Singapore. Subsequent to that, we continued to secure BDSLT pile static load test service engagements from construction projects involving residential buildings, commercial buildings, industrial buildings, MRT stations, electrical substations, roads, tunnels, schools and hospitals in Singapore. Amongst the notable service engagements that we have been involved in using BDSLT in Singapore include Tuas Water Reclamation Plant and Intra Airside Road Connection, Second Parallel Taxiway and Fire Station No.2 for Changi East at Changi Airport.

In 2013, we secured our first BDSLT pile static load test service engagement in Malaysia, where we provided BDSLT pile static load test services for the construction of an MRT station in Kuala Lumpur. Subsequent to that, we continued to secure BDSLT pile static load test service engagements for construction projects involving residential buildings, shopping complexes, office buildings, industrial buildings, MRT lines and LRT lines in Malaysia. Amongst the notable service engagements that we have been involved in using BDSLT in Malaysia include Lalaport Bukit Bintang City Centre, HSBC head office at Tun Razak Exchange, East Coast Rail Link, Pan Borneo Highway, MRT2 and LRT3.

In 2020, we moved to our current headquarters located in Shah Alam, Selangor, which was acquired by our Group in 2017. In addition, we also set up a laboratory dedicated for our R&D activities and to calibrate instruments used in our operations.

In 2021, through an existing customer in Malaysia, we secured our first service engagement in Cambodia where we provided BDSLT pile static load test services for the construction of Naga 3 Integrated Entertainment Complex in Phnom Penh.

In 2022, we enhanced our structural and ground instrumentation and monitoring services when we began providing offsite monitoring services through the usage of our Glostrext WiNA platform. It allows geotechnical data to be monitored remotely through the internet on a real time basis.



Pile Instrumentation and Pile Static Load Test Services

We are principally involved in the provision of pile instrumentation and pile static load test services to construction projects. Pile instrumentation forms part of the static load test process where a series of calibrated instruments including strain gauges and extensioneters are installed within the pile body, while other calibrated instruments and monitoring devices are set up to collect reaction data of the test piles during static load testing. As per industry practice, pile instrumentation works in pile static load test are typically performed by third party testing firm instead of the piling companies to ensure independence in data collection. Over the years, our Group has emerged as the trusted specialists in conducting automatic pile test data acquisition and monitoring, analysis and reporting works for pile load tests, with emphasis on Glostrext retrievable instrumentation, where each and every sensor can be individually calibrated for reliable instrumentation scheme, for driven and jacked-in spun piles, R.C. piles, steel pipe piles, cast-in-place bored piles, barrettes and micropiles.



Reaction anchors system with 'monster block', 1993



H-piles as reaction system, 1994



Rebar for whole building as reaction system, 1995



Tension micropile test, 1996



Kentledge blocks reaction system, 1997



Kentledge vs reaction anchors Reaction piles system, KLCC system side by side, 1999



Convention Centre, 2002



Jimah tension test, 2005



Penang 2X Glostrext system TSP test, Bunker for spun pile, 2007 Island JB, 2008



Jacked-in spun pile with Glostrext, Terengganu, 2008



5000t Kentledge MLT, Platinum Park, 2010



ICT at Marina South, 2010



Record breaking 8,000t MLT (by Sunway) at KLCC Pkg 2, 2013



Typical pile instrumentation & monitoring setup (conventional & retrievable)



Bi-Directional Static Load Testing (BDSLT)

We are involved in the provision of BDSLT services, where we supply and assemble sacrificial hydraulic jacks within test piles, and carry out testing on-site based on testing details and technical specifications provided by our customers. Other works in BDSLT such as manufacturing of reinforced steel cage and casting of concrete are handled by our customers. BDSLT was conducted by applying hydraulic pressure to the pre-installed hydraulic jacks in piles using an air-driven hydraulic pump, creating an upward force to test resistance of pile upper element (upper shaft friction) and an equal, but downward force to test resistance of pile lower element (combined lower shaft friction and end bearing).

Key advantages of the BDSLT method include:

- i. Significant advantage in *Safety and Space* implications. Kentledge setup involve work at height, heavy lifting work, working during night and high risk activities. For BDSLT, it's low "footprint" and "low headroom" requirement for testing. BDSLT installation activities is already part of the steel cage fabrication and lowering of cage process, hence BDSLT is low risk, safe and flexible (over water, confined space, etc.);
- ii. Considerable *Time and Cost* savings, especially for very high loading tests. Approximately 3 to 6 weeks needed for Kentledge tests including setup and unloading but BDSLT can be deployed in fast speed;
- Equivalent MLT top loaded settlement curve can be constructed from BDSLT results. (Ref: CP4:2003, Pg. 196-197, ASTM D8169-18 Bidirectional Test Guidelines, TR63-2018-SSC Technical Reference on Bi-Directional Static Axial Load Test and JKR 20400-0236-20 Section 10).





Structural and Ground Instrumentation and Monitoring Services

Structural and ground instrumentation and monitoring services is carried out to ensure the structural health of buildings and facilities as well as ground conditions of a site is safe from hazardous events such as collapse of buildings and/or structures and landslides due to soil movements. It is widely used in monitoring of deep excavations, building basement, mining, hillside development, slopes and landslides, dams, tunnels and buildings. We provide both manual/on-site and real time/off-site structural and ground instrumentation and monitoring services.



Tunnelling Instrumentation

Transition into data automation in geotechnical instrumentation and monitoring works:

Throughout the years, the Group has built up a solid track record and experiences on satisfactorily completion of high quality geotechnical instrumentation and monitoring projects for both public and private sectors since 1992.

With the increasing use of information technologies in structural and ground instrumentation and monitoring works currently, it is a progressive trend for companies to move toward automation by deploying advanced wireless sensor technology with web-based integrated platform. The creative Internet of Things (IoT) solutions in the geotechnical instrumentation and testing industries have enabled all sizes, from small, modest to mega projects (for both under construction and completed structures) to conduct real time automated continuous monitoring and online data visualization in a cost-effective manner.

The obvious benefits of these wireless automation systems have visibly emerged in the light of Covid-19 crisis especially, and will continue to do so as the geotechnical industry is inevitably moving in transition into automation in many ways to achieve cost efficiency and reduce its carbon footprint. Glostrext's WiNA system allow remote monitoring with minimal human intervention and remote access of data, anywhere and anytime hence fewer people are needed at construction sites at any one time, particular for hard-toaccess or access-restricted infrastructures.

Contact us for information of Glostrext Group's experiences on the applications of WiNA instrumentation and data management system for geotechnical and structural health monitoring.





and many more...

A wide range of sensors can be powered into the Glostrext's WiNA System & Data Management/ Visualization Platform



Accredited Calibration Services

We aim to offer trusted measurements and monitoring data of highest quality, innovative and cost effective services to our clients. Calibration of instruments is a crucial process to ensure the reliability and accuracy of instruments in collecting data for monitoring and analysis. Our dimensional and force laboratories in Malaysia is accredited to ISO/IEC 17025 under Skim Akreditasi Makmal Malaysia (SAMM), and our dimensional laboratory in Singapore is accredited to ISO/IEC 17025 under Singapore Accreditation Council (SAC-Singlas). In Singapore, equipment for pile load test is mandatory to be calibrated by accredited laboratories via BCA circular to the industry since 2016.

Our accredited force laboratory is capable of testing force measuring instruments, load cells and hydraulic cylinders up to 10,000 kN, to address the needs of the industry in measurement capability to handle many of the heavy industry requirements that are necessary today. For such high impact facility, accreditation is important to give customers greater confidence in the laboratory's test, calibration and reports, and fulfil consultants' and authority's requirements. Our accreditation for this high capacity force calibration is accredited to ISO/IEC 17025 under Standards Malaysia's Skim Akreditasi Makmal Malaysia (SAMM). To our knowledge, the testing capacity of up to 10,000 kN is the highest force calibration capability accredited in Malaysia currently.





Sharing via Structured Training and Research & Development

We appreciate our talented and passionate people in the Group, encourage teamwork spirit and knowledge sharing to realize their potential and career advancement via structured internal training, courses offered by our international technologies partners, besides actively participating in and continued contribution of publications in regional and international conferences from time to time. Besides in-house specialized high technology services and IoT solutions, we maintain strong collaboration with universities and our international technologies partners including Geokon Inc. (USA) and Worldsensing (Barcelona).

We recognise the importance of continuously enhancing our offerings with on-going R&D. The focus of our R&D activities is to enhance the automation levels in our service provision to increase our operational efficiency. We launched Glostrext WiNA platform in 2022, a web-based integrated platform which leverages on a series of sensors including IoT-enabled sensors and data visualisation software for remote and real time structural and ground monitoring. With the use of IoT technology, data collection is automated and continuous, therefore reducing the labour required as well as enabling better and data-driven analysis based on large amount of data collected.

