

Project Dossier



PROJECT DOSSIER

NDRC Micro-tunneling works for Mediclinic City Hospital

PROJECT OVERVIEW

The project comprised the construction of an underground crossroad as part of NDRC (Non-Disruptive Road Crossings) works in the eastern area of Dubai near Wafi mall in Umm Hurair District.

The project included the construction of micro-tunnel with two shafts on either end of the tunnel. The construction works were quite adjacent to the existing Mediclinic City Hospital building and also nearby Dubai Health Care city metro station's footbridge foundation pile.

Project	NDRC Micro-tunneling work for Mediclinic City Hospital
Location	Dubai, UAE
Client	Mediclinic City Hospital
Contractor	Kele Contracting L.L.C
Consultants	Hyder Consulting (ME) LTD
Duration	May 2015-Jan 2016

WHY MONITORING?

As the project required the construction of shaft just adjacent to Mediclinic City Hospital building and tunneling below existing Dubai Health Care City Metro Station footbridge (close to foundation piles), instrumentation was planned for safety monitoring of structures, as well as for the risk management of construction works.

MONITORING SOLUTION

Encardio-rite was instructed by Road and Transport Authority (RTA-Owner of Metro structure) and Kele Contracting LLC to provide instrumentation and monitoring program during NDRC to assess the impact on adjacent structures including Dubai Green Line metro pier as per M/s RTA code of practice.

Turnkey services

- Pre-construction building condition survey of metro piers and its viaduct.
- Supply of geotechnical instruments, precise survey instruments, and targets
- Installation of geotechnical instruments including the drilling works for subsurface instruments and survey targets
- Manual and automatic monitoring
- Optical Surveying-precise leveling & 3D deformation monitoring



- Programming and commissioning of data acquisition systems
- Setting up an online web-based data management system (WDMS) and maintenance during the contract period
- Daily & weekly reporting with evaluation & interpretation

INSTRUMENT USED

Instruments for Metro Pier monitoring

Tilt meters	Installed on metro piers to monitor any deflection caused by nearby construction works
Building settlement points	Installed on metro piers to monitor any settlement caused by nearby construction works

Instruments for surface/sub-surface monitoring near construction works

Inclinometer	Installed to monitor lateral movements in the ground around the deep excavation for shafts
Standpipe piezometer	Installed to monitor groundwater level around the deep excavation for shafts
Borehole extensometer	Installed to monitor settlement in the ground around the deep excavation for shafts
Surface settlement points	Installed in the soil to monitor surface settlement around the deep excavation for shafts
Automatic compact data logger	For automatic monitoring of tiltmeters, which required monitoring at every 4 hours.

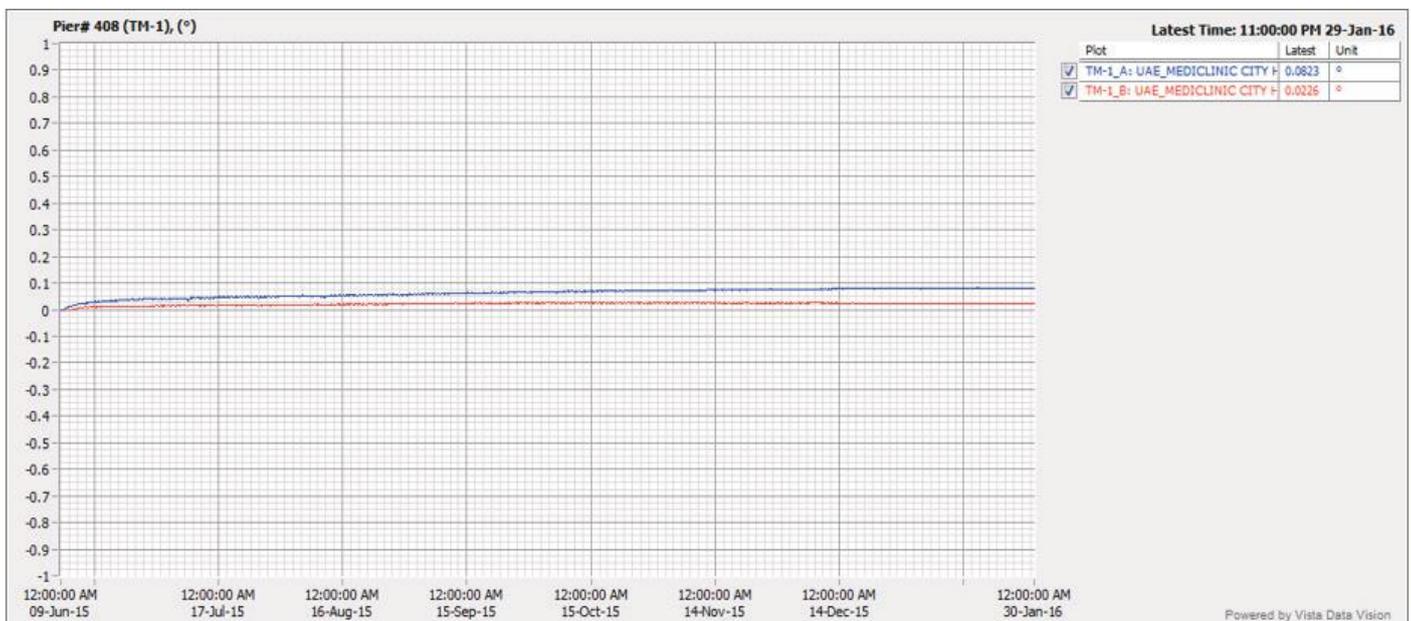
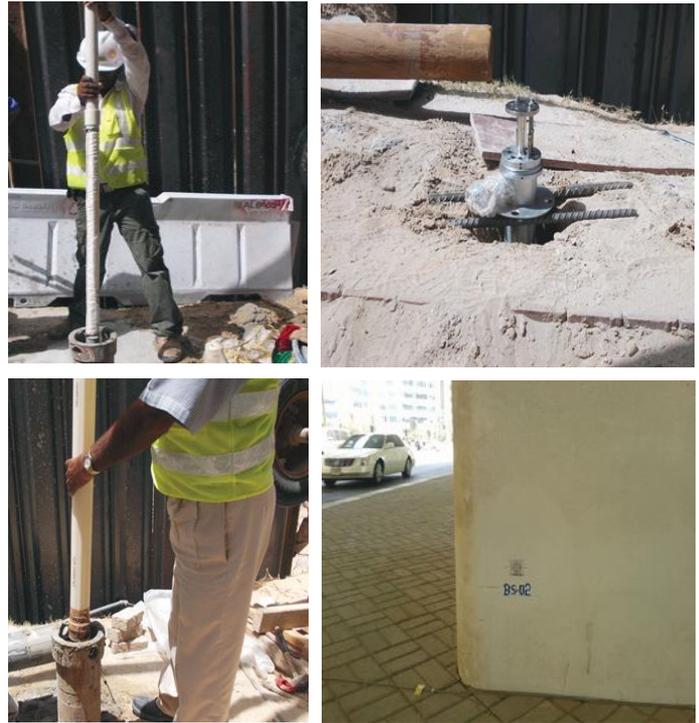
The NDRC works started after the installation of the above instruments and recording their base readings.

CHALLENGE & SOLUTION

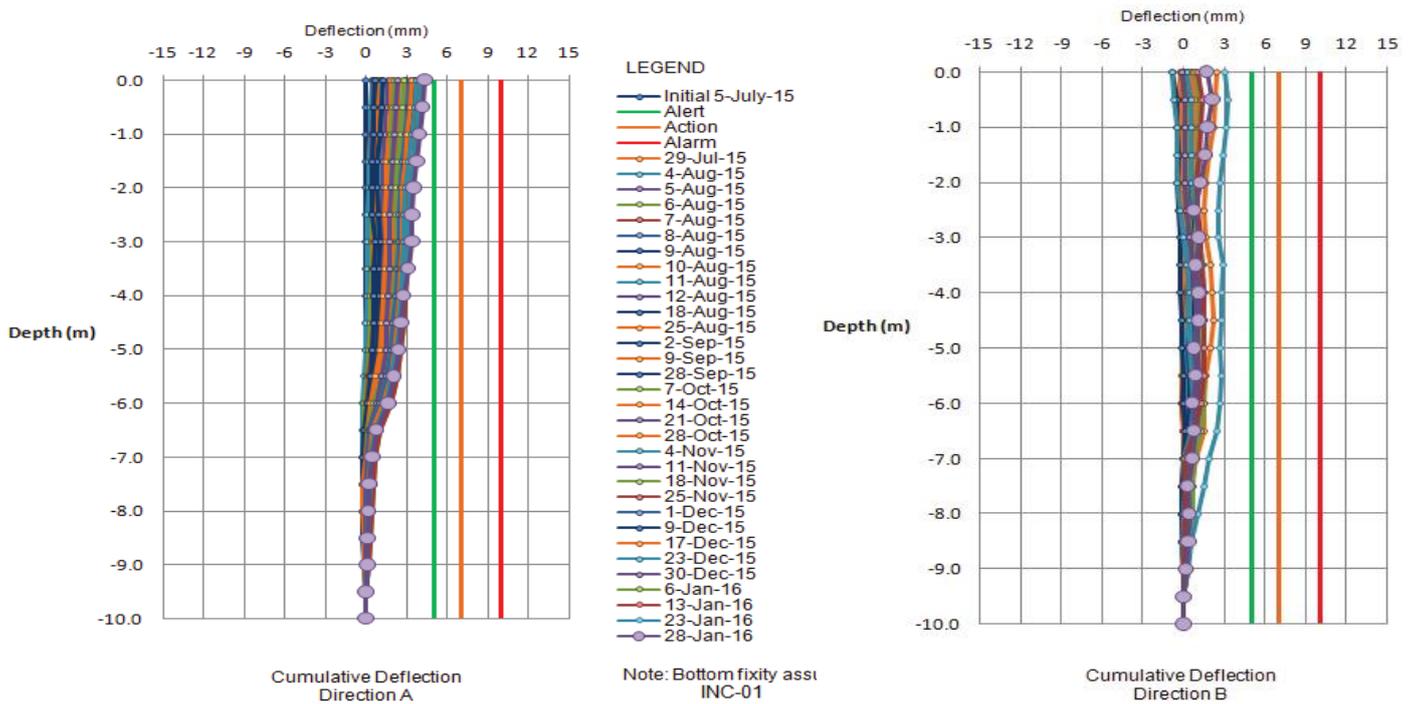
The movement of the metro pier was a major concern. However, any sort of drilling on the existing metro piers was restricted. So other solutions for fixing the instruments were thought of. Also the choice of instruments was made to meet the challenges. Tiltmeter was installed using epoxy, without carrying out any drilling works. Reflective stickers were used to monitor the pier's settlement, in place of conventional building settlement points.

ACHIEVEMENT & RESULTS

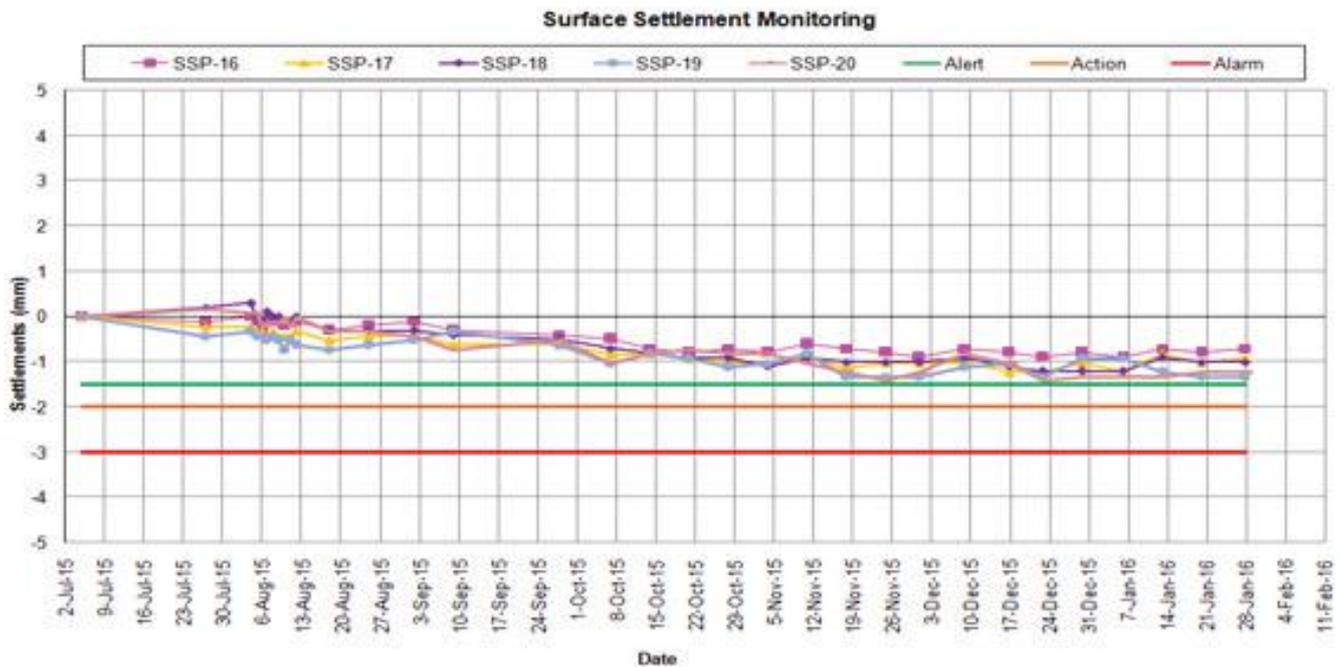
Installation and monitoring of the above-mentioned instruments were executed successfully by experienced and proficient I&M team of Encardio-rite. The real-time data from the tiltmeter installed on the existing metro pier was continuously accessible to the consultant/contractor their desk, during NDRC works. Monitoring reports for the manual data was also provided to the contractor daily. This helped the contractor to perform their construction activities safely, without any delays or failure.



Real time data from Tiltmeter installed in pier. Very small movement observed on metro piers which allowed the smooth operation to the contractor.



Digital Inclinator data, installed in ground near shaft construction for sub-surface lateral movement monitoring.



Surface settlement data installed in soil near shaft construction for surface settlement monitoring.

In the inclinometer data, the "A" axis movement had reached the Alert level. Also the settlement data reached the Alert limit. Due to daily monitoring and reporting, necessary actions were taken in time. The data, thus, did not cross the alert level. All the monitoring results were within the designer's specified limits. This helped in the smooth progress of construction works, without any delays and failures.



TUNNELS



HYDROELECTRIC



CONSTRUCTION



STRUCTURAL



METRO & RAIL



BRIDGES



MINING