

Project Dossier



PROJECT DOSSIER

NDRC Micro-tunneling works for Dewa 132 kV Cable Laying Works

PROJECT OVERVIEW

The project works included Horizontal Directional Drilling (HDD) for installation of electrical cables. The tunneling was to be done underneath the existing Sheikh Zayed Road road and Emirates Tower (Red Line) Metro piers. Project included testing and commissioning of 132 kV cable laying works and associated works for 132/11 kV substation. The horizontal directional drilling technique needed construction of launching and receiving shafts at both ends. The shafts required excavation up to 6 m depth below ground level.

WHY MONITORING?

As the project required the construction/excavation works of shaft just adjacent to Red Line Metro piers and tunneling across Sheikh Zayed Road and metro pier, instrumentation was planned for safety monitoring of structures, as well as for the risk management of construction works.

Project	NDRC Micro-tunneling work for DEWA 132 kV cable laying
Location	Dubai, UAE
Client	Dubai Electricity and water authority
Contractor	Riyadh Cable Group Company
Consultants	Road And Traffic Eng. Services
Duration	March 2019-April 2019

MONITORING SOLUTION

Encardio-rite was instructed by the Road and Transport Authority (RTA-Owner of Metro structure) and Riyadh Cable Group Company to provide instrumentation and monitoring programs during NDRC to assess the impact on adjacent structures including the Dubai Red Line Metro pier and existing road, 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
- Installation of geotechnical instruments including subsurface instruments
- Manual and automatic monitoring
- Precise leveling
- 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

Automatic Vibration sensor	Installed on metro piers to monitor any vibration 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

Borehole extensometer	Installed to monitor subsurface settlement in the ground around metro pier, during tunneling.
Surface settlement points	Installed in the soil to monitor surface settlement along the tunnel alignment as well as near the metro pier

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



CHALLENGE & SOLUTION

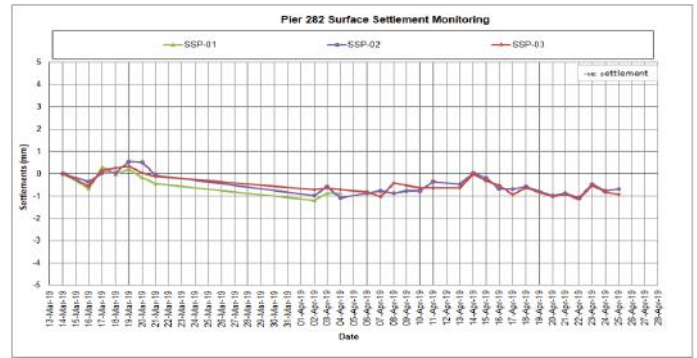
The movement of the metro pier of running metro line was a major concern. For real time continuous vibration monitoring of the metro pier, vibration sensor was installed at the pier. As the data was very critical, battery operated vibration sensor was used with a battery back up of 1 week.

ACHIEVEMENT & RESULTS

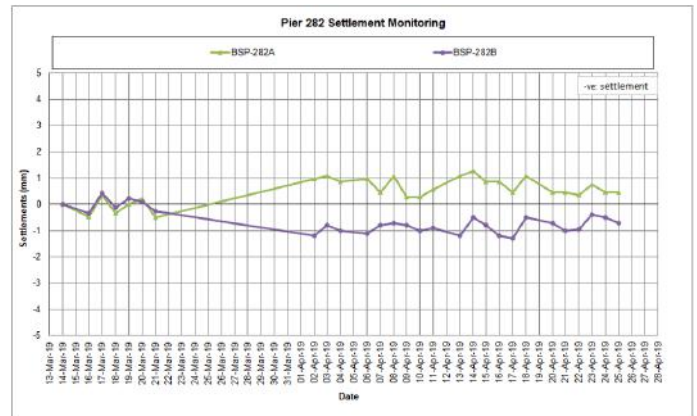
Installation and monitoring of the above-mentioned instruments were executed successfully by experienced and proficient I&M team of Encardio-rite.

The real-time data from the vibration sensor 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.

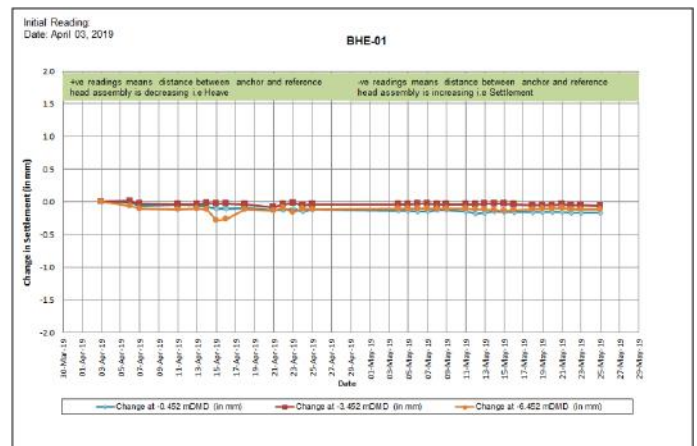
Due to daily monitoring and reporting, necessary actions were taken in time. The data, thus, did not cross the alert levels. All the monitoring results were within the designer's specified limits. This helped in the smooth progress of construction works, without any delays and failures



Monitoring results from surface settlement point



Monitoring results from building settlement point



Monitoring results from multi-point borehole extensometer



TUNNELS



HYDROELECTRIC



CONSTRUCTION



STRUCTURAL



METRO & RAIL



BRIDGES



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