

Project Dossier



PROJECT DOSSIER

NDRC Horizontal Directional Drilling (HDD) works for 132 KV Electrical Cable Installation

PROJECT OVERVIEW

The project work comprised installation of electrical cables underneath existing King Salman Bin Abdulaziz Al Saud Street and tram lines by Horizontal Directional Drilling (HDD) for the establishment of SEYAHIST - MCLB 132 kV Circuit, in accordance with the requirements of the Authorities. The cable installation works were carried out using the directional drilling technique with launching and receiving shafts at both ends. The maximum depth of gradient tunneling was about 6.5 m below ground level. The tunnel was at a depth of 6.5 m below tram line and at depths of 3 m and 2 m below the existing roads.

Project	NDRC Micro-tunneling work for 132KV Electrical Cable Installation
Location	Dubai, UAE
Client	Dubai Electricity & Water Authority
Contractor	Emirates Electrical Engineering L.L.C
Consultants	Arcdis
Duration	February 2020-April 2020

WHY MONITORING?

As the HDD tunnel crossed under existing busy road and tram lines, instrumentation was planned for safety monitoring of infrastructure, as well as for the risk management of construction works, even though the shafts were excavated only up to 2.5 m depths.

MONITORING SOLUTION

Encardio-rite was instructed by the Road and Transport Authority (RTA-Owner of Road and Tram) and Emirates Electrical Engineering L.L.C to provide instrumentation and monitoring solution during NDRC to assess the impact on existing infrastructure.

Turnkey services

- Pre-construction survey of the tram line
- Supply of geotechnical instruments, precise survey instruments
- Installation of geotechnical instruments including subsurface instruments
- Manual and automatic monitoring
- Optical survey and 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 surface/sub-surface monitoring for Road and Tram safety

Automatic Vibration sensor	Installed near tram tracks to monitor any vibration caused by nearby and underneath construction works
Cat-eye Prisms	Installed near tram track to monitor any settlement caused by nearby and underneath construction works
Borehole extensometer	Installed in soil to monitor settlement in the ground along the tram alignment
Surface settlement points	Installed in the soil to monitor surface settlement along the tram alignment

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

CHALLENGE & SOLUTION

The settlement of the tram tracks was difficult to monitor during tram operation time. We proposed cat-eye prism for vertical settlement monitoring, so we can monitor it without going near to the tram. These are special prism suitable for roads and pavements. The orientation of the prism was decided to have a clear line of sight and also to collect data from one stable location out of zone of influence.



Borehole extensometer installed to monitor sub-surface settlement near tram alignment



Cat-eye prism installed to monitor surface settlement along tram alignment



Vibration monitoring near tram alignment

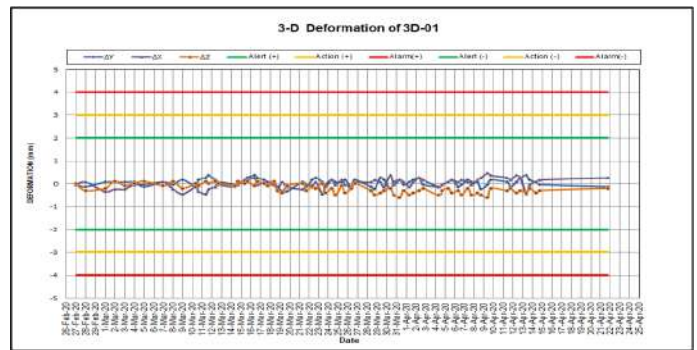
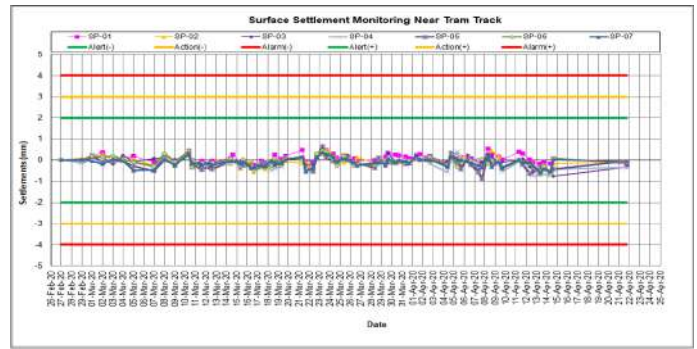
Online continuous vibration monitoring near running tram (tracks) was done with suitable with the vibration sensor was very critical to perform. We used battery operated vibration sensor with the battery back up of 1 week.

ACHIEVEMENT & RESULTS

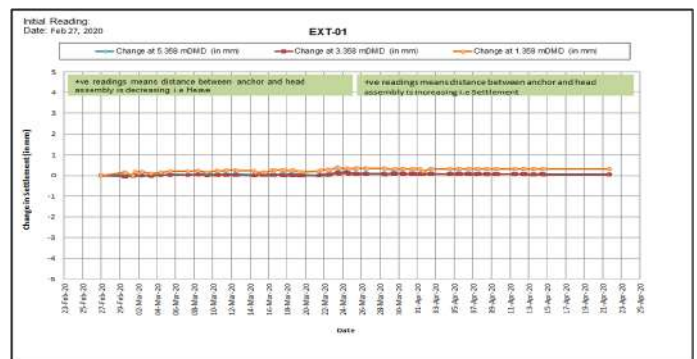
Installation and monitoring of the above-mentioned instruments were executed successfully by experienced and proficient I&M team of Encardio-rite.

The real-time data from the vibration sensor installed near the tram track was continuously accessible to the consultant/contractor at their desk, during NDRC works. Monitoring reports for the manual data was also provided to the contractor daily.

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 the contractor to perform their construction activities safely, without any delays or failure.



Surface settlement data from soil settlement points and from cat-eye prisms



TUNNELS



HYDROELECTRIC



CONSTRUCTION



STRUCTURAL



METRO & RAIL



BRIDGES



MINING