



Guest Editorial

Importance of Instrumentation

Underground space is being explored for various purposes such as development of hydropower, transport tunnels, shopping complexes, recreation, sports utilities, defence installations, nuclear waste disposal, oil storage, parking, water supply and sewage disposal etc. Construction of underground facilities undergoes through enormous difficulties due to varying geological conditions. These problems require specific solutions suiting to the project requirements and natural environment.

Instrumentation plays a vital role in the execution and operational stages of any project. The real time data not only helps in safe execution of any project but the same can lead to savings in time or cost or both. Additionally, the data generated during execution of any project can help in maintenance during its entire life span too. Underground structures require special attention with regard to the stability as the failures prove to be disastrous. Before start of any project, detailed instrumentation plan has to be chalked out. Instrumentation has to be adopted as means to facilitate the construction agencies, designers and the work force. The instrumentation of any underground tunnelling activity needs to be done in a systematic manner. Various activities in instrumentation of underground structures can be categorised as planning, selection of proper instruments, frequency of monitoring, analysis and reporting of data and more importantly providing the feedback to the system to improve upon the designs and to assist the manufacturers to modify or update the technologies.

Precision, designed life, ease of installation, availability of spares etc. should be kept in mind while selection of instruments for any project. The contract document must include supply, installation, monitoring and data analysis. It is the duty of the Engineer-in-charge for proper installation of instruments, safeguard them from construction activities, analyse the data, issue warnings based on the inputs from instrumented data in the event of parametric values exceeding the minimum threshold limits and finally suggest corrective measures. Since, major part of deformation or changes in load/pressures occur immediately after the excavation or advance of heading, the data is required to be monitored without any time delay because '*The data once lost is lost forever*'. Hence, the instruments must be installed timely and at critical locations to get useful data. The delay in installation due to any reason can lead to hazardous situations. Instrument manufacturers may also get benefitted from the lessons learn during the execution of the projects.

Therefore, instrumentation should not be seen as obstacles to the construction process, rather it should form an integral part of the construction process. In underground construction, project cost increases manifold after the collapse. Instrumentation during execution of large civil engineering projects can lead to savings in time, cost and materials through constant reviews.

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