Continuous Monitoring of Construction Noise and Vibration: Challenges of Implementation

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The Los Angeles County Metropolitan Transportation Authority (MTA) is initiating construction of an underground pedestrian tunnel connecting Universal Studios, Los Angeles to the nearby Red Line subway station. A right-of-entry agreement to studio property requires that noise and vibration be monitored on a continuous basis over the estimated 21-month life of the project, which is to occur adjacent to the corporation's world data management center. Notification of noise and vibration threshold exceedance events is expected within 24 hours of their occurrence. The following two objectives were paramount in the development of a monitoring work plan:

1. Compliance with the right-of-entry agreement monitoring specification that defines thresholds of exceedance for noise and vibration events (based upon MTA criteria).
2. Minimization of the overall project costs that are a function of both labor and equipment.

The existing MTA inventory of five permanent-noise-monitoring stations was reviewed for application to this project. Firstly, these stations are remotely accessible via modem, which minimizes data access costs. Secondly, the noise data collected can be tailored such that it is directly comparable to MTA noise criteria using the internal signal processing functions of the monitoring stations, which minimizes post processing and analysis costs. Thirdly, when an exceedance of the appropriate MTA threshold occurs, the units can trigger a notification phone call and/or external devices including auto-dialers that call multiple phone numbers with multiple redial attempts, visible alarm lights, and tape recording devices. Fourthly, several of these permanent monitoring stations can be modified to evaluate vibration events using low-frequency accelerometers of appropriate sensitivity, with additional low-pass filtering and integration of the signal into vibration velocity units for direct comparison to MTA vibration velocity criteria. The state-of-the-art of competing approaches and equipment will be discussed in comparison to the recommended system.