



D11 Understanding and Controlling the Potential Risk of Jobsite Construction Hazards

Daniel M. Honig, PE, Structures Consulting Engineers, Swarthmore, PA 19081*

Learning Overview: After attending this presentation, attendees will understand the significant safety factors required to avoid and/or minimize jobsite construction hazards. The work hazards presented by preexisting subsurface site utilities in direct proximity to the installation of new equipment and related foundation construction will be identified and evaluated. The accurate field measurement and documentation tolerance requirements for the installation of new foundation work relative to existing subsurface conditions requires ongoing careful and redundant engineering and field supervision tolerances and back checks. Forensic engineering requires recognition of these hazards and taking appropriate precautionary measures since this is incumbent to prevention, work safety, and identifying related issues should an incident occur.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by informing attendees of the inherent jobsite hazards and risks when altering and/or upgrading existing electrical substations with new adjacent foundations. Given the limited timeframe needed to complete this type of industrial construction project, ongoing field engineering oversight, documentation, and quality control are critical to the successful and safe completion of this work.

In the summer of 2012 in an eastern Pennsylvania metropolitan area, a pharmaceutical company undertook a fast-track construction program for the replacement of existing switchgear equipment, including alterations to an adjacent electrical substation at one of their manufacturing facilities. For this work, they entered into a design/build fast-track agreement with an energy management company. Due to a large number of existing underground electrical ductbanks and related utilities within the foundation footprint of this project site, the designer/builder elected to proceed with the installation of a micropile foundation system. A general contractor was subsequently engaged in order to complete this overall substation and utility upgrade. The special and complex foundation system for support of this new building project and the civil/structural scope of work needed for completion of this project required the engagement and coordination of multiple subcontractors/subconsultants. This included the engagement of a consulting engineering firm for the field quality control of the new structural foundation system and building superstructure elements. During the exploratory excavation and installation phase of micropile drilling, the drill rig contacted and penetrated a ductbank containing an energized, high-voltage feeder cable. This incident caused a jobsite explosion resulting in the electric shock and serious injury of the drill operator.

This case study provides an engineering analysis of causal factors in this professional negligence case on behalf of the plaintiff (the drill rig operator). The significance of the resultant failure of this case illustrates how crucial diligent engineering analysis is for jobsite construction safety. Specifically, within the forensic community, recognition of these hazards is essential for identifying causal engineering factors for the prevention of construction failures.

Micropile, Drilling, Construction Safety