



Publication Abstract

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Foundation Design And Construction Challenges For The Phoenix Sky Train Project

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The PHX Sky Train is a five mile long automated people mover system located at Phoenix Sky Harbor International Airport. Phase I of the PHX Sky Train includes the design and construction of 227 drilled shafts supporting three stations and approximately 9,000 feet of elevated guideway. The guideway includes a 100 foot high, 330 foot long span extending over an active taxiway, which will be the first system of this kind over an active taxiway in the world. The soil conditions in this area generally consist of alluvial Sand, Gravel and Cobbles (locally known as SGC) deposited by the nearby Salt River. The foundation system will support relatively high axial loads, lateral loads and moments due to the height of the guideway above the ground surface, where it needs to pass over existing concourse walkways, bridges, a taxiway and buildings. Drilled shaft design involves designing 4.5-foot to 9-foot diameter drilled shafts within the SGC deposits, most of which extend well below the groundwater table. There is a high potential for collapse of drilled shaft excavation sidewalls within this material. Such extreme design loading conditions, together with difficult ground conditions at the site, result in several challenges for the design and construction of the deep foundation system for the guideway and stations. A load test shaft was designed and constructed as a means to provide site-specific measurement of axial performance under these difficult conditions. Results from the load test were used to reduce the size of the drilled shafts. This paper provides an overall description of the PHX Sky Train project, a summary of the ground conditions, design requirements, load test results and construction methods and equipment used to successfully install the drilled shafts for this project.