Design and Construction of Drilled Shaft Foundations for the Phoenix Sky Train Project

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Abstract

The PHX Sky Train is an 8 km (5 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 2,750 m (9,000 ft) of elevated guideway. The soil conditions in this area generally consist of alluvial sand, gravel and cobbles (locally known as SCC) 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. The extreme design requirements, together with difficult ground conditions at the site, result in several challenges in the design and construction of the deep foundation system for the guideway and stations. Results from a full-scale 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 used to successfully install the drilled shafts for this project.