Risk Management with Performance-based Geoengineering Monitoring: APM Tunnel Extension at Hartsfield-Jackson International Airport

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ABSTRACT

Atlanta’s International Airport is adding a new $1.2 Billion International Terminal. The Automated People Mover (APM) trains are extended beneath an existing terminal to the new one via twin open-cut tunnels as wide as 67 feet. The excavation was braced by a soldier pile/lagging/tieback system and underpinning piers to depths of about 40 feet. Movement of the adjacent existing tunnel and building was a concern due to unbalanced earth loads and the potential for unexpected behavior.

To manage this risk, a real-time, performance monitoring program was used to provide early warnings of unacceptable or surprise performance to implement protective measures to stop/reduce the consequences. The risk management program included alarms generated from the system via email when measurements exceeded safe values and a plan of action to engage contingency measures. The plan was used to avert potential disaster as well as long delays in the construction schedule.

INTRODUCTION

The existing Automated People Mover (APM) underground train way is being extended to the new Maynard H. Jackson, Jr. International Terminal with a new east entrance to the airport. The project involves the open-cut excavation of 1200 linear-feet of twin tunnels as wide as 67 feet in fill soils of varying composition (see Figure 1). The tunnels were constructed in the area of Delta Air Lines’ active baggage handling, Concourse E and Taxiway D. The tunnels also pass through existing structural walls at Concourse E, which required significant demolition of portions of these walls.

The existing conditions consist primarily of variable consistency fill soils described as medium dense to loose, silty fine to medium sands with N-values ranging from 6 to 30 bpf to depths of 30 to 40 feet underlain by some alluvial soils (clayey sands with organics), Piedmont residual soils (med dense silty sands), partially weathered rock (N>100), and rock (see Figure 2). The site is located in the Piedmont physiographic province and near the headwaters of the Flint River. The