

超深基坑及超大直径挖孔桩施工对临近地铁变形影响分析及对策

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INFLUENCE ANALYSIS AND COUNTERMEASURES FOR EXTRA-DEEP FOUNDATION PIT AND EXTRA-LARGE DIGGING PILES CONSTRUCTION ON ADJACENT METRO

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摘要

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摘要 深圳平安金融中心深基坑围护结构距地铁车站最小仅5.3 m, 基坑开挖深度最深超过30 m, 后续仍有密集的巨型挖孔桩施工, 最大开口直径达9.5 m, 桩底最深至地面以下68 m, 巨型桩能否顺利施工并考虑和控制地铁结构的沉降变形是本工程成败的关键。结合工程实际情况, 运用三维数值分析方法对巨型桩施工前、后各工况进行详细分析, 并据此在桩基施工前采取一系列治理措施, 如高喷与基岩裂隙帷幕灌浆相结合的止水帷幕、加强巨型桩护壁刚度等。监测数据表明, 实测沉降值与计算值较为接近, 巨型桩完成后, 地铁结构沉降仅增加数毫米, 所采用的治理措施对地铁变形控制取得良好的工程效果。

关键词: 基坑工程 地铁侧超深基坑 超大直径挖孔桩 三维数值分析 治理措施 帷幕灌浆

Abstract: In the construction of the extra-deep foundation pit of Shenzhen Ping'an Financial Center, the maximum excavated depth is over 30 m and the minimum distance to metro structures is just 5.3 m. Some of the super-large digging piles will be constructed subsequently with the top opening diameter of 9.5 m. The maximum depth for piles construction is 68 m below the ground surface. Therefore, it is key to consider and control the settlement of metro structures during the pile construction. Based on the actual construction conditions, the three-dimensional numerical simulation method was used for analysis of digging piles construction. Hereby, a series of significant countermeasures were proposed and performed before pile constructions to reduce the excessive settlement, such as high-pressure jet grouting and curtain grouting according to geological conditions. The settlement values monitored increased slightly and matched well with the predicted results after the completion of digging piles, which indicates a better controlling of metro structure deformation contributed by the effective countermeasures.

Keywords: foundation pit extra-deep foundation pit adjacent to metro structure super-large digging piles three-dimensional numerical analysis countermeasures curtain grouting

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