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世博会工程专辑

世博会主题馆抗拔PHC管桩新型连接的计算分析及试验研究

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摘要：

采用先张法预应力混凝土管桩（以下简称PHC管桩）作为抗拔桩，具有工程造价低、施工周期短、质量稳定、抗裂性能佳等诸多优点，但由于PHC管桩通常是作为抗压桩来使用的，结构工程师往往对抗拔管桩接桩的连接可靠性存有疑虑。结合世博会主题馆的桩基础设计，对PHC抗拔管桩的连接计算方法进行了分析和总结，鉴于工程设计中针对标准图集接桩连接采用了外贴钢板焊接方法进行改进处理，为检验改进后接桩连接的受力性能，分别对标准型接桩连接和改进型接桩连接进行了1：1足尺轴心抗拉试验。试验结果表明：改进型接桩节点较标准型接桩节点在受力性能、施工工艺、焊接质量等方面均有明显改善，值得在工程中推广应用。

关键词： PHC管桩 抗拔桩 接桩连接 轴心抗拉试验 受力性能

Design and experimental study on a new connection between PHC uplift pile segments of the Expo Theme Pavilion

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Abstract:

Using PHC pile as uplift pile can reduce project cost, shorten progress schedule, improve construction quality and anti-crack performance of pile. But PHC pile is usually used as compression pile in structural design, due to the doubts that many engineers have about the performance of the connection between upper and lower segment. In design the Expo Theme Pavilion, an improved connection between upper and lower pile segment, using several steel plates welded with alternate pile collar, was proposed. A series of tensile tests were carried out 6 full-scale connections to verify their mechanical property. Test results indicate that the improved connection has better performance than standard connection in aspects of mechanical property, construction process, and actual quality etc. The new connection has the potential to be applied in structural design widely.

Keywords: PHC pile uplift pile pile connection between upper and lower segment axial tensile test mechamical behavior

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