# Protective Measures for Buildings Adjacent to Subway Stations: Postprint

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## Abstract

During metro construction, mitigating construction impacts on the surrounding environment and protecting adjacent buildings and underground utilities have consistently been key priorities in construction control. This paper presents a case study of a station on Shanghai Metro Line 15, addressing the challenges posed by a neighboring hotel building located merely 0.4 m from the foundation pit retaining structure at its closest proximity and exhibiting high settlement sensitivity. A suite of comprehensive protection measures is proposed, including: pre-construction temporary reinforcement using steel inclined raking struts, intensified ground improvement and dewatering control during construction, optimization of the support system with rapid excavation and immediate supporting, and enhanced settlement monitoring throughout the entire process. This technical solution demonstrates strong adaptability to construction space constraints, high-precision deformation control, and timely emergency response capabilities, successfully limiting the settlement of the hotel lobby to within 20 mm and ensuring both foundation pit construction safety and normal building operations. The research outcomes provide valuable technical references for similar foundation pit projects requiring protection of adjacent structures.

## Full Text

## Protective Measures for Buildings Adjacent to Metro Stations

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## Abstract

During metro construction, minimizing the impact on the surrounding environment and protecting adjacent buildings and pipelines has always been a key

focus of construction control. This paper presents a case study of a station on Shanghai Metro Line 15, where the adjacent hotel building was located only 0.4 m from the foundation pit retaining structure and exhibited high settlement sensitivity. To address these challenges, a comprehensive set of protective measures was proposed, including pre-construction temporary reinforcement using inclined steel pipe struts, enhanced ground improvement and dewatering control during construction, optimization of the support system with rapid excavation and immediate support installation, and intensive settlement monitoring throughout the entire process.

This technical solution features strong adaptability to constrained construction spaces, high-precision deformation control, and timely emergency response capabilities. It successfully limited the settlement of the hotel lobby to within 20 mm, ensuring both the safety of foundation pit construction and the normal operation of the building. The research findings provide a valuable technical reference for similar foundation pit projects requiring protection of adjacent buildings.

**Keywords:** building protection; technical measures; construction process

*Note: Figure translations are in progress. See original paper for figures.*