

Effect of Column Studs on Column-Pile Joints in Buildings without Underground Beams

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Abstract

Column-pile joints without underground beams are becoming a de-facto standard for foundation structures of over-track buildings. In the current design guideline, steel column-pile joints are constructed by embedding the steel column at the top of a cast-in-place concrete pile, and the joint is reinforced by an outer steel pipe. If the joint is to retain seismic performance of the joint with a thinner steel pipe, it will need more reinforcement in the form of studs along the sides of the column and reinforcing bars. Loading tests were conducted with specimens to evaluate performance of the column-pile joint. Specimens with thinner steel pipes and without column studs show smaller strength. However, specimens with column studs and reinforcing bars show greater strength than specimens with thicker steel pipes. From the findings of the experiments above, column-pile joints with thinner outer steel pipes and column studs would seem to be most effective.

Keywords: column-pile joint, over-track building, column studs, loading tests

1 Introduction

In Japan's metropolitan centers, larger station buildings are needed to accommodate the many railway users. However, there is rarely enough land available to construct new station buildings since land in these areas is already developed. On the other hand, space above station platforms or railway tracks has rarely been used until recently. As railway companies give top priority to consistency in daily operations, trains are never stopped even when constructing a building over tracks, adding greatly to construction costs.

Underground beams are generally necessary for architectural structures. It is necessary to support tracks with temporary structures when constructing beams under a railway track, thus construction of underground beams is quite expensive. Therefore, in order to utilize over-track

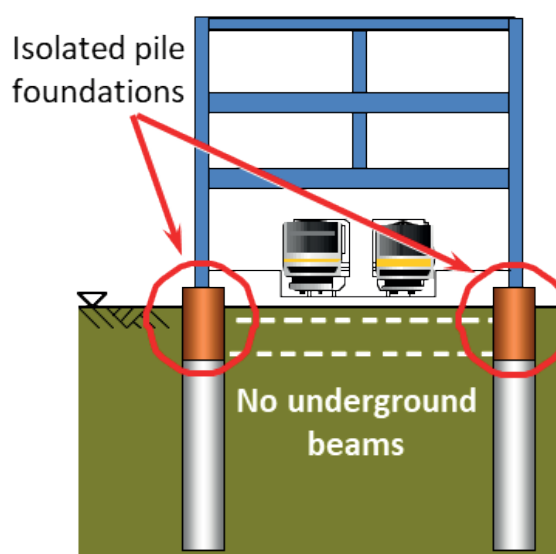


Figure 1. Image of over-track building pile