

## Designing Method and Construction of Sheet Pile Foundation Combining a Footing with Steel Sheet Piles

Masahiro Kondo and Masayuki .Kouda  
JR WEST JAPAN Consultants Company , Railway Technical Resach Institute  
Osaka, Japan, Tokyo, Japan

### ABSTRACT

A new bridge foundation named “Sheet-Pile Foundation” has been proposed and applied for the first time to the existing bridge of railroad. Since this is the initial adaptation, capability confirmation experiment of the foundation was conducted using the horizontal loading test after the construction. In this paper, the experimental results and evaluation of design, construction and loading test are reported.

**KEY WORDS:** foundation, sheet-pile, design-method, footing, horizontal-loading-test, construction, railway-viaduct

### 1. INTRODUCTION

“Sheet-Pile Foundation” is shown in Figure1. In the sheet pile foundation, steel sheet piles are positioned along the four sides of a footing of the spread foundation and combined to it. It is expected that the use of sheet piles can improve the bearing capability of footing sub-ground and increase the resisting force against falling and sliding of foundation. Therefore, if the foundation is expected to have only intermediate bearing capacity which would be considered as having not enough bearing capacity on the ground like sandy soil and diluvial clay soil with N value of 20 or so, it can have the same or more bearing capacity with this type of foundation. Pile foundation has been adapted for the intermediate bearing capacity ground and piles are drilled into the deeper layers through the intermediate bearing grounds without effectively utilizing its bearing capacity. The sheet pile foundation can be the reasonable foundation type for these intermediate bearing capacity ground. At the moment, there are two cases of sheet pile foundation method applied to the railroad structures, which had finished the constructions.

### 2. DESIGN OF SHEET PILE FOUNDATION

#### 2.1 Adaptation Process of Sheet Pile Foundation

##### 2.1.1 Application to Bridge Piers of Railroad Viaduct

Due to changes to double railroad tracks, a new structure had to be constructed in adjacent to existing high grade separation bridge over the single railroad track. For the foundation of this newly constructed cross-linking bridge, the sheet pile foundation was adapted. Figure 2 shows this bridge foundation of pier. For the existing grade separation bridge foundation, the pile foundation was adapted. However, for the newly constructed grade separation bridge, the sheet pile foundation was applied even though a part of ground layers contained soft clay layer. Because, the ground is consisted by gravel layer and hold enough intermediate bearing capacity could be expected.

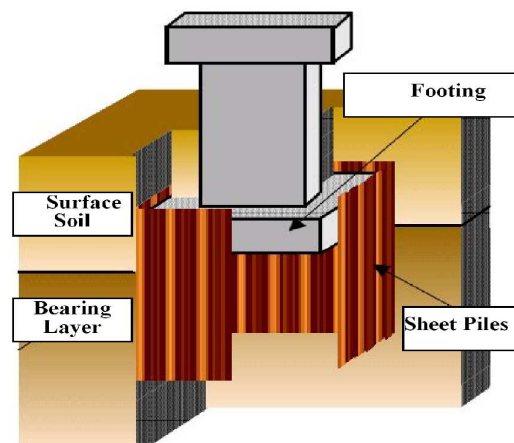


Figure 1. Sheet Pile Foundation