



Effective re-use of existing structures towards the sustainable society at East Japan Railway Company

Junichi Kino

East Japan Railway Company, Tokyo, Japan

Contact: j-kino@jreast.co.jp

Abstract

Since we have laid enough railway network, there are only a few new construction projects of railway structures, and we mainly do improvement projects. In railway improvement projects, we generally dismantle old structures and construct new ones. However, in order to reduce CO₂ emissions as much as possible, it is necessary to re-use existing structures the utmost. East Japan Railway Company has been carrying out many railway improvement projects, and plans to re-use the existing structures as much as possible. We have devised a construction method that re-uses the slabs and beams of the existing reinforced concrete rigid frame viaducts and remake only the columns, and have used this method in several projects. We have been able to reduce a large amount of CO₂ emissions by this method.

Keywords: re-use, existing railway structures, environmental load, improvement project, sustainable society.

1 Introduction

Due to the changes in social conditions such as development of cities, advancement of an aging society and shift to a transportation mode with lower carbon dioxide emissions, the existing railway structures may not be able to meet the needs. We plan many projects that require drastic structural changes such as changing vertical and/or horizontal alignment of an existing line, adding stairs and barrier free facility like slopes, escalators or lifts for the existing viaducts and planning a new road crossing the existing railway structures. In such cases, if we dismantle all the existing structures and construct new structures, the environmental load will be huge because of the need to use lots of materials like steel and cement and vehicles with combustion engine to deliver the materials. In order to establish a sustainable society in future, it is necessary to reduce the

environmental load as much as possible when we implement new projects. In order to reduce the environmental load in such projects, East Japan Railway Company designed many structures that re-use the existing structure as much as possible. In this report, we introduce examples of the railway improvement projects where existing structures were re-used as a part of new structures and they contributed to the reduction of the environmental load.

2 Occasion to re-use a part of the existing structures

In 1995, the Hyogo-ken Nanbu Earthquake caused serious damage to railway structures around Kobe city. Especially in case of the Shinkansen, which uses RC rigid frame viaducts as standard structural type, many RC rigid frame viaducts collapsed due to the shear failure of the columns. (Figure 1)