



Large-scale replacement project of Hanshin Expressway

Yasushi Kono

Hanshin Expressway Company Limited, Osaka, Japan

Contact: yasushi-kono@hanshin-exp.co.jp

Abstract

The Hanshin Expressway was first opened more than 50 years ago in 1962. It has subsequently grown into a network that boasts an operating distance of 259 km and daily traffic of approximately 700,000 units. However, damage has manifested in the expressway because of aging of core structures. To avoid future catastrophic failures due to these damages and road closures associated with them, overall structural replacements (large-scale replacements) are planned. These replacements are planned for 6 segments of the expressway that are not expected to be improved in the future through repair and maintenance.

Keywords: Large-scale replacement; Replacement of the entire bridge; Replacement of the bridge superstructure.

1 Introduction

Fifty years have passed since the Hanshin Expressway first opened in 1964 and subsequently became an aorta supporting the life and economy of the Kansai Metropolitan Area. The initial operating distance of 2.3 km has now reached 259 km across the Kansai Metropolitan Area. It includes a network that boasts daily traffic of approximately 740,000 units.

The Hanshin Expressway is an extremely important social infrastructure that supports the economic, trade, and industrial activities of the Kansai Region. It involves 50% of the automobile and cargo volumes of the Hanshin Metropolitan Area. In terms of the equipment status, approximately 80% of the total extension is occupied by bridge structures; therefore, a high proportion is taken up by structural elements. Among the structures, approximately 30% were constructed more than 40 years ago and 50% were constructed more than 30 years ago. Thus, the structures are rapidly aging.

Furthermore, the Hanshin Expressway experiences heavy usage given that approximately 700,000 vehicles use the expressway each day. The average cross-sectional traffic volume of large vehicles is 6 times higher than that on the general roads within Osaka Prefecture. This has resulted in the manifestation of cracks in concrete structures, corrosion of steel structures, and damages such as fatigue-cracking that are associated with aging.



*Figure 1. Hanshin expressway
(in the Osaka district)*