



Development of High Penetration Agent and its Application to Concrete Bridge Deck Waterproofing, Repair and Reinforcement

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Abstract

This paper presents the newly developed high penetration agent for use in waterproofing, repair and reinforcement of deteriorated concrete bridge decks, which are mainly caused by fatigue cracking and penetration of water into the crack. Comparing to the ordinary permeable agent, the high permeability agent has a relatively low viscosity at low atmospheric temperature, hence, it can fully penetrate into small cracks even in cold season. Moreover, the flexural stiffness of deteriorated concrete bridge deck could be increased at approximately 25%, indicating that the high penetration agent can be applied not only for waterproofing but also for repair and reinforcement work. Recently, the high permeability agent has been widely adopted together with the asphalt waterproofing membrane (two-coat waterproofing system) in the actual maintenance work of concrete bridge deck in the Metropolitan Expressway and other highway bridges in Japan.

Keywords: concrete bridge deck; crack; two-coat waterproofing system; high penetration agent.

1 Introduction

Reinforced concrete bridge deck is deteriorated as a result of concrete distress by various factors such as the fatigue cracking due to repeated traffic loads and the penetration of water into the

top surface of bridge deck. This excessive fatigue cracking causes the deterioration of concrete structures and the corrosion of reinforcement can be induced by the penetration of water. However, the repair work of deteriorated concrete bridge deck is complicated depending on the level of