

Systematic Management for Concrete Bridge Deck to Improve the Durability of Bridge Deck

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The bridge deck is directly exposed to vehicle loads and environmental conditions during the service life. It results in more frequent defects and damages of the deck than other bridge members. Korean expressways, which marks the 50th anniversary of its opening, the main cause of bridge reconstruction was faulty of bridge decks, and the annual repair and retrofit costs for bridge deck amount to about 50 % of the total repair and retrofit costs. Therefore, the systematic management of bridge deck has been required to reasonably calculate the budget on deck repair and to ensure enhancement of the durable life of bridge deck. In this study, the main cause of deterioration of bridge deck was identified. A selection method for the investigation targets, an evaluation technique of repair quantitative by GPR, and optimal repair measures were suggested by the damage level of the bridge deck. First, the main cause of deterioration was the penetration of rainwater and de-icing chemicals through the damaged parts of the overlay. It stays at the interface of overlay and deck, then deck concrete deteriorated by freeze-thaw action. Therefore, the target bridges were selected through regular image surveys on the deck surface with consideration of spraying amount of de-icing chemicals. The damaged ratio and condition rate of bridge deck was determined by ground penetrating radar survey. Cementitious overlay method was applied when the ratio was over than 10%, otherwise asphalt concrete repair method was taken.