

Technology Development Award

Development of Technology for Repair and Strengthening of the Top Surface of Damaged Deck Slabs (PCM Pavement)

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Reason for the Award

The phenomenon in which the top surface of concrete deck slabs of road bridges has degraded into sand and gravel has been reported in cold climates, etc. Also, the phenomenon of corrosion of reinforcement by rainwater or deicing agent and the phenomenon of exposed reinforcement being cut by pavement cutting machines due to the pavement cutting machine removing the top surface of deck slabs have been reported. There are examples of repair and strengthening of the top surfaces of damaged deck slabs using SFRC, but delamination from the deck slab has been reported. Therefore work to renew expressways between cities, etc., with new deck slabs is in progress, abandoning the attempt to extend their useful life. However, removing a deck slab and constructing a new one requires traffic restrictions over a long period of time, and is expensive. Also, the construction work requires a construction yard nearby. As a result, bridges of local governments where securing budget is difficult, and elevated bridges in cities where it is difficult to impose traffic restrictions for a long period of time or to secure a construction yard cannot be renovated. Therefore it is desirable that technology be established for repair and strengthening of the top surface of deck slabs that involves integration of the slab without removal of the pavement. The technology that has been developed involves a new material (PCM) for increasing the thickness with improved adhesion and ability to follow the live load bending of the deck slab by providing an elastic modulus equal to or less than that of the existing deck slab. New technology that applies a dry mix shotcrete process is used enabling the material to be mixed on-site without the use of mobile plant, and material is laid flat and smooth with a newly developed paving machine. Using these developed technologies, damaged deck slabs can be renovated without requiring long-term traffic restrictions or high construction costs. The contribution to society is extremely large, so this work deserves the Technology Development Award.