

10. Study on the Crack Control Measures Using Expansive Concrete - Application to High Bridge Piers and Tunnel Linings -

Kunikazu Azuma, Takashi Misawa, Hiroaki Shiraishi

If shrinkage is prevented by previously placed concrete while concrete is hardening, cracks occur. In order to control such cracks due to the restraint of shrinkage, expansive concrete was applied in the lower part of high bridge piers constructed by the hybrid hollow high pier method and as lining concrete in mountain tunnel sections where inverts were installed. The degree of expansion strain in a structure varies according to the magnitude of restraint. In reinforced concrete structures, restraint by reinforcing bars should be taken into consideration. In this study, reinforced concrete specimens with a varying reinforcement ratio were developed in the first place. The measurements for the specimens were compared with the results of analysis in which expansion strain was applied to examine the applicability of analysis parameters. Preliminary analysis revealed that strain could be controlled by applying expansive concrete in one lift in the lower part of the bridge pier and to a height of 3 m in tunnel lining. Based on the measurements obtained at the time of application at the site, it was verified that the compressive stress applied was effective for controlling cracking. It was found that the effectiveness could be predicted through analysis.

Key words : mass concrete, thermal stress, expansive materials, expansion strain, reinforced concrete