Estimation of Subgrade Settlement Using Cumulative Damage Theory in High-Speed Sections of the Shinkansen

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To ensure operational safety and maintainability of railway systems, subgrades supporting slab tracks are required to effectively mitigate settlement. Furthermore, a reliable model for estimating subgrade settlement is essential to enable higher train speeds. In this study, a calculation model for cumulative settlement was developed based on the cumulative damage theory. A full-scale loading test taking into account the effect of train speed was conducted, and the predicted cumulative settlement was compared with the observed results to validate the proposed approach.