

Estimation Method of Time Dependent Fatigue Strength of Railway Structure Using Railway Information Big Data

Munemasa TOKUNAGA Masamichi SOGABE Kenji NARITA Daisuke TSUKISHIMA

In this paper, we have developed a method to evaluate time dependent fatigue strength of structures based on train operation simulation using the railway operation information big data such as standard time table, run curve, actual riding ratio and running vehicle type. As a result of application of the method to an actual Shinkansen line, a double-track loading probability where trains on both tracks mostly intersect is 5% in the vicinity of the station and 0.2% to 1% in the middle section. In addition, the probability where trains on both tracks simultaneously intersect is 0.5% and 0.02 to 0.1%, respectively. At the position where the occurrence probability of the double-track loading is high, the probability is about 0.5% of the whole train passage at maximum; however, the proportion of double-track loading to the equivalent repetition number of fatigue strength is about 20%. The proposed method can simulate the time dependent fatigue strength of the PC steel of the target bridge based on the assumption that the current operation conditions will continue in the future.