

Quantitative Evaluation of Track Characteristics and Optimization of Resource Allocation for Maintenance

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Sustainable management of railway tracks requires an effective investment plan for allocating limited resources to ensure future infrastructure availability. In order to achieve this, it is necessary to quantify the track characteristics, establish the target maintenance level for track irregularity based on these characteristics, and develop an economical track maintenance plan. By applying principal component analysis, we develop a method that quantitatively evaluates the track characteristics based on various influencing factors, which are verified using data on a railway operator. We develop a “track maintenance condition simulation tool” to determine target maintenance levels and optimize the allocation of investment resources based on the track characteristics and the predicted track irregularity values. Using this tool, we evaluate the relationship between the target maintenance levels and investment resources through a scenario analysis.