

A Predictive Method of Wear Profile of Rail Head

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When railway vehicles run in sharp curves, the large contact stress and the large slip between wheel and rail cause severe wear of rail gauge face and wheel flange. They are major factors of increasing railway maintenance cost. In this study, the laboratory wear simulation considering the applied load and contact geometry in actual Japan railway system was carried out by using a large twin-disc test machine, and the test results clarified the influence of lateral force, attack angle, material hardness and lubrication on the rail wear. Based on those experimental results under various conditions, a database of wear coefficient on the rails was established with elasto-plastic FEM stress analysis. Furthermore, a predictive method of rail wear profile as functions of contact stress, slip ratio at contact patch and material hardness was established to estimate the wear amount and worn profile in the wear process. Similarity between predictive value and actual measurement suggests that the method can be developed to predict wear progress and wear profiles for the actual railway system.