Development of Analysis Method on Rail/Wheel Rolling Contact by Large-Scale Parallel Computing

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Abstract

Running the railway vehicle, the deterioration on the rail or wheel, such as wear or crack can be caused, by the slip along with vibration and impact on the contact patch between rail and wheel. High frequency load response of the order of kHz is considered one of the causes on these phenomena. Therefore, it is necessary that the mechanical behaviors occur on the contact patch estimate with accuracy.

In this study, the method of three-dimensional finite element analysis by large-scale parallel computation was upgraded the functions to conduct the analysis of rolling contact between rail and wheel. The analysis on the large-scale fine model is needed high-speed computer. Accordingly, the execution environment has been built to calculate by the Earth Simulator. Currently, static contact analysis using the large-scale model is conducted to estimate the analysis code.

Keywords: large-scale simulation, finite element analysis, rolling contact, dynamic response, railway