

Method for Decreasing Stress and Noise by Modifying Shape of Wheel Plate

Makoto AKAMA Minoru SASAKURA Kazuhiro FURUNO

Finite element method and boundary element method were applied to develop the low-stress and low-noise lightweight wheel. A design methodology was developed and applied, leading to the development of new plate shapes of wheel whose stresses generated were lower than those of conventional corrugated wheels. Candidate plate shapes were selected based on the analyses. Next, transient dynamic analyses were carried out for the wheels. At the same time, to verify the analytical results, these wheels were manufactured and experiments were implemented. Finally, sound analyses were performed and the results were compared with those obtained by field measurements. From this study, a new plate shape of lightweight railway wheel was obtained that reduces the radiated noise as well as the maximum stresses generated in the plate region.