

Dynamic Measurement Method for Wheel-Rail Contact Position Using Ultrasonic Waves

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Information on the contact positions between train wheels and rails when travelling through curves is essential for evaluating new wheel and rail profiles, investigating wear and damage, and analyzing the sources and mechanisms of wheel–rail noise. The objective of this study is to dynamically measure wheel–rail contact positions using surface waves. Measurement tests were conducted using a full-scale test machine, a test track, and a train. The reflection position of the surface waves corresponded to the edge of the wheel–rail contact area. This result indicates the usefulness of surface waves as a method for measuring wheel–rail contact positions. Additionally, the study showed that the characteristic differences in contact positions between the leading and trailing axles of a bogie, as well as the two-point contact near the gauge corner of a high rail, can be evaluated using real measurements.