Estimation Method of Melting Volume of Current Collecting Materials at Contact Loss Point by using ϕ - θ Theory

Chikara YAMASHITA Koki NEMOTO Takuya OHARA

In order to control electric wear of current collecting materials such as contact wire and contact strip in electric railways, it is necessary to understand the relationship between current and melting volume at a contact loss point. In this paper, we propose a method for estimating melting volume of contact wire whose film resistance is taken into account, based on the ϕ - θ theory. To verify the proposed method, we carried out wear tests under two current conditions to measure melting depth, melting radius, and melting volume. The wear test results showed that experimental values of melting volume of the contact wire were in the range where contact boundary factor α was estimated from 0.90 to 0.94.