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Arc Temperature Distribution with Metal Vapor Affected by Initial Breaking Arc Generation after Melting Bridge Using Three-Dimensional Electromagnetic Thermal Fluid Simulation HONOKA MORISHITA, SHOTA KOKUBO, ZHENWEI REN, YUSUKE NEMOTO, YOSHIFUMI MAEDA, Tokyo City University, TAKAMASA HAYASAKA, Railway Technical Research Institute, TORU IWAO, Tokyo City University, RAILWAY TECHNICAL RESEARCH INSTITUTE COLLABORATION — Electric railway is supplied from a contact wire through a contact strip. When the contact wire and contact strip contact poorly, the arc generates and sometimes the contact wire is damaged and disconnected. For example, when the speed of the electric railway is reduced and the arc generates, the residence time of the arc may increase. Then, the disconnection may occur. The arc starts with the initial breaking arc after melting bridge between the contact wire and contact strip. In this time, the temperature distribution of arc and contact wire are important to avoid the contact wire disconnection. However, the arc generation is very fast phenomenon, and the measurement of contact wire temperature is very difficult. In addition, few reports have researched the temperature distribution of arc and contact wire from the evaporation and droplet from melting bridge. Thus, the temperature distribution of arc and contact wire with metal vapor generated by initial breaking arc after melting bridge is simulated by three-dimensional electromagnetic thermal fluid simulation. As a result, the temperature distribution is calculated, and it depends on the contacting arc time and the amount of the metal vapor from melting bridge.

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