

Evaluation of Material Properties of Pantograph Strip by Microscopic Structure Model

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Most types of sliding material in railway usage are composite material, and its material properties are largely affected by mesoscopic structure. To clarify the relationship between mesoscopic structure and material properties by simulation is useful for effective improvement of material properties. In this study, we make an image-based mesoscopic model by X-ray computed tomography for one of pantograph contact strip material and evaluate equivalent elastic modulus, thermal conductivity and electrical resistivity by homogenization method. The calculated material properties are more consistent with the experimentally measured values than the estimation by the rule of mixture based on the Voigt model. The stress, temperature and current density distribution in the mesoscopic model are also calculated.