

Influence of Cross-sectional Shape and Structure on Antifatigue Property of Contact Wire

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Bending stress which occurs in contact wire with every pantograph passage may cause fatigue of contact wire. The authors inspected whether any peculiar stress distribution occurs in contact wire which has special cross-sectional shape or composite structure and whether it causes deterioration of antifatigue property. The authors conducted stress analysis by finite element method (FEM) of hard drawn copper contact wire (called GT-P) and copper clad steel contact wire (called CSD-P), both of which have built-in insulated wire for wear limit alarm. The results of analysis indicated that any peculiar stress distribution does not occur with respect to GT-P contact wire, while high value stress occurs in steel core with respect to CSD-P contact wire. So the authors conducted accelerative fatigue test of CSD-P contact wire to prepare a sample for fatigue crack observation. Results of observation of the sample are as follows; (1) no fatigue crack originated from the steel core, (2) fatigue crack propagated in the copper layer did not penetrate into the steel core straight. From these results, the steel core does not seem to deteriorate antifatigue property of CSD-P contact wire.