

### **Proposition of Digital Communication Applying for Traction Substation Control Line**

Takeshi KONISHI    Gaku MORITA    Shintaro HIRAKAWA  
Keiichi TAKEUCHI    Daisuke YAMAGUCHI    Koki IWAMOTO

Control signals or measurement data are transmitted between the control board and the substation equipment via a lot of metallic lines. There is a possibility of simplification and cost reduction of the transmission by applying digital communication systems to a wireless or an IP/Ethernet network. The introduction of digital communication to substations requires high reliability, low transmission delay, and robustness to electromagnetic field. Firstly, we clarify the required reliability and transmission speed of the signals and measurement data of railway substations. Secondly, we evaluate the EMC level for the digital communication systems in the railway substations under the condition in which circuit breakers open or close. Thirdly, we apply the digital communication systems to the control line between the temporally control board and circuit breaker, and evaluate the transmission speed of the systems. The results show that the reliability and the transmission requirement can be satisfied by the IP/Ethernet and power line communication.