Effect of High-Speed Shinkansen Train Draft in Tunnel on Current Collection Characteristics

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It is well-known that the wind speed to affect the pantograph is stronger in the tunnel than in the open air on the Shinkansen line. Therefore, we measured wind speed, wind direction, dynamic behavior of the overhead contacts line and metal fittings when the Shinkansen train ran through the tunnel at high-speed. This paper discussed the influence of the air flow in the tunnel caused by high-speed train on current collection characteristics and the overhead contacts lines. Further, the aerodynamic upward force of the pantograph was estimated on the basis of measured results. Finally, using the motion simulation of pantograph and overhead contacts line, their dynamic characteristics at high-speed were evaluated.