Corrosion Prevention of Galvanized Steel

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1. Introduction

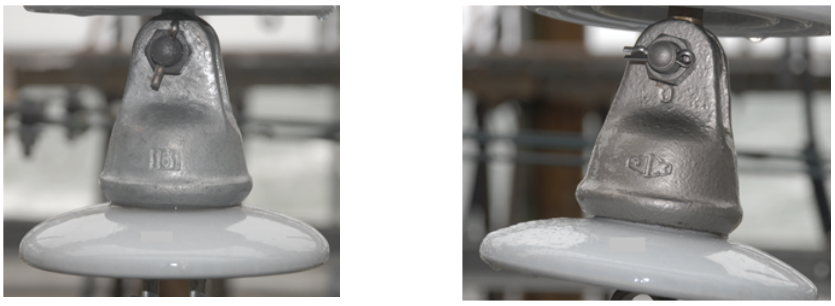
Since the contact line members are structural members, they are galvanized to resist corrosion. The metal fittings of the porcelain insulators are also galvanized because this is an effective and low-cost measure for enhancing the corrosion resistance of steel. However, if the corrosion of metal fittings progresses despite the galvanization and the corrosion product (rust) adheres to the porcelain parts, the insulation properties of the insulators are likely to deteriorate. The strength of the metal fittings might also degrade due to corrosion, consequently leading to an accident of the equipment. Therefore, it is critical to enhance the corrosion resistance in the metal fittings of porcelain insulators.

2. Description

We developed a corrosion resistance improvement measure by coating the galvanized steel of the metal fittings of the insulators with paint having the proper electrical conductivity, This corrosion protection method is expected to maintain its rust-proofing function longer than conventional products. Generally, many of conventional protective coatings are electrically insulating, and once a conductive path is formed on such coatings, leakage currents flow freely into the path and cause significant burnout. However, if this method proposed here is applied to the metal fittings of insulators, the coating films have dispersed conductive paths and burnout is less likely if any conductive corrosion product should become attached to the coating film. Thus, with this method, the insulator performance retention period is expected to be longer.

3. Conclusion

We performed a field test by applying a 1.5kV direct current voltage at our anti-salt testing station and verified the effects by measuring the leakage currents. Fig. 1 presents photographs of a “Treated fitting” (coated with the above paint) and Conventional fitting (uncoated) taken 7 months after the start of exposure. Fig. 2 shows the measurement results of leakage currents of the fittings. The photos show no difference in appearance between the two fittings. However, the leakage current record chart indicates that the peak value of the Treated fitting was less than a quarter of that of the Conventional fitting, and the mean value was almost a half. This suggests that the Treated fitting effectively suppressed the leakage current. Though the effect of this protective coating at the no-power applied points has not been confirmed, judging from the leakage current measurement results, it is considered that the outflow of the coating material, not of the galvanizing material, was dominant 7 months after the start of exposure and therefore the effect of the protective coating lasted for this 7 month period. We will continue the leakage current measurements to verify the long-term effect of the coating.



Conventional fitting　　Treated fitting

Fig. 1 Appearances of Conventional and Treated fitting

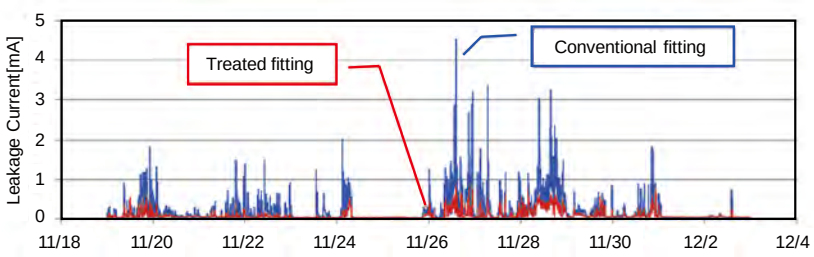


Fig. 2 Measurement Results of Leakage Currents