Advantage and performance of RTV silicone rubber under-coating ceramic insulator

B2   OVERHEAD LINES

PS2 / Q2.3

Introduce briefly the under-coating location, reason, advantage. Based on the field experience. Which type of insulators are the future based on cost-benefit analysation in different environment?
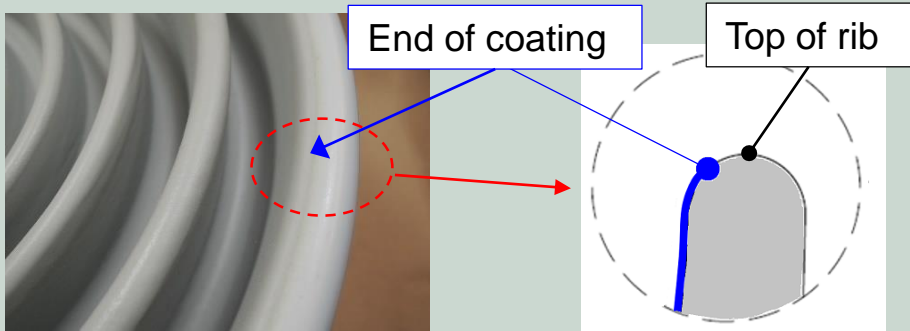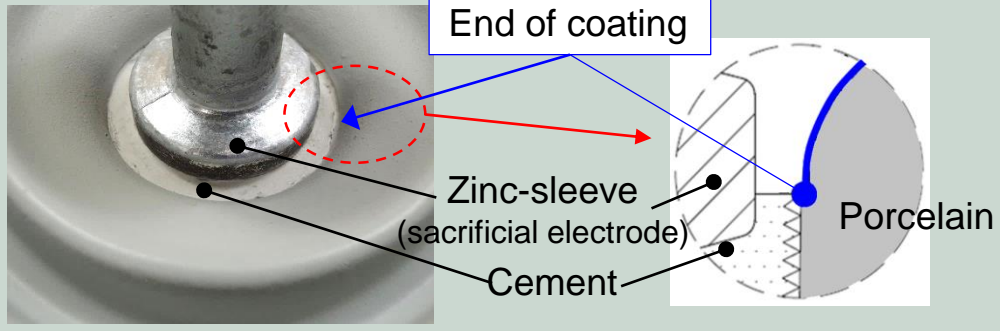
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NGK INSULATORS

Application of RTV coating ceramic insulator in Japan

- Installation of RTV coating ceramic insulator has been increasing for the purpose of preventing from flashover or corona discharge under polluted and wetted condition.
- Pre-coating at the factory is much more common than on-site coating due to customer preference for high quality.
- Recently, under-coating are mainly used for easy packing and handling.

Our contributions are;

- Typical specification of RTV under-coating insulators in Japan, and coating location, reason, and advantage of under-coating.
- Withstand voltage performance and corona prevention performance of under-coating.

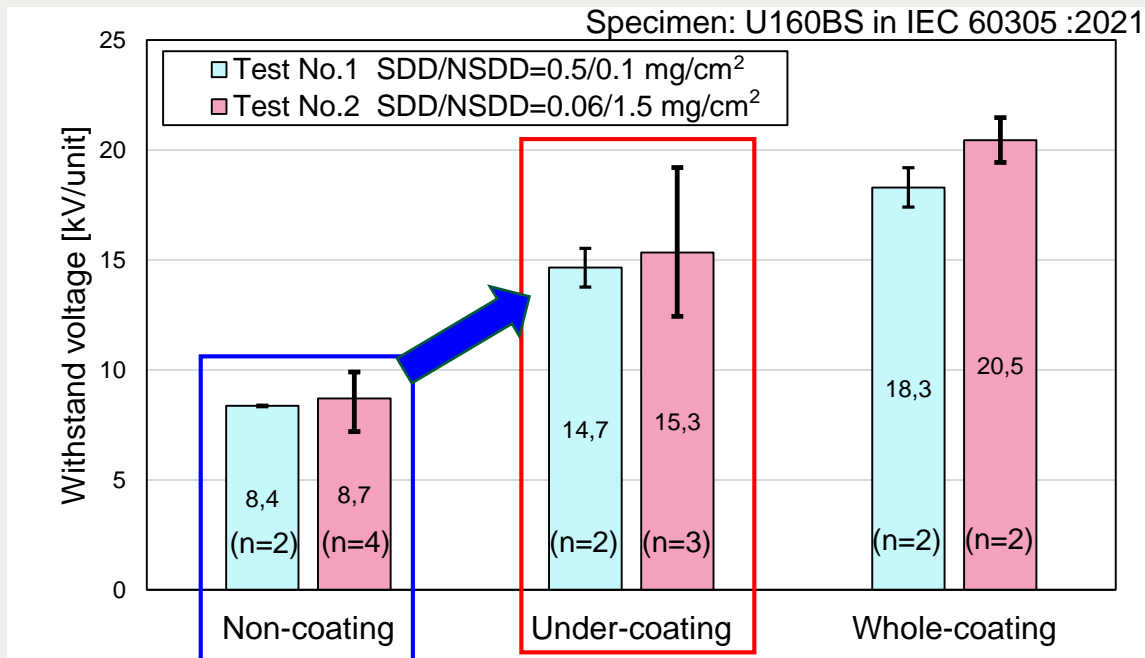# Typical specification of RTV under-coating insulators in Japan

	Outer side of coating	Inner side of coating
Coating location	Slightly inside the top of the outermost rib	Boundary between cement and porcelain
Reason	To avoid contact with packing material	There are concerns about effect to the performance and functions of disc insulators due to coating on cement and/or zinc-sleeve pin.
Advantage	-Prevent from coating damage during packaging and transportation. -Easy packing (cost)	No concern about negative effect to the performance and functions of disc insulators because of no coating on cement and/or zinc-sleeve pin.

- In over 20 years of field experience with these coating specifications, no major problem due to packaging or shipping have been reported and they still have been used without any problem.
- Pre-coating would be the best solution for under-coating application to achieve high quality coating because it is easy to control the coating process (e.g. keeping clean surface, masking for uncoated area, automatic coating, drying).

Performance of RTV under-coating insulators

1) Withstand voltage performance is improved by approx. 75% compared to non-coating which corresponds to the leakage distance of coating area.
2) Corona prevention performance has been confirmed by visual inspection of discharge activity on actual 500kV transmission line located about 480m from the sea coast.

1) Artificial pollution test results of laboratory test

Specimen: U160BS in IEC 60305 :2021

Legend:
- Test No.1 SDD/NSDD=0.5/0.1 mg/cm^2
- Test No.2 SDD/NSDD=0.06/1.5 mg/cm^2

Y-axis: Withstand voltage [kV/unit]

Non-coating: 8,4 (n=2), 8,7 (n=4)
Under-coating: 14,7 (n=2), 15,3 (n=3)
Whole-coating: 18,3 (n=2), 20,5 (n=2)

2) Visual inspection results of discharge activity on 500kV transmission line

(Average temperature; 28.3℃, Average humidity; 88%)

44 discs x 2

(a) String of non-coating insulators

44 discs x 2

(b) String of RTV under-coating insulators

Group Discussion Meeting