

# Current Status of RANS- $\mu$ , a Neutron Salt-Meter for Non-Destructive Inspection of Concrete Bridge at On-Site Use

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As it has been reported that bridges collapsed and many serious damages occurred due to chloride attack of concrete structure all over the world, strong demands have been addressed to urgent requirement of a non-destructive on-site measuring techniques which can measure the chloride ion concentration in concrete structures distributed from the surface to steel bar. To meet them, we have developed of a ortable type neutron salt-meter, RANS- $\mu$ , combining with Cf-252 as neutron source and the method of prompt gamma neutron activation analysis (PGNAA).

In the development, feasibility of RANS- $\mu$  has been examined at outdoor test fields and at concrete bridges in real use as national highway from effectiveness of non-destructive way point of view. The results by RANS- $\mu$  were compared with data obtained by conventional methods like a concrete core sampling, showing are quite reasonable agreements between them. Eventually, performance of RANS- $\mu$  was demonstrated that “the lower detection limit is below 1.0kg/m<sup>3</sup> of the chloride ion concentration to know the marginal concentration of 1.2kg/m<sup>3</sup> at which steel corrosion starts”, “it can measure the chloride ion concentration in 3 depth every 3cm from concrete surface”, “it can measure in 15 minutes to 1 hour in total measuring time”, “it has around 50kg of total weight”, and “it can be installed on the bucket of inspection vehicle”.

A company names “Rans View” was established in April 2023 to dedicate RANS- $\mu$  to diagnose distribution of salt ion concentration in concrete bridges. Upto January 2025, the 66 bridges and their many parts such as piers and main girders have been measured from Hokkaido in the north to Okinawa in the south in Japan. The development of the system will be proceeded to show the chloride ion concentration near steel bars after measurement immediately.

We report current status of RANS- $\mu$ , highlighting specific detector system developments in terms of sensitivity and compactness.

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Applications

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