

# **Power plant PAUT Reliability analysis using multi-POD based on simulation modeling**

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In recent years, it is essential to ensure the reliability of structures through non-destructive evaluating (NDE) to operate the power generation equipment, structures and facilities stably. Among the various methods for ensuring reliability in the NDE system, perform the Round Robin Test(RRT) and calculate a probability of detection(POD). In general, the probability of detection curve is limited to a function of the length of the defect. However, if the length of the defect is not the decisive main factor, or if multiple factors affect the POD calculation, the POD expressed as a function of the length of the defect is not a reliable estimate. In this study, various factors were analyzed in terms of NDE and FMA(Fracture Mechanics Analysis) based on simulation modeling, and a reliability analysis method for various factors was proposed through Multi-POD calculation in which two or more major factors were considered. For reliability analysis, phased array ultrasonic testing(PAUT) was performed using MA-POD(Model-Assisted POD) simulation for butt welds, data on various factors were collected, and the reliability analysis results of Multi-POD calculated using these data were presented. The study was supported by the Korea Institute of Energy Technology Evaluation(No.20217410100100) and Planning(KETEP) and the National Research Foundation of Korea(No.2021M2E6A1084980).