

# **Development of an Phased Array Ultrasonic Testing Technique for Baffle Former Bolts**

**Taehun Lee<sup>1</sup>, Dongryul Kwak<sup>2</sup>, Jeongseok Lee<sup>3</sup>, Seungjin Oh<sup>4</sup>**

<sup>1</sup>NDE Engineering Group, Central Research Institute, Republic of Korea, <sup>1</sup>NDE Engineering Group, Korea Hydro & Nuclear Power Co., Republic of Korea, <sup>1</sup>NDE Engineering Group, Korea Hydro & Nuclear Power Co., Republic of Korea, <sup>1</sup>Material Engineering Group, NDE Engineering Group, Republic of Korea

Baffle-former assemblies are surrounding structures of the core region and consist of the vertical baffle plate and horizontal former plates. The baffle former bolts fasten the baffle plates to the former plate. The conventional volumetric inspection of the baffle former bolts to determine bolt integrity is performed utilizing a two elements ultrasonic probe. Each element of the probe contacts the bolt head on each side of the lock-bar and produces a longitudinal wave at a refracted angle of 6°, which is directed towards the centerline of the bolt. The conventional probe for ultrasonic inspection of baffle former bolts has limited inspection coverage because this has been implemented with single refracted angle at fixed position. In this paper, phased array ultrasonic probe for the inspection of the baffle former bolts is developed and the feasibility of application of Full Matrix Capture(FMC) / Total Focusing Method(TFM) is investigated. TFM images by post-processing of the FMC data could create not only the images equivalent to a conventional phased array image but also various images that cannot be produced by conventional phased array ultrasonic testing. TFM result images from the experiment showed that the flaws at various positions in baffle former bolt were well indicated.