

A Study on Effect of Dynamic Loading Speed on the Fracture Toughness of Equivalent Stress Gradient (ESG) Specimen

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Abstract : Recently, the occurrence of the earthquake has increased sharply and many of the casualties have occurred worldwide, due to the influence of earthquakes. Especially, the Fukushima nuclear power plant accident which was caused by the earthquake in 2011 has significantly increased the fear of people and the demand for the safety of the nuclear power plant. Thus, in order to prevent the earthquake accident at nuclear power plant, it is important to evaluate the fracture toughness considering the seismic loading rate. To obtain fracture toughness for the safety evaluation of nuclear power plant, it is desirable to perform experiments with a real scale pipe which is expensive and hard to perform. Therefore, many researchers have proposed various test specimens to replicate the fracture toughness of a real scale pipe. Since such specimens have several problems, the equivalent stress gradient (ESG) specimen has been recently suggested. In this study, in order to consider the effects of the dynamic loading speed on fracture toughness, the experiment was conducted by applying five different kinds of test speeds using an ESG specimen. In addition, after we performed the fracture toughness test under dynamic loading with different speeds using an ESG specimen and a standard specimen, we compared them with the test results under static loading.

Keywords : dynamic loading speed, fracture toughness, load-ratio-method, equivalent stress gradient (ESG) specimen

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