

원자력 발전소의 Main Control Boards에 대한 내진 해석 Seismic Analysis of the Main Control Boards for Nuclear Power Plant

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ABSTRACT

Seismic qualification of the Main Control Boards for nuclear power plants has been performed with the guideline of ASME Section III, US NRC Reg. Guide and IEEE 344 code. The analysis model of the Main Control Boards is consist of beam, shell and mass element by using the finite element method, and, at the same time, the excitation forces and other operating loads for each model are encompassed with respect to different loading conditions. As the fundamental frequencies of the structure are found to be less than 33Hz, which is the upper frequency limit of the seismic load, the response spectrum analysis using ANSYS is performed in order to combine the modal stresses within the frequency limit. In order to confirm the structural and functional integrity of the major components, modal analysis theory is adopted to derive the required response spectrum at the component locations. As all the combined stresses obtained from the above procedures are less than allowable stresses and no mechanical or electrical failures are found from the seismic testing, it concludes the Main Control Boards is dynamically qualified for seismic conditions. Although the authors had confirmed the structural and functional integrity of both Main Control Boards and all the component, in this paper only the seismic analysis of the Main Control Board is introduced.

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