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Enhancement of Nuclear Safety in Seismic Analysis for TRR-14-1/M1 After Fukushima Daiichi Accident

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After the Fukushima Daiichi Accident, IAEA recommended for strengthening the reactor safety by conducting the seismic analysis of the reactor. The Thai Research Reactor-1/Modification 1 (TRR-1/M1) is an open pool type TRIGA-Mark III using light water as a coolant, moderator, reflector and shield with concrete biological shield and four neutron beam tubes. The maximum power of TRR-1/M1 is licensed at 1.3 MW. TRR-1/M1 uses two types of low enriched uranium TRIGA fuel elements; 8.5% wt. uranium and 20% wt. uranium. The major achievement for Thailand Institute of Nuclear Technology (TINT) as a Technical and Scientific Support Organization (TSO) for the TRR-1/M1 includes the seismic analysis. The Computer Programs which were used in the study including SAP2000 and PCA Column. The TRR-1/M1 seismic analytical results, under different critical combinations of dead load, live load and seismic load, indicate that the maximum stress that will develop in the beam and column is significantly lower than the membrane strength. This can be explained by the interaction of the reactor pool and its building that effectively shorten the overall structure period and reduces the membrane forces. It can be concluded that both the reactor pool and its building structure can withstand from earthquake loading and consequently no strengthening measure is required for the structures under consideration. The further analysis of the reactor is considered the detailed analysis related to other reactor safety aspects.

Country or International Organisation

Thailand

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