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# The Study on the Deaggregation of Seismic Hazard in the PSHA for the NPP Sites

Hyun-Me Rhee [a*], Jeong-Moon Seo[a], Min-Kyu Kim[a], In-Kil Choi[a],
[a]*Integrated Safety Assessment Division, Korea Atomiv Energy Research Institute, 1045 Daedeok-daero, Youseong-gu, Daejeon, 305-353, Korea*
[*]*Corresponding author: rhhm@kaeri.re.kr*

## 1. Introduction

The seismic hazard analysis is that calculates the annual exceedance probability on the magnitude and distance of potential earthquake for nuclear power plant (NPP) site. For the analysis, seismic parameters and attenuation equation were considered. But, input parameters for seismic hazard analysis have a lot of uncertainty by problem of confidence in the quantitative assessment of seismic data. Probabilistic method has been used to effectively apply the uncertainties of seismic data in the analysis.

Probabilistic seismic hazard analysis (PSHA) considers various input data with their weights. The most dependent bin on the magnitude and the distance in the calculated seismic hazards could know by deaggregation of the seismic hazard, because PSHA used various seismic source models.

This study performed the deaggregation of the seismic hazard on the suggested seismic source models by Seo et al. for 4 NPP sites [1].

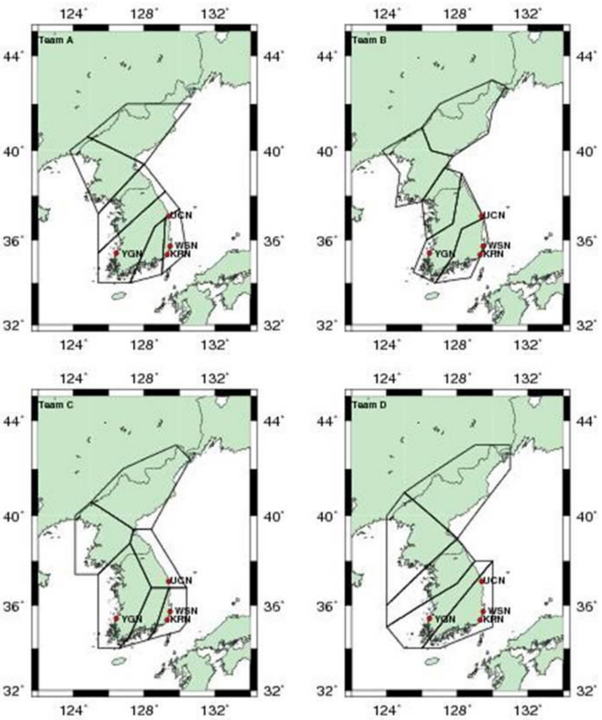


Fig. 1. Seismic Source Models and NPP Sites

## 2. Data

Seo et al. suggested the dependent factor on the seismic hazard as seismic source and occurrence frequency [2]. To reduced uncertainties on seismic source and occurrence frequency, experts had discussed. They had selected four models in used seismic source models on the PSHA for NPP sites. Fig. 1 showed the suggested four seismic source models by experts.

This study calculated the seismic hazard on ninety bins which were composed by combination of magnitude bin (0.25) and distance bin (10km) for four NPP sites.

## 3. Result

Seismic hazards for four NPP sites were calculated on the magnitude range from 5.0 to 7.25 and the distance range from 0 to 100km. The calculated mean hazard curves on the seismic source models for four NPP sites can see in the Fig. 2.

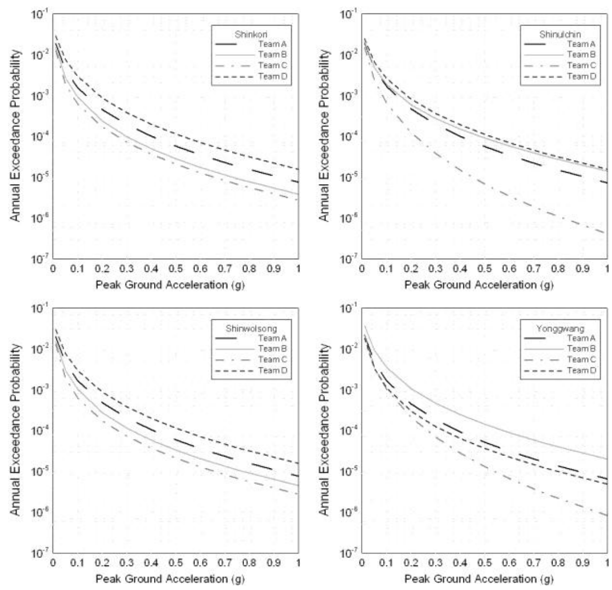


Fig. 2. Seismic Hazard for NPP sites

The standard deviation of the calculated seismic hazards on seismic source models has a range of about 0.27-0.38 at 0.3g. The seismic hazards of Shinkori and Shinwolsong were computed as almost similar values, because they were always included in a same seismic source.

Fig. 3- Fig.6 showed the result of deaggregation of seismic hazard and can see the contributions of each bin to mean hazard for Shinuljin site at 0.3g. The most dependent bin in the ninety bins could know by contribution percent to mean hazard. The contribution of bins depended on the seismic source model. The contribution of the range from 0 to 50km had occupied about 96% of total contribution, and the range from 0 to 20km had contributed about 65%. The contributions on the magnitude bin depend on the parameter of seismic source which included or was around a site, because the seismic hazard on maximum magnitude of seismic source which included or was around a site contributed about 41-74% of total contribution.

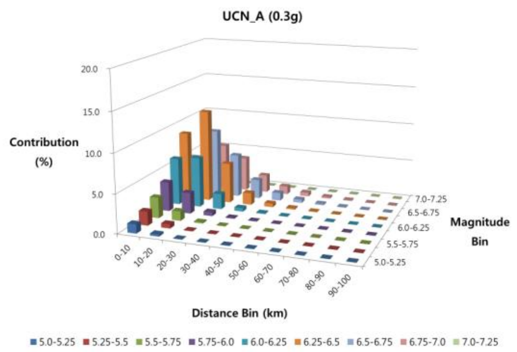


Fig. 3. Deaggregation of the Seismic Hazard on the A model at 0.3g

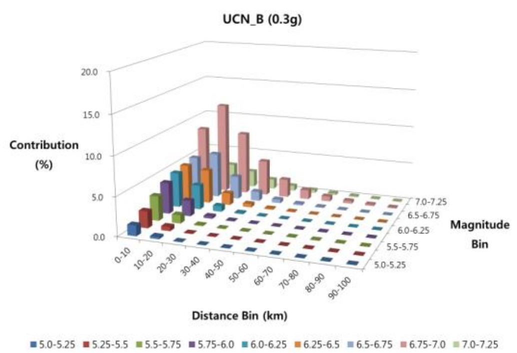


Fig. 4. Deaggregation of the Seismic Hazard on B model at 0.3g

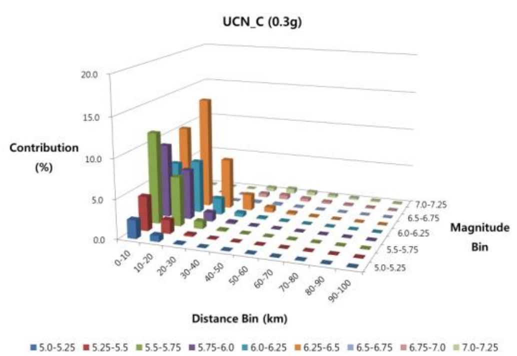


Fig. 5. Deaggregation of the Seismic Hazard on C model at 0.3g

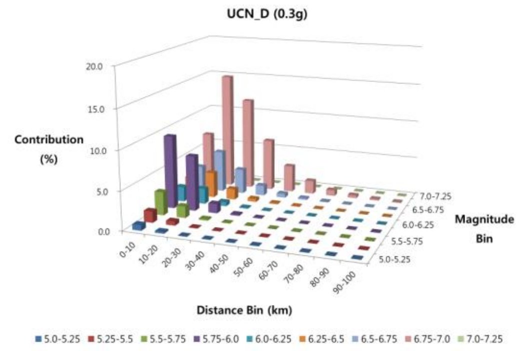


Fig. 6. Deaggregation of the Seismic Hazard on D model at 0.3g

## 4. Conclusion

To reduce uncertainty of seismic source model in the PSHA, Seo et al. suggested four seismic source models by assessment of experts [1]. This study performed PSHA on four seismic source models for four NPP sites with the magnitude range from 5.0 to 7.25 and the distance range from 0 to 100km.

The seismic hazards on ninety bins which were composed by combination of magnitude bin (0.25) and distance bin (10km) were calculated, and the contribution of each bin to the seismic hazard was computed. The result showed that the seismic hazard was depend on the potential earthquake within 50km of site and the maximum magnitude of seismic source which included or was around a site. The seismic source which included a site has strongly affected in the PSHA though the deaggregation of seismic hazard.

## ACKNOWLEDGEMENT

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## REFERENCES

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[2] J. M. Seo, H. M. Rhee, I. K. Choi, and M. K, Kim, "Sensitivity of Input Parameters in the PSHA for NPP Sites," KAERI/TR-3931/2009, Korea Atomic Energy Research Institute(2009).