

Effects of Spatial Variability of soil parameters on reinforced frame stresses

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Abstract

One of the distinguishing features of geotechnical reliability analysis, compared to other structural reliability analysis such as concrete and steel structures is material properties are different from site to site. The sources of uncertainties in reliability analysis are usually classified in four categories, namely physical uncertainty, model uncertainty, statistical uncertainty and gross error.

The purpose of this study is to quantitatively evaluate the physical uncertainty, taking the settlement and the differential settlement prediction of a square shallow foundation on statistically homogeneous elastic ground, as an example; however, this study be extended to show the effects of the spatial variability of soil on the frame sections.

The resulting uncertainty due to spatial variability is evaluated by Monte Carlo simulation (MCS). Honjo et al. (2007), Jililati and Honjo (2008) and others have studied the influence of the spatial variability on the settlement prediction. The methodology employed in this study is almost the same as one used by them, which is based on the random field theory combined with the finite element method; see Smith and Griffiths (1987).

References

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