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Reliability Based Investigation on the Choice of Characteristic Soil Properties

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Abstract : By using partial factors of safety, uncertainties due to the inherent variability of the soil properties and loads are taken into account in the geotechnical design process. According to the reliability index concept in Eurocode-0 in conjunction with Eurocode-7 a minimum safety level of β = 3.8 for reliability class RC2 shall be established. The reliability of the system depends heavily on the choice of the prespecified safety factor and the choice of the characteristic soil properties. The safety factors stated in the standards are mainly based on experience. However, no general accepted method for the calculation of a characteristic value within the current design practice exists. In this study, a laterally loaded monopile is investigated and the influence of the chosen quantile values of the deterministic system, calculated with p-y springs, will be presented. Monopiles are the most common foundation concepts for offshore wind energy converters. Based on the calculations for non-cohesive soils, a recommendation for an appropriate quantile value for the necessary safety level according to the standards for a deterministic design is given.

Keywords : asymptotic sampling, characteristic value, monopile foundation, probabilistic design, quantile values
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