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SETTLEMENT OF WIND TURBINE FOUNDED ON A LANDFILL HILL

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In the frame of a research on the complex energy utilisation of the MSW landfill hills (landfill gas, solar and wind units on the hill), the preliminary geotechnical design of a wind turbine and its service road (Pusztázámor MSW landfill hill, Hungary) was made on the basis of the in situ and large-scale laboratory tests. In Geotechnical viewpoint, the basic properties of the waste were recapitulated. The three large-scale compression tests made on samples taken from a borehole in increasing depths showed stiffening with increasing depth (and degradation) possibly due to the increasing density. By evaluating with the extended Bjerrum model the large-scale compression test made on the deepest sample, the following ratio 0.36 : 0.48 : 0.16 was resulted for the immediate: creep: primary consolidation settlement, respectively. The compression test moduli E_i related to these settlement components and the small strain shear moduli G_0 determined by in situ seismic test were used for subgrade modulus computations. The settlement of the wind turbine under static load was estimated in two parts in the starting research. The final settlement value was estimated with a subgrade method, with a parametric analysis, the result was calibrated using earlier data measured earlier in Karlsruhe and the present subgrade modulus range computed on the basis of the measurements. The time history of the settlement was estimated with a new method based on the evaluation of the oedometric test data. The possibility of the use of the more sophisticated Hydro-Bio-Mechanical model is discussed.

Keywords: MSW landfill, subgrade method, settlement modelling

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