

Analytical Approach to Study the Uncertainties Related to the Behavior of Structures Submitted to Differential Settlement

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Abstract : Recent developments in civil engineering create multiple interaction problems between the soil and the structure. One of the major problems is the impact of ground movements on buildings. Consequently, managing risks associated with these movements, requires a determination of the different influencing factors and a specific knowledge of their variability/uncertainty. The main purpose of this research is to study the behavior of structures submitted to differential settlement, in order to assess their vulnerability, taking into consideration the different sources of uncertainties. Analytical approach is applied to investigate on the one hand the influence of these uncertainties that are related to the soil, and on the other hand to investigate the structure stiffness variation with the presence of openings and the movement transmitted between them as related to the origin and shape of the free-field movement. Results reveal the effect of taking these uncertainties into consideration, and specify the dominant and most significant parameters that control the ground movement associated with the Soil-Structure Interaction (SSI) phenomenon.

Keywords : analytical approach, building, damage, differential settlement, soil-structure interaction, uncertainties

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