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VALIDATION BY CENTRIFUGE TESTING OF NUMERICAL SIMULATIONS FOR SOIL-FOUNDATION-STRUCTURE SYSTEMS

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SUMMARY

In this paper, an attempt is made to validate the numerical response of a soil-structure system with observations from physical modeling, using data from high gravity centrifuge testing that have been carried out on portal frames founded on uniform soil strata. The preliminary conclusions drawn by the comparative evaluation of numerical and physical testing are related to: a) the identification of the assumptions and system modifications required to achieve an acceptable level of matching between numerical and experimental results, b) an overview of the numerical results in terms and the dynamic response of soil-structure systems

INTRODUCTION

Soil-structure interaction phenomena have been proven to be of major importance in numerous earthquake cases, thus have attracted significant scientific attention. Several approaches, tools and methodologies have been developed including sub-structuring, finite element and finite difference codes as well as hybrid methods. This phenomenon is very complex and its beneficial or detrimental effect on the dynamic response of the system depends on a series of parameters such as the intensity of ground motion, the dominant wavelengths, the angle of incidence of the seismic waves, the stratigraphy, the stiffness and damping of soil as well as the size, geometry, stiffness, slenderness and dynamic characteristics of the structure. Despite the extensive scientific work therefore, the complexity and the ensuing large number of parameters involved, make it difficult to derive conclusive recommendations for practical design.

Nevertheless, case studies from experimental data on instrumented soil-structure systems subjected to natural or man-made excitations (i.e. Euroseis-Test Site http://euroseis.civil.auth.gr) are rather limited, thus preventing the quantification and especially the generalization of conclusions drawn analytically and

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