

CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES

TRIP REPORT

SUBJECT: Design of Foundations for Dynamic Loads
Seminar Offered by the American Society of Civil Engineers
Project # 20.06002.01.336; AI # 20.06002.01.336.701

DATE/PLACE: March 14–16, 2007
Philadelphia, Pennsylvania

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PERSONS PRESENT:

The seminar was presented by 2 experts in design of foundations under dynamic loading to 12 geotechnical and structural engineers.

BACKGROUND AND PURPOSE OF TRIP:

The purpose of the trip was to attend the “Design of Foundations for Dynamic Loads” seminar offered by the American Society of Civil Engineers. The seminar addresses the design of foundations for rotating machines and the design of foundations under seismic loading.

SUMMARY OF PERTINENT POINTS:

The 3-day seminar emphasized the evaluation of shallow and pile foundations subjected to dynamic loads such as rotating machines and seismic events. The first part of the seminar presented the basic principles of soil dynamics, geotechnical earthquake engineering, and soil–structure interaction. The presentation covered the theoretical background, numerical models that can be employed, and the type of dynamic loads to be evaluated.

For the analyses and design of shallow foundations, the seminar presented the modifications to the stiffness and damping of the soil–structure system under dynamic loading, the computation of equivalent soil–spring constants, the effect of embedded footings, the impedance function of a layer on half-space, and the response of shallow foundations to harmonic and seismic excitations. For pile foundations, the seminar included the applications of this type of foundation, the computation of stiffness and damping of the soil–structure system for pile groups, the impedance function for pile foundations, and the nonlinear response of pile groups subjected to dynamic loading.

The seminar also provided some examples of assessment of foundation behavior for different types of facilities, as well as remedial measures that can be applied to correct improper performance of the soil–structure system.

CONCLUSIONS:

The seminar provided theoretical background and practical examples of analysis and design of foundations subjected to dynamic loading. This seminar enhanced the skills of the Center for Nuclear Waste Regulatory Analyses staff to adequately review the performance of the structural systems proposed for the potential geologic repository at the Yucca Mountain site.

PROBLEMS ENCOUNTERED:

None.

PENDING ACTIONS:

None.

RECOMMENDATIONS:

NRC and CNWRA staff involved in soil–structure interaction evaluations would benefit by attending this seminar.