



# **FARHANG OSTADAN**

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## **EDUCATION:**

Ph.D., Civil Engineering  
University of California, Berkeley, California, 1983.

## **SUMMARY:**

**15 Years:** Extensive experience in dynamic analysis and seismic safety evaluation of above and underground structures and subsurface materials. Co-developed and implemented SASSI, a system for seismic soil-structure interaction analysis currently in use by the industry worldwide. Developed a method for liquefaction hazard analysis currently in use for critical facilities in the United States.

## **EXPERIENCE:**

As Chief Soils Engineer with Bechtel, San Francisco office, Mr. Ostadan was responsible for providing guidance and support to all projects in the areas of earthquake resistant design, dynamic analysis of structures, soil-structure interaction (SSI) analysis, and seismic stability evaluation of subsurface materials. He has participated in seismic studies and reviews of numerous nuclear structures, offshore structures, underground structures and transportation structures; conducted technology transfer and training courses for engineers of various companies and institutes including Bechtel Corporation, Impell Corporation, General Electric Company, SEAONC, Westinghouse Corporation, Lawrence Livermore Laboratory, and Tennessee Valley Authority (TVA) in USA; Kraftwerk Union, AG West Germany; Tractional Inc., Belgium, Nuclear Data Corporation, Japan; Atomic Energy Organization, Iran.

Major project work includes seismic analysis and evaluation of responses for: the Diablo Canyon Nuclear Station as part of the Long-Term Seismic Program (LTSP); NRC/EPRI large scale seismic experiment in Lotung, Taiwan; large underground circular tunnel for Super Magnetic Energy Storage (SMES); General Electric ABWR and SBWR standard nuclear plants; Westinghouse AP600 standard nuclear plant; Tennessee Valley Authority (TVA) nuclear structures (Browns Ferry, Sequoyah, Watts Bar); several facilities involving liquid gas storage tanks; Heerma TTP offshore structure in the North Sea; seismic stability and liquefaction study at the ITP, RTF, and K-facilities in the Savannah River Site for the Department of Energy; several transportation projects including numerous Caltrans bridges in California; BART

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extension lines including tunnel and aerial structures along the Dublin and San Francisco airport lines, Muni Metro Project, Downtown San Francisco; and Richmond Parkway Project in the San Francisco Bay area.

### **EXPERIENCE (cont'd)**

**1983 – 1985:** Earthquake Engineering Technology Inc., San Ramon, California, As Project Engineer was responsible for development of a method for nonlinear seismic soil-structure interaction analysis in time domain.

**1979 – 1983:** University of California, Berkeley. As Research Assistant in the Civil Engineering Department, duties included development of the flexible volume method for dynamic SSI analysis of soil-pile-structure systems; member of SASSI development team.

### **PROFESSIONAL REGISTRATION:**

Registered Civil Engineer, California

### **PROFESSIONAL ASSOCIATIONS:**

Member of American Society of Civil Engineers

Member of EERI, Earthquake Engineering Research Institute

Member of Sigma Xi, The Scientific Honor Society, University of California, Berkeley

### **PUBLICATIONS**

#### **Technical Papers:**

Lysmer, J., Tabatabaie-Raissi, Tajirian, F., Vahdani, S., Ostadan, F., SASSI - A System for Analysis of Soil-Structure Interaction, Report No. UCB/GT/81-02, Geotechnical Engineering Department of Civil Engineering, University of California, Berkeley, April 1981.

Ostadan, F., Dynamic Analysis of Soil-Pile-Structure Systems, Ph.D. Dissertation, University of California, Berkeley, 1983.

Ostadan, F., Udaka, T., Okumura, M., One Dimensional Seismic Response Study Using Different Soil Models, 8th SMIRT Conference, Brussels, Belgium, 1985.

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Ostadan, F., Lysmer, J., Dynamic Analysis of Directly Loaded Structures on Pile Foundations, 8th SMIRT Conference, Brussels, Belgium, 1985.

Ostadan, F., Lysmer, J., Simplified Dynamic Analysis of Soil-Pile-Structure Systems, 5th International Symposium & Exhibition on Offshore Mechanics and Arctic Engineering, Tokyo, Japan, 1986.

### Technical Papers (cont'd):

Ostadan, F., Tseng, Wen S., Lilhanand, K., Application of Flexible Volume Method to Soil-Structure Interaction Analysis of Flexible and Embedded Foundations, 9th SMIRT Conference, Lausanne, Switzerland, 1987.

Ostadan, F., Tseng, Wen S., Effect of Foundation Flexibility and Embedment on the Soil-Structure Interaction Response, 9th World Conference on Earthquake Engineering, Tokyo, Japan, August 1988.

Ostadan, F., Tseng, Wen S., Effect of Site Soil Properties on Seismic SSI Response of Deeply Embedded Structures, ASCE Foundations Engineering Congress, Evanston, Illinois, June 1989.

Ostadan, F., Tseng, W. S., Sawhney, P. S., Liu, A. S., The Effect of Embedment Depth on Seismic Response of a Nuclear Reactor Building Design, 10th SMIRT Conference, Los Angeles, California, August 1989.

Ostadan, F., Arango, I., Oberholtzer, G., Hsiu, F., Radially Loaded Circular Tunnel Structure, IX Panamerican Conference on Soil Mechanics and Foundation Engineering, Vina del Mar, Chile, August 1991.

Ostadan, F., Marrone, J., Arango, I., Litehiser, J., Liquefaction Hazard Evaluation: Methodology and Application, 3rd U.S. Conference on Lifeline Earthquake Engineering, Los Angeles, California, August 1991.

Ostadan, F., Hadjian, A. H., Tseng, W. S., Tang, Y. K., Tang, H. K., Parametric Evaluation of Intermediate SSI Solutions on Final Response, 11th SMIRT Conference, Tokyo, Japan, August 1991.

Ostadan, F., Arango, I., Litehiser, J., Marrone J., Liquefaction Hazard Evaluation, 11th SMIRT Conference, Tokyo, Japan, August 1991.

## **FARHANG OSTADAN**

Ai-Shen Liu, G. W. Ehlert, R. S. Rajagopal, P. S. Sawhney, F. Ostadan, Seismic Design of ABWR and SBWR Standard Plants, ICON2, San Francisco, California, March 1993.

R. S. Rajagopal, S. Sawhney, F. Ostadan, Seismic Considerations for the Standardized Advanced Light Water Reactor (ALWR) Plant Design, American Power Conference, Chicago, Illinois, April 1993.

I. Arango, F. Ostadan, Qualification of Liquefaction Hazard and Its Application to Risk Assessment and Urban Zoning, 5th International Conference on Seismic Zonation, Nice, France, October 1995.

F. Ostadan, S. Mamoon, I. Arango, Effect of Input Motion Characteristics on Seismic Ground Responses, 11th World Conference on Earthquake Engineering, Acapulco, Mexico, June 23-28, 1996

### **Technical Papers (cont'd):**

I. Arango, F. Ostadan, M. Lewis, B. Gutierrez, Quantification of Seismic Liquefaction Risk, ASME PVP & ICVT Pressure Vessel and Piping Conference, Montreal, Quebec, Canada, July 21-26, 1996.

F. Ostadan, T. Liu, K. Gross, R. Orr, Design Soil Profiles for Seismic Analyses of AP600 Plant Standard Design, ASME PVP & ICVT Pressure Vessel and Piping Conference, Montreal, Quebec, Canada, July 21-26, 1996.

### **Computer Programs:**

User's Manual, Theoretical Manual, and Verification Manual for Computer Program SASSI.

Installation and Validation Reports for Computer Program SASSI prepared for: EDS Nuclear Incorporated, California; Kraftwerk Union, AG, West Germany; Tractional Incorporated, Brussel, Belgium; Bechtel Corporation; General Electric Company; Westinghouse Corporation; Lawrence Livermore Laboratory.

User's Manual, Verification Manual, and Application Manual for Computer Program NANSI (nonlinear analysis of soil-structure systems), Kozo Keikaku Engineering, Japan.

User's and Theoretical Manuals for Computer Program ASHLE (Advanced Seismic Hazard/Liquefaction Evaluation), Bechtel Corporation.



# State of Utah

## DEPARTMENT OF ENVIRONMENTAL QUALITY OFFICE OF THE EXECUTIVE DIRECTOR

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December 17, 1999

Paul Gaukler, Esq.  
Shaw, Pittman, Potts & Trowbridge  
2300 N Street, N.W.  
Washington DC 20037-1128

Via E-mail and First Class Mail

RE: State's Proposed Motion to Compel PFS to Respond to  
State's Fifth Set of Discovery Requests (Contention GG)

Dear Mr. Gaukler:

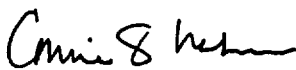
We informed you on Thursday, December 16, 1999, that the State intended to file a Motion to Compel discovery on PFS's failure to respond to requests for admission nos. 10, 11, 12, 19, and 20(b) in which PFS argued that the requests for admissions were not relevant. Contrary to your position the State believes these requests for admission are directly relevant or reasonably calculated to lead to discovery of relevant material.

Requests for admission nos. 10, 11 and 12 relate to the flexible behavior of the cask pad. The flexible behavior of the cask pad may directly impact the application of friction on the pad and the shift from the static case to the kinetic case when considering momentum of the moving casks. Similarly, request for admission no. 19 concerns the amount of lift off which also may directly impact the application of friction and the shift from the static case to the kinetic case. The flexible behavior of the pad and the lift off between the cask and pad are important because friction between the cask and the pad is a function of pressure acting at the contact points and the flexibility of the foundation and the overturning moment of the cask (tendency to uplift) cause a nonuniform pressure at the contact points. Thus, the flexible behavior of the pad and the lift off may have significant effects on how friction varies across the pad.

Additionally, request for admission no. 20(b) which addresses the cold bonding directly relates to the friction between the cask and the pad.

Please call me or Denise Chancellor if you would like to further discuss these issues. We plan on filing the motion to compel discovery on late Monday, December 20, 1999.

Sincerely,

  
Connie S. Nakahara

c: Sherwin Turk, Esq., NRC, Office of General Counsel