

Deep Foundations: Design, Construction, and Quality Assurance

Purpose and Background

The purpose of this course is to present modern techniques for the design, installation and verification of deep foundations. Over the past twenty-five years, major changes have occurred in the deep foundations industry. New improved methods have been developed for installing all types of deep foundations, increased loads are being used, and new quality control procedures have been developed. For driven piles, higher loads can be achieved with new hammers, dynamic quality control methods have been adopted, wave equation analysis is being widely used, and higher strength materials are becoming common. Auger-cast piles are being used with increasing frequency. High capacity drilled shafts are being utilized more frequently. New design and specifications have been adopted in many codes and specifications. This course will present modern design and construction monitoring procedures for deep foundations including discussions on new developments.

Seminar Instructor

Jerry A. DiMaggio, P.E., M.ASCE, D.GE, is a principal civil engineer at Applied Research Associates, Inc. Mr. DiMaggio specializes in the design and construction of geotechnical features and served the civil engineering and construction communities related to strategic planning, innovation deployment, risk management and the development of business plans. He is internationally recognized for his technical accomplishments and contributions on the design, construction, evaluation, forensic assessment and disputes resolution of structural foundations, earth retaining structures, ground improvement techniques and engineered earthworks. Mr. DiMaggio has served on a number of projects related to limit state design (LRFD), risk management assessment and management, innovative contracting and accelerated construction. He is the retired Principal Bridge Engineer, and Geotechnical Engineering National Program Manager with the U.S. DOT, FHWA in Washington D.C. and was previously the Implementation Manager of the internationally recognized SHRP2 program at the National Academies in Washington D.C. He has presented over 400 short courses and provided consulting services on approximately 1000 projects in all 50 states, Central and South America and the Middle East. Jerry has received numerous career recognitions including FHWA's Engineer of the Year and Administrator's Awards, awards from TRB, PDCA. ADSC and ASCE's Kapp and Opal Awards.

For group training, contact John Wyrick (JWyrick@asce.org)
or Stephanie Tomlinson (STomlinson@asce.org)

Summary Outline

DAY ONE

- Welcome and Introduction
- Overview of Deep Foundation Design and Construction
 - ◊ The design process presented for all types of deep foundations and the satisfaction of specification requirements.
- Subsurface Investigation for Deep Foundations
 - ◊ Subsurface investigation methods and Soil and Rock Tests
 - ◊ Evaluation of Soil and Rock Parameters for Design and Construction
- Computation of Geotechnical and Structural Resistances and vertical and Lateral Deformations
 - ◊ Driven piles
 - ◊ Drilled shafts
- Driven Pile Types and Driven Pile Installation Equipment
 - ◊ Driven pile types
 - ◊ Pile driving hammers including new hydraulic hammers
 - ◊ Lead systems and accessories
- Drilled Shaft and Augercast Installation and Equipment
 - ◊ Methods of installation and influence of installation methods on deep foundation performance
- Wave Equation Analysis
 - ◊ Bearing graph and chart generation for inspectors
 - ◊ Driveability evaluation, pile setup, and relaxation

DAY TWO

- Design for Lateral Loading and Pile Groups
- Computer Software for Deep Foundations Design and Analysis
- Quality Control and Assurance of Deep Foundations
 - ◊ Methods of installation control
 - ◊ Techniques for evaluation of the installed end product
 - ◊ Quality assurance and Inspection
- Conventional Static Loading Tests
 - ◊ Load testing methods
 - ◊ Evaluation of load tests
- Dynamic Testing for Capacity
 - ◊ Equipment for high strain dynamic testing
 - ◊ Methods for evaluating dynamic measurements for capacity including Case Method and CAPWAP
 - ◊ Pile driving evaluation
 - ◊ Capacity evaluation of cast in place piles (drilled shafts and augercast piles)
- Other Testing Methods
 - ◊ Bottom-Up load testing
 - ◊ Rapid load testing
 - ◊ Methods & evaluation of results
- Planning an Effective Field Testing Program
- Summary and Conclusion

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Seminar Benefits

- Find out the latest subsurface investigation methods for deep foundation design and construction
- Understand the fundamentals of the design process for deep foundations
- Learn the new standards and procedures for the design and installation of deep foundations
- Learn the use of wave equation analysis as applied to both the design and installation of driven piles including driving problems
- Understand the various capacity determination methods including both static and dynamic methods
- Understand the recommendations for subsurface investigations, laboratory and insitu test methods and parameter selection guidance for deep foundation design and construction
- Select the appropriate deep foundation system and assess the appropriate foundation element installation equipment and construction procedure
- Conduct design and analysis of single piles and pile groups subject to axial and lateral loads and moments
- Apply the use of wave equation analysis for the design and installation of driven piles Understand and specify the use of static and dynamic testing and monitoring methods for structural integrity and geotechnical, load carrying capacity
- Select the key project variables and requirements within construction specifications and plans for deep foundations
- Communicate the advantages and disadvantages of various deep foundation types

Who Should Attend?

- Geotechnical specialists
- Construction engineers
- Contractors
- Structural engineers
- Owners
- Professionals involved in the design, construction, inspection, testing and specification of deep foundations (driven piles, cast-in-place piles, or drilled shafts)

ASCE seminars are available for On-Site Training. For details regarding On-Site Training and/or needs-based training opportunities, please contact:

John Wyrick, Director
On-Site Training Worldwide
ASCE Continuing Education
Tel.: 703-295-6184
Email: jwyrick@asce.org

