CLYDE N. BAKER, JR.

Clyde N. Baker, Jr. grew up in Flushing, New York, son of general surgeon Clyde N. Baker, Sr and Muriel Esty Baker. He graduated from Flushing High School and received his BS and MS degrees in Civil Engineering from Massachusetts Institute of Technology and a B.S. degree in Physics from William and Mary College in Williamsburg, VA. He ran Track and Cross Country at all three schools. He joined the staff of STS Consultants, Ltd. (formerly Soil Testing Services) in the fall of 1954. Over the past 55 years he has served as the geotechnical engineer on the major portion of high rise construction built in Chicago during that time frame. He has also served as geotechnical engineer or consultant on eight of the twenty tallest buildings in the world including the four tallest in Chicago (Sears, Trump, Hancock, and Amoco) and the current four tallest buildings in the world, the Petronas Towers in Kuala Lumpur, Malaysia, 101 Financial Center inTaipei, Taiwan and Burj, Dubai in Dubai.. He is currently working as a consultant on several super tall buildings currently under construction (circa 2008) including the Spire in Chicago, Doha Convention Center and Tower in Qatar and Incheon 151 in Incheon, Korea.

As a result of his experience, Mr. Baker has developed an international reputation in the design and construction of deep foundations. He has been a leader in using in-situ testing techniques correlated with past building performance to develop more efficient foundation designs. In the Chicago soil profile this has facilitated economical use of belled caissons on hard pan for major structures in the 60 to 70 story height range (such as Water Tower Place, 900 North Michigan, and AT&T) which normally would have required extending caissons to rock at significant cost premium.

Mr. Baker credits his success to his early university teachers who taught him to think, particularly Donald Taylor, T.W. Lambe, and Harl P. Aldrich at M.I.T. and Karl Terzaghi and Arthur Cassagrande at Harvard, to John P. Gnaedinger who gave him his start, to professor consultants Ralph B. Peck and Jorj Osterberg, who are known to combine theory and practice, and to his colleagues at work both former and present, who have helped him and from whom he has learned much. Former colleagues Robert G. Lukas and Safdar A. Gill and current colleagues Bill Walton, Tony Kiefer and Bernie Hertlein are top examples.

Mr. Baker has shared his knowledge and experience with his peers through numerous Conference and University lectures, technical articles, papers and publications. He is the recipient of the Deep Foundation's Institute Distinguished Service Award, the ADSC Outstanding Service Award, ASCE's Thomas A. Middlebrooks and Martin S. Kapp awards and of three Meritorious Publication Awards from SEAOI including the "History of Chicago Building Foundations 1948 to 1998" and is the author of "The Drilled Shaft Inspectors' Manual" sponsored jointly by the Deep Foundation Institute and the International Association of Foundation Drilling (ADSC).

Mr. Baker has been very active professionally on both the local and national scene. He is an Honorary Member of ASCE. He is a past President of SEAOI and the Chicago Chapter of ISPE. Nationally he has served as Chairman of the Geotechnical Engineering Division of ASCE and is a past Editor of the Geotechnical Engineering Journal and is a Past Chairman of ACI Committee 336 on Footings, Mats and Drilled Piers. He is a member of the National Academy of Engineering and was the recipient of the ASCE Ralph B. Peck Award for the year 2000.

More recently he received the 2007 Engineering News Record Award of Excellence and the ASCE Opal Lifetime Achievement Design Award in April, 2008. He received the 2009 Washington Award in February and presented the Terzaghi Lecture at the Congress at Lake Buena Vista, FL March, 2009.

Mr. Baker is a past Chairman of STS Consultants, Ltd., a 550 person consulting engineering firm, headquartered in Vernon Hills, Illinois which is now part of AECOM Technology Corporation and currently serves as Senior Principal Engineer.

On a personal note, he gives most credit to his wife of 54 years, Jeanette, for their happy marriage and their flourishing nuclear family of 3 children, 6 grandchildren and 2 great grandchildren. They are both active in the Religious Society of Friends (Quaker) and have served as Clerk of the Evanston Meeting of Friends. Mr. Baker is also a past treasurer and board member of the Quaker organization "Right Sharing of World Resources". For relaxation, Mr. Baker says he likes to read and to run, albeit very slowly (he ran his last full length marathon at age 70), and to kayak on Lake Champlain where his family has a log cabin. Travel where he can visit and reminisce with old friends is also high on his list.

Clyde N. Baker, Jr., P.E., S.E.

Senior Principal Engineer

Education

M.S., Civil Engineering, Massachusetts Institute of Technology, 1954

B.S., Civil Engineering, Massachusetts Institute of Technology, 1952

B.S., Physics, William & Mary College, 1952

Professional Affiliations

American Concrete Institute, Past Chairman, ACI Committee 336, Footings, Mats and Piers

American Society for Testing and Materials

American Society of Civil Engineers, Honorary Member

Chicago Committee on High Rise Buildings

Council on Tall Buildings and Urban Habitat

Deep Foundation Institute

ADSC: The International Association of Foundation Drilling

Highway Research Board

Illinois Society of Professional Engineers

M.I.T. Alumni Council

National Society of Professional Engineers

Structural Engineers Association of Illinois

National Academy of Engineering

Registrations/Training

Professional Engineer: Florida, Illinois, Nevada, New York

Structural Engineer: Illinois

Experience

Mr. Baker has more than 50 years of engineering experience with the design, analysis and construction of deep foundations for high-rise structures. He is responsible for technical consultation and overview on major engineering projects, maintaining technical standards, and development of staff engineering expertise, as well as client and project promotional activities. Following is a sampling of major project involvement:

- Provided peer review foundation consulting services for a 90-story tower in Kaohsuing, Taiwan and two 88-story towers in Kuala Lumpur, Malaysia, both with large area multi-level basements below the water table. Also provided peer review for a 101-story Financial Center in Taipei, Taiwan, the current tallest building in the world.
- Developed and provided oversight for a successful limestone cavity filling and slump zone grouting program below the world's deepest building foundations for the Petronas Towers in Kuala Lumpur, Malaysia, the former tallest buildings in the world.
- Developed a unique friction caisson foundation design for the 45-story SOHIO Building in Cleveland, Ohio involving the deepest known caissons in the U.S. to date. Work involved a full scale instrumented caisson load test to confirm friction design parameters and included instrumentation and long term monitoring of a main production caisson.
- Developed a non-destructive testing evaluation program for the 45-story SOHIO Building in Cleveland, Ohio to permit caisson construction and concrete placement entirely under water and still confirm concrete integrity. Program involved pre-placement of access tubes with the rebar cage and testing by gamma-gamma logging and seismic wave velocity transmission techniques.
- Performed geotechnical engineering for seven of the 16 tallest buildings in the world, and a major portion of the high-rise buildings built in downtown Chicago, Illinois over the past fifty years including nine with deep basements and slurry walls.

Awards

Terzaghi Lecture, 2009

Washington Award, 2009

Engineering News Record Award of Excellence, 2008

ASCE Opal Design Award, 2008

Moles Award, 2006

Chicago Building Congress Award of Honor, 2006

ASCE Ralph B Peck Award, 2000

National Academy of Engineering, 2000

ASCE, Honorary Member, 1996

ASCE, Martin S. Kapp Award, 1995

SEAOI John F. Parmer Award 1995

ADSC, Outstanding Service Award, 1991

ASCE, Certificate of Appreciation, 1990-1991 Chairman, Geotechnical Division

SEAOI, Distinguished Service Award in Structural Engineering, 1990

SEAOI, 1st Place, 1990 Outstanding Paper Award for "A New Combined Footing and Drilled Shaft Design"

ASCE, Chicago Civil Engineer of the Year, 1989

Deep Foundations Institute, Distinguished Service Award for 1987

- Extensive experience with the design and construction of caissons in a variety of soil and rock formations. Involved in the solution of many caisson construction problems utilizing a variety of grouting techniques.
- Performed peer review geotechnical consulting services on the current tallest building in the world under construction, the Burj, Dubai.
- Served as Co-Principal Investigator on a major research project for the FHWA evaluating non-destructive testing techniques to find defects and determine capacity of drilled shafts constructed under slurry.
- Developed a controlled displacement plan for the organic marine silt at the large Sha-Tin Land Reclamation project in Hong Kong. Marine silt was displaced into local silt ponds leaving silt free corridors for roadway and utility support with greatly reduced settlement problems. High-rise structures were constructed on pile supported foundations in the filled-over silt ponds.
- Developed a unique foundation design for 19-story hotel building in lightly overconsolidated soils involving a combination mat foundation and selective piles designed based on soil structure interaction. Piles were designed to be loaded to the point of soil failure while maintaining a structural factor of safety of two. Piles were dynamically monitored during driving for predicted design failure load. System economically reduced settlements to less than half that of a mat foundation alone and permitted significant reduction in mat thickness.
- Participated in a unique design involving a modified mat foundation for a 26-story structure built on a sand layer over soft clay. Stress levels in the underlying soft clay required use of inclinometers and piezometers to monitor lateral soil displacement and pore pressure dissipation as the structure was built.

SEAOI, 1st Place, 1987, for "History of Chicago Building Foundations, 1948-1983," for contribution to the advancement of the art of structural engineering

WSE Octave Chanute Medal for Best Paper in Field of Engineering for the Year, 1983

ISPE-Chicago Chapter Distinguished Service Award in Professional Engineering, 1978

ASCE, Thomas A. Middlebrooks Award for Contribution to the Field of Soil Mechanics and Foundation Engineering, 1972

Community Activities

Past board member (1 year) of the American Friends Service Committee (AFSC)

Active in Evanston Friends Meeting, which is part of Illinois Yearly Meeting of Friends General Conference (Quaker)

Past Treasurer and six-year board member of the Quaker charitable organization "Right Sharing of the World's Resources"

- Performed the geotechnical analysis and consulting for two large, pile supported cooling towers at a nuclear power plant site. Problems involved downdrag from a thick hydraulic fill and an erratic bearing stratum. Planned use of batter piles required an extensive testing program involving dynamic measurements to determine actual hammer energy delivered to the piles. Correct hammer efficiencies were then used in a wave equation analysis to predict capacity at the end of the drive and after ground freeze. Predicted pile capacity agreed very well with load test data.
- Performed the geotechnical engineering for the Jeddah International Airport, the Haj, and the Commercial Bank project in Jeddah, Saudi Arabia.

Publications/presentations

"Unexpected Caisson Problems, Soil Structure Interaction Predictions and Required Ground Modification", 6th International Conference, Case Histories in Geotechnical Engineering, Arlington, VA, August, 2008, co-authored with Sara E. Knight, Ryan C. Rusk and Donald W. Hamlin.

"The Role of Peer Review in the Foundation Design of the World's Tallest Buildings", CTBUH 8th World Congress, Dubai, March 2008, co-authored with Tony A. Kiefer, Steven W. Nicoson, and Khaldoun Fahoum.

"Design of Foundations for the World's Tallest Buildings", ASCE Holtz Symposium, April 21, 2007, Seattle, WA.

"In Situ Testing, Soil-Structure Interaction, and Cost Effective Foundation Design", The Fourteenth Spencer J. Buchanan Lecture, November 17, 2006, College Station, TX.

"Risk and Rewards: A Career Retrospective", Key note address at the ASFE Annual Meeting, October 7, 2006, Chicago, IL.

"Lessons Learned in Quality Control and Quality Assurance" ADSC Geo^3 Conference, Dallas, TX, December 2005, co-authored with Bernard H. Hertlein.

"The Use of the Menard Pressuremeter in Innovative Foundation Design from Chicago to Kuala Lumpur", ISP5 International Symposium, Paris, France, August, 2005.

"A Deep Foundation Surprise, Engineered Response and Foundation Performance" ASCE Geo Institute, Geo Support Conference, Orlando, FL January 2004, co-Authored with Tony A. Kiefer, P.E., William H. Walton, P.E., S.E., and Charles E. Anderson, S.E.

"Use of Straight Shaft Piers as Settlement Reducers in Combined Footing Design Over Soft Chicago Clay", 5th International Conference on Case Histories, April 2004, NY, NY, co-authored with Tony A. Kiefer, P.E. and Kolbjorn Saether, S.E.

"Dearborn Center: A Unique Soil Structure Interaction Design", 5th International Conference on Case Histories, April 2004, NY, NY, co-authored with Ted D. Bushell, P.E., Rob Diebold, P.E.

"Simple Soil Structure Interaction Concepts in Innovative Foundation Design", ASCE Met Section Geotechnical Group, New York, NY, August 2003.

"History of Chicago High Rise Building Foundations 1948-1998." Published by the Chicago Committee on High-Rise Buildings, 1999, co-authored with Charles W. Pfingsten and John P. Gnaedinger.

"Foundation Design and Performance of the World's Tallest Building," Petronas Towers, Fourth International Conference on Case Histories, St. Louis, March 1998, co-authored with Elliott E. Drumright, Len Joseph and T. Azam.

"Practical Experience with Non-Destructive Testing of Deep Foundations," ADSC Drilled Shaft Inspector's Workshops for State DOT's, 1996, co-authored with Bernard Hertlein.

"Measured vs. Predicted Long Term Load Distribution in Drilled Shaft Foundations" Proceedings on "Practical Problems and Solutions in Geotechnical Engineering." Published by ASCE Metropolitan Section, November 1 and 2, 1995.

"Current U.S. Design and Construction Practices for Drilled Piers," International Conference on Design and Construction of Deep Foundation FHWA, Orlando, December 6-8, 1994.

"Settlement Analysis for 450 Meter Tall KLCC Towers," ASCE Special Publication No. 40, June, 1994, co-authored with Len Joseph and T. Azam.

"Geotechnical-Structural Interaction for Innovative Mat Design: Three Case Histories," ACI Special Publication, 1994, co-authored with Elliott E. Drumright.

“The Effects of Free-Fall Concrete in Drilled Shafts,” ADSC-FHWA Research Report, co-authored with Tony Kiefer, 1994.

"Long Term Load Transfer in Drilled Shafts", Proceedings of the XIII ICSMFE, 1994, New Delhi, India, co-authored with Elliott E. Drumright.

"Use of Pressuremeter in Mixed High-Rise Design," ASCE Special Publication No. 38, October, 1993.

“Drilled Shafts for Bridge Foundations,” FHWA-RD-92-004, 1993, co-authored with G.Parikh, J.L. Briaud, E.E. Drumright, and F. Mensah

"Dynamic Testing to Predict Static Performance of Drilled Shafts," proceedings of the Geotechnical Engineering Congress, Boulder, Colorado, June, 1991.

"The Use of Nondestructive Testing to Evaluate Defects in Drilled Shafts," TRB, January, 1991, co-authored with G. Parikh, J.L. Briaud, E.E. Drumright, and F. Mensah.

Drilled Shaft Inspectors Manual, published jointly by the Deep Foundations Institute and the International Association of Foundation Drilling and endorsed by the Association of Soil and Foundation Engineers, 1989.

"A New Combined Footing and Drilled Shaft Foundation Design," Foundation Engineering Congress, June, 1989, co-authored with E.E. Drumright, Martin J. Sten and John E. Benson.

"Complex High-Rise Foundation Design and Construction," Foundation Engineering Congress, June, 1989, co-authored with Steve Bucher and William H. Baker.

"Full Scale Caisson Load Test for the Milwaukee Center," Foundation Engineering Congress, June, 1989, co-authored with Alan Wagner.

"Geophysical and Nuclear Methods for Non-destructive Evaluation of Caissons," Foundation Engineering Congress, June, 1989.

"Design and Construction of Caissons Under Slurry," Published in the proceedings entitled "Foundations in Difficult Soils" by the Metropolitan Section of the American Society of Civil Engineers, April, 1989.

"Use of Highly Stressed Piles to Control Settlement," Deep Foundations Institute, October, 1988.

"Building Design and Construction over Organic Soil," Second International Conference on Case Histories in Geotechnical Engineering, St. Louis, MO, June, 1988.

"Caisson Load Test and Instrumentation Program - SOHIO Corporate Head- quarters," Second International Conference on Case Histories in Geotechnical Engineering, St. Louis, MO, June, 1988.

"Use of Stress Wave Measurements to Evaluate Piles on High Set-Up Conditions," Co-author with Steven W. Hunt, Third International Conference on Application of Stress Wave Theory to Piles, Ottawa, Canada, May 1988.

"Pier Design and Construction in Water Bearing Soils," DFI-CIGIS Symposium, Beijing, China, September, 1986.

"Recent Developments in Deep Foundations for High Rise Buildings," American Concrete Institute, October, 1985.

"Construction of Drilled Shafts," The Practice of Foundation Engineering, August, 1985, co-authored with Safdar A. Gill.

“Comparison of Caisson Load Tests on Chicago Hardpan”, Drilled Piers and Caissons II, 1985, ASCE, Denver, CO Conference. ASCE, Reston, VA.

"Caisson Load Test at One Park Place, Chicago, Illinois," Chicago Committee on High Rise Buildings, 1984.

"History of Chicago Building Foundations, 1948-1983," Chicago Committee on High Rise Buildings, 1984.

"Deep Foundations-Caissons and High Capacity Piles Update," Council on Tall Buildings and Urban Habitat, Monograph, 1983.

"Design of Foundations for the SOHIO Corporate Headquarters," Deep Foundations Institute, November, 1983.

"Soil Exploration, Testing, and Instrumentation for Drilled Piers - Recent Developments," National Bridge Conference, June, 1983.

“Settlement Prediction and Performance – New Orleans Style” ASCE Conference, New Orleans, LA, Oct. 25-29, 1982.

"Uses of Grouting in Caisson Construction," ASCE Conference, New Orleans, LA, February, 1982.

"A Unique Chicago Foundation: A Case History," ASCE Conference, St. Louis, MO, October, 1981, co-authored with S.M. Gale.

"Settlement of Buildings on Deep Compressible Soil," ASCE proceedings, May, 1979.

“Ground Movements Associated with Drilled Caisson Installation,” ASCE Convention, Pittsburgh, PA, April, 1978, co-authored with R.G. Lukas.

“A Modified Mat Foundation Design Over Soft Clay,” ASTM Specialty Conferences, Washington, D.C., June, 1974, co-authored with F. Wiesinger.

“Some Load Transfer Data on Caissons in Hard Chicago Clay,” ASCE Conference, Purdue University, LaFayette, IN, June 1972, co-authored with R.D. Holtz.

“Caisson Construction Problems and Corrections in Chicago,” Journal of Soil Mechanics and Foundation Division, ASCE, Vol. 97, No. 5M2, February, 1971, co-authored with Fazlur Khan.