

## **Professional Experience**

Senior Engineer, Schnabel Engineering, *Gaithersburg, MD, USA* (September 2003 to August 2004)

*General Responsibilities:* Proposal preparation, project management, geotechnical engineering analysis, design, and report preparation, review of engineering analysis and design, and mentor junior staff engineers.

Completed subsurface investigations, geotechnical analysis, design, and recommendations of shallow and deep foundation for the following projects:

- Parking Garage for Building 10, NIH, Bethesda, Maryland.
- Mid-campus Development (Business Building) of Georgetown University, Washington DC.
- United States Embassy Building in South Africa.
- Office Building, 1015 Half Street, S.E. Washington DC.
- Redevelopment on Landfill for Hunter Property, Fairfax County, Virginia
- Forest Knolls Elementary School Additions, Montgomery County, Maryland
- Sculpture, Glenstone Residence, Maryland
- Georgetown University Alumni House, 3604 O Street, N.W. Washington, DC
- Lake Fairfax Phase I Improvements, Reston, Fairfax County, Virginia
- Joint Strike Fighter and Supplies Facilities, Patuxent River Naval Air Station, Maryland
- Auger Cast Pile Load Testing, Prince George's County Courthouse, Maryland

Slope stability analysis, design and recommendations for:

- Retaining Wall – Northeastern Slope, Washington Estate, S.E. Washington, DC
- Blue Wing Drive, Lot 4 and 5 of Block 3, Mt. Vernon District, Fairfax County, Virginia

Subsurface investigations, damage study, repair design, and recommendations for:

- Naylor Garden, S.E. Washington DC.
- Emergency Generator Pad, Baywoods of Annapolis, Maryland
- MSE Retaining Wall, Tower Oaks Residential Development, Rockville, Maryland

Subsurface investigations for Storm Water Management (SWM) Pond design, and recommendations for:

- Martin Luther King SWM Pond, Silver Spring, Maryland
- Belcrest Center, Hyattsville, Maryland

Temporary excavation support and retaining structure design for:

- George Mason University Project Site, Fairfax, Virginia
- Glenstone Residence, Potomac, Maryland

Geotechnical investigation and recommendations for utilization of existing foundation structures:

- Verizon Bethesda Communication Center, 4533 Stanford Street, Chevy Chase, Maryland

Numerical analysis and modeling of embankment on soft ground with pile foundation for NCDOT:

- Performed numerical analysis and modeling of actual embankment (2m high) with reinforcement mattress and supporting timber piles by using Finite Difference Program FLAC.

Reviewer Federal Emergency Management Agency (FEMA) Levee Design Projects.

Evaluated the levee for reasonableness with respect to generally accepted geotechnical engineering practice and to ensure that the design approval is acceptable and in accordance with 44CFR65.05 of the National Flood Insurance Program Regulations. This evaluation included review of slope stability, settlement and seepage analyses. Reviewed the following projects:

- Mirehaven Arroyo Levee Project, Cielo Oeste, Albuquerque, New Mexico
- Sny Island Levee and Drainage District, Mississippi River, Adams, Pike and Calhoun Counties, Illinois
- Levee System along Smoky Hill River, Shilling Road Project, Salina, Kansas
- Enhanced Hills Subdivision Master Drainage Plan, Venada Arroyo Improvements Project, City of Rio Rancho and Town of Bernalillo, New Mexico
- Detention Dam at Walnut Creek, Parmer Lane, Austin, Texas
- Fort Bend Levee Improvement, District 15, Texas

Geotechnical Engineer, *URS Corporations, Gaithersburg, MD, USA* (September 2002 to August 2003) *General Responsibilities:* Geotechnical design, analysis and report preparation, proposal preparation, project management and mentor junior staff engineers.

Completed geotechnical analysis, design, and recommendations of shallow and deep foundation for buildings, as a Project Engineer of the following projects:

- Subsurface investigation, geotechnical analysis, design and report of hanger foundation in Elizabeth City, NC for United State Coast Guard.
- Subsurface investigation and geotechnical analysis, design and report of shallow & deep foundation, excavation support system and impact of excavation on the existing tunnel below proposed building structure for the Department of Transportation (DOT) Headquarter in Washington, DC.
- Geotechnical analysis and design of shallow and deep foundation for National Library of Medicine Facility Expansion, NIH, Bethesda, Maryland. Produced engineering analysis, recommendations and specifications for the underpinning.
- Geotechnical design and report of final cover (using geosynthetics) for Days Cove C & D waste landfill in Baltimore, MD
- Subsurface investigation, geotechnical analyses, settlement and side slope stability, of Days Cove C & D waste landfill extension in Baltimore, MD

Design Engineer, *L&M Foundation Specialist Pt. Ltd., Singapore.* (October 97 to August 99)

*General Responsibilities:* Design of deep foundation, retaining structure, and excavation support system for basement and cut-cover tunnels, project management, and report preparation.

Worked on numerous geotechnical and structural analysis and design of drilled shaft, deep foundation, excavation support system (retaining structure such as diaphragm wall, contiguous bored pile wall, secant pile wall) for basement, cut and cover tunnel, underpass for highway intersections, under ground Mass Rapid Transport (MRT) station.

- Performed numerical analysis and modeling for excavation support system using FEM program PLAXIS.
- Designed and Completed the following "Design and Build" projects:
  - Excavation support system (diaphragm wall) for top down two-storey basement construction and bored pile (Drilled Shaft) for the extension of shopping center "Mustafa".

- Diaphragm wall for circular ventilation shaft of Changi Airport MRT - Contact 503 underground tunnel
- Excavation support system (diaphragm wall) for top down two storey basement construction for the China Square Development Project – Land Parcel G
- Excavation support system (diaphragm wall) for bottom up two storey basement construction for the China Square Development Project – Land Parcel F
- Drilled shafts (0.5m to 2.0 m diameter) for China Square Development–Land Parcel G and F
- Jet grouting for ground improvement for the China Square Development Project – Land Parcel F and G.

Project Engineer, *Penta-Ocean Construction Co. Ltd., Thailand* (April 1997 to October 1997)

Dredging and Reclamation for the Development of MapTa Phut Industrial Estate, Thailand

*General Responsibilities:* Dredging channel slope stability analysis, project management, and report preparation.

- Checked design of dredging channel and prepared drawings for the submission and approval from the port authority.
- Attended weekly meeting with client and submitted monthly progress report.
- Coordinated with the port user for the shipping schedule and dredging schedule to avoid any accident.
- Communicated and co-ordinated with the sub-contractors from Singapore, Japan and Norway

Design Engineer, *Development Design Consultants, Dhaka, Bangladesh* (May 1994 to August 1995) -

*General Responsibilities:* Geotechnical and structural analysis, and design of building, bridge including superstructure and substructure.

- Completed geotechnical and structural analysis and design of typical bridges (lengths of 100m, 200m, 300m, and 400m).
- Completed foundation and structural design of five storey Lalmatia College building (3 Blocks)
- Designed under ground vault room for Bangladesh Bank, Barisal Branch
- Performed geotechnical and structural analysis by using Finite Element Programme STAAD III and completed design calculation by using in house software.

### **Highlights of Professional Experience**

#### **(1) Excavation Support System Design, Instrumentation, and Construction Monitoring**

I have extensive experience in the design, instrumentation, construction and performance monitoring of excavation support system design for building foundations, cut and cover tunnel for underpass, and temporary and permanent excavation support system for transportation related projects. I have completed five related design and build projects in Singapore while I was working as a Design Engineer for a specialist geotechnical company “L & M Foundation Specialist”. However, I have designed more than 50 (fifty) projects during my tenure in Singapore before relocating to USA for my Ph.D. degree at North Carolina State University in 1999. I had worked on design projects in Singapore, Hong Kong, Malaysia, and Thailand. After completing my Ph.D. in 2002, I had worked on five projects related to excavation support system design while working as a consultant in Washington DC area. I had designed,

constructed, and monitored three projects between 2002 and 2004. I can review the excavation support system design during the design phase, and if needed may propose alternative support system for projects. I can also provide instrumentation and construction performance monitoring plan and conduct the performance monitoring during the construction phase of the project.

## **(2) Geostructural Design, and Construction Monitoring of Retaining Structures**

I had worked on geotechnical and geostructural design of earth retaining structures projects extensively. The earth retaining structures includes soldier pile, sheet pile, contiguous bored pile, secant pile, diaphragm / reinforced slurry wall, and mechanically stabilized earth wall. My experience includes design, construction and performance monitoring of earth retaining structures mainly for projects in Singapore, and Washington DC area. I can review and design (if needed) retaining structures for projects during the design phase, and provide instrumentation and construction performance monitoring plan, and conduct the performance monitoring during the construction phase of the project.

## **(3) Slope Stability Analyses, Design, and Remedial Measures of Failed Slopes**

I have more than 10 (ten) years of experience in the analyses, design, instrumentation, and remedial measure design of slopes in Thailand, Singapore and USA. I had performed slope stability analyses using computer program STABL, Finite Element Program PLAXIS, and Finite Difference Program FLAC. However, in most design projects, I used computer program STABL. The advance numerical modeling was used during the forensic study of failed slopes to identify the progressive slope failure pattern. I had the opportunity to work on a unique project in Washington DC, where the structures on top of slope was experiencing differential settlement, causing huge cracks along different locations of the structures. The structures were built in 1950's. However, the first crack appeared in early 1970's. The owner went through 5 (five) rounds of remedial measures in 1979, 1983, 1987, 1993, and 2001 without much success. I was involved in the project during 2003-2004. Based on the extensive site investigation (the structures on slopes were built on expansive clayey soils), inclinometer readings, site visits, and seasonal moisture variation results, I summarized: (1) Presence of big trees near the structures was the main cause of moisture variation during the dry season, and (2) Recommended to cut the trees around the structures or water the trees during dry season to reduce the effect of moisture variation. Based on my experience, I can review and perform slope stability analyses and can propose remedial measures, if needed. I can also provide performance monitoring plan and conduct performance monitoring for slopes stability projects.

## **(4) Forensic Study of Failed Geotechnical and Geostructural Systems**

I had worked on few forensic studies in Washington DC area. One of the projects is described in the previous section. I also worked on forensic study of (i) Emergency Generator Pad, Baywoods of Annapolis, Maryland, (ii) MSE Retaining Wall, Maryland, (iii) Slope Failure in George Mason University Project Site, Fairfax, Virginia, (iv) Small Earth Dam Failure, Maryland. Based on the findings for the projects in Rockville, Maryland and George Mason University Project in Virginia, I had published and presented papers in Geocongress 2006 and Transportation Research Board's (TRB) Annual conference in Washington DC in 2007. In all these projects, I was involved in investigations and analyses of determining the causes of failure and had proposed remedial measures as a senior engineer with Schnabel Engineering. I was also involved in construction and performance monitoring during the remedial works. I have acquired High Resolution Resistivity (HRR) equipment to conduct geophysical study of existing subsurface conditions. Geophysical methods have the possibility to give an "image" of the subsurface. Also, with the development of new software for the interpretation of resistivity measurements, 2D and 3D "resistivity imaging" or "resistivity tomography" is extensively used today in

shallow geophysical investigation and especially for geohazard study. I plan work on forensic investigation of any failed geotechnical or geostructural system, conduct the investigation, and review and recommend corrective measures for the failed system.

#### **(5) Numerical Modeling**

I have more than 10 (ten) years of experience in numerical modeling. My experience includes work with various numerical analysis and design tools including the 2-D Finite Element Program PLAXIS, the 2-D Finite Difference Program FLAC, L-PILE, DRIVEN, gINT and few other geotechnical programs. My Master of Engineering thesis at the Asian Institute of Technology (AIT), Bangkok, Thailand was on "Performance Evaluation and Numerical Modeling of Embankment over Soft Clayey Soil Improved with Chemico Pile". I had worked on a full scale instrumented embankment on soft soils improved with chemico pile and monitored the performance of improved ground. I had also simulated the chemico pile improved soft ground by using the finite element program PLAXIS. Finally, I compared the numerical modeling results with the observed field data. I had published and presented a paper in Transportation Research Board's (TRB) Annual conference in Washington DC in 2006. I had completed a project for North Carolina Department of Transportation (NCDOT) using Finite Difference Program FLAC. I had worked on "Numerical Analysis and Modeling of Embankment on Soft Ground with Pile Foundation" for a highway projects in Tyrrel County, NC.

#### **(6) Deep Foundation Design, Construction Monitoring, and Load Testing**

I have extensive experience in the design, and load testing of drilled shaft founded on gravelly soils or rock in Singapore, Hong Kong, Malaysia, Thailand, and USA. I had completed five related design and build projects in Singapore. However, I had designed more than 50 (fifty) projects during my tenure in Singapore. I had worked on load testing and analyses of drilled shafts and auger cast pile projects in Washington DC area. I have also worked on a design and load testing of Franki Pile System used for the US Embassy project in South Africa.

I have also worked on reuse of an existing pile foundation system for vertical expansion in Washington DC Metro area. The building was built in 1930, in Bethesda, Maryland. A comprehensive pile load testing was conducted on an existing pile without interrupting the current occupants business in the building. The pile load and integrity testing of existing pile foundation was completed to determine the pile capacity and length, respectively.

#### **(7) Geotechnical Site Investigations and Foundation Recommendations**

I have extensive experience geotechnical site investigations, foundation analyses and design recommendations. I have worked on more than 20 (twenty) projects on geotechnical site investigations, shallow and deep foundation design, analyses and recommendations. I had worked with different site investigation methods, which included soil boring and Standard Penetration Testing (SPT), Dilatometer testing, Pressuremeter testing, and in-situ permeability testing. I have also worked on geotechnical site investigation on closed landfill for redevelopment.