AHMED ZEIN, PH.D., P.E.

Vice President



Summary

Ahmed is a Vice President and geotechnical engineer with more than 20 years of experience delivering foundation and ground engineering solutions for dams, levees, industrial and power facilities, transportation infrastructure, landfills and ground improvement projects. He leads geotechnical design efforts from subsurface investigations and advanced numerical modeling through construction-phase consultation, providing clear, practical recommendations on slope stability, seepage, foundations, retaining structures and earth-retention systems.

WEBSITE SAMPLE

Areas of Technical Expertise

- Geotechnical Engineering Design

Education

- Ph.D., Civil Engineering, 2005, University of South Carolina-Columbia
- B.S., Civil Engineering, 2001, Helwan University
- 10-hour OSHA Health and Safety Training
- 24-hour MSHA New Miner Training

Registrations

- Licensed Professional Engineer in FL, SC, OH, LA, ID

Select Project Experience

Geotechnical Engineering Design

H1-NDR Rail Loadout Facility and Infrastructure, Caribou County, ID.* Geotechnical engineering for the design of a new phosphate ore rail loadout facility providing ore storage, rail loading, access roads, and stormwater management infrastructure. Directed subsurface exploration and laboratory testing; performing bearing capacity, settlement, and slope stability analyses; and preparing a geotechnical design report with recommendations for site preparation, earthwork, foundations, pavement design, and ground improvement.

No. 2 Dragline Walkpath Plan for West of I-75 Reserves, White Springs, FL.* Geotechnical engineering services for six Dragline No. 2 walkpaths on the east and west sides of I-75 to support a Model 740 Page dragline accessing reserves west of the highway. Subsurface exploration and laboratory testing to characterize foundation soils in mined and virgin ground, and evaluation of allowable bearing pressures using a hybrid limit-equilibrium slope stability and Meyerhof-based bearing capacity approach.

SA-11 Tower Spillway, White Springs, FL.* Geotechnical engineering design services for a new tower spillway to be constructed on the dam of clay settling area No. 11 (SA-11) at Nutrien's White Springs facility. Performed slope stability and seepage analysis for the proposed grading, and provided foundation design and construction recommendations for the proposed tower spillway structure.

SFM-11 Clay Settling Area, Hardee County, FL.* Geotechnical engineering services for a new clay settling area (CSA SFM-11), adjacent to an existing CSA. Detailed seepage analyses to assess lateral and upward flow gradients at tie-in areas and geotechnical recommendations for drainage features to control pore water pressures and seepage gradients at the north and south connections.

*Denotes work performed with previous employer.

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Swift Creek Mine, FDOT I-75 ROW Crossing, White Springs, FL.* Geotechnical engineering design services for a planned utility crossing beneath I-75, including four ductile iron pipe casings installed by microtunneling and a 12-inch HDPE line installed by horizontal directional drilling. Subsurface exploration and laboratory testing, slope stability analysis for permanent slopes, and geotechnical recommendations for access pits, retaining structures and trenchless construction.

Closure Engineering Program, Coal Ash Management Program, NC.* Geotechnical engineering services for the closure of large ash impoundments at four power stations located in North Carolina. The program consisted of conducting subsurface explorations, engineering evaluations, analyses, design, and construction support activities for multiple complex impoundment closure projects.

Coal Ash Management Program, KY.* Geotechnical engineering for the closure of large ash impoundments and a gypsum stack at a major power station. The program consisted of conducting engineering evaluations, analyses, design, and construction support activities.

Coal Ash Management Program, Southern IN.* Geotechnical engineering for all of AECOM's coal ash management projects at the specific station in Indiana. The program consisted of conducting engineering evaluations, analyses, design, and implementation for multiple projects involving the upgrade of the ash management infrastructure (ponds, basins, landfills, spillways, dikes, etc.) to meet current engineering and operational criteria.

Louisa and Riverside Generating Stations, IA.* Performed seepage and slope stability analyses for the existing ash containment pond embankments at the Louisa Generating Station and Riverside Generating Station. The analysis was performed for the client in response to an audit by the EPA of the existing ash containment ponds in both stations.

Duke Energy Allen Steam Station, CCR landfills, Gaston County, NC.* Geotechnical design services for three CCR landfills. Evaluation of landfill slope stability (under static and seismic loading conditions), settlement of base liner, veneer stability for base liner and final cover system, and liquefaction triggering potential. Extensive subsurface investigation, extensive laboratory testing programs, historical document review and evaluation, engineering design analyses, and preparation of design calculation memoranda.

Tennessee Valley Authority (TVA), Gallatin Fossil Plant (GAF) North Rail Loop Landfill Facility, Gallatin, TN.* Geotechnical analysis for evaluating seismic deformation for a newly proposed landfill. The seismic analysis was performed as part of the industrial waste permit application referred to as North Rail Loop (NRL) Site located at the TVA GAF. The proposed site will be permitted as a new industrial solid waste landfill through the Tennessee Department of Environment and Conservation (TDEC) Division of Solid Waste Management.

Tennessee Valley Authority (TVA), Paradise Fossil Plant (PAF) CCR landfill facility, Drakesboro, KY.* Geotechnical analysis for evaluating static slope stability and veneer translational stability. The analysis was performed for a newly proposed landfill at TVA PAF to meet the necessary CCR guidelines according to the KDEP and USEPA requirements to obtain a solid waste disposal facility permit for the proposed landfill site.

Deep Mixing Method (DMM) for Liquefaction Mitigation, Coal Ash Management Program, Southern IN.* Design of a DMM stabilization system for improving the liquefaction resistance of foundation soils for a CCR impoundment. The project included conducting a geotechnical investigation and engineering design for DMM panels along 2,800 feet of existing dikes.

Farias Lake Dam Rehabilitation, Laredo, TX.* Geotechnical engineering services for the planned rehabilitation of the existing 3,000-foot-long dam using soil-cement mixtures. The dam impounds a lake with an approximate surface area of 25 acres at normal pool. Engineering analysis (slope stability and seepage modelling) for the rehabilitated dam and providing design and construction recommendations for soil-cement lined principal and emergency spillways.

I-20 Noise Wall, Columbia, SC.* Geotechnical services for a new noise wall along I-20 between I-77 and Spears Creek Church Road, including subsurface exploration, laboratory testing, and slope stability analyses to support design and construction.

I-73 Right-of-Way Study, Multiple Counties, SC.* Geotechnical services for Segments A and C of an approximately 18-mile corridor between Dillon and Marion, South Carolina. Subsurface exploration and laboratory testing, monitoring roadway borings, and performing settlement, slope stability, liquefaction, and in-situ testing (dilatometer and ReMi) to support embankment and bridge design.

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Ohio Department of Transportation (ODOT), CUY-90 Innerbelt CCG2 Project (PID 82119), Cleveland, OH.* Geotechnical engineering recommendation reports provided for designing the bridge and abutment foundations associated with Interstate Route 90 (IR-90) Eastbound Innerbelt Bridge over the Cuyahoga River. Designed and constructed a new five-lane bridge. In addition to serving as the technical reviewer for foundation design, other responsibilities included performing complex stress and settlement analyses for the bridge abutments.

Ohio Department of Transportation (ODOT), MOT-70 Bridge Replacement, Multiple Locations (PID 76667), Montgomery County, OH.* Deep foundation design associated with the rehabilitation and widening of bridges along Interstate Route 70 (IR-70). This included bridges over the Stillwater River (MOT 70-11.92), over SR-48 (MOT- 70-1130), over Frederick Pike (MOT-70-1267) and over Meeker Road (MOT 70-12.19). Developed design and construction recommendations for deep foundations to support the new bridges and provided construction plan notes.

SC-262 (Leesburg Road) Widening Project, Columbia, SC.* Geotechnical study for the planned widening of SC-262 (Leesburg Road), including planning subsurface exploration and laboratory testing, performing preliminary slope stability analyses, and developing initial geotechnical recommendations to support roadway design and construction.

Texas Department of Transportation (TXDOT), I-635 LBJ East Design-Build Project, Dallas County, TX.* Geotechnical engineering for the $1.74 billion design-build roadway construction project by the Texas Department of Transportation (TxDOT) to improve mobility, operations and safety along Interstate 635 (I-635). The project spans 11 miles beginning just east of US 75 in North Dallas to I-30 in Mesquite.

Bay Pines National Cemetery Expansion, St. Petersburg, Pinellas County, FL.* Geotechnical investigation for a cemetery expansion and improvements to existing buildings, including subsurface exploration and laboratory testing, bearing capacity and settlement analyses for shallow foundations, and a geotechnical design report with recommendations for site preparation, earthwork, shallow foundations, and pavement design and construction.

Manatee County Environmental Site Assessment (ESA) and Geotechnical Investigations, Manatee County, FL.* Due diligence services for two planned stormwater reservoirs on recently acquired county properties, including Phase I ESA, geophysical survey, test pit excavations, groundwater monitoring, and laboratory testing to evaluate allowable excavation depths and confirm suitability of on-site soils as borrow material.

City of Broken Arrow Water Treatment Improvements, OK.* Geotechnical analyses for two new reservoir embankments at the City of Broken Arrow Water Treatment Plant, including slope stability and seepage evaluations and design recommendations to support embankment construction.

Grove Land Reservoir and Stormwater Treatment Area (GLRSTA), Okeechobee and Indian River Counties, FL.* Geotechnical services for Phase III of a 5,000-acre, 30-foot-high earthen reservoir and 2,000-acre stormwater treatment area, including directing field exploration and laboratory testing, providing foundation design for water control structures, and overseeing final seepage and slope stability analyses.

International Boundary and Water Commission (IBWC) Arroyo Colorado North levee, Hidalgo and Cameron Counties, TX.* Seepage and slope stability analyses for the proposed crest raising of 10.5 miles of the Arroyo Colorado North Levee in Hidalgo and Cameron Counties, Texas, including evaluation under increased loading with steady-state and rapid drawdown conditions and seepage modeling of critical sections.

International Boundary and Water Commission (IBWC) Upper Rio Grande Levee Evaluation, Fabens and Fort Hancock, TX.* Seepage and slope stability analyses for the proposed crest raising of 15.4 miles of the Upper Rio Grande levees near Fabens and Fort Hancock, Texas, including ReMi testing to develop 100-foot shear-wave velocity profiles and liquefaction evaluations at critical sections.

North Canadian Sewage Treatment Plant Levee Certification, Oklahoma City, OK.* Seepage and slope stability analyses for a 7,200-foot flood protection levee separating the North Canadian sewage treatment plant from the North Canadian River, evaluating performance under steady-state and rapid drawdown conditions to support levee design and risk assessment.

Tuscarawas River Levee Certification, Massillon, OH.* Engineering evaluation of approximately 17,300 linear feet of flood protection levee to assess performance for the 100-year event, including slope stability analyses under steady-state and rapid drawdown conditions and seepage modeling of representative sections to evaluate flow rates and critical exit gradients through and beneath the embankment.

Village of Waterloo Levee Certification, Waterloo, NE.* Seepage analysis for 18,100 linear feet of flood protection levee surrounding the Village of Waterloo, evaluating performance under flooding from the Elkhorn and Platte Rivers to support levee accreditation with FEMA.

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Select Papers, Lectures and Publications

"Frequency Spectrum Analysis of Impact-Echo Waveforms for T-beams," American Society of Civil Engineers – Journal of Bridge Engineering, 2010 (co-author)

"Relationship between Impact / Echo Response and Structural Behavior of Retrofitted Concrete Girders during Loading," American Society of Nondestructive Testing- Materials Evaluation, 2008 (co-author)

"Change in Impact-Echo Response during Fatigue Loading of Concrete Bridge T-Girder," Gassman, S.L. and Zein, A.S., 2008 (co-author)

"Non-Destructive Assessment of an Aged Concrete Arch Culvert," 86th Annual Meeting of the Transportation Research Board, January 2007 (co-author)

"Use of Apparent P-wave Velocity Measurements to Estimate the Bending Stiffness of a Concrete Bridge Girder," The 7th Structural Materials Technology (SMT): NDE/NDT for Highways and Bridges and The 6th International Symposium on Nondestructive Testing in Civil Engineering, September 2006 (co-author)

"Condition Assessment of Concrete Bridge T-shaped Girders under Fatigue Loading," Structural Materials Technology (SMT): NDE/NDT for Highways and Bridges, September 2004 (co-author)

"Condition Assessment of Concrete Bridge T-shaped Girders under Fatigue Loading," Structural Materials Technology (SMT): NDE/NDT for Highways and Bridges, September 2004 (presenter)

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CONTACT

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