

ESSEX

Engineering Science & Subsurface Exploration, P.C.
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JAMES L. WOOD, Ph.D., P.E. **Civil and Geotechnical Engineer (Principal)**

*civil engineering; geotechnical engineering; inspection, analysis and design of earth dams;
structural foundations; machine foundations; retaining systems; seepage controls;
earth and rock slope stability analysis and stabilization; settlement analysis;
construction management; mining; solid waste; failure investigation and expert testimony*

Education

Clarkson University, Potsdam, New York:

Ph.D.	Engineering Science (Solid Mechanics)	1976
M.S.	Civil and Environmental Engineering	1973
B.S.	Civil Engineering (with distinction)	1971

Licenses

Licensed Professional Engineer:

New York, New Hampshire, Massachusetts,
New Jersey, Pennsylvania, Maryland

Professional Memberships and Associations

American Society of Civil Engineers
Chi Epsilon Civil Engineering Honor Fraternity
National Society of Professional Engineers
Association of State Dam Safety Officials
United States Committee on Large Dams
International Commission on Large Dams
American Society for Testing and Materials
International Society of Soil Mechanics and Foundation Engineers

Career Summary

Dr. Wood is a licensed civil engineer with 34 years of experience and with special expertise in geotechnical engineering. He has experience in the selection, exploration, characterization, analysis, design, permitting and closure of civil and environmental construction sites for: earth dams and reservoirs, industrial plants, mineral processing facilities, waste management operations, transportation corridors and institutional and commercial construction.

Dr. Wood has performed feasibility studies; site development planning; analysis of slope stability; excavation support designs; bearing capacity, settlement, seepage and drainage analyses; mine subsidence control designs, permitting and engineering design of earth dams, embankments, building foundations, bridge foundations, machine foundations, retaining walls, underpinning systems; waste disposal facility development and closure planning; preparation of construction drawings and specifications; construction quality control, safety inspections and forensic engineering. He has participated in the development of designs and closures under the RCRA and SMCRA, NPDES and CERCLA regulatory programs and has contributed to the preparation and review of environmental impact statements under New York's State Environmental Quality Review Act (SEQRA).

Foundation Investigation and Design Experience

Served as geotechnical engineer of record for a series of nationally known hotel properties in New York, Massachusetts, Connecticut, New Hampshire, Maine, Pennsylvania and New Jersey. Services include geotechnical explorations; recommendations for building foundations, retaining walls, pavements and stormwater management facilities; preparation of earthwork specifications; review of structural drawings and specifications for consistency with geotechnical recommendations and materials testing. Some of the unusual site conditions that have been successfully overcome are existing fills of variable compressibility, shallow underground mines and deep deposits of very compressible peat and clay. Recommended foundation types included conventional shallow foundations, compensated foundations (void spaces below grade to offset building weight), and surcharges. Geo-foam was evaluated for use on one project.

Served as geotechnical engineer of record for a series of nationally known consumer electronics stores in Pennsylvania, New Jersey, New York, Connecticut and Massachusetts. Services include geotechnical explorations, recommendations for building foundations, retaining walls and pavements. Some of the unusual site conditions that have been successfully overcome are existing fills of variable compressibility, underground mines and deep deposits of very compressible peat and clay. Recommended foundation types included conventional shallow foundations, piles.

Inspected, directed, and managed the Federal Energy Regulatory Commission (FERC) Part 12 five-year safety inspection of Hawks Nest hydroelectric power project at Hawks Nest State Park, West Virginia.

Designed shallow foundations for a 140-foot diameter clarifier built over 10 to 15 feet of hydraulically placed silty sand, resulting in insignificant differential settlement.

Conducted site reconnaissance, designed subsurface exploration, directed laboratory testing and designed all foundations, embankments, haul roads and retaining walls for a new coal mine, preparation plant and loadout facility in eastern Kentucky.

Researched and developed standard for lateral earth pressure design for safety-related retaining walls for nuclear power station designs.

Slope Stability Analysis and Design Experience

Consults with Washington County (New York) Department of Public Works regarding stabilization of highway embankments and natural slopes underlain by soft glacio-lacustrine clays, application of innovative lightweight fill materials, highway drainage and similar geotechnical issues.

Developed and managed \$250,000 in geotechnical engineering services for the Arizona Department of Transportation for the major realignment and reconstruction of a four-lane highway through the environmentally sensitive and marginally stable colluvial slopes on the Payson-Show Low Highway. Identified design criteria, laid out and directed subsurface explorations, selected samples and laboratory test programs, selected design concepts, directed slope stability analyses, directed and reviewed calculations, prepared project specifications and engineering report, and presented designs to the US Forest Service on behalf of ADOT. Consulted with ADOT regarding the preservation of unique columnar rock ledges along the Mogollon Rim.

Investigated a rockslide at the site of excavation for a major new hotel in the Philadelphia suburbs and led the design of temporary and permanent slope stabilization measures using rock anchors, steel columns and reinforced concrete.

Directed an emergency response to assess abutment seepage and instability and supervised grouting to create a seepage cutoff and stabilize a two hundred-foot high mine tailing dam.

Directed and managed a \$250,000 contract with the US Department of the Interior, Office of Surface Mining to abate abandoned mine land emergencies such as landslides, mine subsidence, refuse bank fires and dam failures.

Value Engineered abutments for new Main Street Bridge in Greensburg, PA, saving PADOT over \$200,000 in bridge construction funds, and reducing construction schedule by two months.

Prepared designs and specifications for and monitored construction of a 2,000-foot long, 60-foot high earth and rockfill dam near Oklahoma City, Oklahoma.

Designed a cellular steel sheet pile retaining wall approximately 500 feet long and 40 feet high above the dredge line for a shipping facility in the New York City area.

Designed and prepared construction specifications for a cellular steel sheet pile retaining wall 200 feet long and 25 feet high to support a 1,600-ton reactor vessel during unloading from an oceangoing barge.

Monitored subsurface exploration of ancient landslides north of Pittsburgh, performed slope stability analyses and developed conceptual alternatives for the stabilization of the slope to allow construction of the East Street Valley Expressway.

Performed slope stability analyses and prepared embankment designs for several large coal mine waste impoundments in Pennsylvania, Ohio, Kentucky, Virginia, and West Virginia. Developed a geotechnical instrumentation program for the main cooling lake dam at a Midwest US nuclear power station.

Distress/Failure Investigation Experience

Investigated, analyzed, prepared technical briefs and delivered expert testimony regarding the geotechnical and hydraulic condition and ultimate failure of a small earth dam that resulted in the derailment of three locomotives and injury of the train crew.

Investigated structural condition of buildings on campus of California State University at Northridge following January 17, 1994 earthquake. Investigations included exploratory demolition, documented observation of seismic damage details, assessment of structural significance of damage and identification of stabilization and repair techniques. Dr. Wood's team of engineers and technicians, which was one of about ten such teams, investigated the condition of approximately twenty buildings that had experienced violent horizontal and vertical acceleration or were damaged by permanent ground displacement resulting from liquefaction.

Investigated, directed analysis and prepared conclusions regarding bearing capacity failure of a temporary foundation resulting in the destruction of a 300-foot long, 160-ton steel truss a contractor was placing for a basketball stadium at Michigan State University and two large cranes

Investigated and designed correction of pier instability at two 800-foot long, six-span bridges on Interstate 80 for the Pennsylvania Department of Transportation.

Investigated and provided expert testimony regarding foundation failure for major new high school campus in West Virginia. Prepared and provided construction consultation during the reconstruction program to mitigate hazards due to an underlying coal mine. Presented expert testimony regarding the causes of failure.

Investigated a rockslide at the site of excavation for a major new hotel in the Philadelphia suburbs and led the design of temporary and permanent slope stabilization measures using rock anchors, steel columns and reinforced concrete.

Solid Waste and Landfill Experience

Assisted with the development of plans under 6 NYCRR Part 360 supporting a permit application for a paper sludge disposal facility in northern New York State.

Directed, managed, approved and sealed approximately one dozen large mine tailing dam designs, including eight coal refuse dams up to 400 feet in final height; three glass sand tailing dams; and one taconite tailing dam located in Pennsylvania, Ohio, West Virginia, Kentucky, South Carolina and Minnesota, representing \$1,000,000 in engineering services worth over \$100,000,000 in construction value.

Performed office research and field experimentation on use of woven and non-woven geotextiles in sediment control facilities at an eastern Kentucky coal mine.

Conducted an inventory of potential sanitary landfill sites in northern West Virginia using USGS maps, SCS maps, and stereo aerial photographs.

Provided an economic analysis of a coal mine's refuse disposal practices and recommended the development of an impounding facility, Waynesburg, PA. Directed the exploration of the site and the design and permitting efforts; represented the client in negotiations with the Department of Environmental Resources; and guided the construction of the facility, which is now several hundred feet high.

Managed a project to evaluate the leachate characteristics and seepage routes at an intensively undermined coal refuse disposal facility and to design a leachate collection system and treatment plant.

Acted as Project Manager for an OSM Coal Refuse Leachate Minimization Research Project. This project resulted in the recommendation of low-cost, innovative technologies applicable to the construction of modern waste disposal facilities. The object of these technologies was to minimize the acidification of coalmine waste leachate.

Provided expert testimony on mine waste and mine reclamation projects and taught sections of short courses on mine waste management, sponsored by the Mine Safety and Health Administration, the Federal Emergency Management Administration, and the West Virginia Department of Energy.

RCRA/CERCLA Compliance/Closure Experience

Prepared soil erosion and sediment control plans, assisted in the development of engineering plans and specifications, and supervised professional services during the closure of a RCRA facility in Bridgeport, Connecticut.

Prepared and sealed RCRA Part B Permit Application as licensed professional engineer for facility in Bridgeport, Connecticut.

Performed Slope stability analysis, designed surface drainage system, developed grading plans and designed soil bentonite slurry wall seepage barrier as part of the Remedial Investigation and Feasibility Studies for the Schilling Landfill (Ohio) Superfund Site.

Prepared Remedial Investigation and Feasibility Studies workplan for Stark Oil (New York Inactive Hazardous Waste) Site.

Developed remedial action workplan for major marine coatings manufacturer under New Jersey's ECRA.

Construction Management Experience

Directed exploration, design and construction of foundations and maintenance pits for two large new printing presses (one 60 feet long and one 120 feet long) and an associated 4,000 square foot soundproof office building within the printing plant. Due to the printer's production schedule and his need to maintain a very dust free environment, all construction was conducted during the night shift and inside polyethylene tents ventilated to the outdoors.

Researched and developed draft specifications for and monitored construction of soil-bentonite and cement-bentonite slurry walls surrounding a cooling water lake for a Midwest US nuclear power station.

Sited coal refuse impoundment, which is several hundred feet high in Harlan County, KY; conducted the subsurface exploration; prepared the permit documents; and guided its construction.

Directed subsurface exploration of an existing closed-circuit coal refuse disposal facility in Kirby, PA and prepared permit and construction documents to stabilize the embankment and reduce the generation of sediment and acidic leachate. Also guided the construction to implement recommendations and provided periodic reviews and certifications to the Department of Environmental Resources.

Mining Experience

Consulted with a West Virginia Board of Education concerning foundation distress noted early in the construction of a new high school campus above a reclaimed coal mine. Designed and supervised a subsurface exploration of the site and presented evidence of incomplete reclamation at trial. The reclamation contractor was required to correct the reclamation and rebuild the campus.

Designed and supervised subsurface exploration of a site, led the design of a dam to contain coal preparation waste, and presented information about the site and design of the dam to local residents at a public hearing. The dam was approved and is currently in service.

Presented instruction on the "Planning, Design, and Construction of Coal Refuse Disposal Facilities" at a short course sponsored by the Mine Safety and Health Administration of the US Department of Labor.

Presented instruction on the analysis of the stability of mine waste embankments under seismic conditions at a conference sponsored by the Association of State Dam Safety Officials.

Presented instruction to the dam safety community about the unique features of mine waste facilities that must be considered during safety evaluations. The Federal Emergency Management Agency sponsored the conference.

Managed and provided technical leadership on a \$250,000 project to identify hazards related to abandoned mines, design corrective measures, and oversee reclamation. The project included approximately 30 projects involving subsidence control measures, slope stabilization, ground water, and seepage control, and mine fires. The investigation and correction of these problems required interviews and meetings with affected citizens.

Designed and oversaw construction of structural bulkheads in underground mine entries to control flooding anticipated to result as a possible consequence of subsidence near a surface impoundment. The bulkheads represented a second defense against flooding active parts of the mine.

Consulted with R and F Coal Company and with the refuse facility designers concerning the quantity and quality of seepage from the downstream slope of the dam during the early stages of development of a large coal refuse disposal facility.

Provided an economic analysis of a southwestern Pennsylvania mine's refuse disposal practices and recommended the development of an impounding facility. Directed the exploration of the site and the design and permitting efforts; represented the client in negotiations with the Department of Environmental Resources; and guided the construction of the facility, which is now several hundred feet high.

Directed a subsurface exploration of the existing closed-circuit coal refuse disposal facility and prepared permit and construction documents to stabilize the embankment and reduce the generation of sediment and acidic leachate. Also guided the construction to implement his recommendations and provided periodic reviews and certifications to the Department of Environmental Resources.

Managed this project to evaluate the leachate characteristics and seepage routes at this intensively undermined coal refuse disposal facility and to design a leachate collection system and treatment plant.

Earthdams, Liners and Seepage Control Experience

Participated in the design and preparation of construction documents for the landfill liner at the Hudson River Mill of International Paper Company in Corinth, New York. The design complies with New York State DEC requirements including dual impervious zones and a pore pressure relief system. The liner has been constructed and is in use.

Designed, prepared construction specifications and monitored construction of a 2,000-foot long, 60-foot high earth and rockfill dam on highly erodible foundation soils near Oklahoma City. The design included an upstream blanket of relatively impervious earth to control the seepage gradient through the dam foundation. The dam and blanket were constructed and are in operation.

Designed numerous small earthdams and prepared reservoirs for sediment and erosion control structures at surface mine sites throughout the Appalachian Coal Field. Examples of these structures may be found in Kirby and Waynesburg, PA; Erbacon and Chesapeake, WV; Harlan and Hazard, KY and many other sites. The design of these structures must anticipate the effects of desiccation during prolonged dry periods and remain reasonably impervious (and stable) during sudden periods at the design high water level.

Designed earthdam and reservoir liner system to control underseepage through a steeply sloping and fractured rock foundation near Indiana, PA. The liner system was necessary to maintain embankment stability and to limit seepage into and near occupied structures at the base of the dam. The dam is about 60 feet high and the reservoir encompasses about 20 acres. The reservoir preparation measures included selective removal of pervious soils, and excavation of benches in the weathered rock to support compacted impervious fill from a local source. Seepage is monitored in the embankment and foundation and has remained below design limits.

Conducted research into the use of fine grained mine tailings to reduce the generation of acidic mine drainage caused by seepage of impounded water through coal mine tailing dams. The fine-grained tailings have the added benefit of lowering the phreatic surface in these dams and thereby improving their stability, especially during seismic events. The approach was implemented at numerous facilities by discharging mine waste in such a manner that finer material was deposited at the locations of seepage zones that had been identified piezometrically.

Career History

Engineering Science & Subsurface Exploration, P.C. 1997 to present
Hudson Falls, NY
Civil & Geotechnical Engineer (Principal)

James L. Wood, Ph.D., P.E. 1995 to 1997
Hudson Falls, NY
Sole Proprietor

Law Environmental 1991 to 1995
Albany, NY
Principal & Chief Engineer

D'Appolonia Consulting Engineers 1977 to 1991
Pittsburgh, PA
Vice President

Sargent & Lundy Engineers 1975 to 1977
Chicago, IL
Soils Engineer

NY State Department of Transportation 1969 to 1975
Albany, NY
Intern Civil Engineer (summer and winter)

Clarkson University 1973 to 1975
Potsdam, NY
Engineering Mechanics & Surveying Instructor (autumn and spring)