Exponent®
Engineering & Scientific Consulting

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Professional Profile

Dr. Vasilikou is a Manager in Exponent's Construction Consulting practice. She has over nine years of experience in the civil and structural engineering industry.

Dr. Vasilikou has extensive design and on-site experience and has worked on a variety of construction projects with a particular focus in underground infrastructure, both as an engineer and a consultant. Her expertise spans from initial project design via application of advanced numerical analysis and digital techniques to supervision of project execution for public and private entities around the world.

Dr. Vasilikou advises construction clients on a variety of issues related to project management, risk management, project controls, dispute avoidance, and the development or defense of construction claims. Dr. Vasilikou specializes in forensic delay analysis, project planning, and scheduling. Past projects include bridges, rail/transit and mines.

Working with international teams in several regions, Dr. Vasilikou has held lead design and project management positions for a number of milestone infrastructure projects involving deep excavations, tunnels, and shafts. In addition, she has focused on introducing innovative approaches in traditional construction design through application of Machine Learning and Artificial Intelligence methodologies that provide assurance and effective budgeting, resourcing, and cost-management in large scale projects with significant design challenges.

At her previous positions as an engineering consultant, Dr. Vasilikou was instrumental in providing support for complex designs of hard rock and soft ground mined shafts and tunnels. She led geo-structural engineering and geological mapping initiatives via analytical and numerical (FLAC 2D/3D, UDEC & 3DEC, Plaxis 2D/3D) design as part of high-profile Design, Build, Finance, Operate and Maintain (DBFOM) projects in Asia-Pacific and North America.

Academic Credentials & Professional Honors

Ph.D., Mining Engineering, Virginia Polytechnic Institute and State University, 2014

M.S., Civil Engineering, Virginia Polytechnic Institute and State University, 2012

B.S., Civil Engineering, National Technological University, 2009

Prior Experience

Senior Tunnel Engineer, Arup (2018 – 2021)

Tunnel Engineer, Arup (2014 – 2018)

Professional Affiliations

American Society of Civil Engineers

Society for Mining, Metallurgy & Exploration

Society of Construction Law North America

Society of Women Engineers

Project Management College of Scheduling

New York Building Congress

Languages

Greek

German

Project Experience

Light Rail Transit, Canada

Tunnel engineer for the Design, Build, Finance, Operate and Maintain (DBFOM) project to build a $4b light rapid transit (LRT). The project was approximately 2km long including a 400m mined tunnel, major cable stayed bridge crossing, and an elevated guideway. Responsibilities included design of the temporary lining for the Quarters Tunnel using 2D ground-structure interaction modelling (Plaxis2D) and concrete design to applicable project codes and standards. Developed 3D simulation work (FLAC3D) to determine ground relaxation curve for 2D numerical design efforts and verify proposed support. Supported cross-team collaboration for the development of the BIM model. Supervised field work and acted as on-site liaison for the client, vendors, and team of 6 engineers.

Light Rail Transit Project, Canada

Performed delay analysis for a dispute involving the replacement and improvements of an existing 6.4 km rail corridor in Canada. The project included new passenger platforms, station tracks, signals, switches, and circuited track while maintaining non-stop train service. Prepared expert reports for an arbitration, on behalf of the contractor, to assess delays related to design, procurement, installation, testing and commissioning.

Confidential Project, Station Caverns and Tunnels Design

International high-profile project including excavation of underground subway stations and tunnels connections. Design challenges include highly fractured rock under extremely high horizontal stresses. Performed 3D discontinuum simulation (3DEC) to determine the kinematic failure mechanism and optimized support to strict deformation allowable criteria.

Rail Tunnel, Toronto, Canada

The project involved a tunnel passing underneath all twenty-one (21) lanes of traffic effectively (approximately 176m). The tunnel was a minimum of 10.7m in width (inside wall-to–inside wall) and a minimum of 8.6m in height (top of structural floor slab-to-ceiling). Developed 3D numerical models (FLAC3D) to assess and optimize the excavation round length, face support, liner installation timing and proposed jacking frame forces and frequency to conform to allowable ground settlement criteria.

Subway Line Design/Build, Hong Kong

Tunnel Engineer for the design-build project consisting of two separate excavations: a 14m span x 12m high tunnel and a 6m span x 6m high ovoid ventilation adit; both mined through saturated, completely decomposed granite (saprolite) and mixed face/corestone conditions for new metro project. Other major challenges included low cover of 8.5m at portal break out from shaft. Responsibilities included detailed design calculations and numerical simulation (UDEC, FLAC3D) to determine excavation sequence. Seven different support types were developed for varying rock level and ground behavior responses.

Subway Stations, New York, NY

Consultant Engineer to upgrade 33 existing subway stations across all five New York City boroughs. This $500m+ program was delivered via design-build and other alternative procurement methods, with individual contract packages structured to minimize operational impacts while enabling significant architectural improvements. Responsibilities included support of preliminary design, scheduling, cost estimating work and managing the fast-tracked delivery of this program alongside a NYCT team in a co-located project office.

Rock Caverns, Lead, SD

Lead designer for a Project, to be sited 5000 ft. Project involved blasting three caverns up to 65 ft. span x 500 ft. long used to house a liquid argon neutrino detector. Responsibilities included geological mapping of existing drift tunnel in phyllite rock. Carrying out continuum (FLAC3D) and discontinuum (3DEC) 3D numerical modeling using various constitutive laws for anisotropy during preliminary and final design. Managing the design during the construction phases, including coordinating the multi-disciplinary design implementation (tunnel, structural, electrical, mechanical), collaborating with the BIM Team for the development and delivery of the Project BIM model and responding to RFIs to accommodate the contractor’s means and methods.

Confidential Project, Deep Shaft Lining Review and Design

Worked with a team of engineers to review the design of a failed temporary deep (over 1000m) shaft lining comprised of wire mesh reinforced shotcrete. Shaft was situated in weak and weathered, creeping ground under artificial ground freeze. Performed 3D numerical modeling to identify the key failure parameters and their interrelation. Second phase of work involved detailed design of a temporary lining with a user defined creep model calibrated to in situ monitoring data.

Mining, UK

Acted as Owner’s third-party reviewer. Carried out a lining check design for twin 1600m deep shafts. Assessed ground behavior and determined temporary and permanent support requirements for shaft liner in hard and evaporitic rock. Developed numerical models to simulated extremely squeezing Carnalltic Marl ground.

Tunnel, Las Vegas, NV

On-site Tunnel Engineer during excavation of tunnel through both intact and faulted rock mass conditions below Lake Mead. Supervised segmental lining, probing and grouting operations.

Tunnel, Doha

Provided preliminary engineering for adit and TBM starter tunnel in weak limestone rock involving empirical and numerical (UDEC) analysis to develop support and assess ground settlements.

Airport, Jamaica, NY

On-Site Engineer for the expansion and redevelopment of airport Terminal. Design included approximately 4000’ of water main, 1000’ of gravity sewer, and 1500’ of directional drill force main for a sanitary pump station. Performed site observation and engineering and construction administration during the build out of civil works.

Mixed-Use Highrise, New York

Performed quantum and delay analysis for a dispute related to the construction of a 42-story hotel and commercial building in New York. The $2.4 billion project involved the renovation of an existing building and construction of 370,000 square feet of new space, including 452 guestrooms, 27 suites, an 1,880-square-foot penthouse unit, a 40,000 square-foot retail space, and one of the largest, uninterrupted outdoor LED media walls in the world. Prepared expert reports, on behalf of the owner, to assess delays and determine the additional costs.