

Prof. Dr. Levent Ozdemir, PE

**Mechanical Tunneling
Consultant**

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EDUCATION : B.S. Mining Engineering
Colorado School of Mines, 1973
Graduated with honors

M.S. Mining Engineering
Colorado School of Mines, 1975

Ph.D. Mining / Civil Engineering
Colorado School of Mines, 1977
PhD thesis in Mechanical Tunneling

PERSONAL DATA:

Date of Birth : December, 4, 1951
Citizenship : United States

PROFESSIONAL ENGINEER:

Registered professional engineer in the
State of Colorado

AREAS OF QUALIFICATION:

Tunneling and underground construction, including: mechanical rock and soil excavation; hard rock and soft ground mechanical tunneling, microtunneling, mechanical

mining, raise boring and shaft drilling, design, selection and performance assessment of mechanical excavators, including hard rock TBMs, Earth Pressure Balance (EPB) machines and Slurry Shield TBMs, Microtunneling machines, Mechanical trenchers, Roadheaders, Raise borers, Shaft drills, design and construction of civil underground structures, geotechnical site investigations and ground support evaluations.

CAREER HISTORY:

Colorado School of Mines, 1977-2009

Position: Professor of Mining Engineering

Taught numerous undergraduate and graduate courses in the CSM Department of Mining in the areas of mechanical hard rock and soft ground/soil tunneling, raise boring and shaft drilling, design and construction of underground structures, geotechnical site investigations, excavation project management, microtunneling, rock mechanics and underground mining. Served as the advisor of a large number of Masters and Ph.D. students. Also, gave numerous invited lectures in mechanical tunneling and underground construction at prominent universities worldwide.

Colorado School of Mines, 1981 to 2009

Director, Excavation Engineering and Earth Mechanics Institute (EMI)

Director of the Excavation Engineering and Earth Mechanics Institute (EMI), which is, regarded as one of the leading research organizations in the world in the development of new mining and underground construction technologies. In this position, developed and provided the technical and financial management of a large number of projects funded by a multitude of domestic and international mining and civil construction companies, equipment manufacturers, geotechnical and design firms, contractors, owners and various United States government agencies. In addition, performed a significant amount of collaborative research with various well-known mining and underground construction research establishments in different countries. Contributed to the development and introduction of numerous mechanical hard rock and soft ground mining, tunneling, raise and shaft boring and underground construction technologies. Responsible for the development of design optimization techniques, machine selection and performance evaluation of mechanical excavators including hard rock TBMs, EPB and Slurry machines. . Conducted extensive field work in hard rock and soft ground tunneling project sites around the world.

Colorado School of Mines, 1992 to 2009

Position: Director, Microtunneling Research Institute (MRI)

Director of Microtunneling Research Institute which conducted research and development in the rapidly growing field of microtunneling. Research areas included machine selection, design and performance optimization, new cutting tool development, mini-disc application to microtunneling, performance estimation and costing model development, laser guidance systems, muck transport, obstacle detection and site investigations related to the use of microtunneling techniques both in soils and rock. The projects were conducted by a multitude of domestic and international microtunneling equipment manufacturers, owners, engineering firms, contractors and government agencies. Organized annual short courses on microtunneling which were attended by people from all sectors of microtunneling industry.

Excavation Engineering and Earth Mechanics Institute-CSM 1977 to 1981

Position: Research Associate

Worked on various industry and government funded research programs in the areas of mechanical tunneling, shaft drilling and raise boring, rock mechanics, ground support design, innovative rock drilling, advanced mining systems, TBM design and optimization, machine automation and computer modeling for TBM performance and cost assessment

Ozdemir Engineering, Inc., 1979 to present

Position: President

As president of Ozdemir Engineering, Inc., provides consulting services to the tunneling and underground construction industries worldwide in all aspects of mechanical tunneling, including hard rock TBMs, Earth Pressure Balance and Slurry Shield TBMs, Hybrid TBMs, microtunneling, raise and shaft boring, roadheaders, machine selection, TBM design optimization, TBM performance assessment, cutter cost estimations, cutting tool selection and optimization, geotechnical site investigations and ground support. Work has been performed for numerous mining and civil construction organizations worldwide, including owners, engineers, contractors and equipment manufacturers. A partial list of tunneling clients include: Parsons-Bricknerhoff, URS, Montgomery Watson Harza, Hatch Mott McDonald, Arup, CDM, CH2MHill, Shannon and Wilson, Jacobs Associates, Black & Veatch, Jacobs Engineering, Geodata, Fluor, Bechtel, Parsons, Frontier-Kemper, JF Shea, Kenny Construction, Frontier-Kemper, Kiewit, Traylor Brothers, Granite Construction, Modern Continental, Affholder, Ohbayashi, Kajima, Atkinson, WH Haley, Bradshaw, Bilfinger-Berger, Vinci, Strabag, Dragados, Hotchief, Impreglio, Mostmetstroy, Herrenknecht, Robbins, NFM, Sandvik, Atlas-Copco, Caterpillar, Joy as well as a large number of tunnel owners. Also performed extensive consulting work for mining companies worldwide in the application of mechanical excavation technologies for surface and underground mining. A partial list of mining clients include: Newmont, Placer-Dome(Barrick), BHP Billiton, FMC, Peabody, Western Mining, Pasminco, Rio Tinto, Codelco, Boliden, Freeport-McMorrان, Nautilus Minerals, CVRD.

PUBLICATIONS:

Author of over 140 technical papers and over 90 project reports dealing with various aspects of mechanical underground construction and mining. In addition, has given numerous keynote speeches and invited talks at various international conferences. Serves on the editorial board of several prominent international magazines. Has been featured in various newspaper/magazine articles and TV programs for making significant contributions to advancement of mechanical excavation and construction technologies. Also has given lectures at other universities overseas.

EDITORIAL DUTIES:

Serves on the editorial review committee of the Trenchless Technology magazine and the Tunnel Business magazine. Also conducts publication peer reviews for various magazines and professional societies. Also served as the editor of proceedings for various international symposia, including the North American Tunneling Conference, the International Ground Support Conference and International Mine Mechanization and Automation Conference.

TRAINING COURSES:

Teaches courses for the United Nations, World Bank, NATO and the Agency for International Development (AID) in tunneling and civil underground construction technologies to professionals from other countries.

PROFESSIONAL SOCIETIES:

Member of various national and international societies, including: AIME, ISDT, AUA, ITA, ISRM, TTC, WRBA, NSTT. Also, has served on numerous committees of professional societies dealing with various aspects of civil underground construction, tunneling, underground mining and microtunneling.

AWARDS:

Has received several technical awards, including: (1) the Engineering News Record (ENR) annual award for making a significant contribution to the advancement of mechanized underground construction technologies, (2) Outstanding Educator Award, American Underground Construction Association, Society of Mining Engineers (3) Honorary member, Geo-Environmental Branch, Russian Academy of Sciences, (4) Professional Achievement Award, Istanbul Technical University.

SYMPOSIA:

Has organized and chaired numerous symposia and workshops dealing with various aspects of mine mechanization and the civil underground construction. Initiated and served as the chairman Unique Underground Structures and the Mine Mechanization and Automation Conferences. Also, served as the conference and session chair at various other international symposia. Served as the Proceedings Editor of various international symposia, including North American Tunneling, Mine Mechanization and Institute of Shaft Drilling Conferences.

SHORT COURSES:

Has organized and presented numerous short courses worldwide in mechanized tunneling and civil underground construction, including tunnel boring, raise and shaft drilling, microtunneling, roadheaders, mechanical mining, rock excavation and mine mechanization and automation. These courses cover all aspects of underground construction including geotechnical investigations, design, construction (hard rock and soft ground, TBMs, EPBs, Slurry Shields, roadheaders, etc.), instrumentation, ground support, material handling, utilities, project scheduling and costing.

OTHER PROFESSIONAL ACTIVITIES:

- Principal technical advisor to the North Atlantic Treaty Organization(NATO) on the development of rapid tunneling and underground construction technologies as part of the NATO Science for Stability program.
- Board member, American Underground Construction Association
- Guest lecturer: Turin Polytechnic University, Torino, Italy and Istanbul Technical University, Istanbul, Turkey
- Consultant to various US Government Agencies on review and evaluation of proposals/projects dealing with various aspects on underground construction
- Keynote speaker at numerous international conferences on tunneling technology

INVENTIONS:

Co-inventor of a new disc-cutting tool designed to substantially improve the performance of all types of mechanical excavators, microtunneling machines and directional drilling systems.

CONSULTING WORK:

Has performed extensive consulting work worldwide for tunnel owners, engineers, contractors and equipment manufacturers in various aspects of mechanical hard rock and soft ground tunneling and underground construction. These included geotechnical investigations, tunnel design, machine selection, TBM performance analysis, ground support selection and design, TBM back-up system, muck haulage, tunnel utilities, construction monitoring and analysis, microtunneling and pre-bid studies.

DRB INVOLVEMENT:

Has been involved in numerous Disputes Review Board (DRB) proceedings for resolution of claims related to tunneling and underground construction projects. Worked for owners, engineers and contractors as a consultant on issues related to Hard Rock TBMs, EPB machines and Slurry TBMs, machine design/operation/performance, ground control and evaluation of differing site conditions.

EXPERT WITNESS:

Has served as an expert witness in various court cases involving disputes in soft ground and hard rock TBM tunneling and microtunneling projects with emphasis on machine design and selection, machine operation and performance prediction, cutting tool selection and anticipated vs. actual rock and geologic conditions.

INTERNATIONAL ARBITRATION:

Has served as Expert Witness in International Arbitration cases involving underground construction and tunneling disputes worldwide.

FIELD TUNNELING WORK:

Has performed field work in over 90 mechanical tunneling and microtunneling project sites worldwide, including both hard rock and soft ground/soil tunnels, TBMs, Earth Pressure Balance machines (EPBs) and Slurry Shields, Microtunneling machines Roadheaders and mechanical miners. [