

# Dr. Vilem Petr

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## EDUCATION:

Ph.D., Mining and Earth Systems Engineering, Colorado School of Mines,  
Golden, Colorado

M.S., Mineral Engineering, New Mexico Institute of Mining and Technology,  
Socorro, NM

Diploma of Mining Engineering, (*equivalent of B.S. and M.S.*) Technical  
University of Mining, Ostrava, Czech Republic

## Professional Engineers Registration:

January 1999-present, Federal Explosive Permit ATF  
Explosive permit for State of Colorado, USA

## PRESENT POSITION:

**Research Assistant Professor,**  
Colorado School of Mines, Mining Engineering Department

## WORKING EXPERIENCE:

**Research Assistant Professor,** May 2001- Present

I have experience in the following areas:

- Developing new advance technology for study and analyzing underground roof support
- Conduct applied research for aggregate and quarry industries
- Responsibilities for independent project development and project management, trouble shooting, successfully finishing project
- Simultaneously manage several independent projects and monitoring the progress, ability to communicate with different level of operation as well as with clients, progress reporting and presentation.
- Technical background in shock wave physics, material behavior under explosive loading; fragmentation, explosive testing, blast resistant materials, metal forming and metal cutting by explosives
- Computer modeling with discrete element modeling (DEM) and finite element modeling (FEM)

- Extensive industrial use of explosives in mining, construction, underground construction, demolition, avalanche control
- Organized and conducted workshops and seminars in explosive regulations, safety and handling of explosives and training for explosive technicians
- Well-established partnership with the explosive manufacturing companies as well with research facilities and national laboratories

I have managed several projects in the following areas:

- **Present** -Controlled blasting in underground production blasting
- **May 2004**-Testing new equipment “the impact echo” to evaluate the post blasting damage to surrounding walls
- **Present**- Blast resistant studies of pre-cast wall panels
- **Present** -Studies of engineering properties for concrete using waste materials
- **December 2002- June 2003**- NASA planetary Science; experimental studies of a small –scale explosive cratering in the solar system, preliminary research for “*Deep Interior Impact*” project
- **January 2003-June 2003**-Research to utilize intelligent neural network for predicting blast parameters for mining operations
- **May 2003- December 2003**Post blast gas studies
- **May 2002 – August 2003**-Developing underground test chamber for explosive testing

## WORKING HISTORY

**Yenter Companies, Inc., Construction blasting** **June-August 1998**

- Working with different blasting applications
- Installing new grouted cables and rock bolts
- Conducting vibration analyses

**The Ensign-Bickford Company, Research Development Department** **May-August 1997**

- Developing new numerical modeling models for new products
- Analyzing ground vibration data
- Writing proposal for a study of rock fragmentation improvement
- Developing electronic database for library uses
- Helping on new initiation system

**Waste Isolation Pilot Plant, Westinghouse Electric Corporation, Carlsbad** **May-August 1996**

- Developing new numerical modeling models for underground openings using FLAC (Fast Lagrangian Analysis of Continua)
- Experimental studies on underground roof deformation
- Collaboration on several reports

- Working on geotechnical studies of geological influence on control roof collapse.
- Helping with studies on improvement of ventilation systems for production.
- Collaboration on numerical model for underground potash mines.

**DICAPERL**, Socorro, New Mexico, **June-July 1995**

- Responsible for proposal development, project reporting, troubleshooting, data collection on surface mining of perlite ore
- Helping with studies of perlite ore reclamation
- Conducting studies on maintains scheduling

**SEVEROCESKE KERAMICKE ZAVODY**, Most, Czech Republic, **January 1990-August 1992**

- Designing of mine plans for open pit mines and quarries
- Conducting studies on mineral properties evaluation
- Designing mineral processing and crushing systems for quarry applications
- Design pit slop stability and hygiene binderies for mining operations
- Conducting basting and vibration analyses
- Leading fragmentation studies for aggregates
- Cooperating on crushing studies for quality control
- Technical services for blasting operations
- Blasting permitting
- Design and supervise reclamation projects
- Supervising Legal issues with renting or buying new properties
- Mineral properties evaluation and permitting

**Velkolom Maxim Gorky Bilina**, Open pit mine (coal mine) Czech Republic **June 1985- 1988**

- Supervising production on level I and conducting planning and scheduling
- Supervising bulldozers support for maintains of roads
- Supervising disassembles, transportation of conveyable sections and assembles for new position
- Designing new production plan for level I.
- Troubleshooting production challenges
- Designing drilling patterns for exploration of old openings
- Coal properties evaluation
- Developing several protocols for mine safety and production operations
- Supervising blasting operations on overburden
- Supervising and troubleshooting of blasting operations on complex geological conditions of brown coal deposit.

**Research Assistant**, **September 1997- May 2001**  
 Department of Mining Engineering, **Colorado School of Mines**

- Conducting extensive studies on rock fragmentation
- Developing a numerical model for heterogeneous materials
- Developing a experimental model to study shock wave propagation in heterogeneous materials using high speed camera
- Stress analyses using photo elastic analyses
- Developing numerical model using Discrete element method
- Using Finite element method to study rock fragmentation due to explosive loading

**Research Assistant,** **September 1996- May 1997**

Department of Mechanical Engineering, **University New Mexico, Albuquerque**

- Developing numerical models for plastic deformation in soils
- Experimental studies of tensile stresses in soils
- Numerical studies of solid materials under creep loading for Waist Isolation Pilot Plane (WIPP), New Mexico.

**Research Assistant,** **January 1995- May 1996**

Department of Mining Engineering, **New Mexico Institute of Mining and Technology**

- Conducting comprehensive research on Rock mechanic properties during impact
- Developing new testing techniques to dynamic impact.

**Research Assistant,** **January 1987- May 1991**

Department of Mining Engineering, **Technical University Ostrava**, Czech Republic

- Conducting extensive studies on mineral properties evaluation for quartzite deposit in North Bohemia
- Design of mine plane structures and developing studies for mineral economics for a new quarry in North Bohemia, Czech republic
- Developing a study on mine safety for explosive storage for new quarry North Bohemia, Czech Republic.

## **TEACHING EXPERIENCE**

**May 2001- present**

Department of Mining Engineering, **Colorado School of Mines**

- Developed and taught MNGN 407 Rock fragmentation
- Developed and taught MNGN 333 Explosive Engineering I.
- Developed and taught MNGN 444 Explosive Engineering II.

**Teaching Assistant,** **September 1997- May 2001**

Department of Mining Engineering, **Colorado School of Mines**

- Taught repeatedly class on rock fragmentation and drilling
- Taught repeatedly class on explosive engineering
- Taught repeatedly class on surveying during summer session
- Supervising several undergraduate students working on different undergraduate projects.

**Teaching Assistant,** **January 1995- May 1996**  
Department of Mining Engineering, **New Mexico Institute of Mining and Technology**

- Managed Rock Mechanics laboratories in the department
- Conducted laboratory courses on rock sampling and lab testing
- Taught courses on Surveying for surface and underground

**Teaching Assistant,** **January 1987- May 1991**  
Department of Mining Engineering, **Technical University Ostrava**, Czech Republic

- Taught two undergraduate courses, Mineral Processing and Mineral Processing Design
- Supervised several undergraduate students working on different mining projects.

### **PROFESIONAL AFFILIATION**

- Member of the International Society of Explosive Engineering
- Board member of sub committee of recycle materials in concrete ACI 555, American Concrete Institute
- Board member for non-destructive testing committee, Bureau of Reclamation, The Concrete Industry's Strategic Development Council
- Team member, NASA, Deep Interior Impact Project, Lunar and Planetary science, Mission anticipate 2007, Industrial partner Ball Aerospace & Technology, University Santa Cruse, Jet propulsion Laboratory, Pasadena, California

### **AWARDS**

Portland Cement Association Education Foundation Fellowship Award 2004

Recipient of the Cooper-Hansom Fellowship for graduate studies, Mining Engineering Department

Recipient of the Henry Dewitt Smith Trust Scholarship for graduate studies in the Field of Mineral Engineering

Recipient of Research Assistantship in the Department of Mechanical Engineering, The University of New Mexico

Graduate Student Research Project Scholarship, Mineral Engineering Department, New Mexico Institute of Mining and Technology, Socorro

Recipient of the National Collegiate Engineering Awards NCEA, United States Academy Achievement

## **PUBLICATIONS/ REPORTS/ PROPOSELS**

Co-Author, 1995, "Geotechnical Analysis Report for July 1993-June 1994", Waste Isolation Pilot Plant, National Technical Information service, U.S. Department of Commerce, DOE/WIPP-95-2100

V. Petr, G.W. Mustoe, M. Nakgawa and T.G. Rozgonyi , 2000,"A Numerical and Experimental study of static and Dynamic behavior in cemented Elastic Disks" Proceedings of 26<sup>th</sup> Annual Conference on Explosives and Blasting Technique, Anaheim, California, Volume 2, pp:225-234

V.Petr,G.W. Mustoe,K.J. Orgeron,T.G. Rozgonyi, 2002, "Experimental and Numerical Studies of Transient Shock Wave Propagation in a Geomedium" Annual Conference on Explosive and Blasting Technique, Las Vegas, Nevada USA.

V.Petr, M.G. Simoes, T. G. Rozgonyi, 2003, "Future Development of Neural Network Prediction for Blast Design Parameters of Production Blasting" EFEE 2<sup>nd</sup> World Conference on Explosives and Blasting, September 2003

Test Report "Standard Test for Flexural Strength of Concrete Using Third - Point Loading," (ASTM C Designation: 78 – 02, AASHTO Designation: T97-03), 2004 Research Program at Colorado School of Mines on Neural network Development (In the following and in any subsequent reference it is called: Project ZEBRA) 2001

Proposal for Development of Electronic Safety Manual and Textbook for the Aggregates Industry Inc. 2001

Studies for Reduction of Energy Consumption in Aggregate Mining Operations through Effective Blasting, Department of energy, 2002

Proposal Modification and Improvement Timing Requirements Using Electronic Detonators in Underground and Surface Mining Applications, 2002

Proposal Material Testing for Fiber-Glass Materials, Johns Manville, 2002

Proposed Study for Recycled–Tire and Concrete Mixtures, Colorado Advanced Materials Institute, 2002

Composite Concrete Development to Diminish Spalling Fracture Due to High Impact or Explosion, National Research Council, 2002

The joint project between Applied Research Associates Inc (ARA) and the Colorado School of Mines (CSM) to excavate a tunnel (10 ft wide x 10 ft high x 67 ft long).,2002

Research Project Improving the Properties and Marketability of Aggregate Fines, Aggregate Industries, West Central Region, Inc., 2002

Future Development of Neural Network Prediction for Blast Design Parameters of Production Blasting Applied to Zebra Project, 2002

New Composite Concrete Development to Diminish Spalling Fracture Due to High Impact or Explosion, 2002

Studies for Reduction of Energy Consumption in Aggregate Mining Operations Through Effective Blasting, Department of Energy, 2003

Consortium on Nondestructive Testing of Large Anchor Bolts, Strategic Development Council, 2003

NASA Suggested experimental technique to measure and calculate parameters and components of crater phenomena, 2003

Utilization of Aggregate Byproducts in Road Construction, Aggregate Industries, West Central Region, Inc., 2003

PROPOSAL Preventing Rock Falls By Using Precision Blasting Techniques 2004

Composite Rubberized Concrete Development to Diminish Spalling Fracture Due to High Impact or Air Blast 2004

SERVICE PROPOSAL Determination of the Detonation Wave Parameters, 2004

Initial Test Studies On Four Panels, Framework for Experimental Measurements of Maximum Impact Force on Casting Blast-Resistant MetalStudCrete Panels (PR3122-03) and FPED IV 2004

Establishment of Manufacturing Facility and Laboratory For Rubberized Aggregates With Composite Rubberized Concrete (CRC) 2004

Topic number A04-217, Anti-Personnel Blast Mine Protection 2004

Research Proposal: Composite Concrete Development to Diminish Spalling Fracture Due to Mechanical Impact or Explosion 2004

Composite Rubberized Concrete (CRC) Suitable for Pavement Applications and Safety in Concrete Structures- Colorado Institute of Technology 2004

Multi entry –level education program in explosive engineering with emphasis on continuing education for homeland security personnel 2004

NSF Proposal; Meso-scale Mechanics of Shock wave Propagation and influence on Bounded cemented medium 2004

Service Proposal: The “CSM at the Edgar Experimental Mine” in Idaho Springs, Colorado will drive a test drift approximately 400 ft long, with a cross section of 10 ft x 10 ft, and with an individual pull off of 6 ft to 8 ft, the work to be done in three phases 2004

Portland Cement Association: the project is development of composite rubberized concrete (CRC) suitable for pavement applications and safety in concrete structures. 2004

## References

**Dr. Tibor G. Rozgonyi**, Professor and Department head of Mining Engineering Department, Colorado School of Mines, Golden Colorado, (**employer, co-adviser**) **(303)-273-3701**

**Dr. Graham Mustoe**, Professor. Engineering Division, Colorado School of Mines, Golden, Colorado, (**Adviser**) **(303)-273-3661**

**Dr. William F. Kepler, P.E.**, Bureau of Reclamation, Denver Federal Center, (**collaborator**) **(303)445-2386**

**Gordon K. Carlson**, Climax Molybdenum Company, (**collaborator**) **(303)-569-3222, ext. 1484**

**Dr. Richard Goodridge**, Orica Australia, (**collaborator**) **01161-2 -939 5246**

**Dr. David O. Johnson**, Orica USA Inc., (**collaborator**) **(303)-268-5280**