

MALAVIKA VARMA

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EDUCATION

Indian Institute of Technology Madras (IITM), Chennai, India [July 2014-Aug 2019]
PhD in Geotechnical Engineering from Department of Civil Engineering

Thesis: SEISMIC RESPONSE OF TUNNEL AND TUNNEL SUPPORTS IN JOINTED ROCKS

- The wave propagation pattern in rocks in the presence of joints were analysed using experimental and numerical approach.
- Empirical relations were developed to understand the change in wave velocity with change in joint angle, joint roughness, block size, joint position and number of joints for all frequency ranges.
- Performance of unsupported jointed rock tunnels under the action of seismic load
- Performance of tunnel support systems in jointed rocks under the action of seismic loads. The performance of rockbolt and shotcrete individually as supports and as a combined support system was studied. The regions of stress concentration around the tunnel was understood.

Indian Institute of Technology Delhi (IITD), Delhi, India [2011-2013]
M.Tech in Rock Engineering and Underground Structures
from Department of Civil Engineering CGPA: 7.75

Thesis: DEVELOPMENT OF A CLASSIFICATION BASED ON ABRASIVITY AND SPECIFIC ENERGY FOR THE SELECTION OF EXCAVATION MACHINERY

- Abrasive resistance and cuttability play an important role in deciding the durability of a rock. Hence the effect on abrasive resistance and cuttability of different rock samples is compared for their physical and engineering properties by means of different tests.
- Different mineralogical, physical, strength and abrasive tests were carried out. The results obtained out of these tests are used to develop relationships among the rock parameters considering its effect on abrasiveness.
- A suitable excavation machine selection method is adopted comparing the specific energy of the machine and the rock, to reduce minimum material losses due to abrasiveness.

College of Engineering Trivandrum (CET), Trivandrum, India [2007-2011]
B.Tech in Civil Engineering CGPA: 7.19

Thesis: STABILISATION OF RED SOIL AND LATERITIC SOIL USING CaCl_2

- CaCl_2 was used as a stabiliser to increase the strength of red soil and lateritic soil. Increase and optimum percentage of CaCl_2 required to produce maximum strength was studied.

EXPERIENCE

RESEARCH EXPERIENCE

Alcodex Technologies Private Limited

SEPTEMBER 2019-JUNE 2020

Consultant Civil Engineer

- Providing working solutions and calculations for research and development team regarding
 - use and working of soil sensors to be implemented in understanding soil quality and moisture content.
 - crack identification in pipelines.
- Data analysis of air and water quality pattern for various cities using companies air and water quality monitoring devices in different cities.

TEACHING EXPERIENCE

Adi Shankara Institute of Engineering and Technology, Kochi, Kerala

JULY 2013-APRIL 2014

Assistant Professor

- Took classes for B.Tech students.
- The classes included both theoretical lessons providing insights into the basics of civil engineering or engineering mechanics to laboratory classes to demonstrating the practical applicability of the theoretical lessons.
- The experience gave me a high boost in my communication and oratory skills.
- Understanding, motivating and managing the interest and mood of a class of 60 was part of my daily routine.
- In addition, took part in various official work for the accreditation and ISO auditing works.
- Worked as a faculty representative and financial manager in the various fests organised in the institute.

PUBLICATIONS

International Journal

- Varma, M., Maji, V. B. and Boominathan A. (2019). "Numerical modelling of a tunnel in jointed rocks subjected to seismic loading". *Underground Space*, Elsevier, 4(2), 113-146.
- Varma, M., Maji, V.B. and Boominathan, A. "A study on the effect of rock joints on wave response". *International Journal of Rock Mechanics and Mining Sciences*, Elsevier Pub. (Under Review).
- Varma, M., Maji, V.B. and Boominathan, A. "Seismic performance of rock bolts in jointed rock tunnels". *International Journal of Geomechanics*, ASCE (Under Review)

International Conferences

- Varma, M., Maji, V.B. and Boominathan, A. (2018). " Effect of Joint Stiffness in Rock Tunnels under Dynamic Loads ".10th Asian Rock Mechanics Symposium, ARMS 10, Singapore. Paper ID. ARMS10-P-0558.
- Varma, M., Maji, V. B. and Boominathan, A. (2017). "A Study on Ultrasonic Wave Propagation Across Fractures in Jointed Rocks". ARMA 2017. 51st US Rock Mechanics / Geomechanics Symposium held at San Francisco, California, USA. Paper No. 483.

National Conferences

- Varma, M., Maji, V. B. and Boominathan, A. (2015). "Deformation Response of a Circular Tunnel in Jointed Rocks". *Indorock proceedings 2016*, IIT Bombay, Mumbai. Paper ID. INDOROCK201638.
- Varma, M. and Rao K.S. (2014). " Selection Of Excavation Machinery Based On Abrasivity And Specific Energy". *Indian Geotechnical Conference*, JNTU Kakinada, December 19, 2014.

VOLUNTEER AND LEADERSHIP EXPERIENCE

- **June 2018, Rock Engineering Issues and Future Challenges**
Managed in conducting daily sessions of the workshop organised by Indian Geotechnical Society Chennai Chapter & IIT Madras
- **October 2017, Deep Foundation Technologies for Infrastructural Development in India**
Anchored and stage management during conference and pre conference workshop for Infrastructural Development in India and Foundations for Power Systems organised by Deep Foundations Institute, Indian Geotechnical Society and IIT Madras
- **September 2017, Geobruigg India & Indian Institute of Technology, Madras**
Assisted Dr. V.B. Maji and Geobruigg team with the workshop on TECCO® System
- **Decemeber 2016, Indian Geotechnical Conference, IIT Madras**
Management and reception committee volunteer for Indian Geotechnical Conference 2016 organised by Indian Geotechnical Society, Chennai Chapter at IIT Madras
- **Decemeber 2012, Indian Geotechnical Conference, IIT Delhi**
Schedule and stage management committee for Indian Geotechnical Conference 2012organised by Indian Geotechnical Society at IIT Delhi

WORKSHOPS & TRAININGS

- **September- October 2020, Indo-Canadian Workshop on Interactive Design in Geotechnical Engineering: Theory to Practice**
Obained knowledge on research and field experiences from experts on the field of geotechnical engineering from India and Canada
- **April-May 2020, MIDAS Research and Development Centre**
Online workshop and training on Tunneling using GTX NX software owned by MIDAS
- **November 2016, International Conference on Recent Advances in Rock Engineering**
Attended specialised conference of International Society of Rock Mechanics organised by National Institute of Rock Mechanics, Bengaluru
- **July 2016, GIAN Course on Advances in Seismic Hazard Analysis and Soil-Structure Interaction**
Global Initiative of Academic Networks organized by Dr. Carlo G. Lai, Universiy of Pavia, Italy and Dr. G.R. Dodagoudar, IIT Madras, India
- **April 2016, Department of Science & Technology along with British Council at IISER Pune**
Workshop on scientific policy making and concerns/ actions affecting public policy decisions
- **December 2012, Indian Geotechnical Society at Kochi Park Central**
Indo Japanese workshop on seismic behavior of foundations
- **June 2010, L & T ECC, Technopark, Trivandrm**
Undergone industrial training at L&T Technopark Phase III Construction for 2 weeks.

COMPUTER SKILLS

UDEC, 3DEC, GTS NX, Abaqus FEA, RHINO, Slide, Phase2, Examine2D

PROFESSIONAL MEMBERSHIPS

- Indian Geotechnical Society National Chapter (Life time Member)

- Indian Society for Rock Mechanics and Tunneling Technology (Life time Member)
- Society for Petroleum Engineers (Student Membership)
- International Society for Rock Mechanics (Life time Member)
- Tunnelling Association of India [Affiliated to International Tunnelling and Underground Space Association (ITA)] (Young Member)

ACHIEVEMENTS

- Won third prize for Paper Presentation Competition held by ISTE
- 36th position in All India Mathematics Olympiad held by Kendriya Vidyalaya Sangathan for 2004-2005
- Rashtrapati Award for Scouts & Guides in 2004

REFERENCES

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Prof. K.S. Rao,
Dept. of Civil Engg.,
IIT Delhi
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Engineering Expert,
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