Dr. SWAPNIL MISHRA
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EDUCATION

Doctor of Philosophy in Geotechnical Engineering, Department of Civil Engineering, Indian Institute of Technology (IIT) Delhi, (2019)
Masters of Technology, (Geotechnical Engineering), Delhi Technological University (DTU) Delhi, (9.09 CGPA) (Topper) (2013) Bachelors of Engineering, in Civil Engineering from Government EngineeringCollege Rewa, M.P. India (74.60 %) (3rd topper) (2010)

PROJECT TOPICS:

- PhD dissertation topic – **"PHYSICAL AND NUMERICAL MODELING OF TUNNELS UNDER BLAST AND IMPACT LOAD"**
- Masters' dissertation topic – **"CONSOLIDATION OF THIN CLAY LAMINA USING LAURENT TRANSFORM"**
- Bachelor's final year project topic – **"REHABILITATION OF HOUSING COLONY FOR DISPLACED RESIDENTS"**

ACADEMIC HONORS:

- Invited for **"Co-Chairing the session in 13th ISRM Asian Rock Mechanics Symposium (13 ARMS) an ISRM specialized conference held in Delhi, India, for Theme-B1: Analytical, Numerical and Constitutive Modelling" September 2024.**
- Selected as top **75 Women leaders in India in Geotechnical Engineering by Indian Geotechnical Society "Daughter's of Soil"** for the remarkable and extraordinary contributions **(2023)**.
- Felicitated **by "Women Achiever Award 2023" in 98th Foundation Day of IIT(ISM) Dhanbad (2023)**.
- Invited for the "**Chair session in 9YIGEC conference for Theme:9-Rock Mechanics and Rock Engineering", IGC**, MIT Aurangabad, **2023**.
- Awarded with "**Best Paper Award"** for the **Theme: Tunnelling and Underground Structures** in **9YIGEC conference, IGS, MIT Aurangabad, 2023.**
- Awarded with **"Young Women Researcher Award-Geotechnical Engineering"** by **8th Venus International Women Awards (VIWA 2023), 2023.**
- Invited for delivering an online expert talk in **6th ISRM Early Career Forum (ECF 6)** associated with the 11th Asian Rock Mechanics Symposium (ARMS11) on Oct. 24, **2021**.
- Nominated and selected by Indian Geotechnical Society (IGS), among **one of the two Young Geotechnical Scientist (Age below 35 Years) to present research paper in 9th Asian Young Geotechnical Engineer Conference (9AYGEC) and 15th International Conference on Geotechnical Engineering (15ICGE)**, in Lahore Pakistan, **2019**.
- Selected and awarded in "**3rd ECF (Early Carrier Forum) by ISRM"** in ARMS 10 held in Singapore **2018**.
- **"NASI Springer Award"** for Best Paper presented in Physical Sciences Category **2018**
- **"Awarded with Ministry of Human Resource and Development (MHRD), India Fellowship"** for pursuing Master of Technology
- Secured **"Two Travels Grants for attending International Conferences through Institute Scholarship and through The Council of Scientific and Industrial Research, India (CSIR) organization"**

PRESENT PROFILE

- Working as Assistant Professor, Grade - I (Level-12, GP-8000) in Department of Mining Engineering, Indian Institute of Technology Dhanbad (From December, 2020 to till date)

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PREVIOUS PROFILES

- Selected and Appointed as Scientist, Group IV (2) (Area- Geotechnical Engineering, Post code- S-02 in the pay level-11 in CSIR CRRI (05/11/2020)
- Worked as Early Doc Fellow in Indian Institute of Technology Delhi (IIT Delhi) from 01/04/19 to01/06/19.
- Worked as Junior Research Fellow in Indian Institute of Technology Delhi (IIT Delhi) from 01/09/19 to31/10/19.
- Selected as Post Doctoral Candidate in Ulsan Institute of Science and Technology (UNIST), South Korea
- Worked as Assistant Professor, Grade-II in Department of Civil Engineering, Pandit Deendayal EnergyUniversity (PDEU) Gandhinagar, Gujarat from 05/11/19 to 22/12/20 (LEVEL-10, GP:6000).

EXPERT LECTURE:

- *In **Indo-Korean Seminar Series** on "The Art of Tunneling in Challenging Ground Conditions" on 10th Oct. 2023 jointly organised by Korean Government and Ulsan National Institute of Technology (UNIST) Ulsan, South Korea*
- *In **One-week STTP on Advances in Rock Mechanics (ARE-2023)**, "Static and Dynamic failure of Underground Structures in Fragile Rock masses" on 22nd August 2023 jointly organised by IGS-Aurangabad Chapter and Department of Civil Engineering MIT Aurangabad.*
- *In **Training Programme** for **WAPCOS** on "Analysis, Design and Construction of Tunnels and Underground Structures" from 6th to 12th January 2020*
- *In **Ulsan National Institute of Science and Technology (UNIST), South Korea** on "Physical Modelingof Tunnels under Dynamic Loading" 3rd October 2019*
- *In **Workshop** for **IRCON and Northern Railways** on "Tunnelling in Himalayas" at **IIT Jammu** from 17th to 21th January 2017*

R&D, CONSULTANCY PROJECTS:

- Submitted a project under **SERB DST POWER Grant** titled "**Experimental and Numerical Investigation of Safety and Damage Zones inside a Tunnel under Dynamic Loading Conditions ina Highly Stressed Rockmass"** with an outlay of 45,82,900/- as **PI**. (Result awaiting)
- Submitted a project in **Bureau of Indian Standard (BIS)** in **Study of optimal stacking and storage methods for reducing wastage and prevent deterioration of materials stored at site of Construction project. (CED 29)** with an outlay of 8,42,900/- as **PI**. (Result awaiting)
- A consultancy project **Assessment of cuttability of coal and dirt bands using Cerchar Hardness Index tests for the application of Surface Miner in Mahanadi Coalfields (MCL)** is submitted and sanctioned with a outlay of 4,63,000/- as **Co-PI**.

PROFESSIONAL DEVELOPMENT PROGRAMME:

- Organised an executive development programme (EDP) for NHPC on the topic **"Specialised Course on NATM and TBM Tunnelling" as Co-PI** from 21/11/2022 to 25/11/2022 in IIIF Delhi Center IIT ISM Dhanbad (Project- EDP/7042/2022-2023).
- Organised an executive development programme (EDP) for NHPC is planned and scheduled on the topic **"Design of Tunnels and Caverns for Hydro Power Projects" (FND-DE9) as PI** from 18/09/2023 to 22/09/2023 in IIT ISM Dhanbad (Project- Revised EDP/7106/2023-2024).

RESEARCH STUDENTS:

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S.No.	*Name*	*Degree*	*Joining Date*	*Title*	*Status*	*Supervisor*	*Co-Supervisor*
1.	Rohan Paul	Ph.D.	04/01/2024	Seismic Analysis of U/G Tunnels in jointed rockmass	**Ongoing**	**Sole**	**none**
2.	Pooja Saulankhee	Ph.D.	10/05/2024	Vibrations causing deformations in under water blasting	**Ongoing**	**Main**	**none**
3.	Noor Mohammad	Ph.D.		Yet to be decided	**Ongoing**	**Sole**	**none**
3.	Waqas Imteyaz	M.Tech.	28/06/2021	Stability analysis of underground Tunnel in complex ground condition	**Awarded (2023)**	**Sole**	**none**

TEACHING AND RESEARCH ACTIVITIES:

- Successfully completed 1-week course on **Landslide Risk Assessment and Mitigation (LARAM)** organised in IIT Roorkee from 17th to 22th February 2020
- Assisted Prof. K. S. Rao in conducting **Training Course on Analysis and Design of Tunnels in the Himalayas** jointly for IRCON and Northern Railways, Government of India from 17/01/17 to 21/01/17in Jammu, India.
- **Designed and Developed Impact Testing Facility (ITF) laboratory** for research in **IIT Delhi in 2019**
- Involved in the Development of **Creep Testing Facility** at **IIT Delhi**
- Numerical Simulation of Delhi metro tunnel under blast loads
- **Actively volunteered** in organising international conferences like **EGNM and IMPLAST**
- Mentored M.Tech students and interns of the Department in their respective research.
- Helped in conducting classes at PG level in Department of Civil Engineering, IIT Delhi.
- Consistently involved in the testing program and experimentations carried out in the Rock engineeringlaboratory under different consultancy projects

SUBJECTS TAKEN:

MER17106	Surveying	B.Tech, 4th Sem	IIT ISM Dhanbad
MNC 537	Computational Sub Surface and Mine Ventilation Lab	M.Tech, 2nd Sem	
MNC 700	Research Methodology	Ph.D. JRF	
MNC 306	Mine Simulation and Data Analytics	B.Tech, 6th Sem	
NMNC 507	Geomechanics for Underground Space	M.Tech, 1st Sem	
MNO 301	Mordern Surveying Techniques	B.Tech, 7th Sem	
MNC 537	Computational Sub Surface and Mine Ventilation	M.Tech, 2nd Sem	
20CE515T	Ground Improvement Techniques	M.Tech 3rd Sem	Pandit Deendayal Energy University Gandhinagar, Gujarat
18CV235	Engineering Geology Practical	B.Tech, 4th Sem	
17CV205T	Engineering Survey	B. Tech 3rdSem	
17CV205P	Practical Engineering Survey	B. Tech 3rd Sem	
CT & CM	Construction Technology and Construction Management (CT & CM)	B. Tech 4th Sem	
BPD Lab	Building Planning Design (BPD) Practical	B. Tech 5th Sem	

PROFESSIONAL MEMBERSHIPS:

- Life Member of Indian Geotechnical Society (LM-14447)
- Life Member of IGS – Delhi Chapter (LM-1079)
- Life Member of IGS – Dhanbad Chapter
- Life Member of Indian Society of Earthquake Technology (ISET) (LM-1978)
- Member of International Society of Rock Mechanics and Rock Engineering India (ISRM) (Membership no. 122)
- Member of International Society of Soil Mechanics and Geotechnical Engineering (ISSMGE)

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ADMINISTRATIVE RESPONSIBILITIES:

- Corresponding Member, International Technical Committee (TC-222) of International Society of Soil Mechanics and Geiotechnical Engineering (ISSMGE); term:2022-2025
- Member, Sub Committee 9 (SC-9): Student Chapter Activities and Continuing Education of Indian Geotechnical Society (IGS)
- Member, Sub Committee 10 (SC-10): Young Geotechnical Engineer Forum of Indian Geotechnical Society (IGS)
- Warden, International Hostel IIT(ISM) Dhanbad
- Coordinator, Department Placement Cell IIT (ISM) Dhanbad
- Member, Departmental Grievance Redressal Committee (DGRC) IIT ISM Dhanbad
- Convener for NBA Accreditation for Crierion-7 in PDEU Gandhinagar and Member in the Core Committee for NABL Accreditation and Documentation in PDEU Gandhinagar

JOURNAL PUBLICATIONS

1. **Mishra**, S., Rao, K. S., Gupta, N. K., & Kumar, A. Damage to Shallow Tunnels under Static and Dynamic Loading. *Procedia Engineering,* pp 1322-1329, Vol 173, (2017). https://doi.org/10.1016/j.proeng.2016.12.171
2. **Mishra**, S., Rao K. S., Gupta, N. K., & Kumar, A. Damage to Shallow Tunnels in Different Geomaterials under Static and Dynamic Loading. *Thin-Walled Structures,* pp 138-149, Vol 126, (2018). https://doi.org/10.1016/j.tws.2017.11.051.
3. Dhamne, R., **Mishra**, **S.,** Kumar, A., & Rao, K. S. Numerical study of the cross-sectional shape of shallow tunnels subjected to impact and blast loading. *Journal of Engineering Geology,* A bi-annual Journal of ISEG, pp 23-38, Volume XLIII, Nos. 1 & 2, (2018). http://joegindia.com/PAPER/volume-43/FP-03.pdf
4. **Mishra, S.**, Kumar, A., Rao, K. S., & Gupta, N. K. Experimental and Numerical Investigations of Dynamic Response of Tunnels in Soft Rock. *Structures*, Vol. 29, pp. 2162-2173, (2020). https://doi.org/10.1016/j.istruc.2020.08.055
5. Zaid, M., & **Mishra, S.** Numerical Analysis of Shallow Tunnels under Static Loading: A Finite Element Approach; *Geotech Geol Eng* (2021). https://doi.org/10.1007/s10706-020-01647-1
6. Dhamne, R. R., **Mishra, S.**, Kumar, A., & Rao, K. S. Deformation Behavior of D-Shaped Shallow Tunnels under Dynamic Loading Conditions. *Structures*, Vol. 33, (2021). https://doi.org/10.1016/j.istruc.2021.06.097
7. **Mishra, S.,** Zaid, M., Rao, K. S., & Gupta, N. K. FEA of Urban Rock Tunnels Under Impact Loading at Targeted Velocity. *Geotech Geol Eng* (2021). https://doi.org/10.1007/s10706-021-01987-6
8. Imteyaz, W., & **Mishra, S.** (2023). Stability analysis of the Shallow Tunnel Under Soft Ground Regime. *Materials Today: Proceedings*. https://doi.org/10.1016/j.matpr.2023.03.218
9. Chawla, S., Pasupuleti, S., Sarkar, K., **Mishra, S.**, and Rahul, A. (2023). A Geotechnical Approach to Compare Different Slope Stabilization Techniques for Failed Slope in the Darjeeling Hills, India. DOI: 10.1007/s12665-023-11054-3 *Environmental Earth Sciences (2023)*
10. Srivastav, S., Chawla, S. & **Mishra, S.** (2024). Numerical analysis of moving train induced vibrations on tunnel, surrounding ground and structure. *Earthq. Eng. Eng. Vib.* **23**, 179–192 (2024). https://doi.org/10.1007/s11803-024-2223-2
11. Yadav, A. K., **Mishra, S.** & Mishra, D.P. (2024). A detailed review study on utilization of mine and industrial wastes for backfill strengthening. *Arab. J. Geosci. **17**, 121* (2024). https://doi.org/10.1007/s12517-024-11917-4
12. **Mishra, S.,** Mishra, A., Rao, K.S. *et al.* (2024). Factors Affecting Crack Length of a Shallow Tunnel under Surface Impact Load. *Indian Geotech J* (2024). https://doi.org/10.1007/s40098-024-01018-0

JOURNAL PAPERS (SUBMITTED)

1. **Mishra, S.,** Rao, K. S. and Gupta, N. K. (2025); "Development of Impact Testing Facility (ITF) for Underground Structures". *Geotechnical Testing Journal* ***(Communicated).***

2. **Mishra, S.,** Rao, K. S. and Gupta, N. K. (2025); Effect of Impact and Blast Load on Shallow Tunnels; *Rock Mechanics and Rock Engineering* ***(Communicated).***

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CONFRENCE PAPERS

1. Rao K. S., **Mishra, S.**, and Gupta N. K. (2015); *Fracture Propagation of Rock under Dynamic Regime*; 50th International conference, Engineering Geology New Millenium (EGNM), Special publication of Journal of Engineering Geology- A Bi-annual Journal of ISEG, pp 345-358, ISSN: 0970 – 5317, Delhi.
2. Rao K. S., Sarmah, R. and **Mishra, S.** (2015); *Effect of Projectile Penetration on Shallow Tunnels*; 50th Indian Geotechnical Conference, Pune.
3. Rao K. S., **Mishra, S.**, and Gupta N. K. (2016); *Behavior of Underground Structures in Soft Rocks under Different Strain Rate and Litho-Static Pressure,* 2nd International conference on rock dynamics, "Rocdyn: From Research to Engineering", Suzhou, China. Taylor and Francis Group, London, ISBN 978-1-138-02953-8.
4. . Rao K. S., **Mishra, S.**, and Gupta N. K. (2016); *Effect of Different Loading Conditions on Tunnel Lining inSoft Rocks;* ISRM International Symposium "EUROCK 2016", Cappadocia, Turkey. Taylor and Francis Group, London, ISBN 978-1-138-03265-1
5. Chala, E. T., Rao, K. S., **Mishra, S.**, and Kumar, A. (2016); *Geo-mechanical properties of volcanic rocks from Deccan Traps, India*; "VII Brazilian Symposium on Rock Mechanics – SBMR Rock Mechanics and Rock Engineering for Innovation and Development" ISRM specialized conference, Belo Horizonte, Brazil (2016). DOI: 10.20906/CPS/SBMR-02-0005.
6. Gahoi, A., Zaid, M., **Mishra, S.**, and Rao, K. S. (2017); *Numerical Analysis of Tunnels Subjected To Impact Loads*; 7th Indian Rock Conference, Delhi. ISBN 81-86501-25-1, pg. 434-441.
7. **Mishra, S.**, Abhijith, C., Singh, A., Kumar, A., Rao, K. S., and Gupta, N. K. (2017); *Parametric Study of Lined and Unlined Tunnels at Shallow Depths under Coupled Static and Cyclic Loading Condition*; Tunneling in Himalayan Geology, Vol:340, Jammu, India.
8. Kumar, A., Singh, A., **Mishra, S.**, and Rao, K. S. (2017); *Importance of Strength Anisotropy in Numerical Analysis;* Tunneling in Himalayan Geology, Vol: 340, Jammu, India.
9. Sharma, H., **Mishra, S.**, Rao, K. S., and Gupta, N. K. (2018); *Effect of Cover Depth on Deformation in Tunnel Lining when subjected to Impact Load;* ISRM 10th Asian Rock Mechanics Symposium, (ARMS 10); Suntec City, Singapore (2018).
10. Zaid, M., **Mishra, S.,** and Rao, K. S. (2019); *Stability of Different Shapes of Himalayan Tunnels Under Blast Loading*; 8th Indian Rock Conference (INDOROCK), Delhi. ISBN 81-86501-27-1, 375-380, ISRMTT.
11. **Mishra, S.**, Rao, K. S., and Gupta, N. K. (2019); *Static and Dynamic Response of Tunnels under Different Loading Conditions;* 9th Asian Young Geotechnical Engineers Conference (9AYGEC) and 15th International Conference on Geotechnical Engineering (15ICGE), ISSMGE, Lahore, Pakistan.
12. Zaid, M., **Mishra, S.**, and Rao, K. S. (2020); *Finite Element Analysis of Static Loading on Urban Tunnels;* Indian Geotechnical Conference (IGC), Bangalore, India. DOI: 10.1007/978-981-15-6086-6_64 Geotechnical Characterization and Modelling. Publisher: Springer
13. Sinha, S., **Mishra, S.**, Rao, K. S., and Chakraborty, T. (2021); *Analysis of Twin Circular Tunnels Subjected to Impact Loads*, Indian Geotechnical Conference (IGC), Surat, India. Lecture Notes in Civil Engineering Vol.137 DOI: 10.1007/978-981-33-6466-0_63 Publisher: Springer.
14. **Mishra, S.,** Dhamne, R., Rao, K. S., and Gupta, N. K. **(2021)***; Analysis of Urban Tunnels under Different Loading Conditions;* 7th International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics (7ICRAGEE) Banglore India. DOI: 10.1007/978-981-33-4005-3_29, Seismic Design and Performance, Edition: 1, Chapter: Lecture Notes in Civil Engineering, Volume: 120; Publisher: Springer, Singapore
15. **Mishra, S.,** and Mishra, A. **(2022)**; *Comparison of Consolidation Settlement Obtained Using Varying Models.* Geo-Congress 2022 Charlotte, North Carolin https://doi.org/10.1061/9780784484012.044

16. Imteyaz, W. and **Mishra, S. (2023);** *Failure of the tunnels across of the world: Case Studies.* Athens, May 12-18, 2023 Taylor and Francis Group, CRC Press London https://doi.org/10.1201/9781003348030
17. Imteyaz, W. and **Mishra, S. (2023);** *Numerical Analysis of Underground Tunnel under Different Ground Conditions*, **Indian Geotechnical Conference (IGC)**, IIT Roorkee.
18. Dhamne, R., **Mishra. S.,** and Rao, K. S. **(2023)** *Assessing Tunnel Structural Response to Impulsive Loads*, **Indian Geotechnical Conference (IGC)**, IIT Roorkee.
19. **Mishra, S.**, Kumar, A., Rao, K.S., Gupta, N.K**. (2024).** *An Experimental Approach to Analyze the Effect of Impact Loading on Shallow Tunnels in Weak Rockmass*. In: Velmurugan, R., Balaganesan, G., Kakur, N., Kanny, K. (eds) Dynamic Behavior of Soft and Hard Materials Volume 1. IMPLAST 2022. Springer Proceedings in Materials, vol 34. Springer, Singapore. https://doi.org/10.1007/978-981-99-6030-9_19
20. Kumar, A., **Mishra, S.**, Rao, K.S. **(2024).** *Brittle–Ductile Transition of Oil Shale*. In: Jose, B.T., Sahoo, D.K., Oommen, T., Muthukkumaran, K., Chandrakaran, S., Santhosh Kumar, T.G. (eds) Proceedings of the Indian Geotechnical Conference 2022 Volume 5. IGC 2022. Lecture Notes in Civil Engineering, vol 483. Springer, Singapore. https://doi.org/10.1007/978-981-97-3389-7_10
21. Paul. R, and **Mishra, S. (2024)** *Securing Tunnels – Navigating the Interplay of Blast Loads and Seismic Effects in Global Infrastructure*, **13th Asian Rock Mechanics Symposium (13 ARMS) ISRM**, New Delhi.
22. Dwivedi, A., Akashdeep, Paul, R. and **Mishra, S. (2024)** *Discrete Element Modeling of Dump Slope Stability in Complex Geology,* **13th Asian Rock Mechanics Symposium (13 ARMS) ISRM**, New Delhi.

REFERENCES:

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