
Bio-data

NAME & ADDRESS

POST HELD

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Sr. Technical Officer-3 &
Assistant Professor (AcSIR)

EDUCATION

INSTITUTION AND LOCATION	DEGREE	FIELD
Indian Institute of Technology (ISM) Dhanbad	Ph.D. in Mining Engineering	Mining
The Institution of Engineers (I), Kolkata	Degree in Engineering	Mining
Mining Institute Dhanbad, SBTE, Patna	Dip. in Mining & Surveying	Mining

Experiences & Achievements

I have made substantial contributions to the field of rock blasting and excavation engineering through a combination of advanced research, field innovation, and industry collaboration. My prime achievements include:

- Served as **Blasting Expert** for **Khorlochhu Hydro Power Limited (600 MW), Bhutan**, where I led a scientific study on the design and optimisation of blast patterns for varying rock classes. My work significantly enhanced blasting efficiency and included hands-on training of site personnel.
- Successfully led the **retrieval of a stuck Tunnel Boring Machine (TBM)** in a 1000 MW Hydroelectric Project in Jammu & Kashmir using precision-controlled blasting, demonstrating exceptional problem-solving in high-risk underground conditions.
- Developed the **Directional Controlled Blasting (DCB)** technique for stabilization and flattening of railway slopes. I have extensive expertise in blast design for achieving longer pull, induced caving for hard rock management in underground coal mines, controlled blasting, cliff and hillock blasting, advanced vibration control, and tunnel blasting with minimal overbreak. I have also contributed to the assessment and optimisation of explosive quality.
- Led and co-led approximately **61 R&D and industry-sponsored projects** as Principal Investigator (PI) and Co-Principal Investigator (Co-PI), with a total project amount of over **₹180 million**.
- Contributed as a key team member in **165 industry-sponsored projects**, reflecting extensive engagement with real-world engineering challenges.
- Participated in multiple prestigious R&D initiatives, including **four government-funded projects** (two under the Ministry of Mines and one under the Ministry of Coal, Government of India, and a collaborative project with Satluj Jal Vidyut Nigam Limited under the Ministry of Power).

- Authored and co-authored **53 research publications**, including 12 SCI-indexed papers, 13 non-SCI papers, 8 book chapters, and several papers presented at international (9) and national (11) symposia.
- Authored the book “**Principles and Practices of Rock Blasting**”, published by CRC Press, which serves as a valuable reference for researchers and practitioners.
- Delivered several **invited lectures** at premier institutions such as **IIT (ISM) Dhanbad** and **NITK Surathkal**, as well as at **Khorlochhu Hydropower Limited (Bhutan)** contributing to knowledge dissemination and capacity building.
- I was honored with the **MEAI-SCCL Coal Award (2023)** and multiple industry appreciations for field innovations. I actively contribute to the global research community as a peer reviewer and served on the **Advisory Committee of the 5th ICITG Conference 2024, USA (Colorado School of Mines)**.

List of publications

SCI/International/National Journals & Book chapters in Springer/Elsevier/CRC series

1. **N. K. Bhagat**, R.K. Singh, A.K. Mishra (2026) Optimized Tunnel Blast Design in Indian Geological Conditions: A Comprehensive Analysis, Journal of Engineering Geology (JOEG), Vol.49 (Part- II).
2. **N. K. Bhagat**, R.K. Singh, A.K. Mishra (2026) Mitigating impact of climate change on railway infrastructure stability in India. In Climate Change Effects on Infrastructure (pp. 363-384). Elsevier Woodhead Publishing. <https://doi.org/10.1016/B978-0-443-33685-0.00017-8>
3. **N. K. Bhagat**, R.K. Singh, A.K. Mishra (2026) Precision Blasting for Tunnel Expansion: A Case Study of Barcem Tunnel of Konkan Railway, In: Deb, D., Murthy, V.M.S.R., Venkatesh, H.S., Rao, K.S., Goel, R.K., Singh, M. (eds) Advances in Rock Mechanics—Infrastructure Development, Volume 1. ARMS 2024. Lecture Notes in Civil Engineering, vol 783. Springer, Singapore. https://doi.org/10.1007/978-981-95-4259-8_12
4. **N. K. Bhagat**, R.K. Singh, A.K. Mishra (2026). Application of directional controlled blasting method as a ground improvement technique for sustainable railway routes in hilly terrains. Paper presented at The International Conference on Ground Improvement, Landfills and Sustainability (GLS-2025), organized by IGS Bengaluru Chapter in association with the Department of Civil Engineering, Indian Institute of Science, 18–19 July 2025. Lecture Notes in Civil Engineering (LNCE, volume 852)
5. **N. K. Bhagat**, R.K. Singh, C. Sawmliana, A.K. Mishra, V. Anand and R. Mukhiya (2025) Blasting techniques for excavating a large diversion tunnel at Pakal Dul Dam site. In Tunnelling into a Sustainable Future—Methods and Technologies (pp. 2005-2012). CRC Press. <https://doi.org/10.1201/9781003559047-256>
6. **N. K. Bhagat**, R.K. Singh, A.K. Mishra, C. Sawmliana, V.K. Himanshu, R.K. Paswan, A.K. Vishwakarma, P. Hembram & B.P. Poulouse (2025) State of the art tools and techniques for responsible drilling and blasting in open-pit mining. In the Book Chapter of *Innovative and Responsible Mining for Inclusive Growth*, Springer Proceedings in Earth and Environmental Sciences, 11th Asian Mining Congress, Kolkata, West Bengal, October 30-31, 2025, pp 963-975, https://doi.org/10.1007/978-3-032-09929-7_71

7. **N. K. Bhagat**, R.K. Singh, A.K. Mishra, A.J. Das (2025). Benefits of Directional Controlled Blasting Technique for Stabilization of Problematic Rock-Cut Slopes of Konkan Railway. In: Verma, A.K., et al. Proceedings of the 2nd International Conference on Geotechnical Issues in Energy, Infrastructure and Disaster Management. ICGEID 2024. Lecture Notes in Civil Engineering, vol 475. Springer, Singapore. https://doi.org/10.1007/978-981-97-1757-6_26
8. **N. K. Bhagat**, R.K. Singh, A.K. Mishra (2025). Mitigating Blast-Induced Slope Failure in Railway Infrastructure: A Machine Learning Approach for Risk Assessment and Rapid Decision-Making. In: Gutierrez, M. (eds) Information Technology in Geo-Engineering. ICITG 2024. Springer Series in Geomechanics and Geoengineering. Springer, Cham. https://doi.org/10.1007/978-3-031-76528-5_27
9. **N. K. Bhagat**, R.K. Singh, P. Hembram, C. Sawmliana, A. K. Mishra (2024) A Scientific Exploration of Blast-Induced Ground Vibration Mitigation Strategies for Sustainable Coal Mining in India, *Mining, Metallurgy & Exploration*. Vol. 41(1), pp. 123-138.
10. **N. K. Bhagat**, R. K. Singh, P. Hembram, C. Sawmliana, A.K. Mishra (Nov, 2023). The Influential Role of Confinement, Charge Factor and Segmentation of Explosive Charge in a Blasting Round: A Perspective for the Blasting-Induced Ground Vibration Compliance. In: Sinha, A., Sarkar, B.C., Mandal, P.K. (eds) Proceedings of the 10th Asian Mining Congress 2023. AMC 2023. Springer Proceedings in Earth and Environmental Sciences. Springer, Cham. https://doi.org/10.1007/978-3-031-46966-4_35
11. **N. K. Bhagat**, A. K. Mishra, R.K. Singh, C. Sawmliana, P. K. Singh (2022) Application of logistic regression, CART and random forest techniques in prediction of blast-induced slope failure during reconstruction of railway rock-cut slopes. *Engineering Failure Analysis*, 137, p.106230.
12. **N. K. Bhagat**, Rana, A. A. K. Mishra, R.K. Singh, C. Sawmliana, P. K. Singh (2021). Prediction of fly-rock during boulder blasting on infrastructure slopes using CART technique. *Geomatics, Natural Hazards and Risk*, 12(1), 1715-1740.
13. **N. K. Bhagat**, A. K. Mishra, M. M. Singh, A. Rana, P. K. Singh (2020) Innovative Directional Controlled Blasting Technique for Excavation of Unstable Slopes Along a Busy Transportation Route: A Case Study of Konkan Railway in India. *Mining, Metallurgy & Exploration*. Vol. 36(3), pp. 833-850.
14. **N. K. Bhagat**, A. K. Mishra, M. M. Singh, A. Rana, S. Tewari, P. K. Singh (2020) Blasting technique for stabilizing accident-prone slope for sustainable railway route. *Current Science*. Vol.118 (6), pp. 901-909.
15. **N. K. Bhagat**, A. K. Mishra, M. M. Singh, A. Rana, P.K. Singh (2020) Directional controlled blasting technique for excavation of unstable slopes along the Konkan Railway route. *Mining Engineering*. Vol. 72(7), pp. 5-6.
16. Rakesh K. Singh, **Narayan K. Bhagat**, Panchanan Hembram and Chhange Sawmliana (2025). Selecting the suitable rock excavation method of hard rock removal for constructing a ground level service reservoir at Hill Top in urban population. *Underground Mining Engineering, University of Belgrade - Faculty of Mining and Geology*, 47, 83-102; doi:10.5937/podrad25470835.
17. V. K. Himanshu, A. K. Mishra, A. K. Vishwakarma, J. Burgohain, **N. K. Bhagat** (2025) Investigations on Influence of Physico-Mechanical Properties on Blast-Induced Ground

Vibration Using Numerical Simulation and Physical Modeling. *Rock Mech Rock Eng* (2025).
<https://doi.org/10.1007/s00603-024-04376-6>

18. J. Pandey, **N. K. Bhagat**, D. D. Tripathi, A. Khalkho, and J. K. Pandey (2023) Application of suitable methodology for control of coal fire according to its magnitude in hot strata blast-holes—an approach. *International Journal of Coal Preparation and Utilization*, pp. 1-17.
19. A. Rana, S. Singh, **N. K. Bhagat**, M. M. Singh, G. P. Jadaun, P. K. Singh (2021) Evaluating the sustainability of a hydropower project in the Himalayas: A case study for resolving legal disputes in tribunals. *Renewable Energy*, 174, pp. 894-908.
20. A. Rana, **N. K. Bhagat**, A. Singh, P. K. Singh (2022) Predicting blast-induced pull using regression tree. *Arabian Journal of Geosciences*, 15(2), 1-10.
21. A. Rana, **N. K. Bhagat**, J. Pandey, S. K. Mandal, M. M. Singh, P. K. Singh (2021) Specific blasting technique for tunnelling in hot zone. *Current Science*
22. A. Rana, **N. K. Bhagat**, G. P. Jadaun, S. Rukhaiyar, A. Pain, P. K. Singh (2020) Predicting Blast-Induced Ground Vibrations in Some Indian Tunnels: a Comparison of Decision Tree, Artificial Neural Network and Multivariate Regression Methods. *Mining, Metallurgy & Exploration*. Vol. 36(4), pp.1039-1053.
23. A. Rana, **N. K. Bhagat**, G. P. Jadaun, S. Rukhaiyar, A. Pain, P. K. Singh (2020) Predicting blast-induced ground vibrations in some Indian tunnels using decision tree. *Mining Engineering*. Vol. 72(8), pp.11-12.
24. S. K. Mandal, **N. K. Bhagat**, M. M. Singh, (2014) Magnitude of vibration triggering component determines safety of structures. *Journal of Mining & Environment*, Vol. 5(1), pp. 35-46.
25. S. K. Mandal, M. M. Singh, **N. K. Bhagat** (2013) Particle velocity of ground vibration reflected mechanism of rock breakage and damage to structures. *Journal of Civil Engineering and Science*, Sept. 2013, Vol. 2(3), pp. 178-183.
26. S. K. Mandal, M. M. Singh, **N. K. Bhagat** (2012) Simultaneous initiation of cut and production holes in trench method of blasting. *International Journal of Mining and Mineral Engineering* 4.2 (2012), pp. 139-150.
27. M. M. Singh, **N. K. Bhagat** (2011) Recent developments in designing of burn-cut method of blasting in tunneling for higher productivity and special emphasis on the prevention of overbreaks, *Journal of Mines, Metals & Fuels*, Mining Industry Annual Review, October 2011, 332-339.
28. S. K. Mandal, M. M. Singh, **N. K. Bhagat**, S. Dasgupta (2008) Impact of single-hole and multi-hole blasting on vibration parameters, *Journal of Mines, Metals & Fuels*, Vol. 56, No.7 & 8, pp. 122-128.
29. S. K. Mandal, M. M. Singh, **N. K. Bhagat**, S. Dasgupta (2007) Model for energy-based evaluation of blast waves to assess safety of structures. *Int. J. of Mining, Reclamation and Environment*, Vol. 21, No.2, pp. 111-125.
30. R. K. Singh, S. K. Mandal, **N. K. Bhagat** (2007) Assessment of safety and stability of an unapproachable underground water dam due to blasting in nearby opencast coal mine. *Minetech*, Volume 28, No. 2 & 3, pp. 87-92.

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31. S. K. Mandal, M. M. Singh, **N. K. Bhagat** (2006) Magnitude of Vibration vis-à-vis Charge per Delay and Total Charge. *The Institution of Engineers (India)-MN Journal*, Vol. 86, pp. 32-38.
 32. P. Pal Roy, C. Sawmliana, **N. K. Bhagat**, M. Madhu (2003) Induced caving by Blasting: Innovative experiments in blasting gallery panels of underground coal mines of India, *Mining technology (Trans. Inst. Min. Metall. A) U. K.*, Vol. 112, pp. A1-A7.
 33. P. Pal Roy, Ashwani Kumar, C. Sawmliana, **N. K. Bhagat** (2002) INCAB- Induced caving by blasting: Software for blasting gallery (BG) panel of U/G mines. *Journal Mines, Metals & Fuels*, pp. 76-77.

Book

1. V.K. Himanshu, **N.K. Bhagat**, A.K. Vishwakarma, & A.K. Mishra (2024). Principles and Practices of Rock Blasting (1st ed.). CRC Press. <https://doi.org/10.1201/9781003461616>

International Symposium

1. **N. K. Bhagat**, Rakesh K. Singh, A.K. Mishra (April, 2025) Comparative analysis of fragmentation improvement techniques: Case study of a limestone mines, *Fragblast 14th Türkiye*, pp 703-708.
2. R. S. Yadav, R. K. Paswan, S. Kumar, **N. K. Bhagat**, M. P. Roy (April, 2025) Controlled Blasting for hard rock excavation: a case study for Railway Pier Foundations, *Fragblast 14th Türkiye*, pp 795-803.
3. C. Sawmliana, R.K. Singh, **N. K. Bhagat**, P. Hembram, S. Banerjee, Aditya Rana, A. K. Mishra (Jan, 2024) Problems and challenges of rock excavation using drilling and blasting in ecologically fragile areas: Experiences inn Mizoram State, *Proceedings of the 2nd International Conference on Geotechnical Issues in Energy, Infrastructure and Disaster Management, ICGEID, IIT, Patna, India*
4. B. M. P. Pingua, **N. K. Bhagat**, R. R. Singh (2017) Studies on properties of unwrapped explosive to improve blasting performances: A case study, *NexGen Technologies for Mining and Fuel Industries*, ISBN 978-93-85926-40.2, Feb.15-17,2017, pp.265-270.
5. P. Pal Roy, C. Sawmliana, R.K. Singh, R. S. Yadav, **N. K. Bhagat**, P. Hembram, S. Ghanti, and A. Mazumder (2017). Demolition of Over-bridges on active railroad tracks in populated areas, *7th Asian Mining Congress, The Mining Geological and Metallurgical Institute of India (MGMI)*, 8-11 November 2017, Kolkata, India.
6. M. M. Singh, **N. K. Bhagat**, S. K. Mandal (2012) Introducing specialized blasting techniques and sequences of excavation in tunneling works under critical conditions, *Tunneling in Rock by drilling and Blasting*-Spathis & Gupta (Eds), 2013 Taylor & Francis Group, London, ISBN 978-0-415-62141-0
7. C. Sawmliana, R. K. Singh, **N. K. Bhagat**, P. Pal Roy (2010) Development of an angle-cut pattern of blasting for higher productivity from underground coal mines using Pentadyne-HP explosive, *Procs. 3rd Asian Mining Congress (MGMI; ISBN: 978-81-8211069-4)*, January 22-25, 2010, Kolkata, India, pp. 11-23.
8. S. K. Mandal, M. M. Singh, **N. K. Bhagat** , S. Dasgupta (2006) Charge parameters and its impact on ground vibration. *Proc. 1st Asian Mining Congress*, 16-18 January, 2006, The Mining Geology and Metallurgy Institute of India (MGMI), Centenary, pp. 405-412.

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9. S. K. Mandal, M. M. Singh, **N. K. Bhagat** , S. Dasgupta (2005) Causes of overbreak and influence of blast parameters for smooth undamaged wall. Proc. International Symposium on *Advances in Mining Technology and Management*, November 30 – December 02, IIT Kharagpur, India, 2005, pp. 49-58.

National Symposium

1. **N. K. Bhagat**, R. K. Singh, C. Sawmliana, P. Hembram and A. K. Mishra (2025) Advanced controlled blasting techniques for mitigating ground vibrations in danger zones: A Review of Innovations and Applications, National Seminar on “Technological Advancements for Sustainable Mining and Exploration” (TASME-2025) held at CSIR-CIMFR Dhanbad during 31st Jan to 1st February 2025.
2. M. M. Singh, **N. K. Bhagat**, R. S. Yadav, P. K. Singh (2018) Effective Tunnel Blast Design to Enhance Progress with Minimal Overbreak”, RBT 2018 A national seminar on *Rock Blasting Techniques- Challenges and Opportunities*, November 23-24, 2018, CSIR-CIMFR Dhanbad.
3. **N. K. Bhagat**, M. M. Singh and A. K. Mishra (2014) Stability enhancement of rock slopes using controlled blasting techniques along Konkan Railway in India-A case study, National Seminar on Surface Mining (6th NSSM), 10-11 January 2014, ISM Dhanbad. ISBN 978-93-5156-186-6
4. **N. K. Bhagat**, M. M. Singh, R. Kumar, A. Sulaiman (2013) Stabilization of Rock Slopes along Konkan Railway Track Using Controlled Directional Blasting Technique, Proc. of National Seminar on Explosive & Blasting Techniques for Mining, Quarrying & Infrastructures Industry (EBTMQI) Sept. 27-28, 2013 NITK Surathkal.
5. **N. K. Bhagat**, S. K. Mandal, M. M. Singh (2005) Damage of structures vis-à-vis Vibration, Proceedings of 3rd National Seminar on Rock Excavation Techniques, A. K. Chakarborty, G. K. Pradhan & S. K. Dutta (Eds), Nagpur, India, pp. 137-141.
6. **N. K. Bhagat**, P. Pal Roy (2003) A review on the strategic planning for mine closure with particular reference to blast-closure, Proc. National Seminar on Strategies for Mine Closure, October 11-12, 2003, Dhanbad, India, pp. 104-108.
7. P. Pal Roy, C. Sawmliana, R.K. Singh, R. S. Yadav, **N. K. Bhagat**, P. Hembram, S. Ghanti, A. Mazumder (2017) Demolition of Over-bridges on active railroad tracks in populated areas, *7th Asian Mining Congress, The Mining Geological and Metallurgical Institute of India (MGMI)*, 8-11 November, Kolkata, India.
8. M. M. Singh, **N. K. Bhagat** (2016) Short Burden Blasting (SBB)-A New Technique for Barrier Breakage in River Diversion Works, INDOROCK 2016: 6th Indian Rock Conference 17-18 June 2016, IIT Mumbai.
9. M. M. Singh, **N. K. Bhagat** (2011) A suitable blast design to minimize the magnitude of vibration with the use of existing initiation devices keeping in view of the scheduled production & productivity of the mine – a case study. Proc. of All India Seminar on “Advances in Mine Production and Safety” August 26-27, 2011, CIMFR (Dhanbad).
10. S. K. Mandal, M. M. Singh, **N. K. Bhagat** (2004) Parameters affecting blasting in Iron Ore opencast mines --- Some Case study. *National Seminar on Rock Fragmentation*, 23-24th January, 2004, BHU, Varanasi, pp 22-24.

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11. S. K. Mandal, M. M. Singh, **N. K. Bhagat** (2003) Fragmentation by Blasting --- Problems and Remedies. Seminar on Explosive and Blasting by National Convention of Mining Engineers, Institute of Engineers (Mining), Dhanbad Chapter. pp. 60-71.

Invited Lectures

1. Blast design for tunnels to control AOP and ground vibrations” at IIT (ISM) for EDP for Executives of BRO, GOI on 23.02.2026.
2. Tunnel Blast Design Consideration: A Comprehensive Approach in Indian Geological Conditions" (lecture, Workshop on Rock Blasting Innovations for Safety & Efficiency [RISE-2025], NIT Karnataka, Surathkal, March 14–15, 2025).
3. Blasting in Infra Projects: Success Stories (lecture, Workshop on Rock Blasting Innovations for Safety & Efficiency [RISE-2025], NIT Karnataka, Surathkal, March 14–15, 2025).
4. Blast Design for Tunnels to Control AOP and Ground Vibration (lecture, EDP Program on Controlled Blasting Management and Safety for Executives of BRO, Department of Mining Engineering, Indian Institute of Technology [ISM], Dhanbad, February 24–March 8, 2025)
5. Blast Design for Tunnels to Control AOP and Ground Vibration (lecture, EDP Program on Controlled Blasting Management and Safety for Executives of BRO, Department of Mining Engineering, Indian Institute of Technology [ISM], Dhanbad, January 8-20, 2024)
6. Controlled Directional Blasting: A New Approach to Stabilize Unstable Slopes of Konkan Railway (Technical session, Short-Term Course on Controlled Blasting Management and Safety for Road Construction in Mountainous Areas for Senior Executives, Indian Institute of Technology [ISM], Dhanbad, December 16, 2016)
7. Controlled Directional Blasting: A New Approach to Stabilize Unstable Slopes of Konkan Railway" (technical session, Executive Development Programme for Assistant Executive Engineers [Civil], Border Roads Organisation [BRO], Indian Institute of Technology [ISM], Dhanbad, September 23, 2016).

Projects handled as Principal and Co-principal Investigator (Total cost-Rs.18 Crore)

During Financial Year 2026-27 (Total project cost: Rs.169.92 Lakhs)

1. Scientific study on safe excavation of Twin Tunnel Road between Anakkampoyil-Kalladi-Meppadi in Kozhikode and Wayanad (Kerala): Ground vibration monitoring during controlled blasting and related mitigation measures (SSP/1038/2026-27).

During Financial Year 2025-26 (Total project cost: Rs.224.3 Lakhs)

2. Scientific study for design of blast pattern for different classes of rock, optimisation of design and to train the site personnels at KHPL (600 MW), **Bhutan**, (SSP/1022/2025-26).
3. Scientific study on **Carbon Phase Transition Rock Breaking Technique (CPTBT)** at Kallakudi Limestone Mine of Dalmia Cements Bharat Limited, Tamil Nadu, (SSP/1028/2025-26).
4. Scientific study for controlled blasting at Kashlog limestone mine (Mangu block) (SSP/1029/2025-26).

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5. Scientific study for controlled blasting at Sonadih Limestone Mines for permission from 100 m of structures not belonging to mine owner and 50 m from public road (SSP/1011/2025-26).
 6. Scientific study for controlled blasting at Gold Plus Silica Sand Mines of M/s Gold Plus Glass Industry Limited (SSP/1009/2025-26).
 7. Scientific Study for Designing of Drilling & Blasting Techniques for Underground and Open Excavation Works of 1800 MW Adani Gandikota PSP Project, Andhra Pradesh (SSP/1008/2025-26).
 8. Scientific study and advice for controlled blasting at Gagal Limestone Mines (SSP/983/25-26)
 9. Scientific study for safe excavation of Cliff at Kharghar-Turbhe Road Tunnel Project (Rithwik Pvt Ltd. (SSP/969/2025-26).
 10. Geophysical investigations at Bhavani Sagar Dam for aiding safe blasting practices near the dam, Erode, Tamil Nadu (SSP/N/965/2025-26).
 11. Scientific and technical assessment of blasting impacts from Mukutban Mines on Pimparwadi Village (M/s RCCPL Pvt. Ltd] (SSP/951/2025-26).
 12. Scientific study for proof check of blast design at Kharghar-Turbhe Tunnel Road (KTLR), Kharghar, Navi Mumbai, Rithwik Pvt Ltd. SSP/N/950/2025-26).
 13. Assessment of impact of proposed blasting activity and advice thereof at Bhora-Kathra Limestone Mines with specific reference to Rohtasgarh Fort, Rohtas (CNP/5310/2025-26).
 14. Vibration studies and advice prior to development of rock quarry at Shalimar for Pakal Dul HE Project, Kishtwar (CNP/5287/2025-26).

During Financial Year 2024-25 (Total project cost: Rs.67.6 Lakhs)

15. Scientific study on controlled blasting operations for cavern excavation over the TBM shield to retrieve TBM at HRT-TBM of Pakal Dul HE Project. [M/s Larsen & Toubro Limited] (SSP/920/24-25).
16. Scientific study on controlled blasting patterns, blast-induced ground vibration, flyrock, air overpressure at Khatkurbahal North Block Limestone & Dolomite Mines [M/s Shiva Cement Ltd] (SSP/867/2024-25).
17. Scientific study to analyze blast-induced ground vibrations at Boulder Stone Quarry at Laitkynsew Village, Raid Mawlieh, East Khasi Hills, Meghalaya (Total Lease Area-1.279 Ha), SSP/835/2024-25.
18. Scientific study and advice for determination of controlled blasting patterns to work within 100-300 m of residential structures and railway line as well as use of Site-Mixed Emulsion explosives in the blasting operations at Mukutban Limestone and Dolomite Mine of M/s RCCPL Pvt. Ltd., Dist. Yavatmal, Maharashtra, SSP/822/2024-25.
19. Scientific Study and Advice on Slope Stability and Blasting of Subhadra OCP of M/s SCML, Aditya Birla Group (Part B: Blasting Study) (CNP/5283/2024-25)
20. Advice for Optimization of Controlled Blasting Design for Rock Excavation at Ratle Hydro Electric Project (850 MW), J&K and Analysis of Vibration Data Records and Interpretation. [M/s Megha Engineering & Infrastructures Limited] (CNP/5270/24-25)
21. Advice for rock excavation work using drilling and blasting at Kwar HEP (540 MW), Kishtwar, J&K [M/s Patel Engineering Limited] (CNP/5269/24-25)

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22. Advice on blast-induced ground vibration due to blasting activities being carried out at Kiru H.E. Project's quarry areas and to assess the anticipated impact on nearby establishments (UT-J&K). [M/s Patel Engineering Limited] (CNP/5268/24-25)

During Financial Year 2023-24 (Total project cost: Rs.147.03 Lakhs)

23. Scientific study for safe and economical open and underground excavation of rock using drilling and blasting method at Pakal Dul Dam Project (J&K) SSP/774/2023-24.
24. Scientific study and advice for carrying out controlled blasting for hard rock excavation works at Bharamtoli Hill, Ranchi for construction of 28.8 ML GSLR under Ranchi Water Supply Scheme Phase-II, Package-A, SSP/721/2023-24.
25. Scientific advice for assessment of possible impacts due to blasting on various surface structures and surroundings during excavation of road tunnel proposed between Anakampoyil-Kalladi-Meppadi in Kozhikode & Wayanad Districts of Kerala, CNP/5223/2023-24.
26. Scientific advice for assessment of possible impacts of controlled blasting on various surface structures due to excavation of proposed rail tunnel passing under habitat area between Vizhinjam International Seaport and Balaramapuram station in Thiruvananthapuram, Kerala, CNP/5222/2023-24.
27. Scientific study and advice for evaluation of maximum charge per delay, total charge and optimum blast pattern to minimize ground vibration, air-overpressure and restrict the extent of flyrock within safe distance at Julgul Bhalua Limestone mines of M/s Ultratech Cement Limited (Unit-Dalla Cement Works). CNP/5201/2023-24.

During Financial Year 2022-23 (Total project cost: Rs. 121.437 Lakhs)

28. Scientific study for the assessment of influence zones due to blasting at stone quarries in the state of Kerala in compliance to the order of Hon'ble National Green Tribunal (NGT) passed in OA No. 304/2019 (Kerala State Pollution Control Board, SSP/714/22-23).
29. Scientific study for designing of controlled blasting at Amelia Coal Mine for safe blasting operation beyond 100 m but within 500 m of residential structures and assessment of quality of explosive and accessories, SSP/682/2022-23.
30. Scientific study for the slope excavation work using Directional Controlled Blasting (DCB) at Salal Station Yard of USBRL Project of M/s Konkan Railway Corporation Limited (KRCL), Jammu, SSP/656/2022-23.
31. Scientific study and advice for optimisation of maximum charge per delay, total charge and blast pattern to minimise ground vibration, AOP/noise and flyrock using bulk explosive system beyond 100 m distance from the residential structures at patch-G of Kujama opencast project under Lodna Area, BCCL, CNP/5187/2022-23.
32. Scientific study and advice for designing of controlled blasting at Pachhwara Central Coal Mines of DBL Pachhwara Coal Mines Private Limited, CNP/5165/2022-23.
33. Scientific study and advice for designing of controlled blasting patterns for carrying out safe blasting operations at South Khliehajari Limestone Mines of M/s Meghalaya Cement Limited, East Jaintia Hills, Meghalaya, CNP/5159/2022-23.

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34. Scientific study and advice for the development of controlled blasting pattern at Birahuli Limestone Mine of Shri Mukund Jaiswal, Satna, MP (CNP/5155/2022-23).
 35. Scientific study and advice for design and development of controlled blasting nearby villages at Kashlog/Mangu Limestone Mines of M/s Ambuja Cements Limited, HP (CNP/5145/2022-23).
 36. Scientific study for assessment of blasting impacts on the under-construction railway line and advice for designing of controlled blasting patterns at the proposed Itoura limestone mine of M/s RCCPL Private Limited in Satna District, MP, CNP/5135/2022-23.
 37. Scientific study and advice on feasibility of controlled blasting for hard rock excavation works at Bharamtoli hill, Ranchi for construction of 28.80 ml GLSR under Ranchi drinking water project phase-IIA (CNP/5134/2022-23).

During Financial Year 2021-22

38. Advice on directional controlled blasting to excavate hard rock for construction of second line by the side of electrified section between Jaroli - Porjanpur section of East Coast Railway (ECoR) M/s RVNL, Bhubaneswar (CNP/5059/2021-22).

During Financial Year 2020-21 (Total project cost: Rs.84.8 Lakhs)

39. Studying, modeling and evolving a new blasting technique for mine excavations near the proximity of structures (beyond 50 m) using the structural response analysis and dynamic finite element modelling (Funded by Ministry of Mines, GAP/122/2020-21).
40. Advice on directional controlled blasting to excavate hard rock for lying 2nd line nearby existing rail track and other structures at Sanvordem Yard (Kulem-Madgaon Section of SW Railway), RVNL, Goa (CNP/5032/2020-21).
41. Scientific study and advice on designing of controlled blasting pattern for safety of surface features at Budgauna and Majhgawan Limestone Mines of M/s UltraTech Cement Ltd. (Unit: Sidhi Cement Works), CNP/5031/2020-21.
42. Scientific study and advice for designing of deep hole-controlled blasting patterns within danger zone but beyond 100 m from the houses and buildings at Karo OCP, CCL, CNP/5027/2020-21.
43. Scientific study and advice on designing of controlled blasting pattern for safety of surface features at Argat Limestone Mine of Sidhi Cement Works, CNP/5004/2020-21.
44. Scientific study and advice on blast-induced ground vibration, flyrock and AOP at Chormari and Degarhat Limestone mines, Jaypee Rewa Plant, CNP/4984/2020-21.

During Financial Year 2019-20 (Total project cost: Rs. 649.73 Lakhs)

45. Methodology for Excavation, recommendations for design proof check and monitoring during excavation of three tunnels and open excavations at **Panvel-Karjat Double line suburban corridor**, SSP/423/2019-20.

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46. Excavation and flattening of slopes at Bordave, Ukshi Yard, Agave and Shirsawane cuttings using controlled blasting under the jurisdiction of DGM/SW/RN in Ratnagiri Region, SSP/435/2019-20.
 47. Scientific study for safe blast based on the monitoring of blasts event at Gagal Limestone Mine of M/s ACC Ltd. SSP/407/19-20.
 48. Scientific study for safe and economical open and underground excavation of rock using DBM at **Pakal Dul Dam Project**, J&K, SSP/367/2019-20.
 49. Scientific study and advice for safe blast design to minimize Fly-rock, Ground vibration, AOP, Throw at Rajanka Limited Mines (F-South area), CNP/4911/2019-20.

During Financial Year 2018-19 (Total project cost: Rs. 90.08 Lakhs)

50. Scientific study for safe blast based on the monitoring of blasts event at Gagal Limestone Mine of M/s ACC Ltd., SSP/308/2018-19
51. Scientific study to conduct controlled deep hole blasting at Barjora North Coal Mine and advice thereof, CNP/4783/2018-19.
52. Consultancy services on evaluation of explosives and blasting accessories to improve its quality and suggestions at Jhamarkotra Mines, RSMML, CNP/4773/2018-19.
53. Advice on assessment of the effect of vibration due to blasting on nearby villages surrounding Bhanora West Opencast, Sripur area, ECL, CNP/4728/2018-19.
54. Scientific advice and designing of controlled blasting pattern for safety of surface features at Budgauna Limestone Mine of Sidhi Cement Works, CNP/4723/2018-19.

During Financial Year 2017-18 to 2012-13 (Total project Cost-Rs.233.24 Lakh)

55. Study and advice on blast induced ground vibration due to excavation of Additional Adit to HRT, Sawra-Kuddu HEP, Hatkoti, HPPCL, SSP/258/17-18.
56. An advice to evolve a safe blast based on the monitoring of blasts events at ACC Gagal Limestone Mine, CNP/4527/17-18 & SSP/189/17-18.
57. Designing of controlled blasting for rock excavation to set-up Wagon Tippler, Conveying Tunnels & Transfer point site at NTPC, Talcher, Odisha, SSP/173/2016-17.
58. Study to Identify measures for dampening of vibration effects during blasting, Satluj Jal Vidyut Nigam Limited, CLP-59/2015-16.
59. Advice and monitoring of drilling and blasting work at Gagal Limestone Mine, M/s ACC Ltd. CNP-4350/2015-16 & SSP-101/2015-16.
60. Advice on deep hole blasting in an area beyond the danger zone along with blast design parameters in Godhur Patch "A" CNP/4225/15-16
61. Study and advice for safe control blasting technique for excavation and flattening of slopes under the jurisdiction of Regional Engineer/Ratnagiri, Konkan Railway, CNP/3390/12-13.

Professional Membership

1. Life Time Member of the Mining Engineers Association of India
2. Member of the Institution of Engineers (I)
3. Life Time Member of the Mining, Geological and Metallurgical Institute of India
4. Life Time Member of the Indian Mining & Engineering Journal
5. Tunneling Association of India (TAI)

Peer Reviewer of SCI Journals

1. Artificial Intelligence Review
2. Engineering Geology
3. International Journal of Coal Science & Technology
4. Bulletin of Engineering Geology & Environment
5. Mining, Metallurgy & Exploration
6. Shocks and Vibration
7. Scientific Reports
8. Multiscale and Multidisciplinary Modeling, Experiments and Design

Award/Appreciation Received:

1. Recipient of MEAI-SCCL Coal Award - Mining Engineer-2023 for the meritorious service rendered to the coal industry.
2. International Advisory Committee (IAC) member of 5th International Conference on Information Technology in Geo-engineering (5th ICITG) held during 5th to 8th August 2025, Golden, Colorado School of Mines, USA.
3. Appreciation letter (Dated:19.08.2013) received from Assistant Vice President (Mines), J K Cements Works for dedication and talented skillfulness in solving the environmental problems associated with blasting at four limestone mines.
4. Appreciation letter (Dated:08.09.2011) received from Vice President (Mines), Jaypee Himachal Cement Plant for development of systematic benches in hilly terrain of Himalaya at Baga & Bhalag Limestone Mines.
5. Certificate of Merit (SC/T-143/COM/2005-2006) for paper published in the MN Journal of Institution of Engineers (I).
6. Appreciation letters (Dated: 06.06.2006 and 01.07.2008) received from Chief Engineer, Konkan Railway Corporation Limited for stabilization of unstable slopes using controlled blasting techniques.
7. Appreciation letter (Dated:29.10.2008) received from Chief Bridge Engineer, Eastern Railway, for safe demolition of ROB No. 152 near Rampurhat using explosives.
8. Appreciation letter (No.154/C Dated: 29.05.2017) received from Divisional Commissioner Magadh Division Govt. of Bihar for dismantling of unstable boulder located at Brahmayoni Hills Gaya using controlled blasting techniques.
9. Appreciation letter (No.22054/ADGNW/.Drill&Blast/58/E2/Wks Dated:06.05.2020) received from Addl DGBR (NW) for CSIR Controlled blasting technique to enhance the progress of Border Roads.