VOLUME 1

THE MINING EDGE

MONTHLY NEWSLETTER

IIT ISM INDIAN INSTITUTE OF TECHNOLOGY INDIAN SCHOOL OF MINES DHANBAD

SEPTEMBER 2024

Department of Mining Engineering

From HoD's Desk

By Prof. D. P. Mishra

Dear All,

It gives me an immense pleasure to introduce the 1st edition of "The Mining Edge", the monthly newsletter of the Department of Mining Engineering, IIT (ISM) Dhanbad. This newsletter reflects on our ongoing journey and shares some exciting updates of the Department.

As we stand at the forefront of a transformative era in the mining industry, I am excited to share insights into the future of mining technology. The mining sector is rapidly evolving, driven by advancements in automation, sustainability, and digitalization. The integration of smart technologies, such as AI and IoT, is revolutionizing how we operate, enhancing efficiency, and ensuring safer practices. As we delve deeper into these technologies, collaboration and knowledge sharing will be essential. I encourage each of you to stay engaged, share your ideas, and be open to new possibilities.

Our department continues to thrive, fueled by your dedication and innovative spirit. Recent projects and research initiatives have showcased our commitment to sustainable practices and cutting-edge technology. I encourage everyone to engage in collaborative efforts, as these experiences are invaluable for both personal growth and our collective advancement.

I take this opportunity to recognize the hard work of our Students, Staff, Faculty, and Alumni. Your efforts not only showcased your skills but also enhanced our department's reputation. Congratulations to everyone involved in this endeavor! As we move forward, let us remain committed to excellence in education, research, and community service. Together, we can continue to make significant contributions to the mining sector and society at large.

Finally, I thank and congratulate the editorial team for their sincere efforts in bringing this 1st edition of the newsletter in a short time. I am sure that the content and look of the newsletter will improve as we move forward.

Best regards,

Prof. D. P. Mishra

Projects

Prof. D. P. Mishra is awarded a R&D project titled "Assessment of critical minerals in mine and mineral wastes for sustainable utilisation" of worth Rs. 26.0 lakhs from the Ministry of Mines, Govt. of India.

Prof. D. P. Mishra received a consultancy project titled "Ventilation Simulation Study for SMC Underground Project of M/s IMFA Ltd." of worth Rs. 10.62 lakhs from M/s Indian Metals and Ferro Alloys Ltd.

Prof. B. S. Choudhary received a consultancy project titled "Revalidation of scientific study regarding controlled blasting at Borira Patch of Damagoria Colliery of worth Rs. 1.5 lakhs from M/s BCCL, Damagoria Colliery.

Prof. B. S. Choudhary received a consultancy project titled "Scientific Study for controlled deep hole blasting and assessment of blast induced ground vibrations as per regulation 196(3) of CMR-2017 for Narayankuri Highwall Mining Project, Kunustoria Area, ECL" of worth Rs. 6.49 lakhs from M/s Resurgent Mining Pvt. Limited.

Prof. B. S. Choudhary received a consultancy project titled "Scientific study for designing deep hole drilling and blasting for controlling vibrations and Fly rock within Safe Limits for Kuardih-Tirat Coal Mine" of worth Rs. 4.72 lakhs from M/s Kalinga Metalics Limited, Kolkata.

Prof. R. K. Sinha received a consultancy project titled "Elasto plastic RM modelling for pilot operations of Coal Gassification in Kasta West Project" of worth Rs. 29.98 lakhs from M/s Ergo Exergy.

Prof. R. M. Bhattacharjee completed a consultancy project titled "Safety and Health Management System Audit" of worth Rs. 14.75 lakhs from M/s Northern Coalfields Limited.

Prof. A. Yadav, Prof. B. Behara, and Prof. A. Galav received a consultancy project titled "Three Dimensional Subsidence Study of Patal East (Eastern Part) Coal Block" of worth Rs. 14.16 lakhs from M/s RCR Steel Works Private Limited.

Publications

Azam, S., Liu, S., Bhattacharyya, S., Mishra, D. P. 2024. Prevalence of nano-sized coal mine dust in North and Central Appalachian coal mines–Insights from SEM-EDS imaging. Journal of Hazardous Materials, Elsevier, Vol. 476, 135226.

Roy, S., Mishra, D. P., Agrawal, H., Bhattacharjee, R.M. 2025. Development of productivity model of continuous miner operators working in hazardous underground mine environmental conditions. Measurement, Elsevier, Vol. 239, 115516.

Raj, A. K., Choudhary, B. S. & Deressa, G. W. Prediction of Rock Fragmentation for Surface Mine Blasting Through Machine Learning Techniques. J. Inst. Eng. India Ser. D (2024).

Singh, A., Agarwal, S., Prabhat, A. A multi-criteria decision framework to evaluate sustainable alternatives for repurposing of abandoned or closed surface coal mines. Frontiers in Earth Science 12 (2024): 1330217.

Mishra, S., Mishra, A., Rao, K.S. et al. (2024). Factors Affecting Crack Length of a Shallow Tunnel under Surface Impact Load. Indian Geo-tech J. (2024).

Gautam, P. K., Dwivedi, R., Garg, P., Majumder, D., Agarwal, S., McSaveney, M., and Singh, T. N. Evolution of the damage precursor based on the felicity effect in shale. International Journal of Damage Mechanics (2024): 10567895241253727.

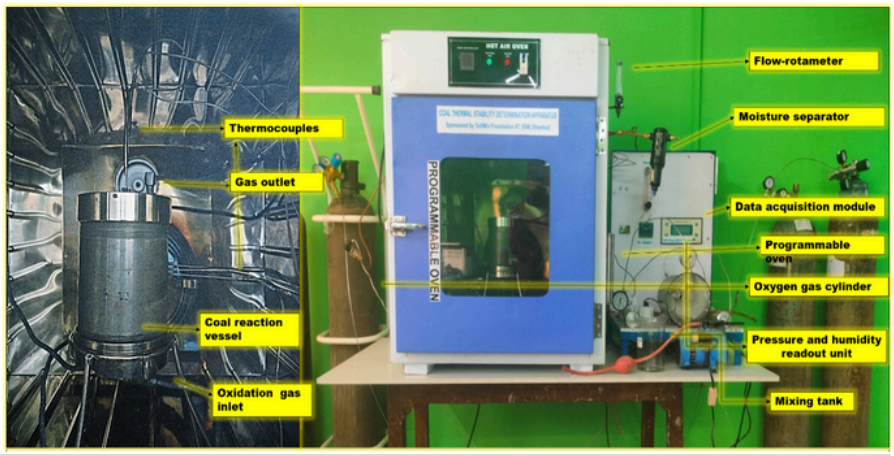
Mishra, S., Kumar, A., Rao, K. S., Gupta, N. K. (2024). An Experimental Approach to Anal-yze the Effect of Impact Loading on Shallow Tunnels in Weak Rockmass. In: Velmurugan, R., Balaganesan, G., Kakur, N., Kanny, K. (eds) Dynamic Behavior of Soft and Hard Materials Volume 1. IMPLAST 2022. Sprin-ger Proceedings in Materials, vol 34. Springer, Singapore.

Kumar, A., Mishra, S., Rao, K. S. (2024). Brittle–Ductile Transition of Oil Shale. In: Jose, B. T., Sahoo, D. K., Oommen, T., Muthu-kkumaran, 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.

Patents

Prof. D. P. Mishra along with his PhD scholar, Mr. Tanmay Dasgupta, filed a patent titled **'An Apparatus for Multiparameter Coal Spontaneous Combustion & Quasi-Steady State Assessment and Method Thereof'**.

This invention is about the development of a new apparatus and method to determine for multiparameter coal spontaneous combustion and quasi-steady state assessment of spontaneous combustion of coal in the laboratory.



The method involves studying the thermal evolution of coal undergoing spontaneous combustion under ambient environmental conditions of humidity, moisture, particle size, gas concentration, and gas velocity. This patent is the outcome of the R&D project undertaken jointly by BIT Sindri and IIT (ISM) Dhanbad with the funding support of TexMin, IIT (ISM) Dhanbad.

MGMI Award

Prof. Anindya Sinha, PoP, has been conferred with the **MGMI Award for Coal Mining** for 2023-24 for his outstanding contribution to the Coal Mining Industry. This award was given by the MGMI Apex Body in their 118th Annual General Body Meeting held at Kolkata on 21 September 2024.

TOP 2% SCIENTISTS

Prof. D. P. Mishra figured in the Stanford Elsevier **Top 2% Scientists List** for 2024 for his significant impact in the field of Engineering (Sub Field: Environmental Sciences).

Prof. R. M. Bhattacharjee attended the **meeting of the Board of Governors of IIT(ISM)** on 25 September 2024 at New Delhi; and the **15th Expert Appraisal Committee (Coal Sector) meeting** held during 18-19 September 2024 on virtual mode.

WORKSHOPS, LECTURES AND SEMINARS

Prof. Dheeraj Kumar participate in the one-day workshop on "Advances in Rock Mechanics – Infrastructure Development" and discussed on Smart Mining and Rock Engineering in detail.

Prof. B. S. Choudhary presented a paper on "Recent developments & strategies in the controlled blasting technology for stone quarries towards a safe environment" in International Mining Experts Conclave.

Prof. D. P. Mishra was invited as a Guest Speaker to address in the 2nd Edition of Minerals and Mining Conclave 2024 & Business Excellence Awards of ASSOCHAM focused on "Coal and Critical Minerals: The Future of Mining" held at Kolkata on 27 September 2024.

Prof. D. P. Mishra and **Prof. S. Agrawal** attended the 12th International Mine Ventilation Congress (IMVC2024) at Sydney, Australia during 12-16 August 2024.

During the 12th International Mine Ventilation Congress (IMVC2024), **Prof. D. P. Mishra** submitted and presented the bid document before the IMVC Committee for hosting the 13th IMVC in India.

Prof. R. M. Bhattacharjee has conducted a Special session on "Vision Zero" in the Indian Mining Sector – Challenges ahead and path forward, for the Executives of Hindustan Copper Limited at Kolkata on 5 September 2024.

Prof. B. S. Choudhary has conducted a three days Professional Development Programme on "Introduction of the Latest Tunneling Technique" for the executives of NHPC Ltd.

Prof. Swapnil Mishra was invited for co-chairing a session in the prestigious ISRM sponsored conference held at New Delhi on 24 September 2024.

Events

Teachers' Day

Department joyfully celebrated the Teachers' Day in honor of Dr. Sarvepalli Radhakrishnan, recognizing his immense contribution to education. Faculty and students came together for heartfelt tributes, sharing stories and expressing their gratitude for the impact of the teachers on our lives.

Vishwakarma Puja

Department of Mining Engineering celebrated Vishwakarma Puja, honoring the divine architect and creator of the universe. Faculty, staff and students joined together for a vibrant puja celebration for seeking blessings of Lord Vishwakarma for creativity and innovation.

Conference by ISM Alumni Association

ISM Alumni Association Kolkata Chapter is organizing the International Seminar & Exhibition on '**Current Trends of Sustainable Underground Mining**,' during **29-30 November 2024** at Biswa Bangla Convention Centre, New Town, Kolkata, India.

KHANAN'24

The Department of Mining Engineering in association with Society for Mining, Metallurgy and Exploration (SME) India Section is organising the biggest annual Techno-Mining Fest "KHANAN'24" during 26-27 October, 2024. This fest aimed at celebrating the spirit of mining and innovation will feature a range events including keynote sessions, competitions, and workshops.

Mine Ventilation and Environment for Green Mining (MVEGM 2024)

Department of Mining Engineering is organizing an International Conference on "**Mine Ventilation and Environment for Green Mining (MVEGM 2024)**" during **20-22 December 2024** at **Swosti Premium Beach Resorts, Puri, Odisha**.

This conference will provide a forum where the mine ventilation, environmentalists, safety professionals, academicians, government, mine operators, consultants and equipment manufacturers from around the world can meet and deliberate on the advances in mine ventilation, mine environmental monitoring and control, mine fires, explosions, mine rescue and recovery, coal bed methane, underground coal gasification, radiation problems in uranium mines, geothermal energy, mine waste management, applications of geomechanics and AI/ML in mine ventilation and environment, CO2 sequestration and reduction of carbon footprint, ventilation problems in deep mines, diesel issues in opencast and underground mines, ventilation and environmental aspects of tunnels and underground space, and allied areas for green mining. The Department of Mining Engineering is continuously focusing on the outlined themes of the conference, and the mining fraternity will immensely benefit from the deliberations made during this conference.