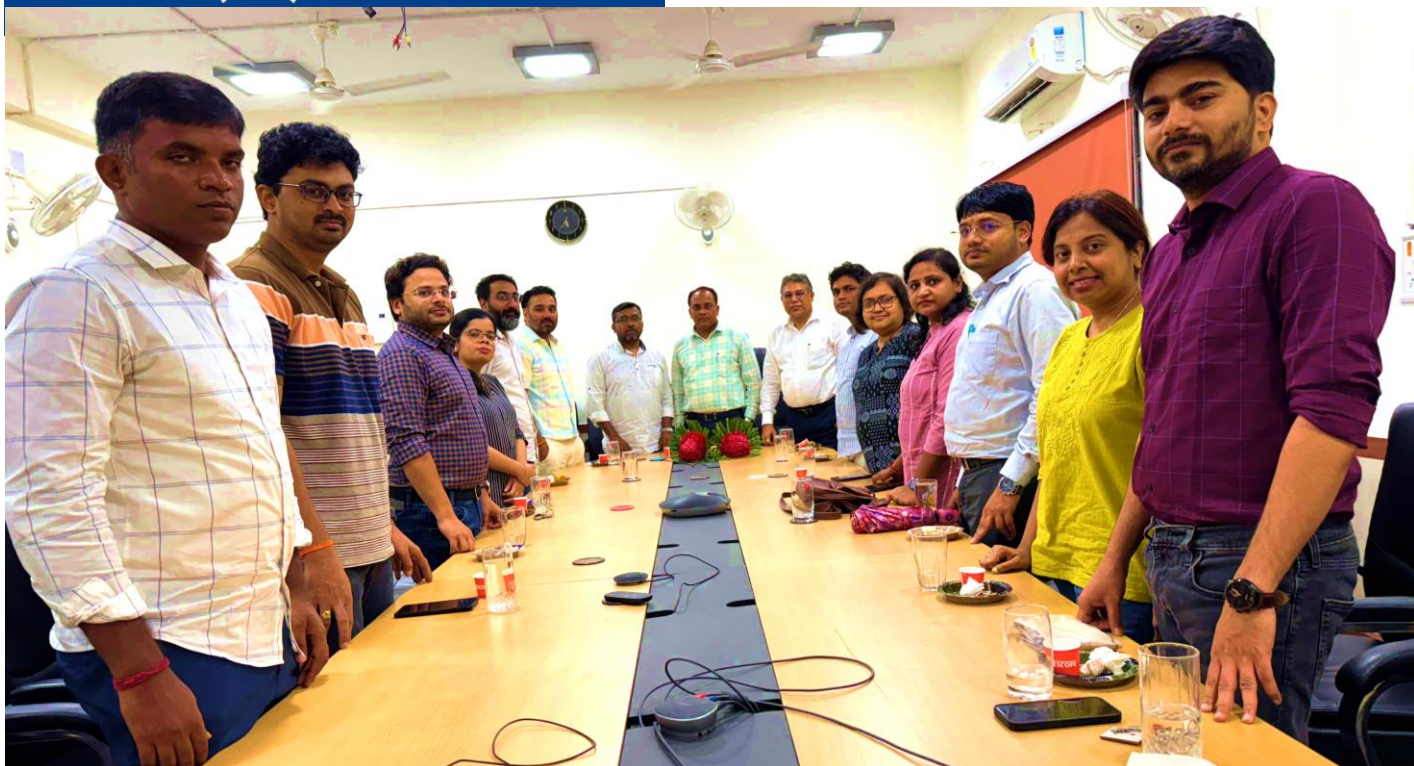




Prof. Shatrughan Soren



From HoD's Desk

Dr. Shatrughan Soren

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Dear Readers,

The tenth edition of our department's monthly newsletter begins with Prof. S. Soren assuming the role of Head of the Department, marking a new chapter in our academic journey. Our department organized Faculty development programme under the aegis of "Malaviya Mission Teacher Training Programme".

*In addition, a national conference "CRISP - 2025" is being organized in the department of Fuel, Minerals & Metallurgical Engineering commemorating **100 years of legacy of IIT(ISM) Dhanbad**, in the month of October bringing together leading researchers, industry experts, policymakers and young scholars to comprehensively explore the cutting edge advancement in processing of critical metals and make it a grand success.*



6 DAY FACULTY DEVELOPMENT PROGRAM ON SURFACE ENGINEERING: PRINCIPLES, TECHNIQUES, AND CHARACTERIZATION

22-27 June 2025

Organized By

FMME Department

**Indian Institute of Technology (Indian
School of Mines) Dhanbad**



Online Mode

No Registration Fee

Under the aegis of



University Grants Commission



सत्यमेव जयते
Ministry of Education
Government of India

**MALAVIYA MISSION
TEACHER
TRAINING PROGRAMME**

ABOUT THE INSTITUTE

Indian Institute of Technology (ISM) Dhanbad, earlier known as Indian School of Mines Dhanbad. The Indian School of Mines was formally opened on 9th December 1926, by Lord Irwin, the then Viceroy of India to address the need for trained manpower related to mining activities in the country with disciplines of Mining and Applied Geology. In 1967 it was granted the status of a deemed to be university under Section 3 of UGC Act, 1956. In 2016, ISM Dhanbad has got the status of IIT. Since its establishment, IIT(ISM) Dhanbad has undergone considerable expansion of its activities, and presently it can be considered as a total technology education institute. At present, the Institute has 17 departments and several centres, which are equipped with all necessary infrastructure and worldclass facilities to undertake all kinds of fundamental and applied research problems.

AREAS COVERED:

Surface Engineering, Coatings, Cold spray, Thermal spray, Laser surface modifications, Additive manufacturing, Surface Characterization

OVERVIEW:

Surface Engineering plays a critical role in enhancing the performance and longevity of materials across industries such as aerospace, automotive, biomedical, and energy sectors. The field encompasses various surface engineering techniques that tailor the surface properties to meet specific functional requirements. This FDP aims to provide participants with a comprehensive understanding of surface engineering principles, contemporary techniques, and advanced characterization methods. This FDP will enable faculty members and researchers to incorporate modern surface engineering concepts into their teaching and research.

COURSE CONTENT:

1. Fundamentals of Surface Engineering Techniques
2. Surface Modification Methods – Coatings (e.g., thermal spray), compositional changes, and microstructural tailoring
3. Surface Strategies for Corrosion and Wear Resistance
4. Advanced Characterization Tools – SEM, XRD, tribology, optical profilometry, etc.
5. ICME Approaches in Surface Engineering
6. Surface Engineering for Sustainable and Green Technologies

SPEAKERS:

Industry experts and academicians will provide insights into the latest trends in surface engineering, emphasizing practical applications and emerging technologies. Eminent list of experts accepted to be featured in this FDP:

1. Dr. Anand K, IITM
2. Prof. Harpreet Singh, IITRPR
3. Prof. Anup Kumar Keshri, IIT Patna
4. Dr. Sisir Mantri, IMMT Bhubhaneswar
5. Prof. Partha Pratim Bandopadhyay, IITKGP
6. Prof. Kantesh Balani, IITK
7. Prof. Lakshminarayan Subramanian, IITD
8. Prof. G M Karthik, IIT(BHU)

WHO CAN ATTEND:

This FDP is designed for faculty members, and educators from the following disciplines (not limited to):

- Metallurgical & Materials Engineering and allied areas
- Mechanical Engineering and allied areas
- Chemical Engineering and allied areas
- Nanotechnology and allied areas
- Physics & Applied Sciences

PROGRAM COORDINATORS:

Dr. Kesavan Ravi (Coordinator)

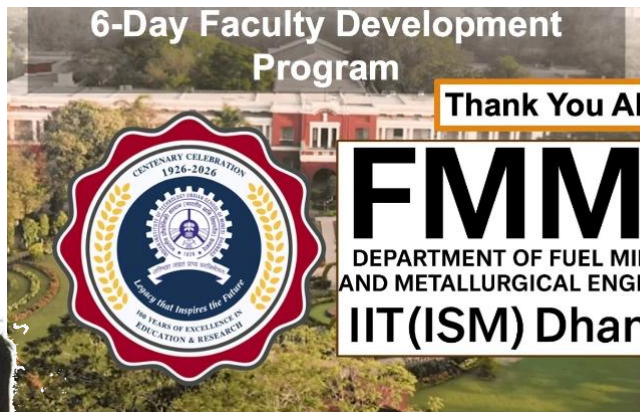
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Dr. Rahul MR (Co-Coordinator)

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ABOUT THE MISSION:

The National Education Policy (NEP) 2020 highlights the importance of motivated and capable faculty in higher education, emphasizing continuous professional development. To strengthen teacher training, the Malaviya Mission Teacher Training Programme (MMTTP) has been re-launched by restructuring existing initiatives like UGC-HRDCs and PMMMNMTT. The mission aims to enhance faculty capacity and integrate Indian values into teaching, research, and institutional development.



Thank You All!

FMME
DEPARTMENT OF FUEL MINERALS
AND METALLURGICAL ENGINEERING
IIT(ISM) Dhanbad

Surface Engineering:
Principles, Techniques and
Characterization



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Under the aegis of



Prof. **Avanish Kumar** delivered a talk on “**Overview of Surface Dependent Mechanical Behaviour of Materials**” in UGC-MMTTP Faculty Development Programme on “**Surface Engineering: Principles, Techniques, and Characterization**”, Organised by IIT(ISM) Dhanbad during **22-27 June 2025**.

Program Coordinators:

Prof. Kesavan Ravi & Prof. Rahul M. R.

ABOUT SURFACE & COATINGS LAB AND ICME LAB @IIT(ISM)

Surface and Coatings Lab focuses on Surface Engineering of varied material systems for diverse applications. The lab works on two key verticals:

SURFACE AND COATINGS LAB

Surface Engineering in Coatings and Additive Manufacturing (Thermal Spray Based Technologies)

- Functional coatings
- AI-applications
- Coatings for wear & tear
- Repair and remanufacturing
- Additive manufacturing
- Coatings for bio-medical implants



Surface Modifications of Polymeric Surfaces for Functional Applications

- FGIMs for structural applications
- Engineered polymer surfaces for environmental applications
- Engineered polymer surfaces for battery applications
- Polymer coatings for environmental applications



**Metal
3D Printing**

Cracked GI pipe

Repaired GI pipe



Repair and remanufacturing



**Surface modifications of
polymer surfaces**

Integrated Computational Materials Engineering Lab works on new material design and development using computational and experimental facilities for various advanced applications with these verticals:



Materials and microstructure informatics



Welding and additive manufacturing simulations



Thermo-mechanical processing of materials



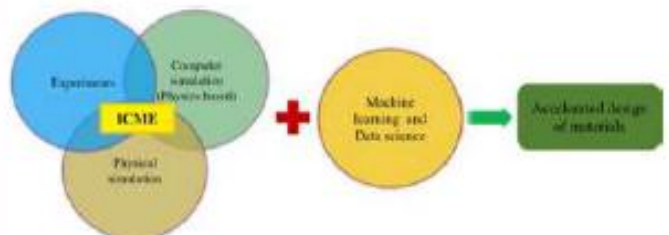
Physical simulation of manufacturing process



Physical simulation of manufacturing process



Microstructure simulation



LinkedIn

<https://www.linkedin.com/in/icme-lab-at-iit-ism-dhanbad-5a9b86363/>

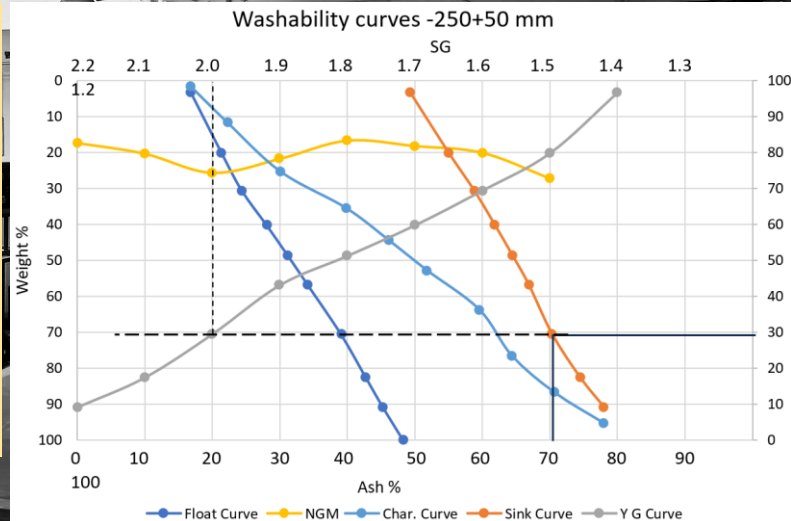
ROM Coal Washability Study for Dry Deshaling Circuit Capacity Design

Sponsored by: Kalyaneswari Tasra Mining Private Limited, Dhanbad

Project number: CONS 7464 C, Value: ₹ 14,57,300, Duration: 2 months

Consultant In-charge: Dr. Pankaj Kumar Jain, panku@iitism.ac.in

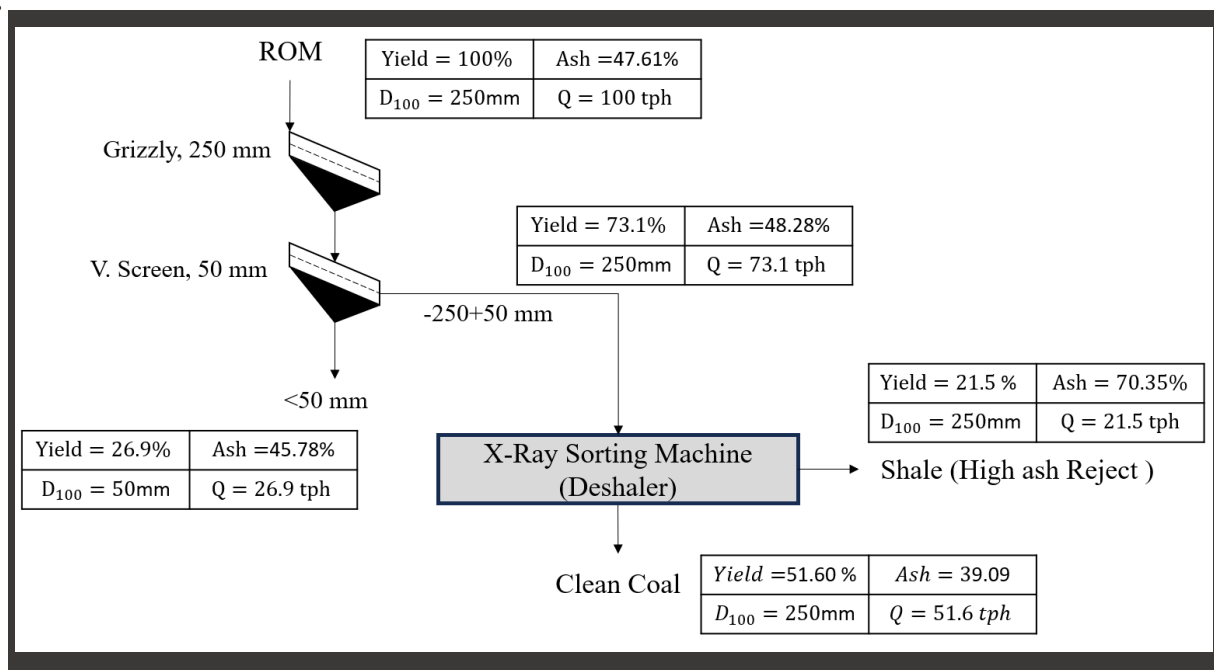
Consultancy Projects



A comprehensive study on the run-of-mine (ROM) coal from the Tasra OC project was done to assess its deshaling potential. The ROM crushing, sampling, and size analysis of ROM was done onsite using portable screens of sizes 250mm, 200mm, 150mm, 100mm, 80 mm, and 50mm. The resulting size fractions were collected, labeled, and transported to IIT (ISM) Dhanbad for further analysis. The samples were weighed, and particle size distribution curves were plotted to estimate the d50 and d80 as 68 mm and 173 mm, respectively.

The washability study was done as per IS: 13810-1993 standards. Dense media with relative densities (RD) ranging from 1.4 to 2.2 were prepared using organic liquids like bromoform (RD 2.85), tetrachloroethylene (TCE, RD 1.45), and petrol (RD 0.775). The samples in the size ranges -250+200 mm, -200+150 mm, -150+100 mm, -100+80 mm, and -80+50 mm were subjected to sink float tests to obtain the float and sink fractions, which were dried, weighed, and prepared for ash analysis. The ash analysis was done as per IS: 1350 (Part I) 1984. Washability tables were constructed for each size range, calculating parameters such as cumulative float weight%, cumulative float ash%, cumulative sink weight%, cumulative sink ash%, near gravity material (NGM), and cumulative float at midpoint specific gravity. Washability curves (float, sink, yield gravity, characteristic, and NGM curves) were plotted to estimate deshaling parameters.

The combined washability analysis for the -250+50 mm size range indicated a feed ash content of approximately 48.28%. Key deshaling parameters showed that at a specific gravity (SG) of 2.0, the reject would have 70.35% ash, 29.41% yield, and 25.7% NGM, while clean coal would have 39.09% ash at a yield of 70.59%. The analysis revealed variations in NGM across size ranges, with no float fraction at 1.4 SG in the -150+100 mm range and cumulative float ash percentages ranging from 44.11% to 54.33%. The study recommends deshaling at a cut density of 2.0 to discard high-ash coal, producing clean coal with 39.09% ash at 70.59% yield. A proposed flowsheet includes a Grizzly screen to reduce ROM to below 250 mm, with oversized particles crushed by a hammer. The undersize is screened at 50 mm, and the -250+50 mm fraction is deshaled at 2.0 SG to produce clean coal for further processing. The study provides a robust framework for optimizing coal beneficiation at the Tasra OC project.





National Conference
on



Critical Metals

(Recycling, Innovation, Separation & Processing)

CRISP-2025

13-15 OCTOBER 2025

Organized by

Department of
Fuel, Minerals & Metallurgical Engineering
IIT(ISM) Dhanbad

In collaboration with





Commemorating **100 years of legacy of IIT(ISM) Dhanbad**, the department of Fuel, Minerals & Metallurgical Engineering is pleased to announce a national conference on **Critical Metals: Recycling, Innovation, Separation and Processing (CRISP-2025)** from **13-15 October 2025** at IIT(ISM) Dhanbad, Jharkhand-India's historic mining hub.

CRISP-2025 will bring together leading researchers, industry experts, policymakers and young scholars to comprehensively explore the cutting edge advancement in processing of critical metals. The conference will features:

- § Identification, exploration and characterization of critical minerals
- § Beneficiation of critical minerals
- § Critical metals extraction from primary & secondary resources
- § Advanced separation and purification techniques
- § Value addition and alloy development
- § Role of AI and automation in critical metals exploration and extraction
- § Environmental impact and lifecycle analysis
- § National policy and regulatory framework on critical metals
- § Future trends and opportunities in critical metals

|| Call for ABSTRACT SUBMISSION & REGISTRATION are now open||

The last date of abstract submission is 15th August 2025.

More information is available in the attached brochure and the conference website (<https://people.iitism.ac.in/~crisp2025/>) of CRISP-2025.

EDITORIAL BODY

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