

Brief Bio-data

- 1. Name** : Mr. Arka Jyoti Das
2. Date of Birth : 16/10/1989
3. Current Position : Scientist & Head

and Address

Geomechanics & Numerical Simulation Section, CSIR-CIMFR, Barwa Road, Dhanbad, 826001, Jharkhand, India, Tele (Offc.): (+91) (326) 2296017, Mob: 8902461329, Email: arkajyoti@cimfr.nic.in/arkajyoti19@gmail.com, [Google Scholar](#), [Orcid](#), [ResearchGate](#), [Publon](#)

4. Educational qualifications: (Graduation and above)

Sl. No.	Degree	Year of Passing	University/Institute	Subject
1.	M.Tech.	2014	AcSIR (CSIR-CIMFR)	Mine Safety Engineering
2.	B.E.	2011	IEST, Shibpur	Mining Engineering

Submitted Ph.D. at IIT(ISM), Dhanbad

5. Work experience:

Designation	Institute/company	From	To	Nature of Work
Scientist	CSIR-CIMFR	11/4/2016	Continuing	R&D
Trainee Scientist	CSIR-CIMFR	5/9/2012	4/9/2014	M.Tech. Course Works
Management Trainee (Mining)	Coal India Limited	3/8/2011	6/7/2012	Execution of mining activities at Jhanrja, ECL

6. Work Area(s)/ Specialization:

Numerical Modelling, Computational Geomechanics, Theoretical and Applied Rock Mechanics, Underground Mining Methods for Coal and Metal Mining, Highwall Mining Method, Ground Control, Subsidence Engineering, Instrumentation and Monitoring, and Stability Analysis of Underground Structures.

7. Major contributions: (Max. 100 words):

The findings of my R&D help to design suitable extraction methodologies of coal by underground mining under different conditions e.g. inclined seam, low height seam, thick seam, contiguous/multiple seams, under the surface/ sub-surface structures, forest land, below and adjacent goaves, below overburden dump, etc. One of the major contributions is the development of strength formulae for inclined and flat coal pillars by which the stability of pillars vis-à-vis safety is ensured. My proficiency in 3-D numerical modelling helps to design extraction methodology, support system and to evaluate the stability of underground structures, rock burst conditions, subsidence, etc.

8. No. of Research Publications:

Papers in Journals	In conference proceedings	Invited lectures delivered
21	19	03

• List of best 05 publications:

- (i) **Das, A. J.**, Mandal, P. K., Bhattacharjee, R., Tiwari, S., Kushwaha, A. & Roy, L. B. (2017). Evaluation of stability of underground workings for exploitation of an inclined coal seam by the ubiquitous joint model. *International Journal of Rock Mechanics and Mining Sciences*, 93, 101-114 (**IF: 7.135**).
- (ii) **Das, A. J.**, Mandal, P. K., Paul, P. S., & Sinha, R. K. (2019). Generalised analytical models for the strength of the inclined as well as the flat coal pillars using rock mass failure criterion. *Rock Mechanics and Rock Engineering*, 52(10), 3921-3946 (**IF: 6.73**).
- (iii) **Das, A. J.**, Mandal, P. K., Paul, P. S., Sinha, R. K., & Tewari, S. (2019). Assessment of the strength of inclined coal pillars through numerical modelling based on the ubiquitous joint model. *Rock Mechanics and Rock Engineering*, 52(10), 3691-3717(**IF: 6.73**).
- (iv) **Das, A. J.**, Paul, P. S., Mandal, P. K., Kumar, R., & Tewari, S. (2021). Investigation of failure mechanism of inclined coal pillars: numerical modelling and tensorial statistical analysis with field validations. *Rock Mechanics and Rock Engineering*. <https://doi.org/10.1007/s00603-021-02456-5> (**IF: 6.73**).

- (v) **Das, A. J., Mandal, P. K., Prakash, A., Roy, L. B., & Tewari, S. (2020).** Underground extraction methodology of contiguous coal seams ensuring the safety of the parting and the surface structures. *Safety Science*, 121, 215-230 (IF: 4.877).

• **Books/Chapters authored/edited: 02**

9. List of 5 Major Contract R&D Projects:

- (i) Roof rock reinforcement system (R3S) for mine roadways intersection under varying geomining conditions” approved as NCP under 4M theme funded by CSIR (Co-Project Leader).
- (ii) Advice on mining/geotechnical sequence and instrumentation and strata monitoring during stopping at Rampura Agucha Underground Mine, HZL sponsored by Hindustan Zinc Limited (Project Leader).
- (iii) Advice for design of extraction methodology for development and depillaring of Sector-F of R-VII and R-VIIA seams using Low Height Continuous miner at 3&4 Incline, Jhanjra Project Colliery, ECL sponsored by Gainwell Commosales Private Limited (Project Leader).
- (iv) Advice for depillaring of 15 East Panel by Continuous Miner Technology in East block of Churcha Mine (RO), Baikunthpur Area, SECL sponsored by GMMCO Limited (Project Leader).
- (v) Advice for preparation of Strata Control and Monitoring Plan (SCAMP) for development and depillaring operation at different underground coal mines of Tata Steel Limited sponsored by Tata Steel Limited (Project Leader).

10. (a) Name of Patents/Copyrights applied /granted/commercialized:

- ✓ “A device useful for supporting the underground mine side wall for highly dipping mine having pillara with acute angle corners” Journal No. 37/2019 dated 13/09/2019.

(b) Technologies/Products /knowhow/Services developed:

- (i) Strength formulae for inclined and flat coal pillars.
- (ii) Extraction methodology of low height (<2m) and normal height (~4.6m) coal seams by continuous miner technology.
- (iii) Extraction methodology of inclined coal seams, contiguous/multiple coal seams and thick coal seams.
- (iv) 3-D numerical modelling for stability assessment of rock mass and support design during underground extraction of coal and ore deposits.
- (v) 3-D subsidence prediction for metal mines.

11. Honors/Awards/Recognitions/Fellowships/Scholarships/Professional Memberships received:

- ✓ All India Rank 1st in GATE Mining Engineering Examination, 2012.
- ✓ Trainee Scientist fellowship by CSIR.
- ✓ Institutes’ Medal for securing 1st Class 1st of 2011 Batch, IEST, Shibpur.
- ✓ MGMI Shivlal Medal for excellent performance in graduation level.
- ✓ MHRD fellowship by Govt. of India.
- ✓ Received 1st prize of Dr. K. N. Sinha Award in 2020 by CSIR-CIMFR.
- ✓ Professional Member of Society for Mining, Metallurgy & Exploration.
- ✓ Associates Member of Institution of Engineers (India).
- ✓ Life Member of Mining Engineers’ Association of India.
- ✓ Student Member of The Mining Geological and Metallurgical Institute of India.

12. Societal Contributions

- ✓ My contributions in coal mining support the industry to extract coal from difficult geomining conditions. It leads towards sustainable mining by minimising the wastage of valuable fossil fuel, i.e. coal. Moreover, society is benefited by getting electricity at an affordable cost.
- ✓ My R&D in the field of metal mining assists the industry to increase the recovery of precious metal ore which is the *sine qua non* in our day to day life.
- ✓ Provided training to the graduate students of different colleges/ universities.
- ✓ Delivered lecture in JIGYASA: A student scientist connect programme as Scientific Social Responsibility.