

1. Name: Dr. Harendra Singh

2. Date of Birth: 30th June 1962

3. Current Position and Address: Sr. Principal Scientist & HOS
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4. Educational qualifications: (Graduation and above)

Sl. No.	Degree/ Certificate	Year of Passing	University/ Institute	Subjects
I	B. Sc. (Maths. Hons.)	1984	Bihar University	Maths., Phy. & Chem..
II	M. Sc. (Maths.)	1987	Bihar University	Mathematics
III	Ph. D. (Applied Maths.)	2002	ISM, Dhanbad	Applied (Maths.)

5. Work experience

I started my carrier as a junior scientist in CIMFR (erstwhile CMRS/CMRI) and was actively involved in measurement of SPM, NO_x and SO_x at Moonidih mine of Jharia coalfields and their modeling. I studied dispersion of air pollutant and their removal mechanisms and completed Ph.D. degree in Applied Mathematics from Indian School of Mines, Dhanbad in this area. I have completed more than 150 consultancy projects, 10 Industry sponsored projects and 3 research and development projects. I have published more than 30 technical papers in the seminar/conference/symposium and national/international journals and written 150 technical reports. I have guided more than sixty B.Tech/M.Tech./M.Sc. students of different institutions/universities for their project work on “Coalbed Methane Exploration and Exploitation Technology”. I have organized two courses as a course coordinator, one on” Exploration and Exploitation Technologies of Coalbed Methane” for executives of CMDIL Ranchi and other on” Analysis of Mine Gases by Analytical and Portable Instruments” for executives of J &K Mineral Corporation Limited. Besides this I was actively involved in testing and certification of safety equipments as the Head of Miners Safety Equipment laboratory (August, 2007 to May 2016). I am a member of ET10 and CED22.5 committees of Bureau of Indian Standards, New Delhi and also of three professional/ scientific bodies. Details of different working positions are given below:

Designation	Institution/company	From	To	Nature of work
Junior Scientist	CSIR-CMRI,	23 rd April, 1990	22 nd April, 1995	R&D
Scientist	CSIR-CIMFR	23 rd April, 1995	22 nd April, 2000	-do-
Senior Scientist	CSIR-CIMFR	23 rd April, 2000	22 nd April, 2005	-do-
Principal Scientist	CSIR-CIMFR	23 rd April, 2005	22 nd April, 2010	-do-
Sr. Principal Scientist	CSIR-CIMFR	23 rd April, 2000	till date	-do---

6. Area of specialization:

- (i) Safety in underground coal mines from methane emission,
- (ii) Evaluation of coalbed methane resource potential in virgin coal blocks
- (iii) Simulation of coalbed methane wells
- (iv) Estimation of methane emission in the atmosphere from coal mining activities and its mitigation options
- (v) Underground coal gasification
- (vi) Testing and certification of Miners 'Safety instruments, Safety wears and LED miners cap lamp
- (vii) Performance evaluation of safety instruments (Methanometer, Toximeter and Luxmeter)
- (viii) Modeling of air pollution

7. Honors/Awards received: None

8. Fellowships/Scholarships: None

9. No. of Research Publications:

- Papers in journals: Five
 - In conference proceedings: Twenty five
 - Invited/key-note addresses: None
 - List of best 05 publications:
- (i) **Singh, H. (2010)**, Mitigation of Greenhouse Gas Emission by Utilizing Ventilation Air Methane, Geological and Technological Facets of CBM, Shale Gas, Energy Resources and CO₂ Sequestration (csECS 2010), Dept. of Applied Geology, Indian School of Mines, Dhanbad, Allied Publishers Pvt. Ltd.
 - (ii) **Singh, H. (2011)**, Methane Sorption Characteristics of Coal from Cambay Basin, 34th International Conference on Safety in Mines Research, 7-11 December, 2011, India Habitate Centre, New Delhi pp. 831-838, Macmillan Publisher India Ltd.
 - (iii) Sharma, N, Agrawal, K and **Singh, H. (2012)** Utilization of Coal Mine Methane to Earn Carbon Credit, Petrocoal 2013, New Delhi
 - (iv) **Singh, H. (2014)**, Methane Emission Control: A Preventive Measure Against Explosive Atmosphere in Underground Coal Mines, 2nd International Seminar and Exhibition on "Recent Trends in Design, Development, Testing & Certification of Ex-Equipment for Explosive Atmosphere" DTEX-2014, November 7-9, 2014, Science City, Kolkata
 - (v) **Singh, H. (2015)** and Mallick, John, Utilization of Ventilation Air Methane in Indian Coal Mines: Prospects and Challenges, published In Science Direct, Procedia Earth and Planetary Science 11 (2015) 56-62

10. Number of Books authored/edited: Nil

- (i) Two Training Course books and Ten number of Project Training reports on coalbed methane are edited.
 - a) Executive Training Programme on “Coalbed Methane Exploration and Exploitation Technology, Organized by CIMFR HRD Cell, during 12-16 June, 2006 for Executives of CMPDIL, Ranchi (as Coordinator)
 - b) Training Programme on “ Analysis of Mine Gases by Analytical and Portable Instruments, Organized by CIMFR HRD Cell ,18-20 November, 2013 for Executives of J & K Mineral Limited (as Coordinator)
11. (a) No. of Patents granted/applied for: None
(b) Technologies developed, Licensed and/or commercialized: None
12. Foreign visits:
(i) Visited Czech Republic under CSIR-Czech Exchange Programme 11 October, 1998 to December 05, 1998
13. Details of Professional memberships:
(i) Indian Science Congress Association, Kolkata-Life Member
(ii) Mining, Geological and Metallurgical Institute, (MGMI), Kolkata – Life member
(iii) Indian Mathematical Society (IMS) New Delhi-Life Member
(iv) ETD 10 Sectional Committee of Bureau of Indian Standard, New Delhi- Member
(v) EC22.5 Sub Sectional Committee of Bureau of Indian Standard, New Delhi- Member
14. Major contributions: (Max. 150 words)
- (i) Coalbed methane resource potential of coal core samples collected from exploratory wells/boreholes drilled in different virgin coal/lignite blocks in the country was estimated more than 200 boreholes/wells. On the basis of our investigation, 33 coal blocks were awarded to different gas producing companies for exploitation of Coalbed methane at commercial scale. CBM is being produced at commercial scale in Purbatpur coal block in Jharia Coalfield and East Bokaro Coalfield by ONGC, South Raniganj coalfields by Great Energy Eastern Corporation Limited (GEECL), Eastern Raniganj Coalfields by Essar Oil Limited (EOL) and Sohagpur Coalfield by Reliance Industries Limited (RIL) and current production of CBM in the country is 0.8MSCMD (Million Standard Cubic Meter per day).
 - (ii) Studied on methane emission for categorization of degree of gassiness of coal seams and advice to control associated gas hazards due to methane emission.
 - (iii) Evaluation of shale gas potential in different oil, gas and coal bearing basins of the country.
 - (iv) Quantification of methane emission in the atmosphere from Indian coal mining and handling activities and its mitigation options
 - (v) Guided more than twenty students of different engineering institutes and universities for their project work on ‘Coalbed Methane Exploration and Exploitation Technologies’.
 - (vi) Organized two nos. of HRD Training Courses one on Coalbed Methane Exploration and Exploitation Technology for executives of CMPDIL, Ranch and other on Analysis

of Mine Gases by Analytical and Portable instruments for executives of Jammu & Kashmir Mineral Development Corporation Limited.

- (vii) Testing and certification of Miners safety equipments to check their performance and quality
- (viii) Performance evaluation of safety equipments used in u/g coal mines to monitor toxic and hazards gas at mine workings in u/g coal mine.
- (ix) Deliver lectures on Coalbed Methane for executives/students of different universities/institute/organizations who have visited the institute under different programmes of HRD.

15. Technologies and Products/ Services

- (i) Services Developed:
 - (i) Excel based software for evaluation of coalbed methane resource potential and estimation of recoverable reserve of the gas by adsorption isotherm curve, (ii) reservoir simulation of CBM well, (iii) methane emission in the atmosphere from coal mining activities and handling systems, (iv) mitigation of coal mine methane in the atmosphere and (v) underground coal gasification
- (ii) Licensed: none
- (iii) Commercialized: none

16. Designs and Prototype Developed

- (i) Developed a grinding machine for crushing coal samples to determine residual gas content (Q_3)
- (ii) Designed and developed controlled temperature bath and desorption canisters of different sizes.
- (iii) Designed and developed Flammability Tester to test flammability of Safety Belts
- (iv) Development of samples preparation equipment for cover rubber of conveyor belt. (in Progress)

- 17. Honours and awards won for technological contributions or sociological impact of R&D: none

Signature