


1	<b>Name:</b>	Dr. SATYENDRA	KUMAR	SINGH	
2	<b>Date of Birth:</b>	05/02/1961			
3	<b>Current Position and Address (with email and Phone no.)</b>				
<p><b>Designation :</b> Chief Scientist [Gr. IV(6)] &amp; Head of Research Group, Mining Methods &amp; Design Simulation, Professor &amp; Course Coordinator, CIMFR-AcSIR  <b>Address with PIN Code :</b> Central Instt. of Mining &amp; Fuel Research (<b>CIMFR</b>), Barwa Road, Dhanbad-826015, India.  <b>E.mail:</b> <a href="mailto:satyendraksingh@cimfr.res.in">satyendraksingh@cimfr.res.in</a> <a href="mailto:satyendraksingh@yahoo.com">satyendraksingh@yahoo.com</a>  <b>Ph.No.:</b> +91 (326) 2296135 (direct) 2296028/29 (PBX) (off) 2310085 (Res)</p>					

#### 4. Qualifications: (Bachelor's degree onward)

S N	Degree/ Certificate	Year of passing	University/ Institution	Subject	Class/Marks %
1	Bachelor of Technology (B. Tech)	1983	Indian School of Mines, Dhanbad, India	Mining engg. & associated subjects	First class with distinction 4.02 out of 5.0 i.e. 80.4%
2	Post-Graduate Diploma	1985	Indian School of Mines, Dhanbad, India	Mine planning & design (mining engg.)	First class with distinction 4.22 out of 5.0/ 84.4%
3	Master of Technology (M. Tech)	1987	Indian School of Mines, Dhanbad, India (Thesis: computer aided equipment selection)	Mine planning & design (mining engg.)	First class with distinction 4.49 out of 5.0/ 89.8%
4	Ph.D. in Mining engg.	2000	Univ. of New South Wales, Sydney, Australia (Thesis: Caving Mechanics and related geotechnical issues)	Rock mechanics, ground control and underground coal mining technology	Admitted for the award
5	First Class Manager's Certificate Of Competency (Coal) ( <b>FCC</b> ).  Recognized Qualified Person ( <b>RQP</b> ) for coal/lignite block	1992  2007	Director General of Mines Safety, Dhanbad  Ministry of Coal (MOC), Govt. of India	General Safety, Legislation, Mine management.  Based on nomination from the institute and qualifications	Based on written and oral exams (marks not communicated).  Competent person to prepare mining plans
6	Member (as a	2013	Ministry of Labour &	The committee is as per	After nominated

	qualified mining engineer) of “Mining Committee”.		Employment (MOLE), Govt. of India	under Section 12 (The Mines Act, 1952) every subjects related to mining	by the Director, CSIR-CIMFR
7	Master of Business Administration (MBA)	2015	Indian School of Mines, Dhanbad (with Project term report submitted #)	Operation Mgmt., Project Mgmt., Human Resource Mgmt., R&D Mgmt.	First class with distinction, 9.14 out of 10.0 i.e. 91.4%
# Technology Forecasting and assessment of potential underground coal mining methods in India and also on “AcSIR to Create Trans-disciplinary Human Resource: for Hybrid Knowledge Management”					

### 5. Work experience (in chronological order):

S N	Period (from-to)	Designation	Place of Employment	Employment details	Additional information/ comments, if any
1	15.07.1983 to 25.07.1988	Junior executive Trainees and then Asst. Colliery Manager, Jr. Mining Engineer	Bharat Coking Coal Limited (Coal India Limited, CIL), -- various coal mines, Dhanbad	An assortment of responsibilities, related to general management and control, statutory also in mines with about 2000 manpower.	Theoretical knowledge acquired academically got value-addition by nuances of coal production processes and inextricable planning & design ramifications
2	26.07.1988 to 22.09.1989	Junior Mining Engineer/Under Manager	Central Mine Planning & Design Institute (CIL), Regional Institutes	did planning & design of u/g coal mines i.e. preparation of DPR, RPR and RCE	
3	25.09.1989 to 30.09.2009	Joined as Grade IV (2) /Scientist-C and left at present Grade IV (5)/ Scientist F	Central Institute of Mining & Fuel Research (a lab. of CSIR- erstwhile CMRI), Dhanbad	Pursuing specializations as mentioned in item 6 of this form	Also worked as Head, Bord & Pillar and Numerical Modelling Dept.(since 1/1/2002)
4	13.03.1997 to 23.06.2000	Ph. D Research Student, includes <b>Casual academics</b>	University of New South Wales (UNSW), Sydney, Australia <sup>#</sup>	Also worked as a research Scientist at UMRC and also as a casual academics	while deputed on study-leave as Scientist ‘C’ [Gr IV (2)] from CMRI (now CIMFR)
# Also worked as Research Student at UNSW Mining Research Centre (UMRC) and associated as a team member in 2 grant-in-aid projects (total >3 million AU\$), separately funded by Australian Research Council and Joint Coal Board:- His research includes application of bolted breakerlines as goaf-edge supports, <u>for the first time implemented and validated by him in Australia coal mines</u> . This has direct research impact in Indian condition, as he is now implementing his such designs in many high-production liquidation-propositions with Continuous Miners deployment.					
5	01.10.2009 to 30.04.2011	present Grade IV (5)/ Scientist F (from 25.09.2004) and IV (6) from 25.09.2009 retrospectively	Council of Scientific and Industrial Research, New Delhi	Co-ordinated 2 earth-science (NGRI & NIO) and 2 engg.-science (AMPRI & CGCRI) laboratories and their research-oriented	pro-active in 2 grant-in-aid ministry project and 8 external-funded research projects with CIMFR scientists

				activities	
6	01.05. 2011 to cont.	present Grade IV (6) / Chief Scientist	CSIR-CIMFR, Dhanbad (erstwhile CMRI)	Pursuing efforts as mentioned in item 6 of this form	Worked as the Head, Coal Mining & Hydrology Dept and now working as the Head of Research Group, Mining Methods and Design Simulation

**6. Area of Specialization:**

Rock mechanics and ground control; Caving behavior and strata mechanics; Design of feasible mining methods and supports and then validation at underground coal mines; Subsidence engineering; R & D back-up for safe coal production and enhanced recovery of coal; Mining engineering and stability analysis with the help of empirical and numerical methods, Knowledge dissemination

**7. Honours / Awards received:**

- ✓ Receives Honours/distinction with first class all along his graduation and post-graduation studies.
- ✓ National Geoscience Award 2014 for excellence in Mining Technology, presented by The President of India on 5<sup>th</sup> April 2016
- ✓ Received individual award for the year 2013-14 for his outstanding contribution in Earth Sciences by “The Mining, Geological and Metallurgical Institute (MGMI), India, (D N Thakur Award)
- ✓ CSIR Technofest 2010, Science & Innovation for Transforming India, Gold Award winner for Theme Pavilion on Mining Minerals & Materials, presented by then-DG, CSIR
- ✓ Received individual award “Sitaram Rungta Memorial Award” for the best technical paper presentation for the year 2002 instituted by Mining Engineering Association of India (MEAI).
- ✓ Received CSIR-Golden Jubilee CMRI-Whitaker Annual Award (2000-2001) *for Research & Development work (individual award) in the field of mining and cognate subjects (Group IV scientist age group > 35 years)* instituted by Central Mining Research Institute (CMRI- now CSIR\_CIMFR), Dhanbad
- ✓ Received 3<sup>rd</sup> prize *for higher external cash earnings*, as the head of Department for the year 2001-2002, out of competition among 50 departments of then-CMRI (now CSIR\_CIMFR), Dhanbad.

**8. Fellowship/Scholarships:**

- **Three prestigious Scholarships** namely, (1) International Postgraduate Research Scholarship (IPRS) by Govt. of Australia, (2) Joint Coal Board (JCB) Postgrad. Research Scholarship, and (3) UNSW Faculty of Engineering and Technology Scholarship, Australia were awarded over and above the **study leave from CSIR** from March '97 till June 2000, the period during Ph.D. research [pl. refer (4) of item 4]
- **Jubilee Scholarship** from **TISCO** for five years, 1978 to 1983 while doing 5-year B.Tech. (mining) [pl. refer (1) of item 4]

## 9. No. of Research Publications

- Papers in journals: **19** no. with citation more than 100 for the listed 5 papers-the highest 78 no. for paper no. 5, also accepted by DGMS as norms for subsidence engg.
  - In conference proceedings: **66** no.
  - Invited/key-note addresses: **6** no.
  - **List of best 05 publications:**
1. **Singh S.K.**, Agrawal H. and Singh A.P. (2016): Rib stability: A way forward for safe coal extraction in India, International Journal of Mining Science and Technology, (Accepted for publication).
  2. Agrawal H., **Singh S.K.**, Mandal P.K. and Singh A.P. (2015): 3-Dimensional numerical modeling: An effective enabler for CM deployment in coal seams, Journal of Mines Metals and Fuels, Vol. 63, Nos. 5&6, May-June 2015, ISSN: 0022-2755, pp-111-118.
  3. Singh, R., **Singh, S.K.**, Kushwaha, A., & Sinha, A. (2012) “Stability of the parting between coal pillar workings in level contiguous seams during depillaring”, Int. J. of Rock Mechanics & Mining Sciences, vol. 55, pp. 1-44
  4. Kushwaha, A., **Singh, S.K.**, Tiwari, S., & Sinha, A.(2010) “Empirical approach for design of support system in depillaring panels of mechanised bord & Pillar workings of coalmines”, Int. J. of Rock Mechanics & Mining Sciences, vol. 47, pp. 1063-1078.
  5. Sheorey, P.R., Loui, J.P., Singh, K.B. and **Singh, S.K.** (2000) “Ground subsidence observations and a modified influence function method for complete subsidence prediction”, Int.J.of Rock Mechanics and Mining Sciences, Vol.37, pp.801-818.

## 10. No. of Books authored/edited: 3 no. authored, 2 listed below;

Title of Book	Name of the Author	Year	Publisher	Page no
“Project Environment Clearance: Engg. and Management Aspects” <b>Chapter 8 by the author</b> : Design considerations related to effects of mining subsidence on environment especially land and aspects of land re-use	<b>Singh, S.K.</b>	2010	Wide Publishing, Kolkata. ISBN 978-81-909043-3-9 (drawing from experiences & knowledge from many writers/experts from Germany, Australia, South Korea & India)	pp. 285-311
Title of technical Book-report	Name of the Author	Year	Publisher	Page no
Caving Mechanism Around Longwall Panels	<b>S.K. Singh</b> and Prof. Bruce Hebblewhite	2000	UNSW Mining Research Centre (UMRC) report RR1/00	61p. (excluding references and appendices)

**Note 1: EDITED proceedings-volumes** of National Seminars/conferences organized by him for better knowledge dissemination and also as the pro-active convener/co-convener/coordinator. He is also the editor of (Indian Mine Manager’ Association) bi-annual IMMA-review distributed to more than 500 mining engineers and others. Though this category is related to limited audience, but this a fact to be under cognizance that these

proceedings are also referred/ cited, though on limited basis, but in an ever-increasing numbers, mostly based on “words of mouth” communication, year-after-year.

**Note 2:** The technical reports, about 200 in numbers, some notables are related to generating a new geotechnical problem-solving ideas/methods of mining method-design and/or support design for better ground control, safety, coal recovery and production and therefore cited/referred by the mine operators, the inspectorates, the trainers and academia extensively and exclusively.

**11. (a) No. and details of Patents granted/applied for: one no.**

i)	“A device for measuring roof convergence in mechanised underground coal mine workings”, Patent No. 266305, Date of Publication 01/5/2015, Journal No. 18/2015, Inventors: A.Kushwaha, S.K.Kashyap, <b>S.K.Singh</b> , S.Tewari, R.Bhattacharjee
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**(b) Technologies developed, Licensed and/or commercialized:**

The published papers and technical reports by him in team-spirit mode (applied R&D in nature) have substantial direct benefits to coal mining industry, in addition to obvious knowledge dissemination, numerous citations and some prestigious awards. The industry can now solve related geotechnical problems based on formulations provided by him. His research works helped mining industry, especially Indian coal industry to optimally extract coal with wider and/or higher galleries and subsequent extraction with faster pace, making underground coal mining economically viable at places where conventional Indian underground mining is non-viable due to technical and financial constraints. The real impacts and contributions by him in terms of Technologies developed, Licensed and/or commercialized may be “words-of-mouth” recognitions received by him from all concerned on behalf of CSIR-CIMFR. CIMFR receives increasing external funding as number of research projects taken-up are on increase due to his ‘participative’ involvements in coal mining. The industry, in lieu, receives its return on investment towards the funding of CIMFR research projects and also gets solutions in each case to the encountering or apprehending geo-technical problems. These all are related to technology/services developed and not related to product development. Since the methodologies as mentioned in item 14 below, cannot be directly licensed and therefore cannot be commercialized as in case of product development, however, CSIR-CIMFR has received external funding more than what may be through licensing mode. The simple reason is it has been done on case-by-case basis, more so because rocks are idiosyncratic in nature and should be treated comprehensively but separately.

Enhanced coal recovery (about 9-12 Mt/year, **otherwise** could not be extracted) below important sub-surface and surface properties was achieved due to his contributions.

**12. Foreign visits:**

In addition to what has been mentioned above vide Sl. no. 4 of item 5. about Australia-visit, he visited for short-duration to Canada (for finalisation of a collaborative GAP as a project member), USA (for presentation of peer-reviewed paper), and (on personal visits) Singapore, Bangkok .

### **13. Details of Professional memberships:**

- Life member of Institution of Engineers and Council member of Dhanbad Chapter
- Life Member of Mining, Geological and Metallurgical Institute (MGMI), India
- Member of the Board of Courses and Studies of the Dept. of Management Studies, ISM, Dhanbad (National Level Committee) continuing since 23.03.2015, India.
- Member of the Board of Courses and Studies of the Dept. of Mining Engineering, ISM, Dhanbad (National Level Committee) continuing since 08.03.2004, India.
- Member of American Rock Mechanics Association (ARMA), USA
- Member of ISM Alumni Association, Dhanbad, India
- Member of UNSW Alumni Association, Sydney, Australia
- Member of International Society for Rock Mechanics
- Life and Council member of the Indian Mine Managers' Association

### **14. Major contributions: (Max.150 words)**

Geotechnical problems were solved on umpteen occasions by him in team-spirit mode in various coal mines having different geo-mining details and with complexities. The results of his research efforts are definite: the coal can be produced with safety and better coal recovery after implementing the recommendations due to his research works. The significant contributions may be subsumed in 3 research approaches considered by him in total perspective and with engineering judgements:

- a. Empirical equations either the established one or developed by him, used gainfully in conjunction with (b)
- b. Numerical modelling used as a tool, where his varied experiences use observations at the mine-sites innately, first with known cases and then for the case-study (ies) under consideration
- c. Strata understanding, monitoring and management in coal mines under his leadership with ingenuity have not only helped the mine operators to develop and extract mineral deposits, especially coal seams, safely and with better strata management, but also facilitate them in applying 'design by measurement' approach in revisiting the recommended designs.

### **15. Technologies and Products/ Services**

- (i) Developed: as mentioned in 11 (b)
- (ii) Licensed: as mentioned in 11 (b)
- (iii) Commercialized: as mentioned in 11 (b)

### **16. Designs and Prototype Developed: NIL**

### **17. Honours and awards won for technological contributions or sociological impact of R&D:**

As a recognition to his technological contributions towards mining industry, he not only received prestigious awards as mentioned in item 7. above, but also he has been selected as-

- A resource person selected by ISM, Dhanbad; NIT, Rourkela; BCCL, Dhanbad; BHU, Varanasi; DGMS S&T Dhanbad and IICM, Ranchi as an examiner, lecturer and/or training-faculty.
- Referee/reviewer for International Journal of Rock Mechanics and Mining Sciences, also of JETR, JIE, Institution of Engineer and the editor, IMMA review. He also has served as an appointed expert in various mine-accidents enquiry-committees, mining-committees of National level e.g. for Supreme Court, Ministries of Coal, Mines and Labour & employment, etc.

The sociological impact of his R&D contributions cannot be underscored in quantitative terms as the impacts are intangible. The mine could continue production safely and with better recovery. This has social impacts in terms of ensuring energy security in India in addition to employment generation and knowledge dissemination, the latter in terms of guiding Ph.Ds and M. Techs and delivering lectures at various forums.