

1. Name :Dr. RAJEEV RANJAN SINGH

2. Date of Birth :12th January, 1963

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.	1983	Ranchi University	Phy., Chem., Math
ii	M. Sc.	1986	Gorakhpur University	Chemistry
iii	M. Tech.	1997	Indian School of Mines	Mining Engineering
iv	Ph. D.	2010	Vinoba Bhave University	Mining, Explosives

5. Work Experience

Designation	Institution/company	From	To	Nature of work
I Scientist-B	CMRS	07/12/1989	06/12/1994	Testing, evaluation,
II Scientist -C	CMRI	07/12/1994	06/12/1999	investigations and R&D
III Scientist-EI	CMRI	07/12/1999	06/12/2004	work related to mining
IV Principal Scientist	CSIR- CIMFR	07/12/2004	06/12/2010	explosives & accessories.
V Sr. Principal Scientist	CSIR- CIMFR	07/12/2010	Till Date	

6. Area of specialization : Mining Explosives & Accessories

7. Honors/Awards received : CSIR Technology Award - 2012

8. Fellowships/Scholarships : NIL

9. No. of Research Publications :

- Papers in journals :15
- In conference proceedings : 21
- Invited/key-note addresses : Nil

➤ **List of best five publications** :

1. **Singh, R. R.**, Bhattacharyya, M. M., Singh, P. K. and Roy, S. K. (2000): Deflagration Studies with NG-based P₅ Explosives, ERZMETALL, Vol. 53, Pages 743-740.
2. Roy, S. K., **Singh, R. R.**, Kumar, R., Amrit, A. K. and Rao, V. V. R. (2006): Explosive-cord System for Blasting Gallery Method, The Indian Mining and Engineering Journal, Vol.-45, Pages 37-40.
3. Roy, S. K., **Singh, R. R.**, Kumar, R. and Dey, U. K. (2007): Evaluation of velocity of detonation of permitted explosives, International Journal of Blasting and Fragmentation, Vol. 1, Pages 69-79.
4. Roy, S. K., **Singh, R. R.**, Kumar, R. and Dey, U. K. (2008): Studies into the possible use of air decking in solid blasting in underground coal mines, International Journal of Transactions of the Institutions of Mining & Metallurgy, Section A: Mining Technology, Vol. 117, Pages 83-92.
5. Roy, S. K. and **Singh, R. R.** (2011): Use of spacer aided initiation technique in solid blasting in Indian underground coal mines, International Journal of Transactions of the Institutions of Mining & Metallurgy, Section A: Mining Technology, Vol. 120, Pages 25-35.

10. Number of Books authored/edited : Nil.

11. (a) No. of Patents granted/applied for : 3

(b) Technologies developed, Licensed and/or commercialized: 2

12. Foreign visits : Nil

13. Details of Professional Memberships : Principal Member of **BIS Sub Committee** on Explosives Pyrotechnics.

14. Major contributions: (Max. 150 words)

a. Spacer-added-initiation technique for improved pull and yield in solid blasting

The undersigned contributed significantly in the development of a new method of **Spacer-Added-Initiation (SAI) technique for achieving longer pull in Solid Blasting**. The method has been **applied for patent** and technology has been transferred to M/s Gulf Oil Corporation Limited, Hyderabad. This method envisages use of air-gap between cartridges for the first time in underground coal mines. **A unique slurry P₅ explosive** with very high **Air-Gap Sensitivity (15 cm)** has also been developed under the S&T project for use with this new method. DGMS has approved this method of blasting with newly developed explosive and field trials are completed in different underground coal mines of CIL, Monet Ispat and SCCL. A pull of 2.1 m with modified burn cut pattern of blasting and around 1.5 m with existing wedge cut pattern of solid blasting has been achieved in GDK-5 incline mine of SCCL. Thus, this method has potential to drastically change the economics of around 300 underground coal mines in India.

b. Development of new emulsion explosive and cord system for Blasting Gallery Method in underground coal mines

Blasting Gallery (BG) Method, a high yielding French Technology for working of thick underground coal seams, envisages use of ring hole blasting with non-incendive special type of explosive-cord system. Nitro-glycerine (NG) based explosive was the only explosive, which had met the statutory requirement and was approved for use in this method before 2006. BG method suffered a major setback due to ban of NG explosives by Govt. of India with effect from 01/01/2004. Development of non-NG based explosive and cord system for continuation of production from BG method was a national issue, which is evident from the letters of **DG, CSIR, different Ministries of Govt. of India** and user industries. Development of a non-NG explosive and cord system meeting all the statutory requirements for use in BG method was seemed to be a difficult technological challenge.

First time, in designing permitted explosives ideas of (i) using **Flame Retardant Polymer (FRP) tube as an additional safety cover**, (ii) **decreasing the diameter from 32 mm to 25 mm** and (iii) **providing channel in the FRP tube for better contact between explosive and detonating cord**, were utilized and as a result, successful development of an emulsion explosive (**Powering**) and cord (**Powercord**) system within the deadline period of March, 2006 could be possible. This development helped in resumption and continuation of production (around 2.0 Million Tonnes) of coal from Blasting Gallery method and thus avoided the major national loss and industrial unrest.

(c) Establishment of National Standards and Standard Methodology

The undersigned contributed significantly in development of standards/ methodologies for safety against firedamp/coal dust explosion in underground coal mines, which are as under:

- **Evaluation of deflagration characteristics of permitted explosives,**
- **Incendivity characteristics of 32 mm diameter cartridges of permitted explosives,**
- **Incendivity characteristics of permitted detonators in coal dust atmosphere, and**
- **Determination of Post Detonation Toxic Fumes of permitted explosives.**

15. Technologies and Products/ Services:

a.	Title of the Product	New emulsion explosive and cord system suitable for use in blasting gallery method in underground coal mines.
	Developed by (Inventors)	S. K. Roy, R. R. Singh , R. Kumar, V. V. R. Rao & S. K. Nayak
	CSIR Ref. No.	0156NF2006
	Patent Application No.	2468DEL2006 dated 16-11-2006 (provisional)
		2468DEL2006 dated 10-05-2007 (complete)
	Licensed to and Commercialized by	M/s IEL, Gomia

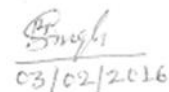
b.	Title of the Product/Method	A method for solid blasting in underground coal mines.
	Developed by (Inventors)	S. K. Roy, R. R. Singh , H. K. Verma & R. K. Paul
	CSIR Ref. No.	0454NF2004
	Patent Application No.	1538DEL2005 dated 10-06-2005
	Licensed to and Commercialized by	M/s GOCL, Hyderabad

16. Designs and Prototype Developed:

- a) Development of Standard Methodology/Set-up for evaluation of Deflagration Propensity of Permitted Explosives, and
- b) Determination of Post Detonation Toxic Fumes and for incendivity behavior of permitted detonators in Coal Dust Atmosphere.

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

CSIR Technology Award for Physical Sciences including Engineering-2012 for developing non-nitroglycerine based Explosive-Cord-System suitable for use in Blasting Gallery Method in underground coal mines.



Handwritten signature of Rajeev Ranjan Singh, dated 03/02/2016.

Signature

(Rajeev Ranjan Singh)

ID. No. 0104

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