

# **CURRICULUM VITAE**

- 1. NAME & PRESENT ADDRESS** : *P K BEHERA*  
*Asst.Prof*  
*Dept. Mining Engineering*  
*Indian School of Mines*  
*DHANBAD-826 005 (Jharkhand)*
- 2. DATE OF BIRTH & PLACE** : July 7<sup>th</sup> 1952, INDIA
- 3. BRANCH OF ENGINEERING** : Mining Engineering
- 4. SPECIALIZATION/  
RESEARCH INTEREST** : Strata Control & Rock Mechanics in Mines
- 5. EDUCATIONAL QUALIFICATION** : B.Tech. (Mining Engg.), 1974  
Banaras Hindu University  
  
M.Tech. (Mining Engg.), 1977  
Banaras Hindu University  
Specialisation of Rock Mechanics
- 6. INDUSTRIAL EXPERIENCE** : Nearly six years Mining,  
Experience in the following companies.  
  
Bharat Gold Mines Limited,  
Coal India Limited.

## **7. RESEARCH EXPERIENCE :**

Twenty years research experience in the field of Rock Mechanics/Strata control.

**7.1.M. Tech. Project:** Application of 3 Dimensional Tank Analogue Technique for stopping problems with special reference to the problems of failure of 503 W Crownpillar at Mocchia Mine (Sponsored by Hindustan Zinc Ltd).

### **7.2.AS RESEARCH OFFICER (Strata Control)**

Worked for R & D project 'control of Ground Movement aground extraction perimeter' Sponsored by the Ministry of energy (Dept. of Coal) India.

The following investigations were carried

Behaviour of strata in multi-section bord and pillar working at Godhur Colliery and Basuriya Colliery, B.C.C.L., Coal India Limited.

Behaviour of Strata in the caving long wall plough face of East Katras Colliery, B.C.C.L., Coal India Limited

Attached to the Strata Control group Chinakuri Colliery, E.C.L., Coal India to study the following.

- a) Behaviour of strata around plough long wall face with hydraulic fill.
- b) To study their methods for determining the location of bump and control measure
- c) Equivalent materials model study for strata behaviour in the mines.

**7.3.AS A LECTURER -ISM :** (i.e. Indian School of Mines) I was carrying out research in the field of strata control bumps prone coal mines.

The R & D project was sponsored by the Ministry of Energy (Dept. of Coal). The investigation Site was at Chinakuri and Girmit Colliery (Coal India Limited).

**7.4.AS DY. CHIEF SCIENTIST - BGML :** Supervised and was responsible for the following investigation in Kolar Gold Mines. (KGF).

- a) In-Situ instrumentation for rock stress and strain measurements to determine the ground movement in mine due to progressive excavation and also rockburst data utilised for stability analysis and Mine planning.
- b) Continuous monitoring of Seismic net work for location the damage, Foci and magnitude of rockburst as well as blasting vibration effect.
- c) Micro-Seismic network under instrumentation along with a PDP-II/34 computer system for predicting rockburst and Mine Stability.
- d) Determination of rock properties and material properties (used in mines) by laboratory testing.
- e) Design of underground cavern, tunnel mine structures and support system.
- f) Mine environmental study in the surface and underground mines.
- g) Support design for mine support.
- h) Measurement of insitu stress and induced stress around mine workings.
- i) Consultancy services to other organisation.

**7.5.AS ASST. PROF. – ISM**

- a) Rock Characterisation for Selection of TBM and Road header for civil, Hydroelectric and Mining Projects. (Funded by INCRMTT/Govt. of India) (Completed -1998).
- b) A study on Physico -Mechanical Behaviour of Concrete -fly ash material(Completed -1998).
- c) Acoustic behaviour and kiser effect of mine rocks (funded by Centre of advance study).
- d) M.Tech. research projects (Guided). The topics of the project are given below:
  - i. Rockmass Classification of immediate roof rock for designing drives in Indian coal mines. (Completed -1996).
  - ii. Determination of rock roughness coefficient and its influence on bonding strength of shotcrete (Completed -1998).
  - iii. Some aspects of abrasivity of coalmeasure rocks and its influence on wearing of drilling tool. (Completed -1998),
  - iv. Influence of various rock properties and confining stress on rock drillability (Completed -1998).

- v. Study of frictional parameters of mixed material (completed -1998).

## **8. PROFESSIONAL EXPERIENCE:(As Deputy Director,NIRM) (From Nov.2000 To Nov.2003)**

- Application of microseismic Technique for slope stability problems at River Velly Projects, NJPC Hydroelectric Project, (INCRMTT & NJPC Project) .
- Seismological investigations in and around Kolar Gold Fields for evaluating the seismic hazard and associated risk following inundation of mines (DST Project) .
- Monitoring of strata behaviour during Longwall mining using microseismic monitoring technique and estimation of caving height at Rajendra Mine, SCEL (Coal S & T Project) .
- Establishment of Broad Band Seismic Station (DST Project)
- Source Parameters of Seismic events in Kolar Gold Fields. (DST Project)

### **DIVISION HEAD AT NIRM**

Coordinated and supervised all projects in the following Divisions as the Head

- Engineering Geophysics & Seismology (EGS)
- Mine Design (MD)
- Slope Engineering (SS)
- Dimensional Stone Technology (DDST)
- Environmental Geotechnology (ENG)

### **SETTING UP OF ENVIRONMENTAL GEOTECHNOLOGY CENTRE AT NIRM**

- I was coordinating in setting up the Environmental Geotechnology Centre at NIRM. In view of this required preparation was made for establishing a laboratory of the centre to meet the essential requirement in carrying out project work related to Environmental Geotechnical Survey & Investigations.
- Projects on Disposal of Thermal of Power Plant Ash into abandoned Open Cast Mines as Structural Fill Material was formulated. Various Mining Companies as well as Fly Ash Utilisation Programme, TIFAC, DST, New Delhi were contacted for identifying an appropriate project site and sponsorship.
- Preparation for project proposals for carrying out research in the area of mitigating measures for environmental problems in Dimensional Mining was made.

### **ADMINISTRATIVE DUTY AT NIRM**

I had carried out the following job in addition to the project work

- Acting Director in absence of the Director
- Acting COA in absence of the Controller of Administration (COA)

- Chairman of Power Conversion Verification Committee
- Chairman of Civil Works Committee
- Chairman of Indent Evaluation Committee
- Chairman of Grievance Committee for Anomalies in pay scale of Assistants
- Chairman Internal Monitoring Committee for Granite Mining Cell
- Alternate Chairman & Member of Committee on Advances
- Member of House Allotment Committee
- Job assigned by the Director time to time

## **9. TEACHING EXPERIENCE**

(While at BHU & ISM)

Since 1986 to 2000 I and presently from 27<sup>th</sup> Nov.2003 teaching the following subjects:

- i. Rock Mechanics and Strata Control
- ii. Mining Supports
- iii. Rock Excavation Engg.
- iv. Rock Slope Engg.

a) The students of the following courses were taught the above subjects.

- B. Tech (Mining).
- M. Tech (Mine Planning & Design) (Rock Excavation Engg.), (Opencast Mining).
- M. Tech (Engineering Geology).
- M. Tech (Mining Exploration).

b) I was a member of faculty for the various short-term Executive Development Programmes (Indian School of Mines) since 1986 till date.

## **10. CONSULTANCY EXPERIENCE**

Worked as a consultant and the following projects. (While at ISM, BHU, BGML and NIRM)

- Studies on the effect of quarry blast vibrations on surface structures at Kumardihi, O.C.P. ECL (Coal India Limited).
- Reorganisation of the ventilation network at Patherkhera Colliery PK -II and Satpura Colliery W.C.L., (Coal India Limited).
- Determining of critical span of stoping at Kalydi copper mines, H.G.M. Ltd
- Determination of mechanical properties Coal and Coal Measures Rocks in various mines, Central C.C.L., W.C.L., B.C.C.L. Coal India Limited.
- Monitoring stability of Sub-level stope and underground opening at Kalyadi Copper Complex, Karnataka, South India.
  - Effect of vibration on K.R.S. Dam due to blasting during proposed new tunnel Mysore. (14.12.85).
  - Design of deephole blasting 3/4 seams in overburden and coal at Bera Colliery Oct.-Nov. 1986.
  - Scientific studies to estimate safe charge limit for Blasting in Underground working of Chora Horipur Colliery under village. ECL (22.11.86).

- Design of Blasting in method for Pathni Limestone Mine, Raipur Cement Corporation of India (Completed on 19.7.87).
- To measure the load bearing capacity of props, steel triangular chocks and wooden cogs in underground working on sand floor -at Kendwadih Colliery, BCCL (Completed Nov. -1987).
- Estimation of insitu strength of coal pillar -Gopinathpur Colliery ECL (Completed 5th June, 1988).
- Design of supports for trunk Roadway at intermediate mine, pyrite phosphates & Chemicals Ltd., (Completed June 1988).
- Study of blasting effect at Bolani Iron Ore mines at SAIL (Completed August, 1988).
- Determination of Physio -Mechanical properties of coal measure rock (800 m) (Completed - Dec. 1988).
- Testing of hydraulic legs at MAMC and M/C Jessop & Co. Power Supports (Completed April, 1988).
- Load Calibration of universal testing machine - Hindustan Maleables Ltd., Dhanbad (Completed June, 1988).
- Testing of hydraulic legs of power Support of Russian Make for Jhanjra Project (August, 1989)
- Assessment of bearing Strength of R. C. C. Structure in Bokaro Steel Plant, SAIL, (May 1989).
- Determination of Rockmass Classifications and design of Supports for Collieries, of Shankerpur (ECL), Kumardihi 'B' (ECL), Bansara (ECL), Amritnagar (ECL), Belbaid{ECL), Laikdih (BCCL) and J. K. Nagar (ECL), Moonidih (BCCL) and Bhalgora (BCCL) - (Completed 1994 -96).
- World Bank Project Study of the Safety of overburden dumps of 25 opencast projects of CIL (Completed 1997}
- Determination cavability of roof of Bord & Pillar depillaring panel at Govindpur Colliery, BCCL – (Completed January 2000).
- .Optimisation of Stopping Parameters in Sub-level open stopes of Sindesar-Khurd Mine(HZL)
- Ground Instrumentation analysis and stope stability evaluation in all stopping areas above 200 mRL and in all the lower level VRM stopes of South Lode in RD mines(HZL)
- Rock Mechanics instrumentation planning, analysis and suggestion of remedial measures for Zawarmala and Baroi Mines(HZL)
- Design of RCC Fill Barricade for Large Diameter Blast Hole stopes at Hutti Gold Mine
- Stress Analysis to determine the extraction of Rib Pillar and Crown Pillars above 250 mRL in Zawarmala Mine(HZL)
- Three-dimensional numerical modelling and stability analysis of western stopes and railway pillar in balaria mine (HZL)

- Ground stability analysis and stope stability evaluation in all stoping areas above 200 mRL and in the lower level VRM stopes of south lode in RD mines (HZL)
- Three-dimensional numerical modelling and stability analysis of western stopes and railway pillar in balaria mine(HZL)
- Evaluation of Possibility of Depillaring of Rib Pillars and Crown Pillars below 430 MRL (HZL)
- Stress Analysis of Horizontal Pillars at RD Mines above 250 MRL(HZL)
- 11.Advice on the optimum shape of shaft and nature of support based on stress analysis for deepening of Mallappa Shaft of HGML
- Optimisation of Stopping parameters of LDBH stopes for The Hutti Gold Mines Ltd., Hutti, Raichur, Karnataka.
- Geotechnical Studies and Design of Slopes at Deposit 10 & 11A, Bailadila Iron Ore Mine (NMDC)
- Slope Stability Investigations at Kudremukh Iron Ore mines
- Design Of Ultimate Pit Slope for Neyveli Mine-I
- Investigations Of Discontinuities In The Rock Mass Using Borehole Televiewing System at Desilting Chambers, Nathpa, SJVN, Himachal Pradesh
- Investigations of Discontinuities in the rock mass using Bore Hole Televiewing System at Desilting Chambers, THPA, Wangkha, Bhutan.

- Setting up of a Test House at Jaipur For C-DOS (under the sponsorship of UNIDO)
- Training Programme on Dimensional Stone Quarrying Technology (Karnataka, Rajasthan and Gujarat) (under the sponsorship of UNIDO)
- Performance determination of open circuit hydraulic props of M/s.Jessop &Co.Ltd.,Kolkata
- Strength assessment of RCC slab using Rebound Hammer,NBCC,Ranchi
- Testing of STDA leg for longwall power roof support of Wipro Fluid Power Support Ltd.,Bangalore-Aug.2004-Sept.2004.
- Determination of CERCHAR Hardness rock samples of CMRI,Dhanbad June 2004
- Strata Monitoring studies in longwall panel No. 7 of GDK No. 9 Incline of RG-II area of SCCL (in progress).
- Scientific study to determine relationship between convergence and roof behaviour in depillaring at GDK 5A Incline, Ramagundam Area, SCCL (in progress).

## **11. TOTAL PROFESSIONAL EXPERIENCE**

Total professional Experience is given below

- From: Nov.2003 till date Asst. Professor (Rock Mechanics) Dept. of Mining Engineering, Indian School of Mines( An Autonomous Institution of Govt. of India & Deemed University), Dhanbad.
- From Nov.2000 to Nov.2003 Deputy Director/Scientist-V, National Institute of Rock Mechanics( An Autonomous Institution of Govt. of India),K.G.F.-53117(Karnataka)
- From: June 1986 to Nov.2000 Asst. Professor (Rock Mechanics) Dept. of Mining Engineering, Indian School of Mines( An Autonomous Institution of Govt. of India & Deemed University),, Dhanbad.
- From: September 1983 to June 1986 Dy. Chief Scientist/Scientist – I. R&D Unit, Bharat Gold Mines Limited(A Govt of India Undertaking), Kolar Gold Fields 563 117. Karnataka State (India).
- From January 1982 to September 1983 as Senior Scientist (Rock Mechanics) R & D Unit, Bharat Gold Mines Limited(A Govt of India Undertaking),, Kolar Gold Fields Pin Code No.563117 , Karnataka, South India.
- From march 1980 to January 1982 Lecturer Department of Mining Engineering, Indian School of Mines( An Autonomous Institution of Govt. of India & Deemed University),, Dhanbad. India.
- September 1979 to February 1980 as Lecturer, Dept. of Mining Engineering Institute of Technology, Banaras Hindu University, Varanasi -221005.
- February 1978 to August 1979 as Research Officer (Strata Control) R & D Project Dept. of Mining Engineering,. Indian School of Mines, Dhanbad, India.

## **12. GUEST FACULTY**

- i. Delivered a series of lectures at B.C.C.L. Coal India Training Centre on September 1981 to 2004.
- ii. Series of lectures on ground control to Sr. Mining Executives, Organised by Karnataka Bureau of Enterprise, January, 1986.

## **13. TRAINING PROGRAMME**

I have undergone the following training programmes:

- i. Dr. O. P. Malik, Occupational Hygiene Service, Canada, UNDP & TOKEN Expert for determining free silica content, in mine dust, effective dust survey & dust suppression methods in BGML Mines.
- ii. Dr. F. Rummel, Prof. University of Ruhr, West Germany, UNDP Expert. Determination of In situ stress measurement in B.G.M.L. mines by hydrofracturing device.
- iii. Attended a course on SESAM-80 Finite Element Structural Analysis package At Computer Aided Design Centre, Jadavpur University, Calcutta, from 20th April, 1987 to 30th April 1987.

(P.K.BEHERA)