RESUME

1. General information

Name (In Capital Letters)	**PROF. (Dr.) NIKKAM SURESH**
Date of Birth (Day/Month/Year)	19·03.1959
Correspondence Address	**Dr Nikkam Suresh**, Professor – Higher Academic Grade (HAG) Dept. Fuel, Minerals & Metallurgical Engineering I. I. T. (ISM), Dhanbad-826004, Jharkhand
Phone No.	Mobile No. 70613 83151 Landline No. 0326-223-5542 [R] (or 0326 223 5442 (O)
Emails	nikkam@iitism.ac.in

2. Present Position:

a.	Designation	Professor -Higher Academic Grade [HAG]
b.	Organisation	Indian Institute of Technology (Indian School of Mines)
c.	Pay Scale	Basic = ₹ 2,24,100/- + Dearness Allowance = ₹ 94,122/-
d.	Total Teaching Experience	36 years 7 months

3 Honours/Awards Received:

Sl. No	Name of Award/ Fellowship etc.	Elected	Awarded by	Year of Award
1	National Mineral Award	Elected	Ministry of Coal & Mines, GoI.	2000
2	Distinguished Teacher Award	Elected	Dr C V Kapur Educ. Found., N Delhi.	2000
3	Coal Beneficiation award	Elected	Indian Institute of Mineral Engrs..	2010
4	DAAD Fellow	Elected	Deutscher Akademischer Austauschdienst, Germany.	1997
5	Dr R P Bhatnagar Award	Elected	Mining Geological & MGMI of India, Kolkata.	1996
6	Certificate of Merit Award	Elected	Institution of Engineers, India.	1992
7	Sankarsan Jena Memorial Award	Elected	Institution of Engineers, Orissa.	2009

4. Details of experience possessed

S. No.	Post held	Pay Scale	Organization	Nature of Duties
1	Professor–HAG	1,82,200 to 2,24,100 + Allowances AGP=12,500	Indian Institute of Technology (ISM)	Teaching & Research
2	Professor	37,000 to 67,000 + 10,500 AGP + Allowances	Indian School of Mines, Dhanbad	Teaching & Research
3	Associate Professor	16,400 - 450 - 20,000 + AGP 9,500 + Allowances	Indian School of Mines, Dhanbad	Teaching & Research
4	Asst. Professor	3,700 - 125 - 4,950 - 150 - 5,700 + Allowances	Indian School of Mines, Dhanbad	Teaching & Research
5	Sr. Lecturer	3,000 - 100 - 3,500 - 125 - 5,000 + Allowances	Indian School of Mines, Dhanbad	Teaching & Research
6	Lecturer	700-40-1100-50-1600+Allowances	Indian School of Mines, Dhanbad	Teaching & Research

5. Educational Qualification (In chronological order):

S. No.	Qualification	University	Year	Subject(s)/ Topic(s)	% Achieved	Distinctions etc.
1	Ph D	Indian School of Mines, Dhanbad	1992	Mineral Engineering	By Research	By Research
2	M Tech	Indian School of Mines, Dhanbad	1985	Mineral Engineering	By Research	First Class -
3	M A Sc. – 3 years (Master of Applied Science)	Gulbarga University, Karnataka	1982	Mineral Processing	71.5%	First Class with Distinction

6. Administrative Experience/Post(s) & Responsibilities held:

S. No.	Post	Academic Position held	Organization / University	Duration	
				From (Date)	To (Date)
1	Head of the Department	Associate Professor	Department of Fuel & Mineral Engineering, ISM, Dhanbad	01.02. 2008	31.01.2011
		Professor	Department of Fuel & Mineral Engineering, IIT(ISM)-Dhanbad	01.02.2011	23.05.2012
		Professor	Department of Fuel & Mineral Engineering, IIT(ISM)-Dhanbad	26.09.2006	25.09.2019
2	Chairman, Board of Studies	Chairman JRF Admissions	IIT(ISM)-Dhanbad	23.05.2012	22.05.2014

3	Members of the Academic Council	Professor	Indian School of Mines	2008	2016
4	Members of the Senate Committee	Professor	IIT(ISM)-Dhanbad	2016	Till date
5	Member of the Executive Council	I I M E	Indian Institute of Mineral Engineers	2008	Till Date
6	Membership in Professional/ Academic Bodies	IIME	Life Member & Vice-president (student chapters) of **The Indian Institute of Mineral Engineers** No: LM-061	2008	Till Date
		ISTE	Life Member of **The Indian Society for Technical Education**	1994	Till date
		F(IE)	Fellow Member **The Institution of Engineers (India),** [No: F-125249-2]	2019	Till Date
		MMGMI	Member Mining Geological Institute of India [No: 7516]	1997	Till Date
		KSTA	Karnataka Science & Technology Academy	2022	Till Date

7. Involvement with formulation of academic programmes:

S. No.	Nomenclature of Innovative Academic Programmes formulated	Date of Approval by Academic Council	Year of Introduction
1	Actively involved in the framing and formulating of the following Two 5-Years Dual Degree Programs: a). B Tech with M Tech Dual Degree in Mineral Resource at IIT (ISM), Dhanbad. b). B Tech with M Tech Dual Degree in Clean Coal and Energy Technologies at IIT (ISM), Dhanbad.	2006	2007

8. Important MoU's formulated/created for Academic collaborations:

S. No.	**MoUs formulated/created**	**Name of Agencies/ Departments involved**	**Year of MoU**
1	Industry Institute Collaborate programme (IICP)	Weir Minerals, Bangalore.	2009
2	Australia India Joint Working Group on Energy & Minerals, IIT(ISM) and the Curtin University of Technology Australia.	Curtin University, Perth, Australia	2015

9. International academic Exposure

S. No	Post/ Assignment	Organisation/ University	Area of Assignment	Duration		In Years & Months
				From	To	
1	DAAD Fellow (while working as Asst. Prof)	Heidelberg University	Underwent German Language course	04.05.1998	31.08.1998	1 Year & 6 Months
2		Karlsruhe University, Karlsruhe, Germany	Research	01.09.1998	31.07.1999	
3	Member of 9th JWG Group for coal energy	Australia-Indian coal & Energy Summit	Coal & Energy	17-06.2015	19.06.2015	
4	Joint Ph. D	With Curtin University Australia	Clean coal & Energy Technology Centre	17.05.2015	16.05.2020	5 years

10. Research Publications:

A. In Refereed international Journals = 77 papers

Sl. No.	Date	Title	Name of Journal	Refereed journal or not	Number of Citations	Impact factor, if available
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Aug 1, 1989	Effect of cone angle on separation characteristics of compound water-only cyclone	Mining, Metallurgy & Exploration	Yes	3	NA
2	Apr 1, 1990	Water-Only Cyclones	Mining Magazine	Yes	12	NA
3	Jan 1, 1990	Water distribution in water-only cyclones	Minerals Engineering	Yes	5	3.795
4	Oct 1, 1990	Effect of Outlet Diameters on The Performance of A 76-Mm Water-Only Cyclone	Transactions of the Indian institute of metals	Yes	__	1.205
5	Nov 1, 1995	Selective Flocculation as a Pre-Concentration Process—an Overview	Mineral Processing and Extractive Metallurgy	Yes	2	2.785
6	May 1, 1996	A performance model for water-only gravity separators treating coal	Fuel	Yes	18	5.578
7	Jan 1, 1996	Prediction of performance of 76-mm compound autogenous cyclone at different outlet diameters	Fuel and Energy	Yes	2	NA
8	Oct 1, 2001	Application of water-only cyclones in coal and mineral beneficiation plants	Journal of Mines, Metals and Fuels	Yes	3	NA
9	Dec 5,2004	Methodologies for Recovery of Carbonaceous Material from Coal Combustion Byproducts in India	Powder handling and processing	Yes	__	NA

10	Dec 1, 2005	A kinetic model for the prediction of water reporting to the froth products in batch flotation	Mineral Processing and Extractive Metallurgy	Yes	13	2.785
11	Dec 1, 2008	Additional investigations on the separation of titano-ferrous impurities from kaolin by high shear pretreatment and froth flotation—Part I	Applied clay science	Yes	27	5.907
12	Jun 11, 2008	Coal-fine beneficiation studies of a bench-scale water-only cyclone using artificial neural network	International Journal of Coal Preparation and Utilization	Yes	25	2.791
13	Dec 1, 2008	Additional investigations on the separation of titanoferrous impurities from kaolin by high shear pretreatment and froth flotation-Part II	Applied clay science	Yes	—	5.907
14	Nov 14, 2011	Prediction of process input interactions of Floatex Density Separator performance for separating medium density particles	International Journal of Mineral Processing	Yes	21	2.688
15	Jan 5, 2011	Improvement of performance efficiency of a hydrocyclone with design modification by suppressing air core	Korean Journal of Chemical Engineering	Yes	11	3.146
16	Jul 18, 2012	Experimental analysis of solids and water flow to the coal flotation froths	International Journal of Mineral Processing	Yes	20	2.688
17	Jun 1, 2013	Classification performance evaluation of floatex density separator for coal fines	Fuel	Yes	14	5.578
18	Mar 1, 20133	Role of air core in particle separation in cyclones	Mineral Processing and Extractive Metallurgy	Yes	10	2.785
19	Mar 1, 2013	The effect of diameter and height of the inserted rod in a dense medium cyclone to suppress air core	Minerals Engineering	Yes	22	3.795
20	Sep 1, 2014	Separation analysis of dry high intensity induced roll magnetic separator for concentration of hematite fines	Powder technology	Yes	42	5.64
21	J1, 20142014	Characterization and Beneficiation of carbonaceous material in Indian fly ash	Fuel	Yes		5.578
22	Jan 1, 2014	Characterization of Unburnt Carbon Recovered from Fly Ash by Froth Flotation	Journal of the Indian chemical society	Yes	2	0.243

23	Jan 1, 2015	A short review on hydraulic classification and its development in mineral industry	Powder Technology	Yes	62	5.64
24	Jul 1, 2015	Effect of desliming on the magnetic separation of low-grade ferruginous manganese ore	International Journal of Minerals, Metallurgy, and Materials	Yes	39	3.85
25	Mar 1, 2015	Magnetic separation studies on ferruginous chromite fine to enhance Cr: Fe ratio	International Journal of Minerals, Metallurgy, and Materials	Yes	16	3.85
26	Oct 1, 2015	Prediction of separation performance of dry high intensity magnetic separator for processing of para-magnetic minerals	Journal of The Institution of Engineers	Yes	6	1.43
27	Oct 2, 2015	Evaluation of the characteristics of as-received and washed low grade Indian coals for their industrial applications	Energy Sources	Yes	4	0.543
28	May 3, 2016	Prediction of separation performance of dry-high intensity magnetic separator for processing of paramagnetic minerals	Journal of The Institution of Engineers (India)	yes	31	1.43
29	May 3, 2016	Processing of ferruginous chromite ore by dry high- intensity magnetic separation	Mineral Processing and Extractive Metallurgy Review	Yes	31	2.785
30	Dec 1, 2016	A suitable process for clean coal recovery from tailing pond deposits	Energy Sources	—	16	0.543
31	Dec 16, 2016	Effect of oil type on the recovery of coal fines from coal waste slurry by the oil agglomeration process	Energy Sources	Yes	4	0.543
32	Dec 1,2016	Recovery of coal fines from coal waste slurry by oil agglomeration process using linseed oil	Energy Sources	Yes	2	0.543
33	May 19, 2017	Characterization of macerals from the coal flotation froth fraction	Energy Sources	Yes	—	0.543
34	Jan 1, 2017	Statistical Optimization of Coal-Oil Agglomeration Using Response Surface Methodology	International journal of coal preparation and utilization	Yes	—	2.791
35	Jan 1, 2017	Recovery of coal fines from coal waste slurry by oil agglomer-ation process using linseed oil (vol 38, pg 3453,2016)	Energy Sources	Yes	—	0.543
36	Jan 10,2017	Influence of process parameters of dry high intensity magnetic separators on separation of hematite	International Journal of Mineral Processing	Yes	55	2.688

37	Nov 1, 2017	Dry high- intensity magnetic separation in mineral industry—a review of present status and prospects	Mineral Processing and Extractive Metallurgy Review	Yes	38	2.785
38	Jun 10, 2017	Modeling and optimization of coal oil agglomeration using response surface methodology and artificial neural network approaches	International Journal of Mineral Processing	Yes	25	2.688
39	Mar 1, 2017	Influence of particle size on dry high- intensity magnetic separation of paramagnetic mineral	Advanced Powder Technology	Yes	19	4.969
40	Jan 2, 2017	Beneficiation of low-grade iron ore fines by multi-gravity separator (MGS) using optimization studies	Particulate Science and Technology	Yes	19	
41	Jan 1, 2017	Application of artificial neural network to study the performance of multi-gravity separator (MGS) treating iron ore fines	Particulate Science and Technology	Yes	15	
42	Jan 1, 2017	Optimization studies on a multi-gravity separator treating ultrafine coal	International Journal of Coal Preparation and Utilization	Yes	14	2.791
43	Jan 1, 2017	Recovery and de-ashing of coal fines from coal water slurry using the oil agglomeration process by waste transformer oil	Energy Sources	Yes	3	0.543
44	Jan 1, 2017	Correlation between Average Gray Value (AGV) of coal froth image with its ash and vitrinite content	Energy Sources	Yes	3	0.543
45	Jan 1,2017	Studies on separation of macerals from coal by froth flotation	Energy Resoures	Yes	3	
46	Jan 1, 2017	Recovery of coal values from the refuse pond coal slurry using flotation	Energy Sources	Yes	1	0.543
47	Jan 1, 2018	Investigation and optimization of the recovery of coal fines using oil agglomeration process: Use of waste oils from different sectors (vol 39, pg 754,2017)	Dispersion science and technology	Yes		NA
48	May 15, 2018	Application of artificial neural networks and response surface methodology approaches for the prediction of oil agglomeration process	Fuel	Yes	29	5.578
49	Jun 1, 2018	Cleaning of coal by multi gravity separator	Transactions of the Indian Institute of Metals	Yes	11	NA
50	May 19, 2018	Statistical optimization of coal–Oil agglomeration using response surface methodology	International Journal of Coal	Yes	6	2.791

			Preparation and Utilization			
51	Dec 2, 2018	Evaluation of the performance of water-only cyclone for fine coal beneficiation using optimization process	Energy Sources	Yes	4	0.543
52	May 4, 2018	nvestigation and optimization of the recovery of coal fines using oil agglomeration process: Use of waste oils from different sectors	Journal of Dispersion Science and Technology	Yes	3	NA
53	Apr 17, 2018	Performance evaluation of basic flotation kinetic models using advanced statistical techniques	International Journal of Coal Preparation and Utilization	Yes	13	2.791
54	Jul 4, 2019	Kinetic studies on petrographic components of coal in batch flotation operation	International Journal of Coal Preparation and Utilization	Yes	11	2.791
55	Mar 4, 2019	Mineralogical characterization and washability of Indian coal from Jamadoba	Energy Sources	Yes	9	0.543
56	Apr 29, 2019	Statistical studies on high ash Indian coal crushed to (− 3 mm) using 76 mm dense medium cyclone	International Journal of Coal Preparation and Utilization	Yes	5	2.791
57	Jan 2, 2020	Separation characteristics of 100-mm dual- cone water-only cyclone to wash high NGM coal	International Journal of Coal Preparation and Utilization	Yes	2	2.791
58	Jul 2, 2020	Mathematical representation of the performance of DM cyclone and Vorsyl separator for coal cleaning	International Journal of Coal Preparation and Utilization	Yes	1	2.791
59	Mar 3, 2020	Flotation production of vitrinite maceral concentrate and its optimization using response surface approach	International Journal of Coal Preparation and Utilization	Yes	7	2.791
60	Nov 1, 2020	Determining the best particle size-class for flotation of a high ash coal	International Journal of Coal Preparation and Utilization	Yes	5	2.791
61	May 4, 2021	Prediction of ash content and yield percent of clean coal in multi gravity separator using artificial neural networks	International Journal of Coal Preparation and Utilization	Yes	6	2.791

62	Aug 3, 2021	Taguchi based Grey relational analysis for optimization of design parameters of a 100 mm water-only cyclone	International Journal of Coal Preparation and Utilization	Yes	6	2.791
63	Nov 1, 2021	A Review on flotation of coal using mixed reagent systems	International Journal of Minerals Engineering	Yes	2	3.795
64	Aug 13, 2021	Flocculation studies on high- ash coal slurry for improved clarification of water	International Journal of Environmental Science and Technology	Yes	2	3.519
65	Jul 1, 2021	Carbothermic reduction roasting for processing of ferruginous chromite ore using conventional and microwave heating	Advanced Powder Technology	Yes	1	4.969
66	Mar 4, 2021	Performance Evaluation of Batch Coal Flotation from the Petrologic Point of View	International Journal of Coal Preparation and Utilization	Yes	1	2.791
67	Feb 10, 2021	Beneficiation of high-ash Indian coal fines by froth flotation using bio- degradable-oil as a collector	International Journal of Coal Preparation and Utilization	Yes	1	2.791
68	Jun 28, 2021	Correlation between Average Gray Value (AGV) of coal froth image with its ash and vitrinite content	ENERGY SOURCES	Yes	1	0.543
69	Mar 29, 2021	Studies on Clarification of Coal Washery Effluent Using Polymeric Flocculants and Settling Kinetics	Research Square	No		NA
70	Mar 30, 2022	Processing Studies on Banded Hematite Quartzite's of Sandur Scisht, Karnataka, India	Energies	Yes	6	3.252
71	Mar 23, 2022	Mahua oil as an alternative biodegradable collector for the flotation of low- rank high-ash oxidized coals based on kinetic studies	International Journal of Coal Preparation and Utilization	Yes		2.791
72	Apr 4, 2007	Characterization and beneficiation of low-grade Indian Iron-Ore fines, Australasian Institute of Mining and Metallurgy	Special issue on Iron Ore Beneficiation	Yes		NA
73	March 2022	Processing Studies on Banded Hematite Quartzite's of Sandur Schist, Karnataka, India	International Journal 'ENERGIES'	No	NA	NA

74	May 2022	Recovery of Hematite from Banded Hematite quartzite of southern India By Magnetic Separation and Reverse flotation.	International Journal 'MINERALS'	No	NA	NA
75	Nov 2022	Application of Kerosene/ crude palm oil and their mixtures as collectors for flotation of oxidized coal fines and their performance analysis	International Journal of Coal Preparation and Utilization	Yes	NA	2.791
76	Jan 2023	Flotation and oil agglomeration of high ash LVMC coal after deshaling by jigging: a comparative study using different collectors DOI: 10.1080/19392699.2024. 2305931	International Jr. of Coal Preparation & Utilization,	Yes	NA	2.791
77	-	Separation Characteristics of CrossFlow Separator for Beneficiation of High Ash Indian Fine Coal	International Jr. of Coal Preparation & Utilization,	Paper Communicated in Feb 2024		

B Participation and scholarly presentations in conferences:

Total Number of National and International Conferences = 57

S. No.	Date	Title of Conference or Institution	Title/Subject of presentation (if made)
(1)	(2)	(3)	(4)
1	Aug 10, 1986	National Seminar on Fine Particle Processing	Flotation Characteristics of Limestone fines
2	Dec 12, 1990	National Seminar on Recent Developments in Mineral Processing	A simple mathematical model to represent the performance of coal cleaning gravity separators
3	Apr 4,1992	International Symposium on Mineral Beneficiation	Beneficiation of Talchir Classified coal fines by froth flotation - a mathematical approach
4	Jan 16,1991	International Symposium on Beneficiation & Agglomeration	Performance studied on 76 mm Autogenous Cyclone treating coal
5	Aug 10,1994	International Symposium on Mineral Beneficiation	Kinetics of Chalcopyrite dissolution using Ferric Chloride
6	Aug 10,1994	International Symposium on Mineral Beneficiation	Selective flocculation of Lead-Zinc-Copper sulfides of fines of Rangpo-Sikkim area

7	Dec 8,2001	International Conference on Challenges and Trends in Coal Mineral Beneficiation [ICCAMB-2001]	Characterization and Beneficiation of Boula-Nuasahi chromites
8	Aug 25,2001	National Seminar on Placer Mineral Separation	Technological Innovations in Processing of Beach Placer Minerals
9	Dec 7,2001	International conference on Coal & Mineral Beneficiation, ICCAMB-2001	Beneficiation of studies on Chromites -A case study
10	Dec 20,2001	IV convention of Mineralogical Society of India & National Seminar on Geology, Processing and Metallurgy of Economic Minerals, GEOPEPMEM 2001	Recent developments in processing of beach placer minerals
11	Nov 29,2001	National Seminar on Engineering Applications of Hydrocyclones	Application of water-only cyclones in coal and mineral beneficiation plants
12	Dec 15,2001	National Seminar on Mathematical, Statistical and Computational Methods in Science and Technology	A numerical approach for accurate estimation of yield of products in coal washing plants
13	Jan 3,2002	International Conference on Mineral Processing Technology - 2002	Particle Size Effects in Batch Limestone Flotation
14	Feb 2,2003	International Conference on Minerals Processing Technology [MPT2003]	Importance of characterization in Development of beneficiation strategy - A case study of beneficiation of Limestone.
15	Jul 3, 2003	International Conference on Quantitative Approaches in Mineral Processing-2003, QAMP-03	Use of computer animation in Mineral Beneficiation Plants
16	Feb 12, 2004	National Conference on Emerging Areas in Applied Physics	Physical Separation Methods In Minerals Processing
17	Feb 12, 2004	National Conference on Emerging Areas in Applied Physics	Removal of carbonaceous material from fly ash
18	Jan 28, 2004	International conference on Mineral Processing Technology [MPT- 2004]	Computer-Aided Design & Simulation of Comminution Circuits
19	Nov 30, 2005	Advances in Mining Techniques and Management	Optimization of a Bench-Scale Water-only Cyclone Using Response Surface Methodology
20	Jan 16, 2005	Mineral Processing Technology - 2005, [MPT-2005]	Textural Image Analysis of Batch Coal Flotation Froths
21	Jan 6,2005	Mineral Processing Technology - 2005, [MPT-2005]	Textural Image Analysis of Batch Coal Flotation Froths

22	Jan 6, 2005	Mineral Processing Technology - 2005	Studies on Beneficiation of Karaikal Beach Sands Using Mozley Mineral Separator
23	Jan 6,2005	Mineral Processing Technology - 2005, [MPT-2005]	Recovery of Carbonaceous Material From Bokaro Thermal Power Plant Fly Ash (BTPP) By Froth Flotation
24	Oct 13,2011	Underground Metal Mining: Status and Prospects {UMMSP- 2006)	Recent Developments In Ore Beneficiation Techniques
25	Mar 8,2006	Mineral Processing Technology [MPT- 2006] & Indo-Korean Workshop on Resource Recycling	Characterization of unburnt Carbon Recovered from Fly Ash by Froth Flotation
26	Mar 8,2006	Mineral Processing Technology [MPT- 2006] & Indo-Korean Workshop on Resource Recycling	Influence of some Design & Operating Variables of Autogenous Cyclone on Coal Washing Performance
27	Mar 8,2006	Mineral Processing Technology [MPT- 2006] & Indo-Korean Workshop on Resource Recycling	Recovery of carbonaceous material from fly ash using different methods
28	Nov 2,2006	National Seminar on Frontier Areas in Geological and Technological Aspects of Fossil Fuel & Mineral Resources GTFM-ISM	Influence of Some Design & Operating Variables of Autogenous Cyclone on Coal Washing Performance
29	Oct 13,2011	Underground Metal Mining: Status and Prospects {UMMSP- 2006)	Jigs in Mineral Processing - A Review
30	Feb 22,2007	Industrial Minerals and their Processing - International conference on Minerals Processing	Characterizations of Flotation Froths by Textural Image Analysis in Batch Coal Flotation operation
31	Feb 22,2007	Industrial Minerals and their Processing - International conference on Minerals Processing	Additional Investigations on the Separation of Titanoferrous Impurities from Kaolin by High Shear Pre- treatment and Froth Flotation – Part II
32	Mar 10,2008	Workshop on CBM & CMM, Held by total CBM solutions	Production of Coal Bed Methane in India - Its Prospects and Important Environmental Issues
33	Apr 5,2008	International Conference on Mineral Processing - MPT-2008	Beneficiation of Mamuara clay with special reference to froth flotation
34	Oct 10, 2009	International Conference on Mineral Processing Technology-2009	Comparison of Hydrocyclone Performance Using Different Mathematical Models

35	Oct 10, 2009	Mineral Beneficiation	Effect Of Screen Deck Angle On Recovery Of Value Added Materials From Partially Laterised Khondalite Rocks
36	Dec 15, 2010	International Conference on Mineral Processing Technology-2010	Studies on beneficiation of BHQ samples by different methods
37	Jul 16, 2010	National Seminar on Beneficiation of Indian Minerals-Practices & Trends [BENCON- 2010]	Criteria for Flowsheet Design and Layout Preparation in Primary Crushing Operations
38	Dec 15, 2010	International Conference on Mineral Processing Technology [MPT- 2010]	Evaluation Of Floatex Density Separator Performance Using Silica Sand
39	Nov 25, 2011	International Conference on Enhancement of Washery Capacity – a priority for the Indian Coal Industry	Role of Manpower Training and Skill Development in Coal Preparation, New-Delhi
40	Dec 16, 2011	International conference on Mineral Processing Technology [MPT- 2001]	Studies on characterization of –1.0mm coal washery feed fines of Tata Steel at West-Bokaro division
41	Dec 18, 2013	International Conference on 'Science & Technology of Iron & Steel Making'(organized by and Tata Steel)	Flow sheet Design and Layout Preparation of Coal Processing Plant
42	Dec 10, 2013	13th International Mineral Processing Technology	Separation Behavior of Individual Size Fractions of Para Magnetic Minerals in a High Intensity Dry Roll Magnetic Separator
43	Dec 10, 2013	13th International Mineral Processing Technology [MPT- 2013]	Studies on beneficiation of low grade iron ores using Mozley Mineral Separator
44	Dec 10, 2013	International Conference on Mineral Processing Technology {MPT-2013],	Beneficiation of low grade iron ore fines by Multi Gravity Separator (MGS)
45	Dec 16, 2013	International Conference on Science and Technology for steel making, STIS- 2013	Comparative Study on Magnetic Separation of Ultrafine Chromite to Enhance Cr:Fe Ratio,
46	Feb 1, 2017	International Seminar on Mineral Processing Technology [MPT- 2017] to Minimize Mineral Waste & Maximize Value	Study of operational parameter of MGS to minimize mineral waste

47	Feb 1, 2017	International Seminar on Mineral Processing Technology [MPT- 2017] to Minimize Mineral Waste & Maximize Value	EPMA, FTIR, XRD Characterization of middling obtained from a Coking –Coal Washery
48	Feb 1, 2017	International Seminar on Mineral Processing Technology [MPT- 2017] to Minimize Mineral Waste & Maximize Value	Studies on Beneficiation of Manganese Ore Fines (0.50mm) using Mozley Mineral Separator
49	Nov 27, 2013	Heavy Minerals Conference -2013, 'Overcoming new Challenges' 27–29	Dry High Intensity Magnetic Separators in Mineral Industry – Present Status and Future Prospects
50	Dec 16, 2019	Mineral Processing Technology for Global Economy - Concepts to Commercialization	Efficient use of water-only cyclones
51	Sep 15, 1990	International Symposium on Gravity Separation	Prediction of performance of 76mm compound water-only cyclone
52	Sep 24, 2012	26th International Mineral Processing Congress [IMPC-2012]	Performance Analysis of Newly Designed Industrial Dense Medium Cyclone for Improved Coal Washing
53	Sep 25, 2012	26th Internationals Mineral Processing Congress [IMPC]	Classification Performance Studies in a Floatex Density Separator
54	April 18-19, 2013	XX International coal preparation Congress and Expo, ICPC-2013	Chaired the session on Coal Beneficiation and delivered an invited talk on 'Training & Skill Development in Coal Preparation'
55	November, 13-15, 2019	XIX International Coal Preparation congress held at ICH New Delhi	Chaired the session on Coal Beneficiation and delivered an invited talk 'On Influence of Collectors Types on Flotation Separation of Coal'
56	16-19, Dec 2019	Mineral Processing Technology – MPT 2019	Invited talk on '**Efficient Use Of Water-Only Cyclones For Washing Of Indian Coals'**
57	16-19, October 2023	International Coal Preparation Congress, being organized by Australian Coal Preparation Society. Held in Gold Coast Australia.	Studies on cost-effective flowsheet design of high-ash and high - NGM Indian coking coals

11. Contribution to Research Projects:

A: List of Ph D topics guided along with the names of students

Number of students = 16+2 =18

Sl. No	Name & Address	Title of the Ph D topic	Role
1	Dr Shivakumar I Angadi Scientist, IMMT, Bhubaneswar	Conventional and Column Flotation Studies on Coal and Graphite Fines	Principal Guide
2	Dr P Raghavan, Scientist, RRL, Trivendrum	Investigations into Flotation Separation of Titanoferrous Impurities from China Clay	Principal Guide
3	Dr R Sripriya, Researcher, Tata Steel, Jamshedpur	Analysis of Design and Performance Aspects of Dense Medium Cyclone for Coal Washing	Principal Guide
4	Dr C Raghu Kumar, Researcher, Tata Steel, Jamshedpur	Analysis of Separation Characteristics of Fine Particles in Floatex Density Separator	Principal Guide
5	Dr Surabhi Singh, SRF, IIT(ISM)	Characterization and Beneficiation of Indian Fly Ashes	Co-Guide
6	Dr Sunil Kumar Tripati, Scientist, Tata Steel, Jamshedpur	Particle Separation Behaviour in Rare Earth Magnetic Separators	Principal Guide
7	Dr Rama Chandra Chaurasia SRF, IIT(ISM)	Performance Analysis of Multi Gravity Separator (MGS) for Beneficiation of Coal, Graphite and Hematitic Iron Ore'	Principal Guide
8	Dr Anand Mohan Yadhav SRF, IIT(ISM)	Study on recovery of coal and mineral fines using oil-agglomeration and synthesized flocculants	Principal Guide
9	Dr Sarika Pimpalkar, Research Officer, IIT(ISM)	Clarification Of Coal Washery Effluents From Coking Coal Washeries Of Jharia Coalfield, Jharkhand, India	Co-Guide
10	Dr Saroj Sahoo, SRF, IIT(ISM)	Studies on separation of Macerals from coal by using Froth flotation	Principal Guide (co-Guide is Prof A K Varma)
11	Dr Abhishek Hembrom SRF, IIT(ISM)	Beneficiation of Coking and Non-Coking Coals using Water-Only cyclones	Principal Guide
12	Dr Bhabani Supriya SRF, IIT(ISM)	Effect of Design parameters on separation characteristic of Compound water-only cyclones to beneficiate coal and mineral fines	Principal Guide
13	Dr Dejalin Sahu, SRF, IIT(ISM) [Jointly with Curtin University Australia]	Studies on Performance Analysis of Dense Medium Cyclones and Vorsyl Separator for Coal Cleaning	Principal Guide
14	Dr K L Bharath, SRF, IIT(ISM)	Studies on the Flotation of High-Ash Oxidized Coal Fines Using Bio-Degradable Oils	Principal Guide
15	Dr K Mohana Rao, SRF, IIT(ISM)	Investigation on Enhanced Flotation Performance of Oxidized Coal Using Single and Mixed Collectors"	Principal Guide
16	Dr A Kumar Swamy, Vice-President, Thakur Industries, Koppal.	Resource management and utilization of low grade Iron Ore	Principal Guide

		Resources through beneficiation of BHQ of Bellary-Hospet sector, Karntaka	
17	Sri Piyush Malhotra, SRF, IIT(ISM)	Beneficiation of Low-volatile-Medium-Coking coals by Different Methods	Principal Guide
18	Sri Bivas Kumar, SRF, IIT(ISM)	Application of Density Based Processes for Washing of High-Ash and High-NGM Coals	Principal Guide

B: List of Major Research Projects under took

Number of Major RAD Projects = 10

S. No.	Client/Organization's name	Duration of project	Amount of grant (lakhs)
1	Design of coat effective process flow sheet for improved washing efficiency of Indian Coking and Non-coking coals [CIL R&D project Jointly with BCCL & CMPDIL]	4	1212.98
2	Selective flocculation of sulfide fines [CSIR Project]	3	14.52
3	Comparison of Performances of DM Cyclone and Vorsyl Separators for coal washing [CSIR Project]	3	14.50
4	Beneficiation of marginal grade ores for sustainable mineral development. [MHRD Project	3	2.0
5	Characterization studies on Water-only Cyclones to treat Indian Coals [DST Project]	3	5.0
6	Modeling and Scale-up Studies on Water-only cyclones treating Coal [CMPDIL Project]	3	8.0
7	Characterization and Grading of Coal Samples Received from the Office of the Coal Controller, Ranchi, Jharkhand	3	2.91
8	Development of Beneficiation Strategies for Processing of Industrial Minerals [ISM Minor research Scheme]	2	2.0
9	Characterization and Beneficiation of low grade Graphite from Arunachal pradesh, NE-Region, [CSIR].	3	14.72
10	Characterization, Beneficiation and coke making of Low volatile medium Coking Coals [UGC]	3	9.56
	Total Amount		**12,86.19**

11. Short-term courses offered to the working executives (Under Executive Development Program):

Organized following training programs:

No.	Title of the course	Type	Year	Place
1	Mineral Beneficiation - principles, Developments & Plant Practices	In-campus	1994	I S M
2	Beneficiation & utilization of Iron Ore Fines.	In-campus	1995	I S M
3	Mineral Dressing - Principles & Plant Practices.	Off-Campus	1996	FOMENTO-Goa.
4	Beneficiation of Iron Ore Fines	In-campus	1997	I S M
5	Mineral Beneficiation - Principles, Developments and Plant Practices	In-campus	1997	I S M
6	Processing of Beach Placer Minerals	In-Campus	2001	I S M
7	Coal/Mineral Beneficiation - Plant Practices	In-Campus	2003	I S M
8	Application of Cyclones in Coal Mineral	Off Campus	2006	Weir Minerals Bangalore
9	Coal Preparation– Principles & Practices	In-Campus	2007	ISM
10	Coal Preparation for Practicing Engineers	Off-Campus	2008	W.B. Coal, Washery, Ghatotand, Tata steel,
11	Coal Beneficiation – Principles & Practices	In-Campus	2011	ISM (with CPSI)
12	Coal Beneficiation - Principles & Practices	In-Campus	2012	ISM (with CPSI)
13	Mineral Processing	In-Campus	2014	ISM (for Afghanistan participants, GoA)
14	Coal Preparation – Principles & Practices	In-Campus	2016	CI-Kolkata
15	Coal Preparation – Principles & Practices	In-Campus	2017	CI-Kolkata

12. Consultancy Projects:

(Only for the period 2015 onwards, owing to space constraints, the projects prior to 2015 are not listed here) List of key consultancy assignments undertaken:

Sl. No.	Client/Organization's name	Nature of assignment	Duration	Amount of Grant
1	WCL	Coal characterization and washability studies on Mungoli-Nirguda Deep OCM, Wani Area, WCL, Nagpur.	2018-2019	8,26,500.00
2	SAIL	Analysis of Coal Samples for Annual declaration of Coal Grade for Chasnala, Jitpur and Tasra Colliery	2018-2019	5,20,000.00
3	CCSO-SAIL & CIL-Subsidiaries	Third party Sampling & Analysis of Coal dispatched from CCL washeries/ROM to SAIL Plants	2018-2019	48,04,445.00
4	CIL	Sampling and Grading of 0.57 million Ton of Coal Dumps from CCL Mining Areas (Part-C).	2017-2018	33,97,621.00
5	BCCL	Sampling and Grading 20000 Tons of Coal Slurry from Heap No. 'B' of Moonidih Washery.	2017-2018	49,230.00
6	BCCL	Sampling and Proximate Analysis of 11,544 Tons of Coal Slurry from Dugda Washery Collected from Pond Number 4D3A.	2017-2018	42,029.00
7	CCL Ranchi	Proximate & CGV analysis of Samples Received from CCL-Ranchi.	2017-2018	2,16,000.00
8	BCCL	Sampling and Analysis of Sudamdih Coal Washery Slurry.	2017-2018	48,000.00
9	JPPL	Proximate & GCV analysis of Samples Received from Amelia (N) Coal Mines, JPPL.	2017-2018	10,800.00
10	BCCL	Sampling and Analysis of Sudamdih Coal Washery Slurry.	2017-2018	15,594.00
11	MCL	Washability Studies on G14 grade coal from Lakhanpur area of MCL to get it washed by to get it washed by WBPDCL	2017-2018	2,92,373.00
12	CCL	Sampling and Grading of 7.76 Lakh Ton of Coal Dumps from Rajrappa Washery CCL (Part - B)	2018-2019	46,56,312.00
13	CCL	Sampling and Grading of 1.46 lakh Ton of Coal Dumps from Swang Washery CCL (Part-A)	2018-2019	8,76,000.00
14	CCL, Ranchi	Sampling and Grading of 0.8 million Ton of Coal Dumps from CCL, Mining Area (Part - b)	2017-2018	48,00,000.00

15	Katras Area, BCCL	Third party Sampling of Power coal Transported from different subsideries of CIL to Various Power Consumers PART-A	2017-2018	7,10,000.00
16	BCCL	Sampling proximate Analysis and GCV determination of 75,000/- metric tons of Raject Coal of Bojudih Coal Washerym BCCL, Dhanbad	2017-2018	2,74,100.00
17	CDA Asia Ltd. Kalkata	Grinding of Silica Sand (7 kgs) to 600 micron size.	2017-2018	25,000.00
18	BCCL	Technical Studies on Washability of Coal Samples from 2 different Mines of BCCL	2017-2018	9,00,000.00
19	CCL Ranchi	Technical Studies on Washability of Coal Samples from 9 different Mines of CCL	2017-2018	40,50,000.00
20	BCCL	Sampling and proximate Analysis of 20000 Tons of Coal Slurry from Moonidih Washery	2017-2018	49,230.00
21	SECL, Bilaspur	Proximate & GCV Analysis of Samples Received from CCO-Bilaspur (Part-B)	2017-2018	1,72,800.00
22	CCL	Sampling and Grading of 0.8 million Ton of Coal Dumps from CCL Mining Areas	2017-2018	48,00,000.00
23	NCL	Proximate & GCV analysis of samples received from Northern Coalfields Ltd. Singrauli	2017-2018	1,98,000.00
24	NTPC	Proximate & GCV analysis of samples received from Pakri Barwadih OCP, NTPC.	2017-2018	10,800.00
25	CCL Ranchi	Proximate and GCV analysis of samples received from MMAE, Sasan Power Ltd.	2017-2018	10,800.00
26	SECL Bilalspur	Grading of 2.4 lakh tons of coal from Dankuni Coal Coal Complex heaps of SECL	2017-2018	7,96,190.00
27	Colliery of Eastern Jharia Area, BCCL	Sampling and Analysis of Madhuban Coal Washery Slurry.	2017-2018	82,964.00
28	CCO	Proximate & GCV Analysis of Samples Received from CCO-Bilaspur (Part - A)	2017-2018	3,15,763.00
29	Dubeswari Colliery, ECL	Sampling and Analysis of Madhuban Coal Washery Slurry Part - B	2017-2018	68,708.00
30	BCCL	Sampling and Analysis of Coal Samples dispatched from BCCL	2017-2018	43,55,916.00

31	BCCL, Moonidhi Coal Washery	Sampling and Analysis of Moonidih Coal Washery Slurry.	2017-2018	80,000.00
32	BCCL	Sampling and Grading 20000 Tons of Coal Slurry from Dugda Washery	2017-2018	1,00,000.00
33	CCL	Sampling and Grading of CCL Coal Seams (Part B)	2017-2018	8,61,617.00
34	CCL	Technical Studies on Washability of Coal Samples from 8 different Mines of CCL	2017-2018	36,00,000.00
35	CCL	Sampling and Grading of CCL Coal Samples (Part B)	2017-2018	30,44,939.00
36	CCL	Sampling and Analysis of Coal samples dispatched from CCL.	2016-2017	19,94,732.00
37	SAIL	Third Party Sampling of Coal Supplied From CCL Washeries and Mines to SAIL Steel Plants	2016-2017	7,649.00
38	SECL	Sampling and Analysis of Coal samples dispatched from BCCL, CCL & SECL.	2016-2017	43,16,452.00
39	SGS India Pvt. Ltd., Kolkata	Sampling and Analysis of Sudamdih Coal Washery Slurry.	2016-2017	9,956.00
40	BCCL	Analysis of Coal samples of Patherdih Coal Washery, BCCL	2016-2017	2,25,000.00
41	WCL	Determination of Quality/Grade of Various coal seams and their Physico-Mechanical Properties Tensile & Compressive Strength) of various coal seams of different Mines of WCl Part-A	2015-2016	25,55,000.00
42	Sandur Manganese and Iron Ores Ltd., Bellary	Characterization and Beneficiation Studies on SMIORE Manganese Samples.	2015-2016	3,50,000.00
Total amount of resource generation				**5,45,20,920/-**

CONTRIBUTION TO RESOURCE GENERATION	**Amt, Crores**
From R&D Projects	12.86
From Consultancy Projects	5.45
From short courses and training programmes	2.50
Grand total	**20.81**

13. Lectures Delivered at various forums on different topics

No	Lecture	Company & Place	Nature/Type of course
1	Coal Preparation Practices in India	Macnally Bharat Engineering -Kolkata	For Management Trainees of MBE
2	Efficient use Cyclones in coal & Mineral Industry	Essar Steel –Vizac (Batch-1)	Off-campus
3	Cyclones in coal & Mineral Industry	Essar Steel –Vizac (Batch-1)	In-campus at EDC-ISM
4	Cyclones in coal & Mineral Industry	Essar Steel –Vizac (Batch-1)	In-campus at EDC-ISM
5	Cyclones in coal & Mineral Industry	Essar Steel –Vizac (Batch-1)	In-campus at EDC-ISM
6	Cyclones in coal & Mineral Industry	Essar Steel –Vizac (Batch-1)	In-campus at EDC-ISM
7	Gravity concentration of Indian coals	Tata steel	In-campus at EDC-ISM
8	Gravity concentration of Indian coals	Tata steel	In-campus at EDC-ISM
9	Engineers and Geologist of Jharkhand State Mineral Development	Jharkhand State Mineral Development	In-campus at EDC-ISM
10	Developments in Gravity Separation	Tata Science auditorium, Jamshedpur	Back to basics, IIME-Jamshedpur
12	Modelling of Compound Autogenous Cyclones for Coal Cleaning	Tega industries limitedKolkata	Off-campus
14	Design & Selection of Coal Crushing Circuits	For Engineers working in L&T, MECON, MBE, BCCL	In-cmaous, EDC-ISM
15	International Practices adopted in Iron Ore Beneficiation	MTI Sail Ranchi, on 22.04.2008	SAIL Executives
16	Basics of Comminution & Classification	For management trainees of Macnally Bharat Engg. on Forenoon 0f 19.02.2008,	At the corporate office of MBE, Mangolane, KOLKATA
17	Principles of Gravity Separation	For management trainees of Macnally Bharat Engg. on afternoon 0f 19.02.2008,	At the corporate office of MBE, Mangolane, KOLKATA
18	Coal beneficiation Basics	Junior officers of CCSO-SAIL	CCSO-SAIL Saraidhella, Dhanbad

14. List of articles in popular magazines or newspapers or popular

Photo showing participation in 9th Joint Working Group on Energy and Minerals at Brisbane Australia, 2015

आइएसएम . दो महत्वपूर्ण प्रोजेक्ट प्रस्तावित हैं केंद्र सरकार के पास

तीन माह से संचालित है क्लीन कोल पर रिसर्च सेंटर

धनबाद, संवाददाता

आइएसएम में क्लीन कोल पर सिर्फ तीन माह से रिसर्च सेंटर न केवल स्थापित है, बल्कि उसके बेहतरीन एचीवमेंट भी सामने आये हैं. इस सेंटर के जरिये संस्थान ने दो महत्वपूर्ण प्रोजेक्ट तैयार कर उसे स्वीकृति के लिए केंद्र सरकार को भेजे हैं. इन प्रोजेक्ट की स्वीकृति मिलते ही क्लीन कोल पर इस रिसर्च सेंटर एडवांसमेंट (ऑस्ट्रेलिया इंडिया क्लीन कोल एनर्जी टेक्नोलॉजी) और तेज गति से काम करना शुरू कर देगा. यह जानकारी सेंटर के को-ऑर्डिनेटर प्रो. एन सुरेश ने दी. उन्होंने बताया कि इस सेंटर के चीफ को-ऑर्डिनेटर संस्थान के निदेशक प्रो. टीसी चांदराही खुद हैं, जबकि सेंटर के संचालन से संस्थान के प्रो. अरुप भट्टाचार्जी सहित अन्य फैकल्टी भी संबंधित हैं.

प्रस्तावित प्रोजेक्ट : जानकारी का कहना है कि क्लीन कोल के इन दोनों प्रोजेक्ट्स एडवांस मैग्नीफिकेशन तथा लोबेल बेनिफीशिएशन को स्वीकृति में आइएसएम में ऑस्ट्रेलिया के हिरी हाई कमिश्नर का टैग उपेक्षक की भूमिका निभायेगा. फिलहाल ये ऑस्ट्रेलियाई विवि के साथ काम करने की तैयारी चल रही है. प्रो सुरेश ने बताया कि वैसे तो आइएसएम व ऑस्ट्रेलिया के चार विवि व संस्थानों के साथ मिलजुल कर काम करने का समझौता हुआ है, लेकिन वर्तमान में दो ही संस्थानों के साथ काम शुरू करने की तैयारी है. पहला कर्टिन यूनिवर्सिटी तथा न्यू कैसल यूनिवर्सिटी के साथ मिल कर काम करने की तैयारी है.

टाटा ने की सहयोग की पहल : प्रो. सुरेश ने बताया कि क्लीन कोल एनर्जी टेक्नोलॉजी के लिए टाटा ने सबसे पहले सहयोग का हाथ बढ़ाया. टाटा का मानना है कि यह रिसर्च विश्व स्तर की एक बड़ी समस्या के समाधान का मार्ग प्रशस्त करेगा. इसमें मदद करने के लिए वह हर प्रकार से तैयार है.

ऑस्ट्रेलिया के डिप्टी हाई कमिश्नर आइएसएम के प्रो एन सुरेश. (फाइल फोटो)

एमप्रोयू का मकसद : प्रो. सुरेश ने बताया कि प्रधानमंत्री नरेंद्र मोदी की योजना हर घर को बिजली देने की है. बिजली उत्पादन का सबसे बड़ा स्रोत न केवल भारत, बल्कि पूरे विश्व में कोयला ही है. 70 प्रतिशत बिजली कोयला से बनती है, जबकि 30 प्रतिशत अन्य स्रोतों से. ऑस्ट्रेलिया विश्व का सबसे बड़ा कोयला निर्यातक है, वहीं भारत कोयला के लिए विश्व का सबसे बड़ा बाजार है. दोनों देशों के कोयला उत्पादन के लिए नकारात्मक तथ्य है कि दोनों ही कोयले में राख की मात्रा अधिक है, यह गुणवत्ता बिजली उत्पादन में बाधा देने के साथ-साथ प्रदूषण का भी संकट उत्पन्न करता है. इसी उद्देश्य को लेकर क्लीन कोल रिसर्च की अवधारणा बनायी गयी.

प्रो. सुरेश कर चुके हैं ऑस्ट्रेलिया का दौरा

जुलाई 2015 में आइएसएम में रिसर्च सेंटर खुलने के बाद अगस्त 2015 में आयोजन पर प्रो. एन सुरेश ऑस्ट्रेलिया का दौरा कर चुके हैं. भारत- ऑस्ट्रेलिया के दौरान के बीच हुए समझौते के आलोक में ऑस्ट्रेलिया के विक्टोरिया सहित कई इंडस्ट्रीज में दौरे पर प्रो. एन सुरेश भी भारत की ओर से शामिल थे. इससे पहले 17-18 जून, 2015 को ऑस्ट्रेलिया के डिप्टी हाई कमिश्नर की मीटिंग में यह भी शामिल थे, क्लीन कोल पर आइएसएम के प्रयास की सराहना की गयी. उक्त मीटिंग में ऑस्ट्रेलिया के विक्टोरिया सहित न्यूकैसल यूनिवर्सिटी की कुलपति भी मौजूद थीं. ऑस्ट्रेलियाई उच्चायुक्त के दौरे के बाद एआइएसएम-प्रो (ऑस्ट्रेलिया-इंडिया स्ट्रेटजी रिसर्च सेंटर) दुबला की स्थापना होगी.

Photo showing agreements made to jointly work on clean coal energy and energies between IIT(ISM) and Australian instates.

Patent sought for equipment that rids coal of impurities

ISM scientist creates 'cyclone'

PRADUMAN CHOUBEY

Dhanbad, Jan. 14: An ISM scientist has developed a "cyclone" that can disintegrate even the finest impure particles clinging to raw coal.

Nikkam Suresh, the head of the fuel and mineral engineering department, has designed a "dense medium cyclone", an equipment for use in coal washeries, after two years of rigorous research with engineers of Weir Minerals, the world leader in design and manufacture of processing equipment.

Recipient of a number of awards, including the national mineral award from the Union ministry of coal in 2002 and the distinguished teacher award 2000, Suresh is now filing for a patent right along with Weir Minerals.

The new equipment is an improved version of existing cyclones that are made of hard materials. The new version has 28 times more resistibility than the older cyclone and boasts of a longer life span.

The equipment is expected to limit, if not end, India's dependence on foreign suppliers. The device will also come in handy for the steel industry as it would help cleansing coal of impurities.

Suresh, who has also won the Arti Bhatnagar award in 1996 instituted by Mining Geological and Metallurgical Institute of India, Calcutta, said: "The equipment can wash impurities as fine as 3mm or below".

Recently conferred the coal benefaction award at an international conference in Jamshedpur, Suresh lamented that more and more open cast mines were leading to bulk production, but the quality of coal had suffered.

"I hope my equipment will help procure high quality coal and benefit allied industries and the country as a whole," he added.

Nikkam Suresh and his machine. Pictures by Gautam Dey

Paper cutting showing the new Industrial Dense Medium Cyclone designed and developed between IIT(ISM) and Weir minerals for efficient washing of coal.

आइएसएम में दिखेगा गहरी खदानों का जीवंत दृश्य

जासं, धनबाद : हजारों मीटर गहरी खदान का दृश्य अब आपकी आंखों के सामने होगा और आप इसे महसूस भी कर सकेंगे। खदान में चाल कैसे धंसती है, अंधेरी खदानों में जान जोखिम में डालकर श्रमिक कोयला कैसे निकालते हैं, इन गतिविधियों को अब खुली आंखों से देखा जा सकेगा। इसके लिए आपको खदान के अंदर उतरना भी नहीं होगा। इन नजारों से आपको आइएसएम 'वर्चुअल रियलिटी सिम्यूलेटर' नामक तकनीक से रूबरू कराएगा।

देश में आस्ट्रेलिया से मंगाई जाने वाली इस तकनीक का इस्तेमाल पहली बार किया जा रहा है। वीआरएस थ्री डी लघु तकनीक केवल आस्ट्रेलिया के पास है जो आइएसएम को जल्द मिल जाएगी। आइएसएम ने मुख्य भवन में इसके लिए स्थान निर्दिष्ट कर दिया है।

आज कोलकाता में होगी दोनों देशों की बैठक : आइएसएम व आस्ट्रेलिया के बीच नवंबर में शैक्षिक, शोध व तकनीक को लेकर हुए करार के बाद मंगलवार को दोनों देशों की पहली बैठक कोलकाता में होगी। इस दौरान मानव संसाधन मंत्रालय के आर सुब्रहमण्यम, कोल इंडिया चेयरमैन एस भट्टाचार्य के अलावा आइएसएम चेयरमैन प्रो. डीडी मिश्र, निदेशक डीसी पाणिग्रही एवं प्रो. आरएम भट्टाचार्य समेत एक दर्जन आइएसएम प्रोफेसर हिस्सा लेंगे।

प्रो. भट्टाचार्य ने कहा कि बैठक में आस्ट्रेलिया के एक्सपर्ट मौजूद रहेंगे। दोनों देशों के अभियंताओं के प्रशिक्षण के अलावा माइंस वेंटिलेशन, माइंस सेफ्टी, डिजास्टर मैनेजमेंट, वेन्टिलेटिंग, रेस्क मेकेनिज्म, माइनिंग टेक्निक समेत नौ कोर्स शुरू किए जाएंगे। कोल कर्मियों को प्रशिक्षण देने के लिए मास्टर ट्रेनर बनाने को लेकर अंतिम रूपरेखा तैयार की जाएगी। आइएसएम आस्ट्रेलिया के समक्ष कलीन कोल टेक्निक समेत एक दर्जन प्रोजेक्ट की प्रस्तुति करेगा।

• आस्ट्रेलिया से आयात की जा रही तकनीक

कोयले की गुणवत्ता बढ़ाएगा आइएसएम

आइएसएम में आयोजित प्रशिक्षण शिविर को संबोधित करते वक्ता।

धनबाद : आइएसएम कोयले से छाई की मात्रा को कम कर गुणवत्ता को बेहतर करेगा। दावा है कि यह तकनीक देश में केवल आइएसएम के पास ही है। इस तकनीक का लाभ कोल इंडिया को मिलेगा। आइएसएम फ्यूल एंड मिनरल इंजीनियरिंग विभाग के व इस कार्यक्रम के समन्वयक प्रो. निलय सुरेश ने सोमवार को आयोजित कार्यशाला में बताया कि खदान से निकलने वाले कोयले में छाई की मात्रा काफी अधिक होती है। इससे न केवल स्टील प्लांट बल्कि 70 प्रतिशत कोयले की खपत वाले पावर प्लांट की उत्पादन क्षमता को कई गुणा बढ़ायी जा सकती है। प्रदूषण को भी नियंत्रित किया जा सकता है। कोल इंडिया ने 7-8 दागरी खोलने की योजना तैयार की है। इसकी डिजाइन आइएसएम बनाएगा। उन्होंने कहा कि पांच सप्ताह तक चलने वाले इस कार्यशाला में कोल इंडिया के 30 विशेषज्ञों ने हिस्सा लिया है। आइएसएम के निदेशक प्रो. डीसी पाणिग्रही के अलावा अन्य प्रोफेसर उपस्थित थे।

Picture showing inaugural function of the Executive Development programme being offered to the working engineers in coal sectors.

15. Summary of the Most significant Contribution

Prof Suresh worked extensively on the washing of high-ash high-NGM oxidized Indian coal fines using water-only cyclones (WOC). His noteworthy contribution has been to the development of cost-effective processes for washing coal fines. In his research, he came out with a modified design of water-only cyclone to suit washing of Indian coal fines, which he named *'Compound water-only Cyclone (CWC)"*. This has been a piece of significant research contribution to the field of coal preparation, where Prof Suresh developed four basic mathematical models for predicting the performance of the cyclones viz.

a) Model for the throughput of slurry to the cyclone
b) A cone-angle model for prediction of cut specific gravity of WOC
c) A model for the prediction of water-split in WOC and
d) Model for fines-split

Amongst the above four mathematical models, the model developed for water split has been unique, as it was based on the 'Characteristic Water Distribution Plot' for cyclone which he proposed it for the first time in the word.

Initially, Prof Suresh's research was limited to laboratory size cyclones, as time progressed, he subsequently extended his research to industrial applications and designed a 250mm size Industrial Water-Only Cyclone using the above-stated models and demonstrated its application in one of the operating washeries of BCCL (in Moonidih Coal Washery, Dhanbad, Jharkhand state). Further, using the data of lab-scale water-only cyclones and Industrial cyclones units, he developed and proposed the scale-up factors for ease of designing water-only cyclones for the first time. In due recognition to his contributions made to the fields of coal and mineral beneficiation, the **Ministry of Coal and Mines, Govt. of India,** bestowed him with **National Mineral Award in the year 2000,** is one of the highest recognitions given to nations young scientists

As Prof Suresh has been in close rapport with the coal industry, where he had understood hiccups faced in coal washing, could able to extend his research for designing Industrial **D*ense Medium Cyclones (DMC's).*** Further, having understood the inefficiencies of the existing DM cyclones in washeries and the metal wear at the outlets of the cyclones, which were affecting the washing performances, he decided to collaborate with one of the reputed pump manufacturing companies namely "**M/s Weir Minerals"** Sydney, Australia, (with their Indian office located at Bangalore known as Weir Minerals India Pvt Ltd., formerly known as Warman International). Subsequently, upon the

signing of an agreement between the two institutions, an Industry Institute Collaborative Project (IICP) proposal was conceived in the form of a project. In this project, two industrial cyclones of **190m^3/hr and 300m^3/hr** capacity were designed with **alumina ceramic liners**. These were named '**Involute Cyclone Separators'** for which a joint International Patent was applied. Based on the mounting mechanism of liners, the life of the liners worked out to be 18 to 20 years. Recognizing the contribution of Prof Suresh, the Indian Institute of Mineral Engineers conferred a **'Coal Beneficiation Award'.**

In addition to the abo*ve, Prof Suresh's* contribution to the development of Laboratory facilities to students to carry out experiments on coal and minerals beneficiation are many. These facilities have been in use at IIT(ISM) to B Tech/M Tech Laboratory classes and to the Research work of Ph D students. Some of them to list are

a) The Laboratory size **Denver type** self-aerated flotation machine with dual scrapping facilities

b) 100mm and 75mm diameter Compound water-only Cyclone test rigs,

c) column flotation units 50mm and 60mm diameters with mechanical instrumentations to control flow rates.

d) Design of 3inch DM cyclone and Vorsyl Separator units to wash intermediate size coals.

Throughout his life span of teaching, Prof Suresh has focused on '**Design and Development of Gravity Separation Units to Beneficiate Indian Ores and Minerals.**

Prof Suresh's recent emphasis is on **Design of cost-effective processes to beneficiate high-ash coals and BHQ Iron ores using jigs and different elutriators**, which has been a notable contribution in terms resource management and effective utilisation of low-grade ores, that can generate employment to the local people.

[Prof (Dr) Nikkam Suresh]
Professor – HAG
Department of Fuel, Minerals & Metallurgical Engg.
IIT (ISM) – Dhanbad