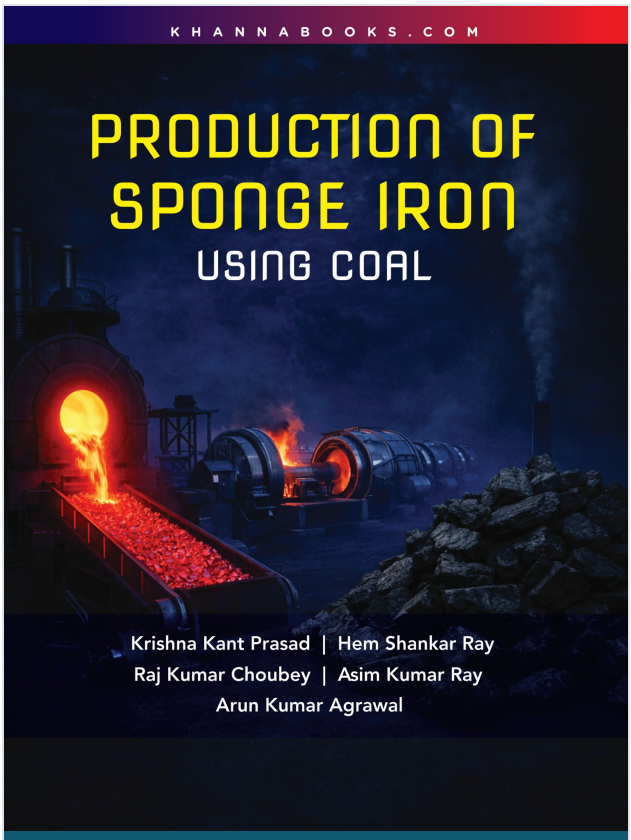

Krishna Kant Prasad, Hem Shankar Ray, Raj Kumar Choubey, Asim Kumar Ray, Arun Kumar Agarwal

Production of Sponge Iron Using COAL

Author :	Krishna Kant Prasad, Hem Shankar Ray, Raj Kumar Choubey, Asim Kumar Ray, Arun Kumar Agarwal
ISBN 13 :	978-93-74546-75-8
ISBN 10 :	9374546752
E-ISBN 13 :	978-93-74546-75-8
Edition :	First
Pages :	256
Type of book :	Physical
Year :	2026
Language :	English
Publisher :	Khanna Publishing House
M.R.P :	Rs 490.00
Categories :	Metallurgical Engineering, Book Store, New Arrivals
Condition Type :	New
Country Origin :	India

Khanna Publishing House
4C/4344, Ansari Road, Daryaganj, New Delhi-110002
Email: contact@khannabooks.com | Tel: 011-2324 44 47 - 48 | Mobile: +91-99109 09320

Product Description

Production of Sponge Iron Using COAL

Production of Sponge Iron using Coal: Rotary Kiln, Tunnel Kiln and using Gas from Coal is a definitive technical guide that explores India's global leadership in the coal-based direct reduction of iron ore. While international markets often rely on gas-based shaft processes, this book highlights how India has pioneered and perfected the use of rotary kilns to utilize abundant, high-ash non-coking coal-resources often dismissed by foreign experts as "muck". The text provides an exhaustive analysis of the thermodynamic, kinetic, and aerodynamic principles that govern the solid-state reduction of iron oxides.

The book serves as a vital bridge between theoretical research and industrial application, documenting decades of expertise from leading metallurgists. It broadens the traditional focus on rotary kilns to include emerging commercial successes in tunnel kiln technology and coal gasification-based shaft furnaces. Beyond technical specifications, the authors connect modern engineering with India's ancient metallurgical heritage, such as the storied Iron Pillar of Delhi. This work is an essential resource for metallurgical students, researchers, industry professionals, and entrepreneurs seeking to understand the economic and technical nuances of sustainable ironmaking in coal-rich regions.

Salient Features

- Rotary Kiln Dominance: Detailed analysis of the rotary kiln's primary role in India, covering its versatility in processing lump hematite and its unique operational strengths and weaknesses.
- Scientific Process Modeling: Comprehensive chapters on mathematical modeling, CFD analysis, and reaction kinetics that allow for precise control over heat transfer and solid movement.

Khanna Publishing House
4C/4344, Ansari Road, Daryaganj, New Delhi-110002
Email: contact@khannabooks.com | Tel: 011-2324 44 47 - 48 | Mobile: +91-99109 09320

- Alternative Reduction Technologies: In-depth exploration of tunnel kilns as a viable solution for reducing magnetite and iron ore fines, filling a critical gap in traditional kiln operations.
- Coal Gasification Insights: Evaluation of the economic and technical feasibility of converting coal into reducing gas (CO and H) to supplement production in shaft furnaces.
- Resource Optimization: Strategies for utilizing high-ash Indian coal and recirculating char to enhance energy efficiency and reduce the environmental footprint of ironmaking.
- Practical Engineering Focus: Guidance on plant design, refractory management, and overcoming common industrial hurdles like accretion or "ring formation" inside kilns.
- Historical Contextualization: A unique addendum on India's ancient ironmaking legacy, offering a perspective on the longevity and evolution of sponge iron technology.
- Future-Ready Strategies: Critical projections on hydrogen-based ironmaking and the integration of sponge iron into blast furnaces to reduce costly metallurgical coke consumption.

Khanna Publishing House

4C/4344, Ansari Road, Daryaganj, New Delhi-110002

Email: contact@khannabooks.com | Tel: 011-2324 44 47 - 48 | Mobile: +91-99109 09320

Table Of Contents

- Glossary
- Introduction: Why, How & from Where?
- Return of Sponge Iron Making: Rotary Kiln rules in India
- Thermodynamic Considerations: Feasibility of Reactions
- Aerodynamics Inside a Sponge Iron Rotary Kiln: An Eye Opener
- Mathematical Modelling in Rotary Kiln Sponge Iron Making Precisely Controlling the Process
- Physical Movement of solids Inside a Rotary Kiln: Tumbling of Solids and Coal Throwing/Slinging – Modeling Continued
- Requirement, Generation and Transfer of Heat in a Sponge Iron Rotary Kiln: Coal is the Key!
- Reaction Kinetics: A Lot Remains to Be Understood
- Raw Materials for Sponge Iron Making: In A Rotary Kiln, Tunnel Kiln and Shaft
- Accretion Or Ring Formation Inside a Rotary Kiln: Fusion Stalls the Process
- Process Design, Engineering and Operational Aspects of an RK-DR Plant
- Other Uses of Rotary Kiln for Reduction Purposes
- Environmental Aspects of Sponge Iron Making in Rotary Kiln
- Obtaining A Reducing Gas from Coal
- Producing Sponge Iron in a Shaft Furnace
- Producing Sponge Iron in a Tunnel Kiln
- A Comparison of the Sponge Irons Produced from Different Sources and Processes
- Re-Oxidation and Auto-Ignition Properties of Sponge Iron: How to Protect During Storage, Handling and Transportation
- Uses of Sponge Iron
- Future of Sponge Iron: Reading the Crystal Ball

Khanna Publishing House

4C/4344, Ansari Road, Daryaganj, New Delhi-110002

Email: contact@khannabooks.com | Tel: 011-2324 44 47 - 48 | Mobile: +91-99109 09320

- Addendum

Author

Krishna Kant Prasad

Dr. Krishna Kant Prasad (born on 24th January 1945 in Bhagalpur, Bihar), after completing B.Sc. Hons. (Chem.) from Bhagalpur University, he did his B.E., M.E. and Ph.D. in Metallurgical Engineering from the Indian Institute of Science, Bangalore. After brief teaching stints at the Banaras Hindu University and MR Engineering College, Jaipur he joined R&D Division of Tata Steel, Jamshedpur in 1972. He moved to RDCIS, SAIL, Ranchi in 1981 as in-charge of R&D activities in the Sponge Iron Pilot Plant Complex and since then he was actively involved in steering R&D activities both in Sponge Iron Making and Alternate Iron Making areas. He retired from SAIL, in January 2006. Thereafter, he served as a visiting professor in the Department of Metallurgical Engineering in IT (now IIT), BHU, Varanasi, for two and then joined NITK (National Institute of Technology Karnataka) in Surathkal, initially as the Ministry of Steel Chair Professor, and then in various capacities - all equivalent to a visiting professor - for seven and a half years. Dr. Prasad has guided four Ph.D. students. He has to his credit over 130 research papers, five registered copyrights and holds two patents on sponge iron making. He has authored four books entitled Sponge Iron Making in Rotary Kiln, Chemical and Metallurgical Thermodynamics, Advances in Rotary Kiln Sponge Iron Plant and Integrated Iron- and Steelmaking. He has also edited two books - "Trends in Beneficiation and Agglomeration of Iron Ore' and 'Steel Plant Technologies: An Overview. He is life member of the Indian Institute of Metals, Electrochemical Society of India and the Computer Society of India. E-mail: kkpmprnc@gmail.com. Professor

Hem Shankar Ray

Hem Shankar Ray (born on 19th June 1940, Jabalpur, Madhya Pradesh) unfortunately left for his heavenly abode on 28th April 2023 just as the preparation of the manuscript

started. Prof. H. S. Ray is widely regarded as one of the greatest minds of the Indian scientific community and a very well-known name in the field of Extractive Metallurgy. He obtained his B.Tech. (Hons.) in Metallurgical Engineering from the Indian Institute of Technology, Kharagpur (1962) and M.A.Sc. and Ph.D. degrees from the University of Toronto, Canada (1963, 67). He was with I.I.T. Kanpur from 1967-80 as Lecturer and Asst. Professor. In between he served as Manager/Senior Technologist - Research and Development, Pilkington Research Centre, Lathom, England (1977-1979). He then served as Professor of Metallurgical Engineering (1980-1990) and Dean of Students Affairs (1988-90) at the Indian Institute of Technology, Kharagpur. Prof. Ray served the Regional Research Laboratory, Bhubaneswar (now IMMTD) as Director from 1990-2000 (two terms). On retirement he served as an Emeritus Scientist at the Central Glass and Ceramic Research Institute, Calcutta. He holds several patents including 2 U.S. patents to his credit. His areas of interest included thermal analysis, kinetics, extractive metallurgy, energy and R&D administration. He guided about 40 Ph.D. students and 20 M.Tech. students for their thesis work. He has published about 500 papers in reviewed journals and conference proceedings and over 26 books. He also edited 15 Conference proceedings and written about 50 technical reports. He also wrote numerous other non-technical articles, editorials, etc. Prof. Ray received several awards in recognition of his work and these include the National Metallurgists Day Award, G.D. Birla Award and two Kamani Gold Medals of the Indian Institute of Metals. He received the Distinguished Alumni award from IIT Kharagpur, which, interestingly, he shared that year with the Google CEO, Sundar Pichai. He served several companies and R&D laboratories as consultant or member of Boards/Research Councils. He was associated with several Professional Bodies and served as President, Indian Institute of Mineral Engineers and Indian Thermal Analysis Society; also, as a Vice President of the Millennium Institute of Energy and Environment Management and was an Editor of a popular science magazine Everyman's Science. He also served in several other institutions in various capacities. He was deeply involved with professional bodies such as IIM (Indian Institute of Metals),

MIEEM (Millennium Institute of Energy and Environmental Management), IAPQR (Indian Association for Productivity, Quality and Reliability) etc. and used to be regular and most 0sought-after speaker in their seminars/workshops. Apart from his stellar achievements in the world of academics, Prof Ray was well known for his interests and capabilities in other spheres of life such as Music and Art. His creative abilities spanned far and wide across writing books of both scientific and nonscientific nature, proficiency in several musical instruments like Guitar, Tabla, Violin and Esraj and painting in both oil and water colour. His office workspace at his home housed an eclectic mix of all forms of Arts. His most unusual interest was in Magic. He had a keen interest in the subject and built several magic tricks himself. He also performed in public as a professional magician. Prof Ray was a great friend to all his colleagues and students. His abilities to build positivity in all his circles made him stand out as an exceptional human being. His associations with people were lifelong. He held deep respect for all his relationships and loved nurturing the young and rising. From writing science fiction books for teenagers to help inculcate interest in core science in school to mentoring startups in science and tech and to helping and problem solving institutions to break through status quo to push forward, Prof Ray had pretty much done it all. He remained a self-driven human being with natural leaderships skills combined with motivating and inspiring others to rise, right till the end. Sri

Raj Kumar Choubey

Raj Kumar Choubey , was born on August 11, 1954 at Sikariya, Bhojpur, Bihar (unfortunately he passed away on February 19, 2024). He passed B.Sc. from the University of Burdwan in 1974 and Bachelor of Engineering from MREC (now MNIT) in Jaipur Rajasthan in the year 1980. He joined M/s Jaipur Metals and Electricals in 1980 and operated the first induction furnace of India. In 1982 he joined M/s Hindustan Motors and served till the year 2000. There he developed various grades of automobile grade steel and was a part of the team who fabricated the first Diesel Engine for automobiles in India. Thereafter he decided to be a start-up entrepreneur. His portfolio lately read: Owner -

Metcon Power Consultant & Engineers, Kolkata, having global clients base including Tata Steel and Jindal Steel. Director - Bhagwati Power & Steel Limited, Raipur, CG. Director - RNT Medicare Private Limited, Kolkata. Partner - Premier Hygienic Services, Kolkata. He involved himself in innovation and setting up commercial plants based on self developed technology for: Manufacturing DRI (Sponge Iron) from Mill Scale, DRI through Tunnel Kiln Technology, Development of Metallic Saggers for reduction of Iron Ore, Process for reduction of Chromite Ore at lower temperature, Extraction of liquid fuel from waste plastic, Recycling of Steel Plant wastes Development of Binders for agglomeration Address: Metcon House, North Bazar, Post: Andal - 713321, District: Paschim Bardhman, West Bengal. Email: choubey@metconpower.in, Website: www.metconpower.in. Dr.

Asim Kumar Ray

Dr. Asim Kumar Ray was born at Calcutta in 1952. He graduated with Honours in Chemical Engineering from Jadavpur University in 1974. He did his Masters in Chemical Engineering from IIT Kanpur and Ph. D. in Metallurgical Engineering from IIT Kharagpur. After a brief stay of about one and a half year each at Indian Iron and Steel Company, Burnpur and Indian Oil Corporation, he joined Research & Development Centre for Iron & Steel (RDCIS), SAIL, Ranchi in 1978. After a long stay at RDCIS, SAIL, Ranchi, he assumed charge of General Manager (Quality) at Durgapur Steel Plant (DSP), SAIL in 2008. Dr Ray was instrumental in commissioning Sponge Iron Pilot Plant and associated Process Research Laboratory and carried out R & D activities related to Sponge Iron & other Alternate Iron Making processes, Steelmaking and Continuous Casting. He established Computational Laboratory at RDCIS and carried out mathematical and physical simulation of different metallurgical processes. He steered several projects on process improvement and product development in all SAIL plants. Under his leadership, DSP had received several awards on Quality including prestigious Golden Peacock Award on Quality -2010 of Institution of Directors (IOD). Dr. Ray retired from SAIL in December 2012. Presently, Dr. Ray is with M/s Lechler (India) Pvt. Ltd. Dr. Ray has co-authored the Book on "Rotary

Kiln Sponge Ironmaking". He has to his credit about 140 research publications and three patents. Shri Arun Kumar Agrawal , born in 1963, is a 1985 metallurgical engineering graduate from the then Institute of Technology, Banaras Hindu University (IT-BHU - now IIT-BHU), Varanasi. He joined MECON Limited, Ranchi in the year 1986 as Management Trainee (Technical) after one year stint in Hindustan Aluminium Co. (Hindalco - Aditya Birla Group) at Renukoot in Uttar Pradesh. He joined the Iron Making Division of MECON and was deeply involved in the basic engineering and design, detailed engineering, consultancy and project management as well as site services of various Iron Making Projects particularly DR (Direct reduction) projects - both coal and gas based. In Blast Furnace area, he was the co-ordinator for NMDC Blast Furnace in Nagarnar and 1.2 mtpa Blast Furnace Complex of M/s PTKS, Indonesia. He was involved in engineering of a number of coal and gas-based DR projects, most prominent being world's first syngas-based DR plant in Angul for JSPL. He possesses over 37 years of varied and rich experiences in Iron and Steel technology, conceptualisation of projects along the entire value chain and development of process flow sheets, making and guiding the preparation of multitudes of reports, etc. Besides he has rendered expert services to Ministry of Steel (MOS) by being part of several committees, policy and norms formulation and their subsequent regulation as well as handling of diverse technical queries. In the process he immensely contributed to the development and growth of Indian Steel Industry. Shri Agrawal was deeply involved in all business verticals of MECON Limited, both technical & commercial. During his illustrious career, he displayed rare strategic insight and business acumen for enhancing company's business prospects. Shri Agrawal rose to the level of Director (Technical) of MECON in June, 2020 and continued for three years before superannuation in 2023. Under his leadership, a new Design Cell was created to develop specific tailor-made innovative designs and engineering solutions for new application and import substitutions. He was instrumental in launching of company's in-house prestigious quarterly technical journal "Techquest" to provide platform for sharing technical knowledge as well as unique design, engineering & project experiences and site based

solutions among the engineers to help them learn from each other's experience and make constant improvement in their subsequent endeavours.

Arun Kumar Agarwal

Dr. Krishna Kant Prasad (born on 24th January 1945 in Bhagalpur, Bihar), after completing B.Sc. Hons. (Chem.) from Bhagalpur University, he did his B.E., M.E. and Ph.D. in Metallurgical Engineering from the Indian Institute of Science, Bangalore. After brief teaching stints at the Banaras Hindu University and MR Engineering College, Jaipur he joined R&D Division of Tata Steel, Jamshedpur in 1972. He moved to RDCIS, SAIL, Ranchi in 1981 as in-charge of R&D activities in the Sponge Iron Pilot Plant Complex and since then he was actively involved in steering R&D activities both in Sponge Iron Making and Alternate Iron Making areas. He retired from SAIL, in January 2006. Thereafter, he served as a visiting professor in the Department of Metallurgical Engineering in IT (now IIT), BHU, Varanasi, for two and then joined NITK (National Institute of Technology Karnataka) in Surathkal, initially as the Ministry of Steel Chair Professor, and then in various capacities - all equivalent to a visiting professor - for seven and a half years. Dr. Prasad has guided four Ph.D. students. He has to his credit over 130 research papers, five registered copyrights and holds two patents on sponge iron making. He has authored four books entitled Sponge Iron Making in Rotary Kiln, Chemical and Metallurgical Thermodynamics, Advances in Rotary Kiln Sponge Iron Plant and Integrated Iron- and Steelmaking. He has also edited two books - "Trends in Beneficiation and Agglomeration of Iron Ore' and 'Steel Plant Technologies: An Overview. He is life member of the Indian Institute of Metals, Electrochemical Society of India and the Computer Society of India. E-mail: kkpmprnc@gmail.com. Professor Hem Shankar Ray (born on 19th June 1940, Jabalpur, Madhya Pradesh) unfortunately left for his heavenly abode on 28th April 2023 just as the preparation of the manuscript started. Prof. H. S. Ray is widely regarded as one of the greatest minds of the Indian scientific community and a very well-known name in the field of Extractive Metallurgy. He obtained his B.Tech. (Hons.) in Metallurgical Engineering

from the Indian Institute of Technology, Kharagpur (1962) and M.A.Sc. and Ph.D. degrees from the University of Toronto, Canada (1963, 67). He was with I.I.T. Kanpur from 1967-80 as Lecturer and Asst. Professor. In between he served as Manager/Senior Technologist - Research and Development, Pilkington Research Centre, Lathom, England (1977-1979). He then served as Professor of Metallurgical Engineering (1980-1990) and Dean of Students Affairs (1988-90) at the Indian Institute of Technology, Kharagpur. Prof. Ray served the Regional Research Laboratory, Bhubaneswar (now IMMTD) as Director from 1990-2000 (two terms). On retirement he served as an Emeritus Scientist at the Central Glass and Ceramic Research Institute, Calcutta. He holds several patents including 2 U.S. patents to his credit. His areas of interest included thermal analysis, kinetics, extractive metallurgy, energy and R&D administration. He guided about 40 Ph.D. students and 20 M.Tech. students for their thesis work. He has published about 500 papers in reviewed journals and conference proceedings and over 26 books. He also edited 15 Conference proceedings and written about 50 technical reports. He also wrote numerous other non-technical articles, editorials, etc. Prof. Ray received several awards in recognition of his work and these include the National Metallurgists Day Award, G.D. Birla Award and two Kamani Gold Medals of the Indian Institute of Metals. He received the Distinguished Alumni award from IIT Kharagpur, which, interestingly, he shared that year with the Google CEO, Sundar Pichai. He served several companies and R&D laboratories as consultant or member of Boards/Research Councils. He was associated with several Professional Bodies and served as President, Indian Institute of Mineral Engineers and Indian Thermal Analysis Society; also, as a Vice President of the Millennium Institute of Energy and Environment Management and was an Editor of a popular science magazine Everyman's Science. He also served in several other institutions in various capacities. He was deeply involved with professional bodies such as IIM (Indian Institute of Metals), MIEEM (Millennium Institute of Energy and Environmental Management), IAPQR (Indian Association for Productivity, Quality and Reliability) etc. and used to be regular and most 0sought-after speaker in their seminars/workshops. Apart from his stellar achievements in

the world of academics, Prof Ray was well known for his interests and capabilities in other spheres of life such as Music and Art. His creative abilities spanned far and wide across writing books of both scientific and nonscientific nature, proficiency in several musical instruments like Guitar, Tabla, Violin and Esraj and painting in both oil and water colour. His office workspace at his home housed an eclectic mix of all forms of Arts. His most unusual interest was in Magic. He had a keen interest in the subject and built several magic tricks himself. He also performed in public as a professional magician. Prof Ray was a great friend to all his colleagues and students. His abilities to build positivity in all his circles made him stand out as an exceptional human being. His associations with people were lifelong. He held deep respect for all his relationships and loved nurturing the young and rising. From writing science fiction books for teenagers to help inculcate interest in core science in school to mentoring startups in science and tech and to helping and problem solving institutions to break through status quo to push forward, Prof Ray had pretty much done it all. He remained a self-driven human being with natural leaderships skills combined with motivating and inspiring others to rise, right till the end. Sri Raj Kumar Choubey , was born on August 11, 1954 at Sikariya, Bhojpur, Bihar (unfortunately he passed away on February 19, 2024). He passed B.Sc. from the University of Burdwan in 1974 and Bachelor of Engineering from MREC (now MNIT) in Jaipur Rajasthan in the year 1980. He joined M/s Jaipur Metals and Electricals in 1980 and operated the first induction furnace of India. In 1982 he joined M/s Hindustan Motors and served till the year 2000. There he developed various grades of automobile grade steel and was a part of the team who fabricated the first Diesel Engine for automobiles in India. Thereafter he decided to be a start-up entrepreneur. His portfolio lately read: Owner - Metcon Power Consultant & Engineers, Kolkata, having global clients base including Tata Steel and Jindal Steel. Director - Bhagwati Power & Steel Limited, Raipur, CG. Director - RNT Medicare Private Limited, Kolkata. Partner - Premier Hygienic Services, Kolkata. He involved himself in innovation and setting up commercial plants based on self developed technology for: Manufacturing DRI (Sponge Iron) from Mill Scale, DRI through Tunnel Kiln Technology,

Development of Metallic Saggers for reduction of Iron Ore, Process for reduction of Chromite Ore at lower temperature, Extraction of liquid fuel from waste plastic, Recycling of Steel Plant wastes Development of Binders for agglomeration Address: Metcon House, North Bazar, Post: Andal - 713321, District: Paschim Bardhman, West Bengal. Email: choubey@metconpower.in, Website: www.metconpower.in. Dr. Asim Kumar Ray was born at Calcutta in 1952. He graduated with Honours in Chemical Engineering from Jadavpur University in 1974. He did his Masters in Chemical Engineering from IIT Kanpur and Ph. D. in Metallurgical Engineering from IIT Kharagpur. After a brief stay of about one and a half year each at Indian Iron and Steel Company, Burnpur and Indian Oil Corporation, he joined Research & Development Centre for Iron & Steel (RDCIS), SAIL, Ranchi in 1978. After a long stay at RDCIS, SAIL, Ranchi, he assumed charge of General Manager (Quality) at Durgapur Steel Plant (DSP), SAIL in 2008. Dr Ray was instrumental in commissioning Sponge Iron Pilot Plant and associated Process Research Laboratory and carried out R & D activities related to Sponge Iron & other Alternate Iron Making processes, Steelmaking and Continuous Casting. He established Computational Laboratory at RDCIS and carried out mathematical and physical simulation of different metallurgical processes. He steered several projects on process improvement and product development in all SAIL plants. Under his leadership, DSP had received several awards on Quality including prestigious Golden Peacock Award on Quality -2010 of Institution of Directors (IOD). Dr. Ray retired from SAIL in December 2012. Presently, Dr. Ray is with M/s Lechler (India) Pvt. Ltd. Dr. Ray has co-authored the Book on "Rotary Kiln Sponge Ironmaking". He has to his credit about 140 research publications and three patents. Shri Arun Kumar Agrawal , born in 1963, is a 1985 metallurgical engineering graduate from the then Institute of Technology, Banaras Hindu University (IT-BHU - now IIT-BHU), Varanasi. He joined MECON Limited, Ranchi in the year 1986 as Management Trainee (Technical) after one year stint in Hindustan Aluminium Co. (Hindalco - Aditya Birla Group) at Renukoot in Uttar Pradesh. He joined the Iron Making Division of MECON and was deeply involved in the basic engineering and design, detailed engineering, consultancy and project management as

well as site services of various Iron Making Projects particularly DR (Direct reduction) projects - both coal and gas based. In Blast Furnace area, he was the co-ordinator for NMDC Blast Furnace in Nagarnar and 1.2 mtpa Blast Furnace Complex of M/s PTKS, Indonesia. He was involved in engineering of a number of coal and gas-based DR projects, most prominent being world's first syngas-based DR plant in Angul for JSPL. He possesses over 37 years of varied and rich experiences in Iron and Steel technology, conceptualisation of projects along the entire value chain and development of process flow sheets, making and guiding the preparation of multitudes of reports, etc. Besides he has rendered expert services to Ministry of Steel (MOS) by being part of several committees, policy and norms formulation and their subsequent regulation as well as handling of diverse technical queries. In the process he immensely contributed to the development and growth of Indian Steel Industry. Shri Agrawal was deeply involved in all business verticals of MECON Limited, both technical & commercial. During his illustrious career, he displayed rare strategic insight and business acumen for enhancing company's business prospects. Shri Agrawal rose to the level of Director (Technical) of MECON in June, 2020 and continued for three years before superannuation in 2023. Under his leadership, a new Design Cell was created to develop specific tailor-made innovative designs and engineering solutions for new application and import substitutions. He was instrumental in launching of company's in-house prestigious quarterly technical journal "Techquest" to provide platform for sharing technical knowledge as well as unique design, engineering & project experiences and site based solutions among the engineers to help them learn from each other's experience and make constant improvement in their subsequent endeavours.

Khanna Publishing House

4C/4344, Ansari Road, Daryaganj, New Delhi-110002

Email: contact@khannabooks.com | Tel: 011-2324 44 47 - 48 | Mobile: +91-99109 09320