



P.R. CHANDNA

Metallurgical Engineer with Business Management, Experience in Consultancy, EPC, Project Management, Financial Appraisals, Process Plant Operations & Maintenance & General Management

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EDUCATIONAL/ PROFESSIONAL QUALIFICATIONS:

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| 1. | All India Higher Secondary Examination, 1969 | KV IIT, Powai, Mumbai, India |
| 2. | B.E. (Metallurgical), 1974 | Malaviya NIT, Jaipur, University of Rajasthan, India |
| 3. | Business Management, 1988 | AIMA, New Delhi, India |
| 4. | Value Engineering, 1983 | BISOVE, New Delhi, India |
| 5. | Contract Management & Contract Strategies, 2006 | AIMS, Chennai, India |

PROFESSIONAL MEMBERSHIP:

- **Directors Identification No. (DIN):** 00018676, issued Ministry of Company Affairs, Govt. of India.
- Life Member, Indian Institute of Metals (IIM), Kolkatta, India.
- Member, Consultancy Development Centre (CDC), New Delhi, India – An associate of FIDIC.
- Member Sectional Committee on Light Metals & Alloy (MTD-7), Bureau of Indian Standards (BIS), India.
- Empanelled as an Independent Director by ONEID – Institute of Directors, India

EXPERIENCE:

SUMMARY:

I am a First Class graduate in Metallurgical Engineering, with business management, having held various senior technical, managerial, lead project management, and general management positions in the Consultancy, EPC, Project management, Metals & Mining industries. I have in depth appreciation of national and international business environment in these industries.

More than three decades of professional career in the base metals & mining and metallurgical engineering industry working on more than thirty multi – disciplinary Green & Brown fields/ De-bottlenecking/ Expansion/ Performance improvement projects – from

concept to commissioning & Operations & Maintenance in India and overseas. This experience includes:

- More than 18 years in consulting – management & engineering, due diligence, EPC, project management, procurement, contract management, construction, and commissioning of zinc, lead, cadmium, gold, silver, copper, nickel, tin, titanium sponge, copper rod plants, and Natural Gas – Piped / CNG supply and distribution systems. *I have been rewarded with number of appreciation letters for executing projects within budget and ahead of time schedule.*
- More than 12 years in non – ferrous smelters operations including six years as Assistant Plant Manager working in both Indian Primary Zinc Smelters and associated Pyro & Hydro Metallurgical leach plants, Sulphuric acid, Mercury Removal and fertilizer & phosphoric acid plant operations. *I have been rewarded with appreciation letters for trouble shooting during breakdowns and reviving back the plant into operation within the shortest period and highest productivities/ productions achievement during operations.*

I was also associated with the execution and commissioning of a pioneer Environmental Mercury removal project right from the discovery of mercury in the smelter sulphur off gases utilized for manufacture of Sulphuric acid at the Zinc Smelter Hydro metallurgical plant.

I have visited numbers of Pyro & Hydro process based Metallurgical smelter plants for Lead, Zinc, Cadmium, Sulphuric acid, Mercury Removal & Recovery, Silver & Gold Refineries, Integrated Secondary Copper Refineries & Copper rod (CCR), abroad in *Norway, France, and USA.*

I have represented governing councils of Consultancy Development Centre (CDC), and Consulting Engineers Association of India (CEAI) – both an associate of FIDIC. I am also a member of CDC. I am also on the team of internal auditors for Total Quality Systems (ISO 9000 - 2000).

I have also served as Honorary Treasurer/ Secretary/ Joint Secretary, etc., of Indian Institute of Metals (IIM) and organized number of International Seminars/ Conferences/ Exhibitions on Metallurgy, Metals & Minerals.

DETAILED EXPERIENCE:

M/s MECON LIMITED: India's frontline engineering, consultancy, EPC, and Project Management organisation. Presently working with M/s MECON Limited, New Delhi & Bangalore offices since 16/11/1987 as:

- **Deputy General Manager:** 01/04/2006 till date
- **Assistant General Manager:** 01/04/2000 to 31/03/2006
- **Senior Manager:** 01/04/1995 to 31/03/2000
- **Assistant Engineering Manager:** 01/07/1991 to 31/03/1995
- **Senior Design Engineer:** 16/11/1987 to 30/06/1991

Worked in Non – Ferrous Metals, Project Management and Management Advisory Services/ Techno – Economic and Estimating Sections. Industries covered – Zinc, Lead, Cadmium, Precious Metals Refineries – Gold & Silver, Copper & Secondary Copper Refineries, Tin, Nickel, Titanium, Continuous Cast Copper Rod plants, Compressed NG/ Piped NG & Cross country gas pipelines.

My area of expertise in these industries had been in Complete Project Engineering, Management and Consultancy; comprising of identification of projects & complete execution, i.e., from concept to commissioning; Capital /project cost estimations, Bankable Feasibility studies; Economic analysis, Process/ technology selection and successful absorption, Technology status review; New technology opportunities/ strategies; Due diligence, Business Planning and Strategy; Market appraisals; Site selection, Detailed engineering, Contract Management, Procurement, Consultancy, Construction & Erection, Start-ups & Commissioning, Project Leader, Project monitoring and Project Management, Marketing for new business opportunities and General Management for the past more than 18 years – **Led a team of multi – disciplinary team consisting of design, detailed engineering, planning, projects, cost control, procurement, inspection, construction and commissioning engineers, finance, etc.**

Received numbers of appreciation letters from client as well the management –copies of the same will be made available on request.

The list of major Projects executed are given at Annexure - I.

M/s HINDUSTAN ZINC LIMITED: (Now M/s Vedanta Resources Plc.):

I had an experience of more than 12 years in operations & maintenance, production, planning & control, bench marking, technology audit, and to optimize the process & production performances, manufacturing costs and improve energy & metal output recovery efficiencies, commissioning and general management of both the Zinc - Lead Smelters plants at Debari and Visakhapatnam (including Pyro & Hydro metallurgical based leach residue plants and associated metallurgical gas based Sulphuric acid plants and fertilizer plants – SSP and phosphoric acid plants) of M/s Hindustan Zinc Limited (now M/s Vedanta Resources Plc).

Worked with M/s Hindustan Zinc Limited, Udaipur, from 01/08/1975 to 15/11/1987:

➤ **Assistant Plant Manager (Met.):** 1/07/1981 to 15/11/1987

Worked in process plant units of Fluo – Solid Roaster & Sulphuric Acid, Zinc Leach Residue (Waelz Process), Leaching & Purification and Mercury Removal & recovery at Vizag Lead and Zinc Smelter, Visakhapatnam (AP).

The nature of duties included production, planning, coordination and control within the sections to ensure smooth working, cost control, process and technology improvements, commissioning of Mercury Removal & Hot - Cold Purification plants and general administration – **led a team of engineers from multi disciplines, operators/workmen and finance personnel consisting of around one and half hundred employees and achieved excellence in operations and highest productions/productivities. Received the appreciation letters from management.**

➤ **Assistant Engineer:** 1/02/1977 to 30/06/1981

Worked in process plant units such as Fluo – Solid Roaster & Sulphuric Acid, Single Super Phosphate, Phosphoric acid, Leaching & Cadmium and Zinc Leach Residue Treatment at Zinc Smelters, Debari and Visakhapatnam units.

The nature of duties included control of operatives, shifts and to ensure proper balancing between sections to maintain continuity of operations – led a team of more than sixty engineers and operators/ workmen.

➤ **Probationer Engineer** from 1st August 1975, for a period of two years:

A reduction of six months in training period was awarded to me on the ground of merit and I was absorbed as Assistant Engineer in advance on 1/02/1977.

During this period I had the opportunity to go around all the units namely, Zinc & Lead Smelting and Mining, Ore dressing, Fertilizer plants – SSP and Phosphoric acid plants, Rock phosphate mines, Project and planning department, Finance, Maintenance, Marketing departments and In-plant training in Zinc Smelter.

M/s PROCESS ENGINEERING CORP.:

01/09/1974 to 31/07/1975

➤ **Sales / Design Engineer:**

The nature of duties included pre-selling, designing, preparation of tenders, negotiating technical and commercial terms, system detailing and executing projects, process engineering, market survey, project pre – feasibility studies, evaluation and feasibility report preparation.

ASSIGNMENTS/ VISITS ABROAD:

Countries visited:

NORWAY, USA, AND FRANCE

1. From 21/05/1984 to 01/06/1984 at **M/s Norzink A/s, Odda, Norway:**
 - ❖ *Training in operation and maintenance of **Mercury removal plant** based on **Boliden – Norzink Process** route for the SO₂ off gases from Zinc Roaster plant.*
 - ❖ *Overview of Zinc Smelting hydro-metallurgical operations (**RLE – Roast Leach – Electrowin Process Route**) at Norzink plant for extraction of Zinc, Cadmium and Jarosite leach residue treatment processes and Sulphuric acid plant.*
2. From 02/06/1984 to 06/06/1984 at **M/s Noyelle Godault, France:**
 - ❖ *To study and recommend the process of **Pyro – refining of Lead and Silver bullion.***
 - ❖ *An overview of process and operations of sintering and **Imperial Smelting Furnace (ISF)** for the simultaneous extraction of both Lead and Zinc.*
3. From 12/11/1995 to 22/11/1995 at **USA:**
 - ❖ *To study operations of **Continuous Cast Copper Rod (CCR)** plants at:
 - **M/s Southwire Company, Carrollton, Atlanta, Georgia, USA.**
 - **M/s Amrod Corp., Newark, New Jersey, USA.***
 - ❖ *To evaluate the plant and equipment and study process and operations of the **Secondary Copper recovery and Continuous Cast Copper rod plants of M/s Southwire Company at Gaston, Columbia, USA – A due diligence study for purchase recommendation to the client in USA.***
 - ❖ *Visit to No-Twist rolling mill equipment manufacturer's works, M/s Morgan Company, Worcester, USA*

TRAININGS IN INDIA:

SL. No.	Training Programme	From	To	Organisations
1.	Summer Internship in a "Foundry Plant"	05/06/1972	09/07/1972	M/s Peerless Foundries, Sahibabad, Ghaziabad.
2.	Summer Internship in a "Copper Smelter Plant"	17/05/1973	26/06/1973	M/s Hindustan Copper Ltd., Khetri Nagar.
3.	"Industrial Engg. & Business Management"	18/03/1977	31/03/1977	M/s NITIE, Powai, Bombay.
4.	"Operation and Maintenance of Package Boilers"	01/08/1977	03/08/1977	M/s IAEC, Bhandup, Bombay
5.	"Industrial Safety"	14/11/1981	16/11/1981	M/s NSC, Bombay
6.	"Computer Appreciation"	23/03/1982	25/03/1982	M/s Howard Finley, Madras
7.	"Organisational Effectiveness"	13/09/1982	18/09/1982	M/s SIET, Hyderabad.
8.	"Value Engineering"	12/09/1983	12/12/1983	M/s R. P. Billimoria Consultants Pvt. Ltd., New Delhi.
9.	"Computer Orientation & PC Application"	20/04/1987	15/05/1987	M/s NITIE, Powai, Bombay
10.	"Internal Audit of Quality Systems"	08/09/1994	09/09/1994	M/s CII, New Delhi
11.	"Contract Management & Contract Strategy"	10/02/2006	11/02/2006	M/s AIMS, Chennai

PAPER PRESENTED:

- **"Lead Zinc Smelter at Chanderiya - Concept towards realization"** at ILZIC Silver Jubilee Conference - Lead, Zinc and Cadmium Into The 90's New Delhi, 1st-3rd November 1988.
- **"Recent developments in Lead Smelting and Refining Technologies"** NMD'92 Indian Institute of Metals held at Udaipur between 14th-17th November 1992.

- **“Recent developments in Lead Smelting and Refining Technologies”**
MECON JOURNAL Vol. 13 No.1 September 1993.
- **“Indian Zinc Metal Industry – Role of Consultants”** at Indian Metals Conference organized by Metal Bulletin & Metal Junction held between 23rd – 25th April 2006, Hotel Hilton Towers, Mumbai, India.
- **“Zinc Metal Industry in India”** at 10th Zinc & its Markets Seminar organized by Metal Bulletin Events held between 24th – 26th May 2006, The Park Lane Hotels, London.

INDIAN INSTITUTE OF METALS (IIM):

1. **Hony. Secretary** for IIM, Delhi Chapter: Year 2003 – 04 (up to September '03).
2. **Joint Hony. Secretary** for IIM, Delhi Chapter: a) 1998-1999 & b) 1999-2000 & c) 2000-03
3. Worked as rapporteur on the following occasions:
 - Annual Technical Meet (ATM) seminar of **NMD '88** of the Indian Institute Metals held at New Delhi between 14th–17th November 1988.
 - Seminar on **"Hydromet '90"** held at Udaipur between 7th–9th February 1990.
4. **Organisation of Exhibitions and International Seminars:**
 - Organization of **"Metals and Metallurgy '98 and 2nd International Trade Fair"** and International Seminar on **"Advances in Metallurgy"** held at Pragati Maidan, New Delhi between 7th–10th October 1998.
 - Organization of International Seminar on **“Bars, Wire Rods and Wire Products”** held at Scope Complex, New Delhi between 17th–18th February 2000.
 - Organization of **"3rd International Trade Fair and International Conference on Mineral, Metals and Metallurgy in 21st Century”** held at Pragati Maidan, New Delhi between 27th–28th September 2000.
 - Organization of **"4th International Trade Fair and International Conference on Metals & Materials for Automobile Industry”** held at Pragati Maidan, New Delhi between 12th–15th September 2002.

ACHIEVEMENT

1. COLLEGE:

- *Recipient of Merit Scholarship of Govt. of India (GOI) from 1970 – 1974.*
- Senior Reporter for Daily Bulletins during the “**Inter-Collegiate Football Tournament, University of Rajasthan, 1973-74**”.
- Running Commentator for “**9th and 10th Annual Games and Sports functions of the College**”.
- Summer internship at Khetri Copper Complex (KCC), Hindustan Copper Ltd., Khetri Nagar.

2. HINDUSTAN ZINC LIMITED:

- *A reduction in training period by six months based on the induction training comprising of rotational programs at all the plant units and mines and functional sections/divisions, on the job training and written examination.*
- Discovery of presence of Metallic mercury in the wet gas cleaning plant (GCP) sludge's of the Roaster and sulphuric acid plant at Zinc Smelter, Debari, Udaipur. After the discovery, company planned for setting up of mercury removal facilities upstream of Sulphuric acid plant. Mercury removal plant was set up at Zinc Smelter, Visakhapatnam for which I was deputed to M/S Norzink A/S, Odda, Norway in 1984.
- *Received appreciation letters from GM, Hindustan Zinc Limited, for exemplary work done during breakdown of the plant and for highest productivity – few are appended herewith.*

➤ COMMISSIONING OF PLANTS:

1. 227 TPD Fluo – solid Roaster and Acid plant at Zinc Smelter Expansion Project, Debari, Udaipur during March 1977.
2. Revamped 120 TPD Roaster and Acid plant at Zinc Smelter, Debari during October 1978.

3. Conversion Residue Leach Jarosite Process at Leaching and Purification plant at Zinc Smelter, Debari, Udaipur.
4. Commissioning of Mercury Removal and Recovery Plant at Zinc Smelter, Visakhapatnam during 1986.
5. Commissioning of Cold – Hot Purification System, developed in-house R & D efforts at Zinc Smelter, Visakhapatnam during 1987.

3. **MECON LIMITED:**

- **81,000 TPA (CCR) Continuous Cast Copper Rod Plant, Birla Copper Plant, Dahej, Gujarat:**
Project Management, detailed engineering, consultancy, site supervision and commissioning of 81,000 TPA Continuous Copper Rod Plant, Six months ahead of schedule. Received appreciation letters from the M/s Aditya Birla Group and CMD, M/s MECON Limited for before time execution of the Continuous Copper Rod Plant.
- **ICSG – International Copper Study Group, Portugal, Spain/ M/s TIFAC, India: Market Survey of Copper Alloys In India:**
Received appreciations from client and the management.
- Represented on the *Governing Council* of the *Consultancy Development Centre*, New Delhi and *Consulting Engineers Association of India*, New Delhi – both an associate of FIDIC.
- Represented Sectional Committee on Light Metals - MTD-7 of Bureau of Indian Standard for the past several years.

REFERENCE LIST OF MAJOR PROJECTS EXECUTED IN INDIA

ANNEXURE – I

<u>SL. NO.</u>	<u>PROJECTS</u>	<u>CLIENT</u>	<u>SERVICES RENDERED</u>
1.	Chanderiya Lead Zinc Smelter (CLZS), Chittaurgarh, Rajasthan Zinc: 70,000 t/yr Lead: 35,000 t/yr & bye products	M/s Hindustan Zinc Ltd. (Now Vedanta Resources Plc.)	Preparation of Firm Cost estimates \pm 5% (1987 – 1988)
2.	Chanderiya Lead Zinc Smelter, Chittaurgarh, Rajasthan. - Lead Refinery Plant: Capacity: 35,000 t/yr & bye products like Silver and Gold sludges.	M/s Hindustan Zinc Ltd. (Now Vedanta Resources Plc.)	Acceptance of basic engineering, Detailed engineering, procurement assistance, consultancy, construction supervision services, and commissioning (1989 – 91)
3.	Chanderiya Lead Zinc Smelter, Chittaurgarh, Rajasthan. Precious Metal Recovery Plant.	M/s Hindustan Zinc Ltd. (Now Vedanta Resources Plc.)	Acceptance of Basic Engineering, Detailed engineering, consultancy procurement assistance, consultancy, construction supervision services (-do-)
4.	Roaster Acid Plant –1, Debari Zinc Smelter, Udaipur	M/s Hindustan Zinc Ltd. (Now Vedanta Resources Plc.)	Techno – economic study for Revamping of Roaster & Acid plant (1991-92)
5.	Expansion of Khetri Copper Smelter and Refinery Capacity 45,000 t/yr.	M/s Hindustan Copper Ltd.	Feasibility Report preparation (1992)
6.	Debari Zinc Smelter Plant, Debari, Udaipur	M/s Hindustan Zinc Ltd.	Process/ Technology Evaluation &

		(Now Vedanta Resources Plc.)	Economic evaluation study report for Replacement of Roaster & Acid plant with - RLE Process vis-à-vis Pressure Leach Process (1993)
7.	Khetri Copper Complex Expansion of Refinery 31,000 tpa to 45,000 t/yr	M/s Hindustan Copper Ltd.	Detailed Engineering and Consultancy Services for modernization and de-bottlenecking (1992 –1993)
8.	Expansion of Khetri Copper Smelter and Refinery Capacity 100,000 t/yr	M/s Hindustan Copper Ltd.	Techno-economic Feasibility Study (1994)
9.	Nickel Extraction Plant at Sukhinda in Orissa Capacity: 10,000 t/yr	M/s RRL, Council of Scientific & Industrial Research (CSIR).	Preparation of Feasibility Report for Nickel Plant from Chromite Over Burden (COB).
10.	Sterlite Copper Smelter Plant 60,000 t/yr of Copper Ingots Plant.	M/s Sterlite Industries Ltd, Bombay (Now Vedanta Resources Plc.)	Preparation of Capital cost estimates (1992)
11.	Birla Copper Plant Capacity 100,000 t/yr Copper Smelter Plant at Dahej, Gujarat.	M/s Aditya Birla Group	Preparation of site selection, process selection and TEFRR reports – Market Survey for disposal of Sulphuric acid and recommendation of process/ technology for conversion to value added products of Phosphoric acid & further conversion to DAP fertilizer.

			(1992-1994)
12.	Birla Copper Plant Capacity 100,000 t/yr Copper Smelter Plant at Dahej, Gujarat. - Precious Metals Recovery Plant	M/s Aditya Birla Group	Preparation of TEFR for setting up of Precious Metals Recovery Plant based on sludge from Copper Refinery (1995)
13.	Continuous Cast Copper Rod Plant Capacity 81,000 t/yr at M/s Birla Copper Plant, Dahej, Gujarat.	M/s Aditya Birla Group	Project Management and Detail engineering, consultancy, procurement, construction and commissioning of CCR Plant – Led a team of multi – disciplinary engineers. Received appreciations for executing the project six months ahead of schedule. (1995 – 97)
14.	Sterlite Zinc Smelter Plant 100,000 t/yr of Zinc Ingots Plant at Gujarat	M/s Sterlite Industries Ltd, Bombay (Now Vedanta Resources Plc.)	Preparation of site selection report, process selection and TEFR (1999)
15.	Lead Smelter Plant, Visakhapatnam, AP, India	M/s Hindustan Zinc Ltd. (Now Vedanta Resources Plc.)	Assessment of Lead Blast Furnace, Sintering Machine, and Refinery Plant Equipment condition - Due diligence Report (1999).
16.	Zinc Smelter Plant 100,000 t/yr of Zinc Ingots Plant at Dahej, Gujarat	M/s Aditya Birla Group	Preparation of Pre investment report (2000)
17.	Tin Smelter Plant 10,000 t/yr of Tin Ingots Plant at	M/s Aditya Birla Group	Preparation of Pre investment report

	Dahej, Gujarat.		(2001)
18.	Expansion & Performance Improvement of Debari Zinc Smelter plant by 10,000 t/yr of zinc ingots (that is, from existing 49,000 t/yr to 59,000 t/yr)	M/s Hindustan Zinc Ltd. (Now Vedanta Resources Plc.)	Detailed Engineering, consultancy, site supervision services and project monitoring. Led a team of multi-disciplinary engineers. Presently plant is producing 75,000 t/yr. (2000-01)
19.	Cost Estimates Preparation for 100,000 t/yr Zinc Smelter Plant at Dahej, Gujarat.	M/s Aditya Birla Group	Detailed Structural & civil work cost estimates preparation (2001- 02)
20.	Delhi City Gas & CNG Distribution System for Delhi State	M/s Indraprastha Gas Ltd., (IGL), New Delhi	Contract Engineering & Capital Cost Estimations (2001- 02)
21.	Piped NG for industries, commercial & domestic consumers and CNG distribution system for automobiles for Six cities, namely – Agra, Faridabad, Kanpur, Patna, Pune and Varanasi.	M/s Gas Authority of India Ltd., (GAIL), New Delhi	Market Survey for assessment of Demand for NG and Preparation of TEFR (2002)
22.	Piped NG for industries, commercial & domestic consumers and CNG distribution system for automobiles for two cities – Hyderabad/ Secunderabad & Vijayawada	M/s Gas Authority of India Ltd., (GAIL), New Delhi	Market Survey for assessment of Demand for NG and Preparation of TEFR (2002-03)
23.	CNG distribution system for Lucknow city	M/s Gas Authority of India Ltd., (GAIL), New Delhi	Preparation of TEFR (2002)
24.	Chainsa Maruti Cross Country Natural Gas Pipeline	M/s Gas Authority of India Ltd., (GAIL), New Delhi	Contract Engineering & Capital Cost Estimations (2002-03)

25.	Market Survey for “ Copper and Copper Alloy Scrap in India”.	M/s International Copper Study Group (ICSG), Portugal, Spain – Through M/s TIFAC, New Delhi.	Coordination & Collection of field data and coordination with Indian client. (2002-03). Received appreciations from client and GM, MECON, Bangalore.
26.	Site Selection Report for setting up of a 170,000 t/yr. Zinc Ingots Plant in India	M/s Hindustan Zinc Ltd. (Now Vedanta Resources Plc.)	Preparation of Site Selection Report - (Nov. 2004)
27.	Chanderiya Lead Plant Expansion 50,000 t/yr. based on Ausmelt Technology	M/s Hindustan Zinc Ltd. (Now Vedanta Resources Plc.)	Detail Engineering, Consultancy, Designer Supervision, inspection, project monitoring & control (2004 –2005)
28.	Titanium Sponge Production plant of 1000 t/yr. capacity based on DMRL Technology	M/s Kerala Minerals & Metals Limited.	Preparation of Techno – economic feasibility Report (TEFR) (2005)
29.	Titanium Sponge Production plant of 10,000 t/yr. Capacity.	Govt. of Kerala.	Preparation of Techno – economic Project Profile Report (Dec. 2005).
30.	200,000 TPA Copper Cathodes Smelter Plant & 100 MW Thermal Power plant.	Confidential	Preparation of Feasibility Report Capital Cost Estimates (2006).