

Dr. Raghupatruni Bhima Rao holds a Ph.D. in mineral engineering from IIT Dhanbad [formerly known as ISM Dhanbad]. He commenced his professional journey as a scientist B at the Council of Scientific and Industrial Research and retired as Chief Scientist. With over 45 years of experience in Research and Academia in Mineral Engineering, his expertise spans comminution, flowsheet developments for various industrial minerals and ores, auditing, and modifications of operational Indian mineral processing industries. The Odisha State Center of The Institution of Engineers India is honoring Dr. Bhima Rao by establishing an award in his honor within the Mineral Processing – Chemical Engineering category. This prestigious award will be presented by The Institution of Engineers India, Odisha State Center to one outstanding engineer from among the seven thousand engineers in Odisha State.

On his journey as a researcher, he delved into the realm of mineral exploration. Through his remarkable achievements, he has attained numerous esteemed positions and prestigious accolades. As a result of his exceptional work in the field of beneficiation, several beneficiation plants have been established in both Odisha and India as a whole. The mineral industries have embraced his expertise in utilizing additives for energy-saving purposes in comminution plants. Serving as the principal advisor to various mineral industries in India and abroad, he has been recognized for his outstanding contributions to the field of mineral beneficiation, receiving the Govinda Gupta Memorial Shield in honor of his research and development endeavors in Odisha. His remarkable accomplishments have also been acknowledged through multiple best paper awards and other forms of recognition.

In his initial role as a scientist, Dr. Raghupatruni Bhima Rao was given the opportunity to undertake an industrial project focused on chromite ore beneficiation. This project resulted in the establishment of beneficiation plants by Ferro Alloys Corporation Limited in Bhadrak, Odisha, and TISCO in Bhimtangnagar, Odisha. Dr. R. Bhima Rao embarked on his research career by focusing on the improvement of chromite ores and the extraction of nickel, cobalt, and chromite from the overburden materials found in Sukinda, Odisha. It was discovered for the first time that the overburden contained 0.5% nickel, which was subsequently enhanced to 1% nickel and 40% chromite with varying levels of success. As a result of these studies, a nickel plant was successfully established at the institute. Dr. R. Bhima Rao's expertise in developing flowsheets for iron ores in Odisha has also led to the establishment of mineral separation plants by Tata Steel, Ushamartin, VS Dempo, Hi Grade pellets, among others. In recognition of his outstanding contributions to mineral beneficiation in Odisha, he was honored with the Excellence in Mineral Beneficiation award.

Dr. R. Bhima Rao and his team members conducted a comprehensive study on bauxite mining in Damonjodi, Odisha. This mining operation produces a significant amount of overburden, which consists of partially lateralized khondalite rock, totaling 6.5 million tons per annum. In order to create value-added materials, this overburden requires grinding. Dr. Rao's research focused on alternative approaches to determine the bond work index for soft and friable partially lateralized khondalite rocks found in bauxite mine waste materials. This research gained significant attention from both researchers and industries, leading them to adopt this optimal grinding method. Additionally, a study was conducted on the utilization of partially lateralized khondalite rocks for ceramic and refractory industrial applications, resulting in the production of value-added materials. Dr. Rao's contributions to both basic and applied research in the field of metallurgical bauxite and refractory bauxite have been embraced by renowned industries such as NALCO, Aditya, Ashapura, Vedanta, and Dalmia.

His expertise in the utilization of additives in grinding for energy conservation or liberation of mineral values in comminution plants has been widely acknowledged by a select few mineral industries. The impact of grinding aids on graphite flotation was researched for the first time to enhance grinding efficiency, improve grade and production, and decrease energy consumption. This research was effectively implemented in numerous plants in Odisha. In 1993, he was invited by the Swedish government as a specialist "Guest Researcher" in Mineral Technology at Lulea University, Lulea, Sweden, to introduce the same practices to their mineral industries. The National Mineral Award in the field of mineral beneficiation [established under the National Mineral Award program of the Ministry of Mines, Government of India] is among his esteemed accolades for his work on additives in grinding.

He was involved in multi-mineral processing studies before delving into the textural and mineralogical studies of offshore placer deposits after fifteen years of his scientific career. Subsequently, he participated in the CSIR mission project focusing on the capacity-building project for the Characterisation and Beneficiation of beach sand placer deposits, becoming an expert in placer sands. This expertise allowed him to secure numerous grants, sponsorships, and consultancy projects as a team leader, particularly on beach sand placer deposits and red sediments of badlands topography in Odisha. His research on the Development of a Process Flowsheet to Recover Individual Heavy Minerals from East Coast Beach Sand, Srikakulam, Andhra Pradesh, resulted in the establishment of a Minerals Separation Plant by M/s Trimax Industries. Collaborations with BRNS, DST, M/s. IREL, M/s. Bengal Chemicals, and M/s. VS Dempo Industries led to the publication of various technical papers and the supervision of several Ph.D. students. Furthermore, industries adjusted their flowsheets based on the technical data provided, prompting IREL to appoint him as Honorary Advisor to Indian Rare Earths Limited [Dept of Atomic Energy, Gov. of India], Chatrapur, Odisha.

IREL (India) Limited in Chatrapur has recently acquired a new lean grade deposit from Bramhagiri in Puri district and entrusted Dr. Rao with its management. Dr. Rao has successfully overseen the project. An innovative approach has been adopted, utilizing seawater as the separation medium instead of fresh or groundwater. This method has led to a significant enhancement in the recovery of total heavy minerals. Therefore, it is strongly recommended to promote the use of seawater at the mining site for the recovery of heavy minerals, followed by dewatering with fresh water before transporting them to the mineral separation plant. Remarkable results have been achieved in the recovery of individual mineral concentrates such as ilmenite (98.1% grade with 92.6% recovery), rutile (98.8% grade with 74.1% recovery), zircon (98.86% grade with 82.3% recovery), sillimanite (98.7% grade with 84.6% recovery), garnet (97.4% grade with 94.1% recovery), and monazite (98.9% grade with 84% recovery). IREL (India) Limited in Chatrapur is spearheading this project, and tenders have already been issued for its implementation.

Dr. Raghupatruni Bhima Rao has contributed to more than 250 publications in a range of National and International journals and 300 technical reports. He actively serves as an editorial member and reviewer for both National and International journals. Additionally, he has played a significant role in mentoring Ph.D. and M Tech students, contributing to India's academic growth. Dr. Rao's exceptional contributions have been recognized and honoured/felicitated by numerous professional societies and academic institutions across the country, including the Governors of Odisha and Tripura.

