

- * Use of high angle conveyors.
- * Application of heavy ANFO, in-hole delays, electronic delays, 'tailored' blasting, throw blasting, etc.

Technology for the design and development of mining methods, mine planning, environmental management, blasting, optimum ventilation system, pit slope stability for open cast mines and support design for tunnels and underground excavations in hard rock mining are well developed in India.

Besides the search for technology from abroad, efforts continue to innovate the existing mining practices and modify the technologies available in the non-coal mining sectors.

Before making a large scale application of the new technology, field trials are conducted in specified conditions. During these trials, studies are undertaken to evaluate the strength and weakness of the foreign technology, the modifications and improvements needed for its successful adoption in India and the production and productivity levels expected to be achieved by the application of particular technology.

Mechanisation

Present search for technology in mineral and allied industries has aimed itself to large scale mining, particularly with reference to (a) coal, (b) non-ferrous metals : Lead, Zinc, Copper, Gold, Uranium, (c) iron and (d) limestone.

Most non-coal mines have switched over to hydraulic excavator units for handling ore and waste. This has necessitated optimum fragmentation vis-a-vis bucket size, good floor conditions, and more vigilant machine operation. India is looking for this variety of equipment.

Low productivity of sub-systems

As noted earlier, drilling and blasting, loading & transport, ground control and ventilation systems (manually operated) have resulted in low productivity of 1.3 to 2.5 tons of output per manshift, against world average of over 10 tons.

Sub-grade & low grade ores

Exploration and improving the recovery rate of metals such as copper from lean ores is a major issue confronting the Indian mining industry. Though experiments of pyrometallurgical and hydrometallurgical methods are continuing, success is still eluding India.

Beneficiation technology

Technological gaps are also wide in this area with concentrators and design parameters are dated. Also, there is a lack of modern additions such as in-stream process control, automation and computerisation, resulting in lower recoveries, excess manpower and resultant higher cost.