

Ground Methods

Among ground methods, time-domain EM method (e.g. SIROTEM, UTEM) are useful in areas of conductive overburden where traditional IP or EM techniques are ineffective. Geophysical methods are useful indirect methods in gold exploration in identifying host rock, geoenvironment marker beds or structures with unusual magnetisation, density, electric polarisation or conductivity. Some of the markers may be basic rocks (magnetic) BIF or bearing signatures detectable. India has gold deposit models and geophysical signatures.

Instruments such as Terraprobe to detect gold directly is also available in India.

The scope of ground probing radar systems has vastly improved and the subsurface profiling (to map near surface structures) complemented by geochemical and IP data makes it yet another useful tool in mineral investigation.

Drilling

Drilling techniques practised in mineral exploration in the country are mostly outdated. Sophisticated and latest technology is required. Use of wireline core barrels is a must and the latest available is thin walled series TK barrels.

Mining Technology Issues

The selection of technology is largely based on the mineral characteristics such as depth, character of ore, associated mineral wealth, mine size, demand pattern for the minerals and availability of needed financial resources.

The Indian mining sector (including coal) was dominated by underground mining until about two decades ago. With the technological advances abroad and the pressing need to raise coal production to fuel a number of thermal power plants to bridge the ever-widening demand/supply gap for electric power, India also shifted to opencast mining. At the same time, the role of the underground mines kept enhancing on quality considerations and availability of large deposits.

The non-coal mineral deposits in India are primarily amenable to opencast mining, with the exception of some copper, lead-zinc, manganese ore, gold and uranium. These mines are, however, small in number.

Unlike the mineral rich developed countries such as Canada, U.S.A., and the developing countries such as Chue, Zambia, South Africa, China, Malaysia, India's absorption rate of new technologies is rather low owing to financial resource constraints. Even in the projects, such as coal, bauxite and iron ore, set up with foreign participation, the technological upgradation has been slow and poor.

Coal Sector

Of the 450 mines of Coal India Limited currently in operation, 281 are underground mines, contributing only 30 per cent of the total production of 225 million tons (1993-94), the rest being the share of opencast mines. This low production rate of underground mines is a direct consequence of dated technology. Blasting and drilling continues to be the conventional type. While in the developed world significant proportion of production comes from large dia. holes (over 100 m to 300 m), Indian mines still operate below 100 m holes. Generally, drills used are also of