CHAPTER 7

QUARRIES AND THEIR IMPACT ON ENVIRONMENT
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Like any other industries the process of mineral exploitation also affects the environment. In this chapter the types of environment degradation, its treatment and preventive measures due to mining particularly open cast mines and quarries have been described. A review of the existing conditions suggests that the effects of mineral exploitation on environment are not alarming and can be managed.

7.1. ENVIRONMENTAL IMPACT:

The relationship between man, stone and its environment is has high significance. The use of stone i.e. granite has helped the civilization to grow and leave its reminiscence over the centuries in the form of artifacts, buildings, residences and many other stone related materials. The ancient man has benefited formably with the stone, which has not affected adversely the environment and promoted civilization over the years. Nevertheless, with the innovation of explosives and advanced technology in exploitation of stones has definitely made an impact adversely over the environment. Further, it added fuel to the fire the excessive usage of granite stone and crushing / building stone mitigated or intensified to damage the environment in turn affects the population living in and around the mining centres.

The environment damage occurs in two ways viz., during mining and during processing of the granite stones. The intensity of damaging the
environment through the granite mining may be marginal when compare to mining of other industrial minerals. That does not mean it need not be addressed the issue at all. In other words precautionary measures should be looked into in maintaining better eco friendly relationship between the mining activity and the population living around the mines in the general and rural areas in particular.
In the initial stage the granite mining was concentrated on the hillocks where granite boulders were available for extraction. Therefore, the environment damage or degradation was minimal. The effects on environment are witnessed on land, water, air, flora, fauna and socio-economic fabric both as favorable as well as unfavorable.

The adverse effect on land is felt in the form of removing the top soil and excavation of weathered material to reach the sheet rock. The crop yield of the nearby cultivated land is declined considerably, because of air borne finer particles of soil settle down on the plants leaf thus hinder the growth and production.

Regarding the adverse effect on water during granite mining due to silt, which is carried away by the rain water. The water table of the region also explains and directly associated with the depth of the mining activity in the region.

As far as air pollution is concerned, higher the usage of explosives in the granite mining higher will be the damage on the quality of the lives of the people dwelling in and around the mining activity. Further, the dusk, use of heavy machineries, exhaust fumes and smoke generated during the use of heavy vehicle cause the air pollution.

The flora and fauna in and around the mine has adverse effect on the grazing land, the vegetation cover and the importance of wild life, local population has difficulties in procuring the fodder for the live stock and all these intensify the overall habitat of the local fauna.
Though mining activities are generally operated away from the village / town settlements in turn have less opportunities for wage / employment for the skilled and unskilled workers. It has been observed that local labour force seldom get employment opportunities and especially for the granite operations, normally the requirement of labour force seem to be skilled workers, are being hired / employed non-locals. Therefore, it is always advisable to make a balance in between local and non-local work force for the mining activities.

The environmental impact by processing of granite industry:

The granite slab irrespective of the colour until it is dressed or given regular shape after being transported the huge blocks, cutting into slabs, polishing or making desirable shape that are in demand both at domestic as well as at international consumers across the various income groups and also for the cultural activities.

The dressing of granite blocks although, it may look a minor work in respect of value earned by the larger block but this will play an important role in the overall economics of the mining. During sawing substantial quantities of granite is converted into fine powder or dust by the cutting action. The fine dust once dried up becomes air borne with slight breeze and cause wind pollution of a very high magnitude. Sawing of granite need coolants, which are used in gang saws, consists of lime, water and steel shots mixture, which is sprinkled throughout its operation. The second type of coolant is used for cutting granite in Kerosene, which is generally used in circular saws.

In the recent years the need for preservation of pure environment and for restoring the damaged environment are being increasingly recognized. In India the need was recognized as early as 1972. A high level committee namely the
National Committee on Environmental Planning and Co-ordination (NCEPC) was formed. Subsequently, the Acts viz.,

1. Water (prevention and control of pollution) Act 1974
3. Environment (protection) Act 1986, have come into force.

These have come into force. The other Acts providing for environment protection indirectly are Forest Conservation Act, 1980 and Wild Life Act. The State Governments have also framed rules and various pollution control boards, Today, the environmental degradation has become a global issue and the awareness has spread down to the individual level. Various sources and different kinds of environmental hazards have been recognized on the one hand and on the otherhand technical equipments are also being developed with a view to strike a balance between environment preservation and economic development. Like the other industry’s mining and quarrying industry, also affects the environment although to a lesser extent. However, as in the case of other industries, the pollution due to mining and quarrying are also either preventable or being constantly evolved. In this connection, the impact of mining and quarrying on environment and the measures suggested by the various scientists to combat the pollution of environment have been described. The general aspects of environment have also been briefly described. The discussions are mainly confined to open cast mines and stone quarries.

The main purpose of the chapter is to indicate;
(a) The environment degradation caused by mining and quarrying.
(b) The measures and techniques of preventing pollution due to mining and quarrying.
(c) Emphasize that quarrying poses a far lesser environmental hazard as compared to other industries.

7.2. GRANITE QUARRY AND ENVIRONMENTAL POLLUTION:

Environment is defined as a system of physical and biotic elements with a dynamic interaction between them. Any natural area representing “living space” is environment. It is the habitat of man and other living beings. The essential components of the physical environment surrounding the biosphere are land, water and air. The very existence and longevity of man and other life forms is dependent on the purity of these three physical components. The environment changes in accordance with activities of its “occupiers” and also due to external factors like climatic changes. In general, there is an adjustment between environment and changes in the physical elements and parameters. It is the activities of human beings that largely disturb the stability.

Pollution constitutes the most glaring and detectable form of environmental disorder. It is the undesirable change in the physical, chemical or biological characteristics of the components of environment and causing harm to human beings and other life, living conditions and cultural assets.

Environmental degradation and associated problems have become an integral part of development processes in the developing nations and the so-called third world nations. The rate of development of industrialization and human needs at the present day is large. The zeal and instance urge for rapid economic growth has created environmental problems. The principle environmental degradations are: -

a) Deforestation
b) Soil erosion and hill cutting
c) Air pollution
d) Water pollution
e) Hazard of nuclear explosion
f) Noise disturbances etc.
Like other developing countries, India is also facing acute environmental problems. These include:
1) Rapid degradation of forest wealth
2) Sprawling wastelands
3) Increased incidence of floods
4) Colossal soil depletion
5) Increased alkalinity, salinity and decreasing soil fertility.

7.3. ENVIRONMENTAL ISSUES DUE TO MINING AND QUARRYING:

Quarrying and mining are the processes of excavation of rocks and minerals from the earth. This involves digging into ground, making pits on the surface and stripping of exposed rock surface and breaking of boulders. The scale of these operations being dependent on the value of the mineral and the quantity to be raised, may call for complete mechanization or semi mechanization. These activities of mining and quarrying make a notable impact on environment.

The environmental impacts of mineral exploitation are:
a) Degradation of land
b) Noise pollution
c) Air pollution
d) Water pollution
e) Health impact.

Among these, land degradation is the most important.

Some of the important environmental problems due to opencast mining and quarrying, preventive measures, management aspects have been described below. As already emphasized the foremost impact of opencast mining and
quarrying is the land degradation. The degradation is due to excavations, pits, mine roads, dumping of waste in the soil and effect on landscape.

In present day context quarries for minor minerals can be classified into:

(a) Quarries for building stone
(b) Quarries for sand
(c) Quarries for brick and tile clays
(d) Quarries for ornamental stone

Quarrying for any minerals involves:

1. Clearance of surface habitats like forest, wild life etc.
2. Top soil stripping
3. Creation of excavations and pits that are eventually abandoned
4. Enormous solid waste production, which begins from the production to processing stages.
5. Introduction of new quarry culture in the areas.
7.4. BUILDING STONES AND ENVIRONMENTAL DAMAGE:

These quarries are generally located above the ground surface and far away from the villages and towns. The main impact is the disfiguration of the landscape and where the operation is below ground. The result is land damage. They by themselves do not cause problems of air or noise pollution. However, these became significant when stone crushers are operating in the area, which is normally the case around urban centers.

A compendium of few points of relevance in respect to environment, quarrying and mineral development.

1. Striking development in the minds of planners is the concern about damage to the environment, public health and safety.

2. Environmental movement developed out of conservation movement and turned its attention also to the environmental consequences of quarrying and mineral use.

3. Quarrying is one of the sources of damage to the environment. Quarrying is essentially a destructive process particularly in large projects and it is both conspicuous and consequential the result is controversies.

4. There are strong differences in priorities assigned to preservation / conservation versus development of natural resources and the result is disputes over the facts of environmental damage.

5. Approach to environmental problems in relation to quarrying industry could be:
   a) Specific environmental consequences of quarrying activity.
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b) Potential impact depending on the type of ornamental deposits
c) Type of quarrying operation involved.
d) Topographical and climatic conditions.

6. Different types of mineral deposits differ greatly in the nature and composition they contain thereby consequences also do differ in exploitation of different minerals and its impact on quarrying and environment.

7. Quarrying is not the principal disturber of land environment, whereas the principal disturber of land environment are:
   a) Agriculture Development
   b) Urban Development
   c) Highway Construction
   d) Projects
   e) Railway Network
   f) Mining projects etc.

8. Quarrying is generally high value of land.

9. Environmental protection should be made part of the plan of quarrying operations.

10. It is difficult to eliminate damage to surface and to the environment due to quarrying but it is possible to minimize within limits, stopping quarrying leads to set back on the industrial development / labour problem, revenue and foreign exchange earning to Government etc.

   It is apparent that quarrying activities do cause environmental damage and ecological imbalances. The question is should the quarrying activities be
stopped? Minor minerals form the backbone for any developmental projects, such as road and related systems, irrigation projects, urbanization etc. The spurt in the population growth, developmental programmes and urbanization has necessitated a larger supply of minor minerals. The ornamental stones have gained importance in view of the aesthetic beauty, easy maintenance and their ability to withstand any climatic conditions and also pollution affects caused by other sources.

Under these circumstances any move to restrict the quarrying activities would severely hamper the developmental programmes and projects. The very basic necessities of housing, roads etc., would be affected. Further, the minor minerals are source of substantial revenue to the state government. Through the ornamental stone industry the government earns a substantial foreign exchange.

The other benefits of quarrying industry, especially the ornamental stone industry are increased rural employment, health activities, interior communication, education etc. Developing countries like ours cannot afford to practice “No growth ideology” of some of the developed countries. It is interesting to note much protests are voiced against the ornamental stone quarries. It is pointed out that these category of quarries from a small percentage among the quarries and only a small number are considerably mechanized, compared to the mines of major minerals. The ornamental stone quarries are hence of secondary magnitude. Compared to many large scale manufacturing industries especially chemical industries, the threats to environment due to quarrying are insignificant.
Mining and quarrying is a vital sector of economy and provides the crucial inputs namely

(1) Fuel for energy
(2) Metals used for machinery and equipment
(3) Minerals for chemical and fertilizer manufacture
(4) Raw materials for cement, glass and ceramics manufactures.

It is apparent now important minerals are for economic growth. Under these circumstances the question that arises is whether environment should have the say in preference to mining and quarrying and if so, to what extent environmental degradation could be tolerated? Should new mineral development projects or the existing ones to be phased out or closed on environmental consideration only? While the environment cannot be ignored it is also necessary that mineral exploitation go on in a normal way in view of their importance in the nation’s economy. The approach should be:

a) Sustained development of mineral wealth with minimum environmental degradation.

b) Prevention of long-term environmental side effects by “Mitigative measures” so that remedies do not become unmanageable and expansive in the long run. Proper environment management in the operative mines and quarries and impact assessment programmes in the case of new mineral projects could achieve this.