Stone quarrying and the environment

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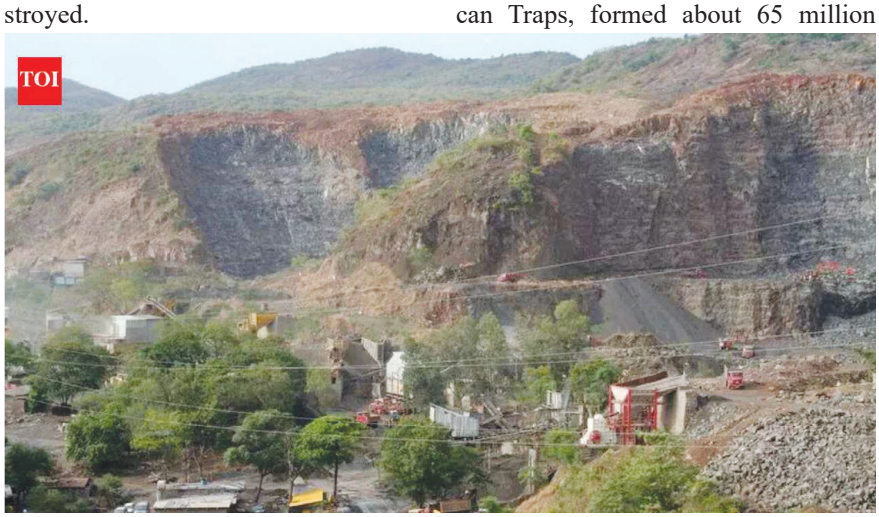
Construction activity in cities is natural. With increasing need for housing, commercial complexes, industrial establishments, hospitals, hotels, banks, schools, colleges and governments own requirements, there is tremendous pressure on the supply of raw materials like sand, grog, cement and water. A very large part of the concrete used for the construction of RCC structures and roads is obtained from stone in the form of grogs of various sizes. Of late, dredging of rivers and creeks for recovery of sand has been disallowed for environmental reasons. As a result, the fines generated in the crushing operations of stone are being used instead of sand. This has increased the requirement of stone powder and increased the pressures on their supply.

Defacing of hills

Stone quarrying has been going on in Mumbai for nearly 100 years. The hills of Powai and Ghatkopar have been thoroughly excavated, leaving behind scars on the surface. No efforts seem to have been made to restore the damage done. Some parts of Andheri and Powai, which were covered by forests only about 50 years ago, have been destroyed.



There is a large housing complex and industrial estate near Sakinaka, which I have seen as ponds formed by removal of stone from small hills in the early 70s.

The 35-km long Parsik Hill, extending from Kalva to near Panvel, has been defaced on both sides. I was once speaking to an old resident of that area who gave me a shocking information: about 60-70 years ago, there were about 150 water bodies on both sides of the hill. Villagers used to fish there for supplementary needs of food. Over time, the quarrying activity became so intense that villagers had to vacate these locations due to blasting of mines, dust pollution due to crushing of stones, and noise pollution all day and night.

Gilbert Hill

The quarrying activity has been so unmindful that a unique structure in Andheri, claimed to be a very rare ejection from the ground by volcanic activity, Gilbert Hill, has been reduced more than 50%. The stone in this hill is very unique, and shaped like a pencil.

Gilbert Hill is a remnant of the Deccan Traps, formed about 65 million

years ago. These massive lava flows are linked to volcanic activity around the time of the Cretaceous-Paleogene extinction event. This makes the hill a direct window into one of Earth's largest volcanic episodes. It is composed of columnar basalt, where cooling lava contracts to form vertical hexagonal columns. This structure is similar (though much smaller) to Giant's Causeway in Northern Ireland, and serves as a geological relic of Mumbai's original volcanic landscape. The vertical columns indicate slow, uniform-cooling thick lava flow units. The geometry helps geologists understand heat dissipation in lava, and stress distribution during solidification.

Gilbert Hill is recognized by the Geological Survey of India as a National Geological Monument. This highlights its importance for education, research, and conservation. Despite this, the hill is surrounded by dense construction; and weathering and human activity threaten its structural integrity.

Even though Gilbert Hill has been declared a protected monument, it continues to be surrounded by tall buildings, and for several years stones were

removed for alternate uses. Since it is a protected monument, a 500 meter circle from the hill should be declared as a 'No trespassing' zone.

Geologist believe, there were several such hills in the past, but this is the only one remaining now.

Both these hills need to be restored, and there are two ways of dealing with this problem.

Restoration

Construction industry produces huge inorganic waste in the form of used bricks and waste of new construction. This needs to be disposed. There are some efforts to recycle this for construction purposes. This is a welcome move, but there would still be some materials left requiring disposal. Several homeowners who have lived in a house for 20-25 years want to renovate their dwellings. These activities also generate tonnes of debris, which also requires safe disposal.

The cavities left by removal of stone from the hills should be filled. The outer side should be first constructed without a binder using stones and bricks, allowing the wall to be porous. The rest of the cavity should be filled with the residues from construction. Once the shape of the hill has been restored, trees should be planted on the fresh surface. Over a period of time, the shape of the hills will be restored with a green cover on top.

Disposal of millions of tons of municipal waste every year is a problem. In the first place, this will need segregation. After removal of recyclable materials like plastic, metal, paper and glass, organic-compostable material should be separated. This can either be converted to a fertiliser or compacted to convert it to a fuel. The remaining inorganic material only should be used for repairing the environmental damage left behind by the stone quarrying. It should be further separated from the bricks and other regular shaped debris like stone pieces that can be used for construction of retention wall. As some space will be created, it should be filled with the soil, clay and irregular pieces obtained from construction waste. Even the accumulated waste of Mumbai city in Mulund, Kanjurmarg, Mankhurd and Borivali – roughly 100 million tons, may not suffice to fill the dents left behind by stone excavation over last 100 years.

The requirement of the construction industry is increasing and they cannot be denied easy and inexpensive access to raw material. In last few years we have seen the drilling of a large number of tunnels in and around Mumbai. This has been possible because Maharashtra has mountains made of volcanic rock, which is monolithic. The stone crushing industry now onwards should be allowed to dig only horizontally. The excavation may last several years going left, right, up and down. After several years when the job is done, the cavity can be used for rain water storage. This water can also be used by industry, or enable water sports, fishing and agriculture. The entrance can be either closed or be restricted.