



FACULTY OF ENGINEERING & TECHNOLOGY

TOPIC : STONES (L-3)

Quarrying is the process of collecting stones from the natural rock surfaces. Site selection and methods used for quarrying for construction works is discussed.

Quarrying of stone is completely different from mine. Mine belongs to underground operation only whereas quarry is carried out on exposed surface of natural rocks. So, the stones collected through quarrying is used for various engineering purposes. Stone quarrying is generally done at hilly areas where large quantity of stone is available.



Site Selection for Quarrying of Stones

The quarry should be selected based on some conditions as follows.

1. The site should be near to human living areas where labor and tools are always available, required materials also should be available.
2. At least one of type transportation facilities (road or railway or port or all) should be available.
3. Clean water source should be available near the quarry site.
4. Good quality and quantity of stone should be available.
5. The site should be far from permanent structures like bridges, dams etc. because the vibrations due to blasting in the site may cause harm to them.
6. Non-living area should be available to dump the refuse obtained in quarrying.
7. Proper drainage facility should be available.
8. Geological information of site should be read.

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Considerations for Quarrying of Stones

After the site selection, some important considerations are to be followed before starting quarrying of stones stated as follows:

1. The rock surface should be properly checked for cracks and fissures. The presence of these may cause planes in the stones, along which they may split. Then, the quarrying will be easy and quick as well as economical.
2. Layout should be prepared which contains different stages involved in quarrying operation.
3. The machines used should be tested to operate them easily and quickly.
4. If the top surface of site contains soft soil, then it should be removed and dumped.
5. The removal of stones should be done carefully otherwise there may be chances of landslides or slips which can cause severe damage to the lives of labor.

Methods of Quarrying of Stones: Quarrying can be done by three methods as follows:

1. Hand tools
2. Machine quarrying
3. Blasting

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Quarrying of Stones using Hand Tools

In case of soft stones or for smaller works, quarrying is done by using hand tools. There are various ways to quarry using hand tools and they are:

Excavating

Heating

Wedging

Excavating

Excavating is preferred in case of soft stone surfaces. Hammers, pick axes, shovels are used to excavate the stones.



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Heating

The top surface of rock is heated by placing wood with fuel on it. The fire will be allowed for some hours and the top surface gets heated and separates from the rock. This separated portion is removed by pick axes, crowbars etc.

The stones obtained by heating will be in good shape if the rock formation contains horizontal layers at shallow depth. So, the stone obtained will be directly used for masonry works.



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Wedging

This method is applicable when the rock contains cracks or joints in it. Steel wedges or steel points are put in these cracks or fissures and hit them with hammer.

Then the rock portion separates from parent rock. If natural cracks are there, then artificial holes are drilled in the rock and wedging is done.



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Machine Quarrying of Stones

Machine quarrying is done by using channeling machines in the site. This type of machine is driven by steam, compressed air or electricity.

A groove is made using this machine around the rock and the horizontal holes are drilled underneath the block. Hence, the block gets separated from its bed.

A large groove of 24-meter length and 50 to 75 mm width and with a depth about 2 to 3.7 meter can be made using channeling machine. So, larger blocks of stones can be obtained using this method.

Marbles, lime stones, etc. are quarried using machine quarrying.



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Blasting for Quarrying of Stones

In this method explosives are used to separate the stones from parent rock. This process is applied in case of hard stone or hard rock which does not contain any cracks or fissures. The holes are drilled in the rock and explosives are arranged in the holes and blasted with proper safety measures. The stones obtained through this process are not larger in size. So, the main purpose of blasting is to obtain small stones which are used as ballast for railway works, aggregate in concrete works etc..



Thank You

