



NOTES FOR STUDIES

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TOPIC NAME	JOINTS AND ITS CLASSIFICATION
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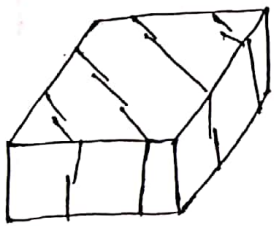
JOINTS

Unit-4 (1)

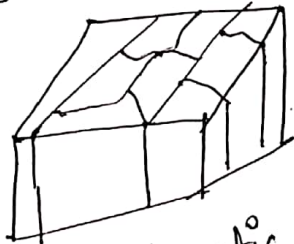
Joint is a very small displacement normal to their surfaces and no, or very little, displacement \parallel to their surfaces. The fractures collectively are called a joint set. Systematic joints are roughly planar geometry, regular \parallel (parallel) orientations, and regular spacing.

Non-systematic joints are curved and irregular in geometry, although they may occur in distinct sets of regional extent.

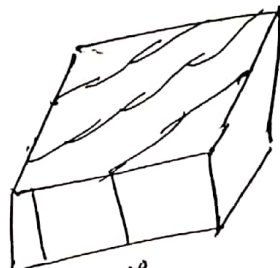
Joint zones is a quasi-continuous fracture that is composed of a series of closely associated \parallel fractures and that extends much further than they any of the individual fractures.



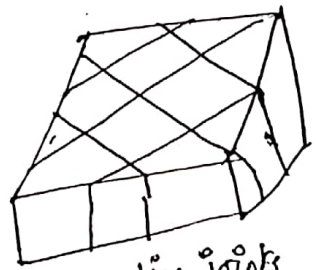
Systematic Joints



Non-systematic Joints



quasi-continuous joints



Intersecting joints (cross joints)

Two or more joint sets affecting the same volume of rock constitute a joint system. Cross joints are systematic joints of one set consistently terminate against the joints of another set.

Types of Joints

(2)

Genetically
Joints

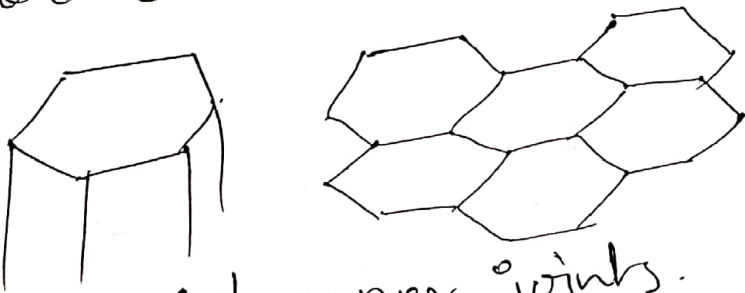
are divided into two types \Rightarrow

1) Tension joints \Rightarrow Tension joints are those which are formed due to tensile forces or stresses produced in the rocks, either during their formation or after during their formation.

The ~~important~~ direction of such joints is always perpendicular (\perp) to that of the force which tries to pull them apart.

The important types of tension joints are \rightarrow
(a) columnar joints, (b) mud cracks, (c) sheeting joints, (d) mural joints.

1) Columnar joints \rightarrow columnar joints are extension fractures of shallow tabular igneous intrusions, dikes or sills or thick intrusive flows.

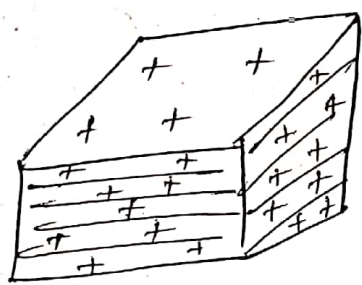


Columnar joints.

2) Mud cracks \Rightarrow Mud cracks are also tension joints, formed in a similar manner as columnar joints. These are formed by drying of the mud.

5) Sheet joints are curved extension fractures that are sub parallel to the topography and result in a smooth ~~so~~ rounded topography.

Ex. - Plutonic rocks in mountainous regions where the joints appear to cut the rock into sheets like the layers of an onion.



sheet joints.

1) Mural Joints → Mural joints are three sets of ~~joint~~ joints, mutually \perp (perpendicular) (two sets of vertical and one set of horizontal ~~so~~ joints) to one another.

ex. - Granite.

The spacing between the joints is more or less equal, so that the rock is split into cubical blocks, or murels.

2) Shear Joints → Shear joints are formed by the shearing stresses; which tend to slide (or actually slide) one part of the rock against the other. Such joints are during folding or faulting.

Importance of joints in Civil Engg. → ②
For construction of any major civil engg. structure in any area, it is absolutely necessary to investigate the rock joints thoroughly, mainly because joints act as sources of weakness for the rocks, and also as sources of leakage through the rocks.

If the proposed foundation rocks for a dam or a reservoir happens to be heavily jointed, and if the water table of the region is low, then the leakage from the reservoir to the underground may be very heavy, finally resulting in abandoning the proposed site, and to choose better one. Similarly, in construction of tunnels, if the roof or the side rocks, are highly fractured or jointed, the ground water may seep into the tunnel, thus creating acute water troubles, in addition to its becoming unstable or unsafe structurally.

The joints in rocks play a very important role in landslides in hilly regions, because they serve as slip surfaces.

10.- Joints dipping towards the hill slope may allow the overlying, unsupported mass of rock to slide down, causing a landslide. The occurrence and orientation of joints, and their possibilities of lubrication must be investigated, as they may lead to landslides from under the highway, or along the proposed eng. structure.

Study of joints becomes important in quarrying and mining operations. In quarrying of stones, joints may help in making quarrying easier, if quarrying is done along them. But they may reduce the sizes of the quarried stones, ~~joints may help in making quarrying eas~~ which may then be limited by the spacing between the joints.

Treatment of Joints will differ in different projects.

Ex. when leakage is to be avoided, grouting of joints is generally adopted.