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Primary waves

Primary waves, are first waves to arrive at a seismograph.

Primary waves are the fastest seismic waves and can move through solid, liquid or gas.

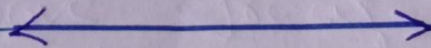
They travel through the earth interior and can pass through both solid and molten rock. They shake the ground back and forth.

Secondary waves

Secondary waves, are the second waves to arrive during an earthquake.

Secondary waves are much slower than P waves and can travel only solid.

S-waves lag behind P-waves as they travel 1.7 times slower. However they do more damage because they are bigger and shake the ground vertically and horizontally.



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Q2: Describe the role of geology in selection of sites for dams and reservoirs?

: Selection of sites:

Selection of sites is based on following basis.

: Topographically:

Most suitable place must be chosen for construction. Ideally it must be a narrow gorge or a small valley with enough catchment area available behind so that calculated the amount of water can be easily stored in the reservoir created upstream.

Location of Spillway: All dam should have an adequate spillways for passing flood flows. If a river gorge is narrow, then there may not be sufficient spillway width available and a suitable location on the periphery of the reservoir has to be found to locate a spillway.

Possibility of river diversion during construction:

The way, river can be diverted at a particular site for making way for construction of the dam may effect the design of the dam and also the construction schedule.

: Sedimentation Possibilities:

The average quantity of sediment carried by the river has to be known as precisely as possible, which would give an idea of the rate at which a proposed reservoir may get filled up.

: Technically:

The site must be sound as possible: Strong, impermeable and stable. Strong rock make the job of designer easy, impermeable sites ensure better storage inventories, site must be stable with respect to seismic shocks slope failure around dam.

: Constructionally:

The site should be far from the

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: Rock and Debris Slides:

Happen when rocks or debris slides down a preexisting surface.

: Rock and Debris falls:

Happens when a piece of rock fall down the slope. Debris falls are similar, except they involve a mixture of soil, regolith and rock. At the base there is an accumulation of fallen material termed talus.

: Slumps:

A type of slides wherein downward rotation of rock or regolith occurs along a curved surface due to oversteepening.

: Flow:

Flow of soil and regolith contain a large amount of water.

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: Creep:

The gradual downhill movement of soil and regolith.

: Solifluction:

Is flow of saturated soil down slope at a rate of a few millimeters or a few centimeters per day or per year.

: Permafrost:

Slow landslide due to slowly melting of permanently frozen ground

Protective measures of landslide are:

: Reducing Risk of landslide:

- Draining water from slopes.
- Revegetation with plant that have deep root.
- Terracing redistributes mass along a slope and reduce the slope angle.

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→ Retaining wall can catch debris or stabilize regolith.

→ Rock bolts can be used to stabilize coherent masses.

Q4: Differentiate fault, joint and fold?

Fault	fold	joint
It is caused generally due to vertical movement.	folding is caused due to horizontal movement.	A joint is a fracture along which no movement has taken place, usually caused by tension.
force moves away from common centre	force moves toward common centre.	
Due to tension fault occur along which displacement of rock take place	Due to compression, different types of folds are formed.	
They are generally common in igneous or metamorphic rocks etc.	They are generally common in sedimentary rocks.	

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if Proper Planning is not exercised before starting the actual excavation. And the excavation methods are intimately linked with the type of rock to be excavated. Choice the right method will, therefore, be possible only when the nature of the rock and the ground all along the alignment is fully known. This is one of the most important aim and object of geological investigation.

c) selection of Design for the Tunnel:

The ultimate dimensions and design parameters of a proposed tunnel are controlled, beside other factors by geological constitution of the area along the alignment. whether the tunnel is to be circular, D-shape horse-shoe shaped or rectangular or combination of one or more of these outlines. D-Shape or horse-shoe shape may be conveniently adopted but these shape would be partially unstable in soft ground. in those cases circular outline may be choice first.

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d) Assessment of cost and stability:

These aspects of the tunneling project also closely interlinked with the first three consideration. Since geological investigation will determine the line of actual excavation, the method of excavation and the dimensions of excavation as also the supporting system (lining) of the excavation, all estimates about the cost of the project would depend on the geological details.

e) Assessment of Environmental Hazard:

The Process of tunneling, whether through rock or through soft ground and for whatsoever purpose, involves disturbing the environment of an area in more than one way. The tunneling method might involve vibration induced through blasting or ground cutting and drilling, producing abnormal quantities of dust and last but not the least interference with water supply system of the nearby areas.