

There are different procedures or methods of grouting, Fig. (1.27), that can be classified as; permeation (cement or chemical injection) grouting, compaction grouting, jet grouting.

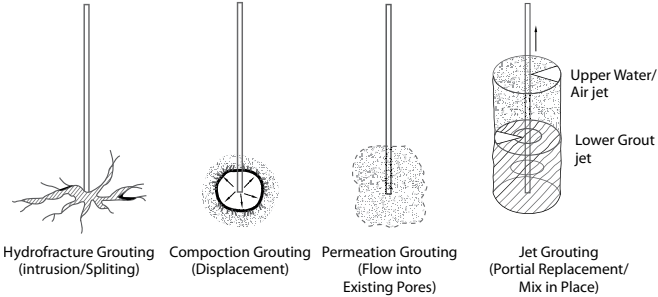


Fig. (1.27): Different procedures of Grouting Techniques

1.4.1.f Permeation Grouting

Structural chemical grouting is the permeation of sands with fluid grouts to produce sandstone like masses to carry loads. Water control chemical grouting is the permeation of sands with fluid grouts to completely fill void to control water flow. Permeation grouting, Fig. (1.28) can be used for lagging operation, support of footing, grouted tunnel support, grouted cut-off wall and grouted pipeline support.

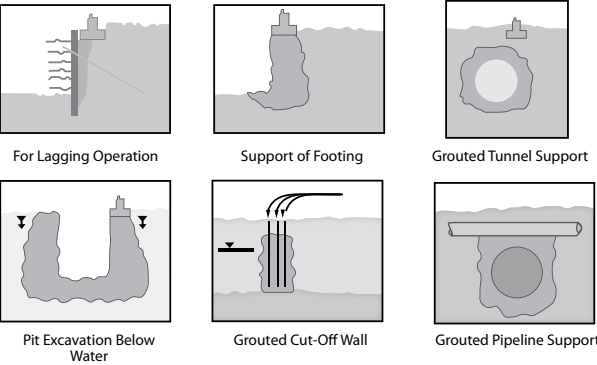


Fig. (1.28): Permeation Grouting Technique

Cement Grouting, Fig. (1.29), also known as Slurry Grouting, is the intrusion under pressure of flowable particulate grouts into open cracks and voids and expanded fractures. Slurry Grout Materials may be Cement, Clay (Bentonite), Sand, Additives, Micro-fine Cement, Fly Ash, Lime and Water

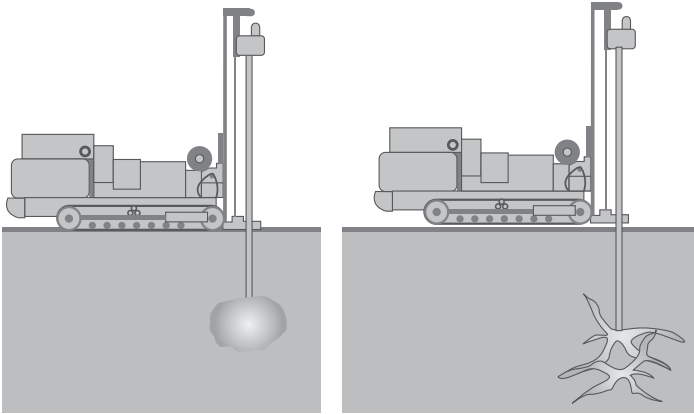


Fig. (1.29): Cement Grouting (Slurry Grouting) Technique

1.4.1.g Compaction Grouting

Compaction Grouting is the injection under relatively high pressure of a very stiff, “zero slump” mortar grout to displace and compact soils in place. The monitored injection of very stiff grout into a loose sandy soil results in the controlled growth of a grout bulb mass that displaces the surrounding soils as per Fig. (1.30). This action increases lateral earth pressures and compacts the soil, thereby increasing its resistance to liquefaction.

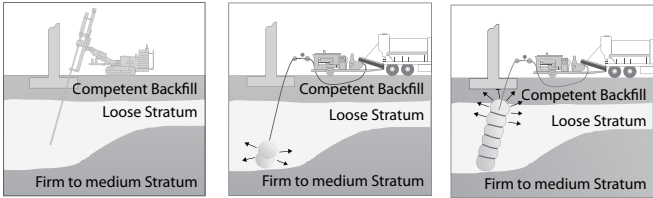


Fig. (1.30): Compaction Grouting Technique