JEM446

ŞEHİR PLANLAMASINDA JEOLOJİ

Ders Notları 13.Hafta

Dr. Koray ULAMIŞ

Ankara

ZEMİN İYİLEŞTİRME YÖNTEMLERİ

Zemin iyileştirilme yöntemleri dört ana gruba ayrılabilir (Yıldırım, 2002):

- mekanik
- hidrolik
- fiziksel ve kimyasal iyileştirme
- ekleme ve sınırlama

Bu yöntemlerin uygulanması (tek başına veya kombine) ile aşağıdaki hedef veya hedefler gerçekleştirilir:

- saha zemininin kayma dayanımını arttırmak
- zeminin yapısal yükler altında beklenen oturmasını azaltmak
- zeminden su/sıvı sızıntısı kayıpları azaltmak (bent, baraj, gölet, atık depolama sahaları gibi uygulamalarda)

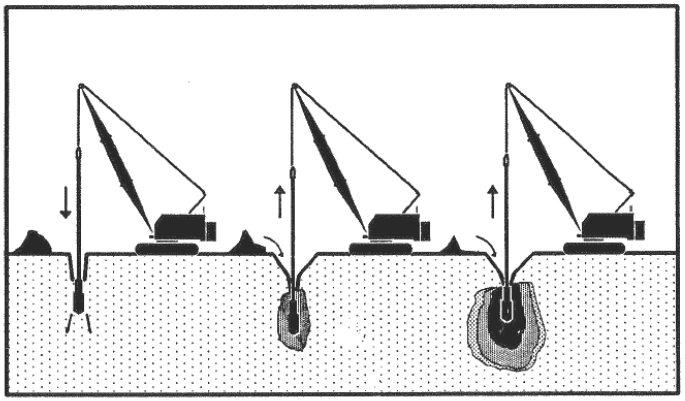
Zemin İyileştirme (Islah) Yöntemlerinin Sınıflandırılması

Mekanik	Hidrolik	Fiziksel ve Kimyasal	Ekleme ve Sınırlama
• Silindirle (düz, titreşimli, darbeli, yoğurmalı) sıkıştırma • Derinde Titreşim • Patlatma	• Ön Yükleme • Drenaj • Elektro-ozmos	• Yüzeysel zemini katkı ile iyileştirme • Derin zemini katkı ile iyileştirme (Enjeksiyon, Jet Grout, vs) •Isıtma-Dondurma Yaygın olarak kullanılan katkılar: Çimento, Kireç, Uçucu kül, Fiber, Bentonit, vs.	•Donatılı duvarlar (geosentetik, çelik, vs. kullanarak) •Zemin Çivisi •Ankraj •Kazık, taş kolon •Diyafram duvar, palplanş perde •Zemin dayanma yapıları (ağırlık, betonarme, gabion, vs.)

Vibro-Compaction (Vibroflotation)

Vibro-Compaction is...

The rearrangement of particles into a denser configuration by the use of powerful depth vibrators.



Vibro-Compaction Applications

- Reduction of foundation settlements
- Reduction of the risk of liquefaction due to seismic activity
- To permit construction on granular fills

Important Vibro-Compaction Parameters

- Ground type and gradation
- Relative density

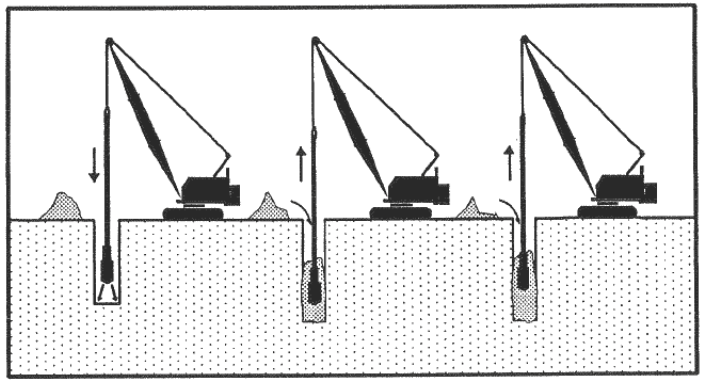
Vibro System Acceptance Testing

- Standard Penetration Test (SPT)
- Cone Penetrometer Test (CPT)
- Dilatometer Test (DMT)
- Load test
- Pressuremeter Test (PMT)

Vibro-Replacement (Stone Columns)

Vibro-Replacement is...

The improvement of more cohesive soils by reinforcement of the soil with compacted granular columns or "stone columns."



Vibro-Replacement Applications

- Reduction of foundation settlement
- Improve bearing capacity/reduce footing size requirements
- Reduction of the risk of liquefaction due to seismic activity

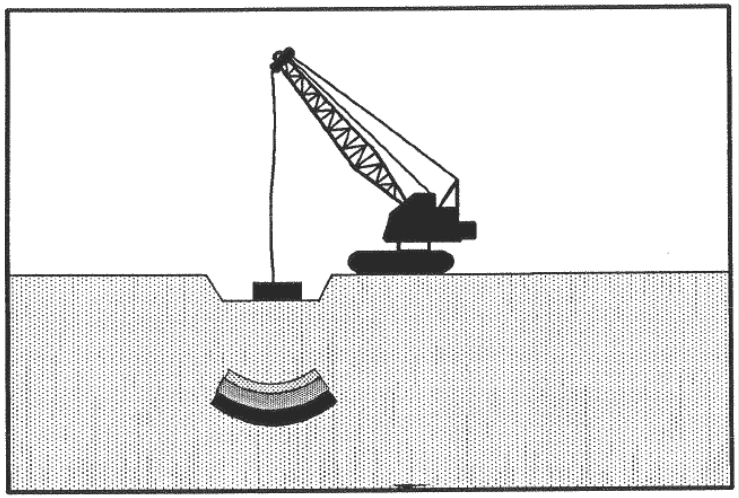
Slope stabilization

To permit construction on fills

Dynamic Deep Compaction

Dynamic Deep Compaction^{tm} is...

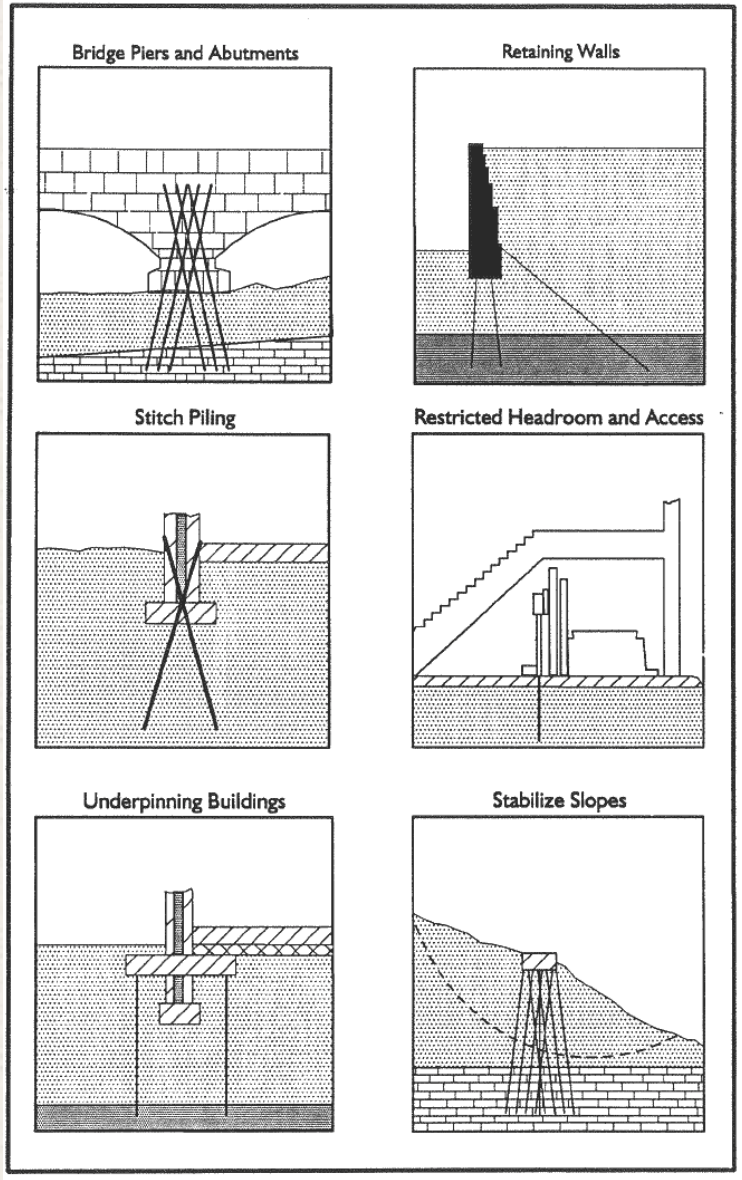
Dropping of heavy weights on ground surface to densify soils at depth.



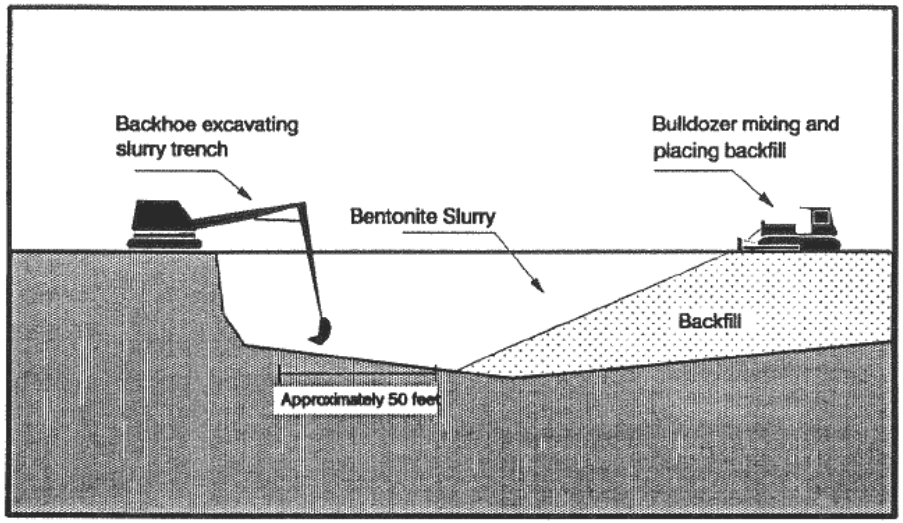
Important DDC Geotechnical Parameters

- Ground type
- Relative density
- Degree of saturation
- Permeability

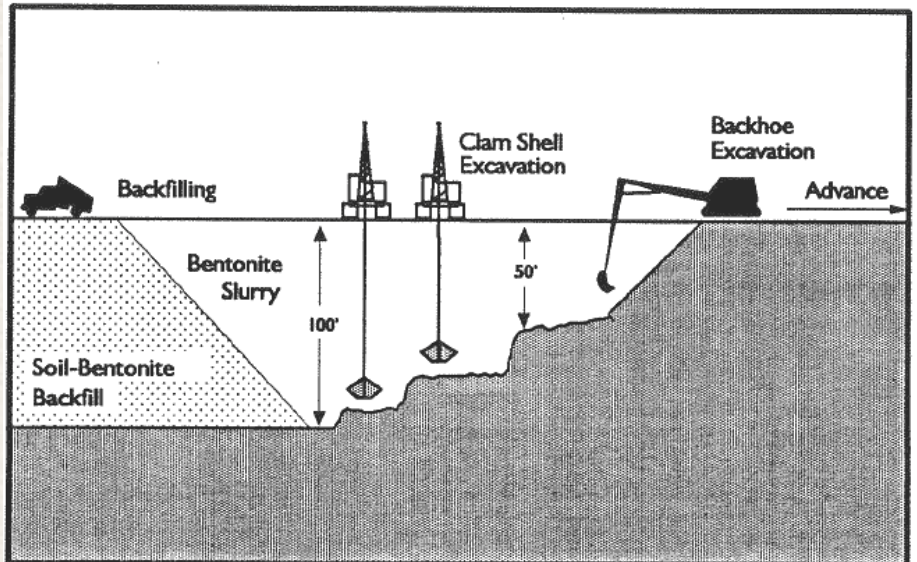
Minipile Applications



Shallow Excavation

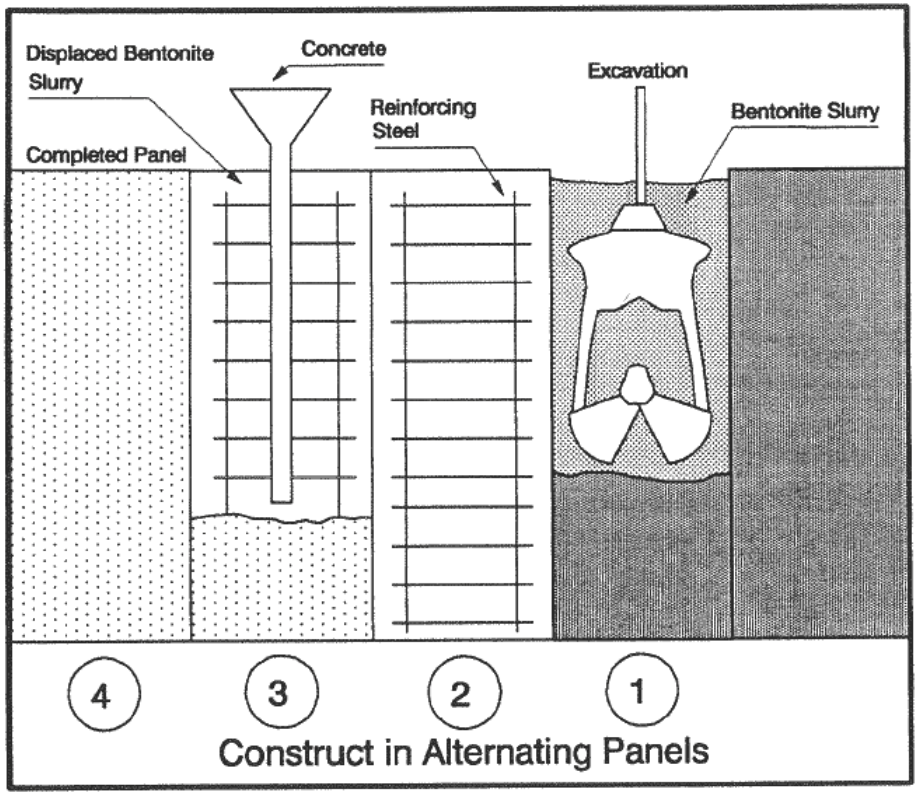


Deep Excavation



Diaphragm (Structural) Slurry Wall Applications

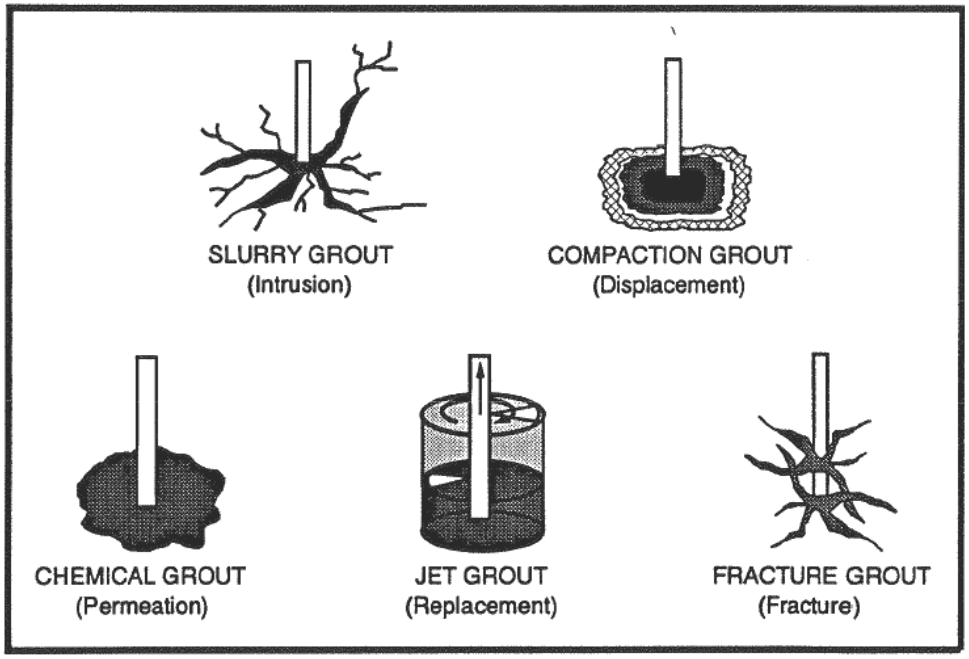
- Retaining walls
- Heavy foundations
- Combination retaining wall-foundations
- Combination retaining wall-water control
- Associated with the up-down construction technique as basement walls

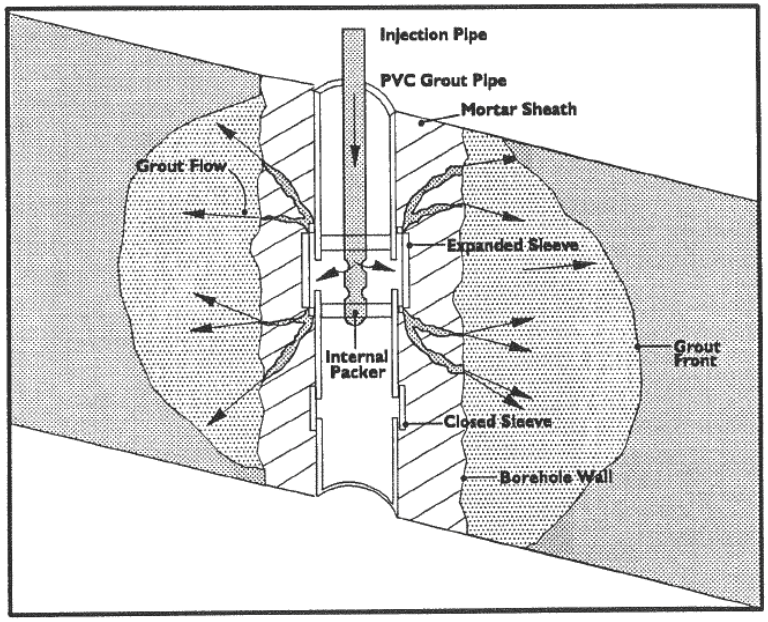


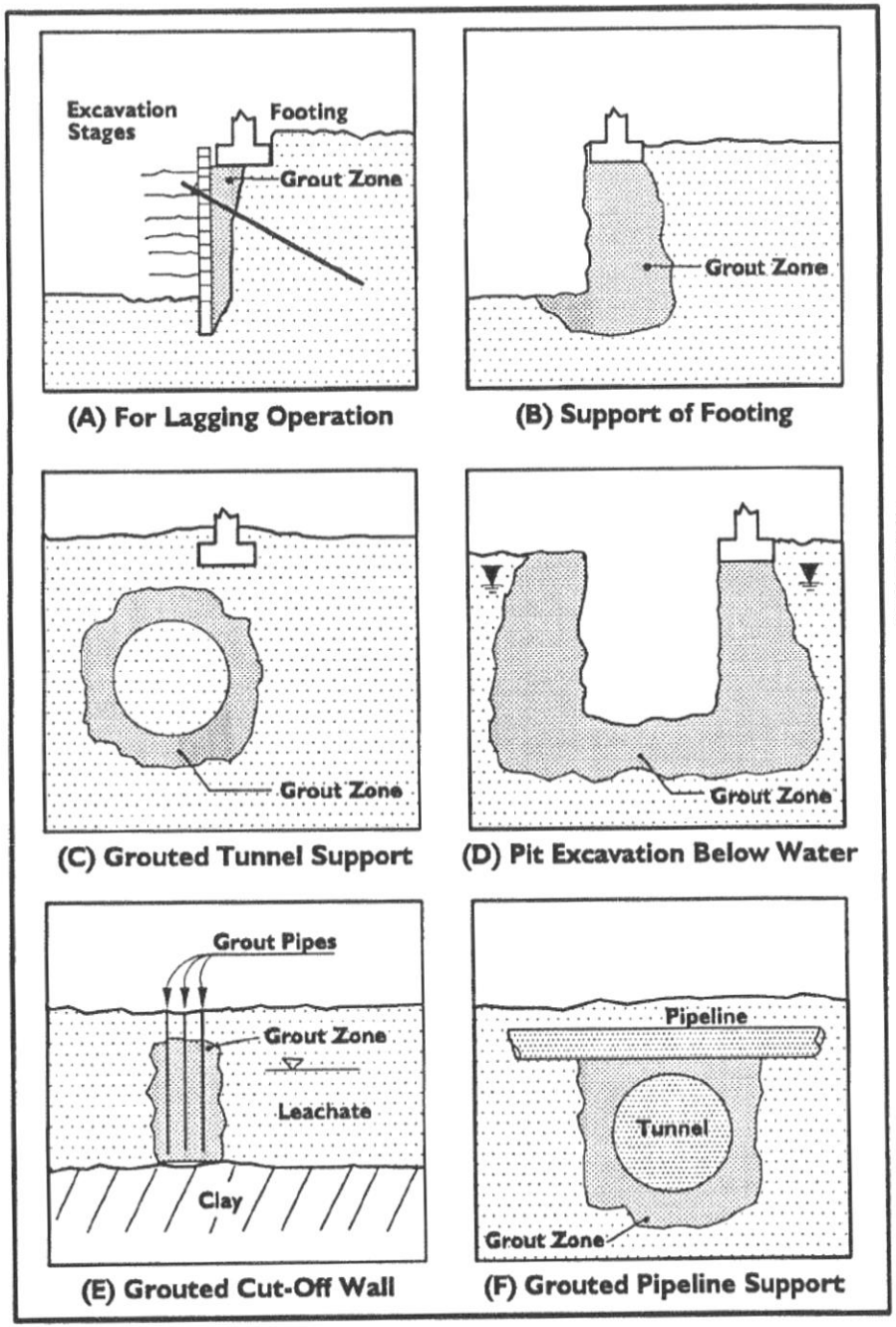
General Grouting

Grouting is...
The injection of pumpable materials into a soil or rock formation to change the physical characteristics of the formation.

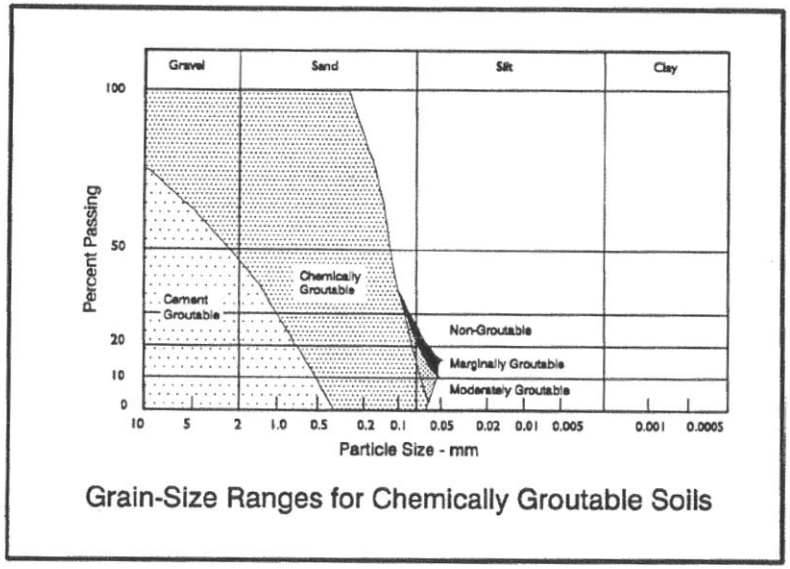
Types of Grouting







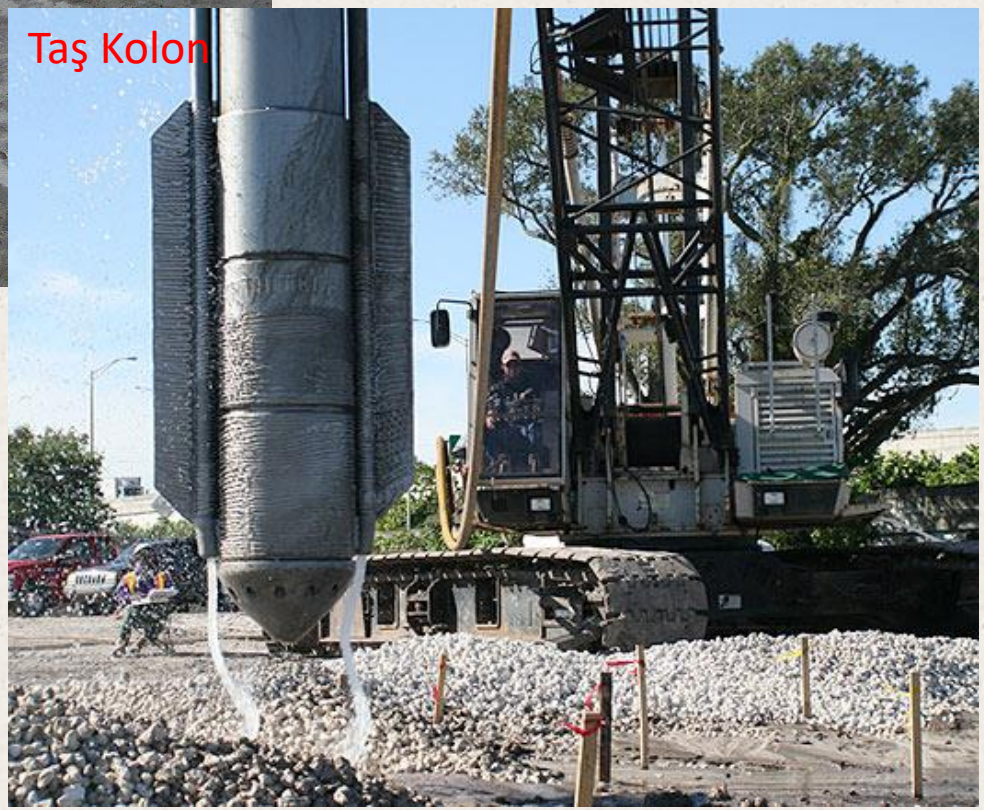
Chemical "Groutability"



Grain-Size Ranges for Chemically Groutable Soils

Dinamik kompaksiyon

Vibroflotasyon



Taş Kolon