

Mechanically Stabilized Earth (MSE) Wall Project

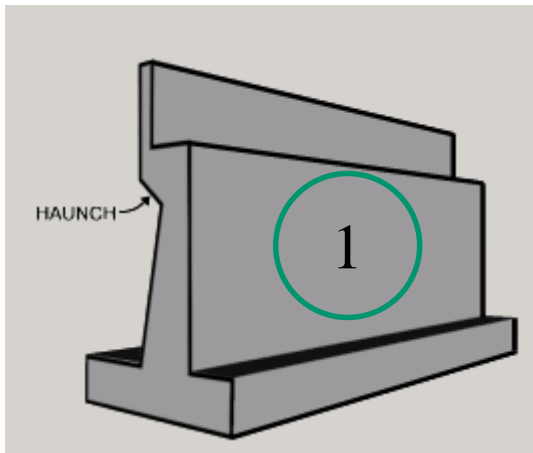
Geotechnical Design

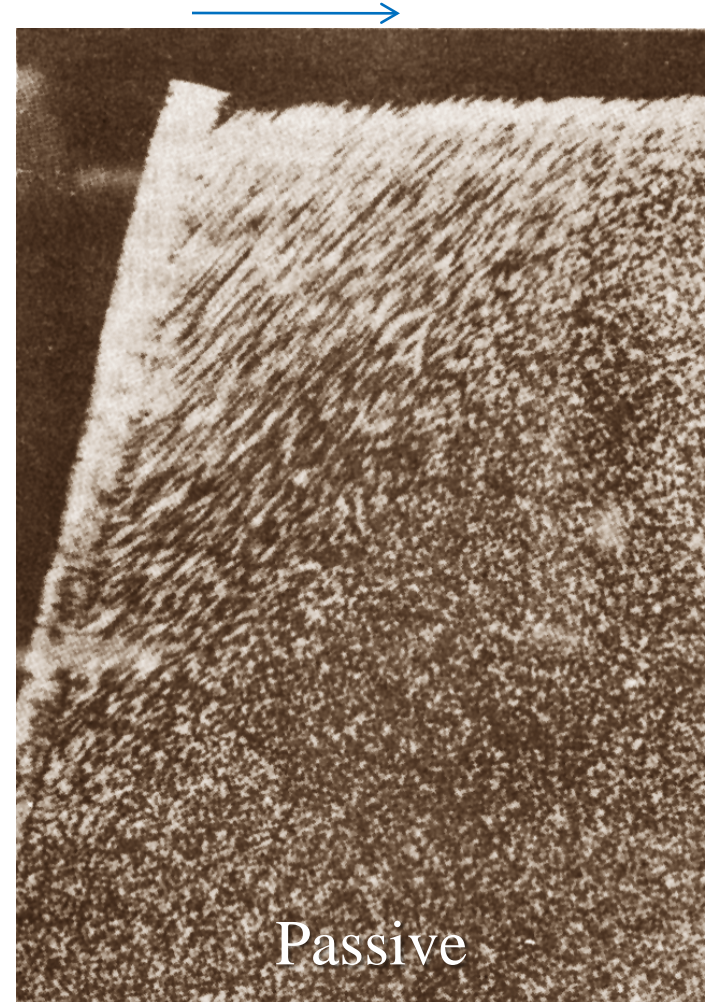
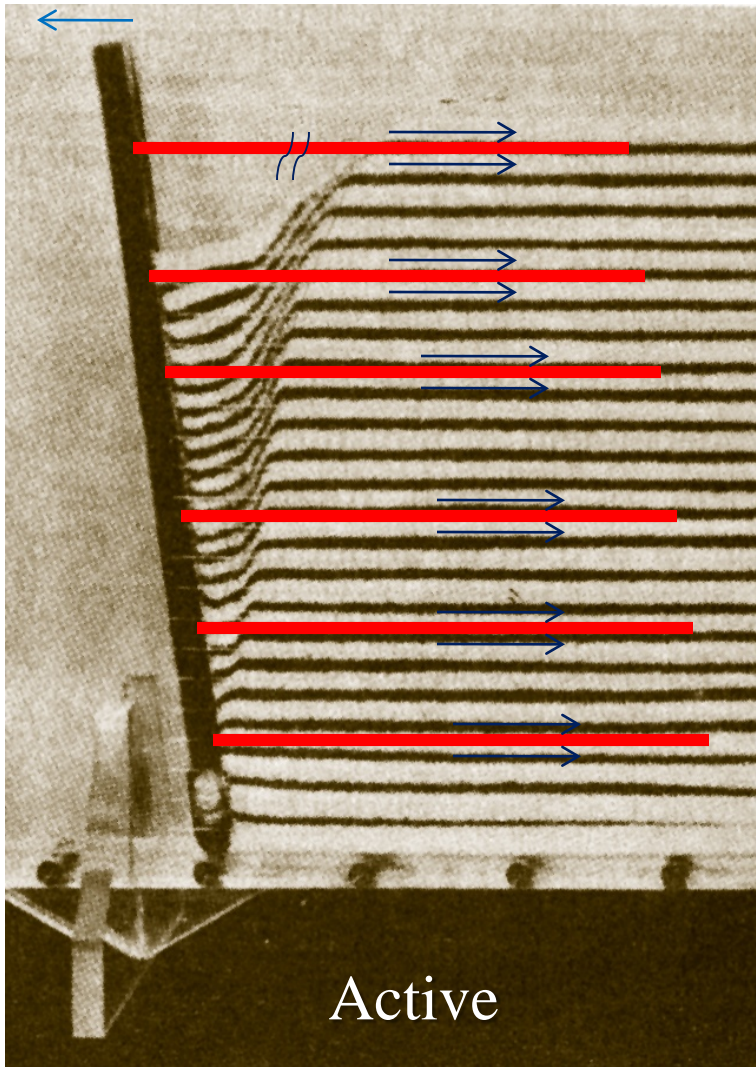
CEG 4801

Spring 2017

Kamal Tawfiq, Ph.D., P.E.

Choices for Bridge Abutments

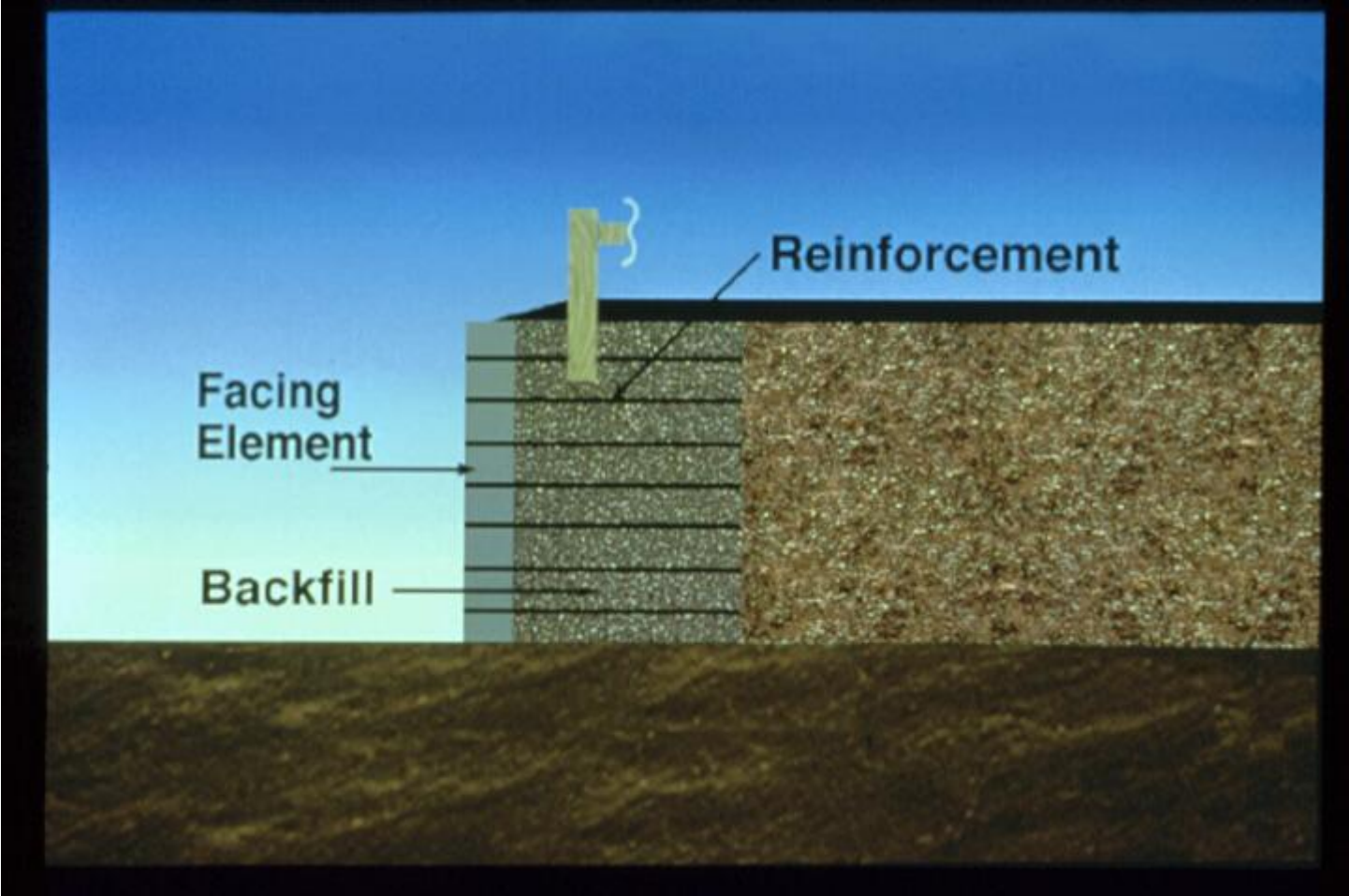




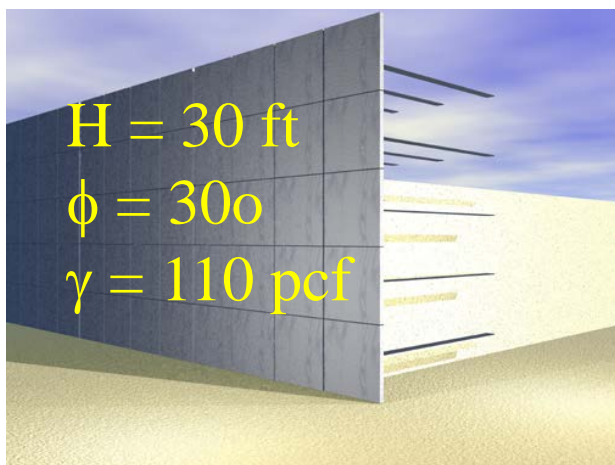
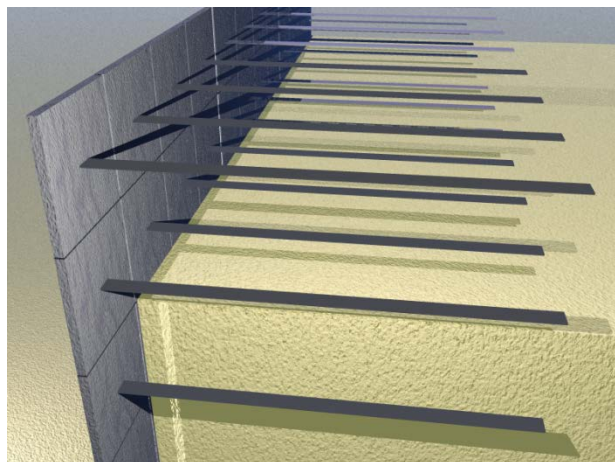
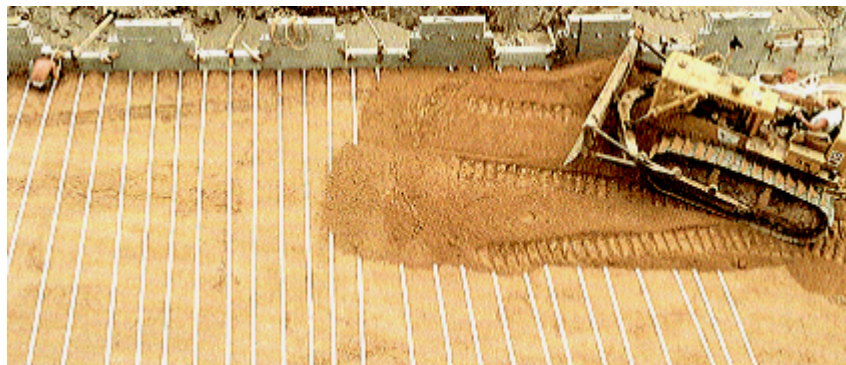
Earth Pressure Behind Retaining Wall

French architect and engineer
Henri **Vidal** in the early 1960s

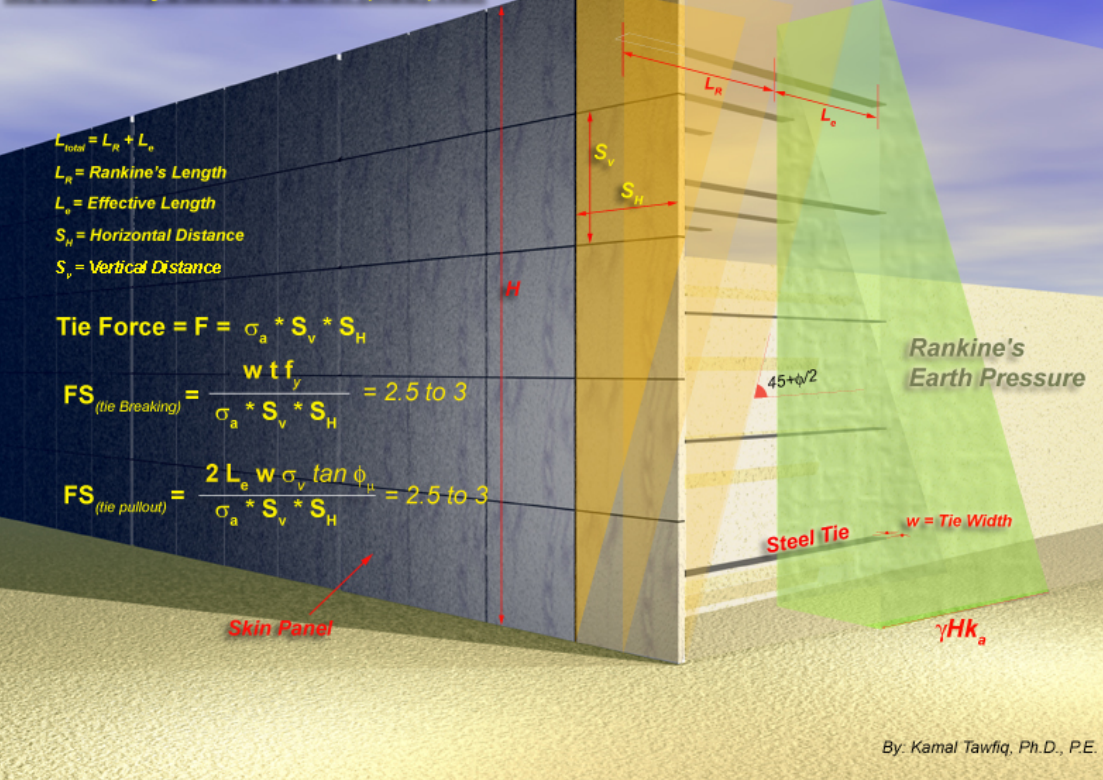


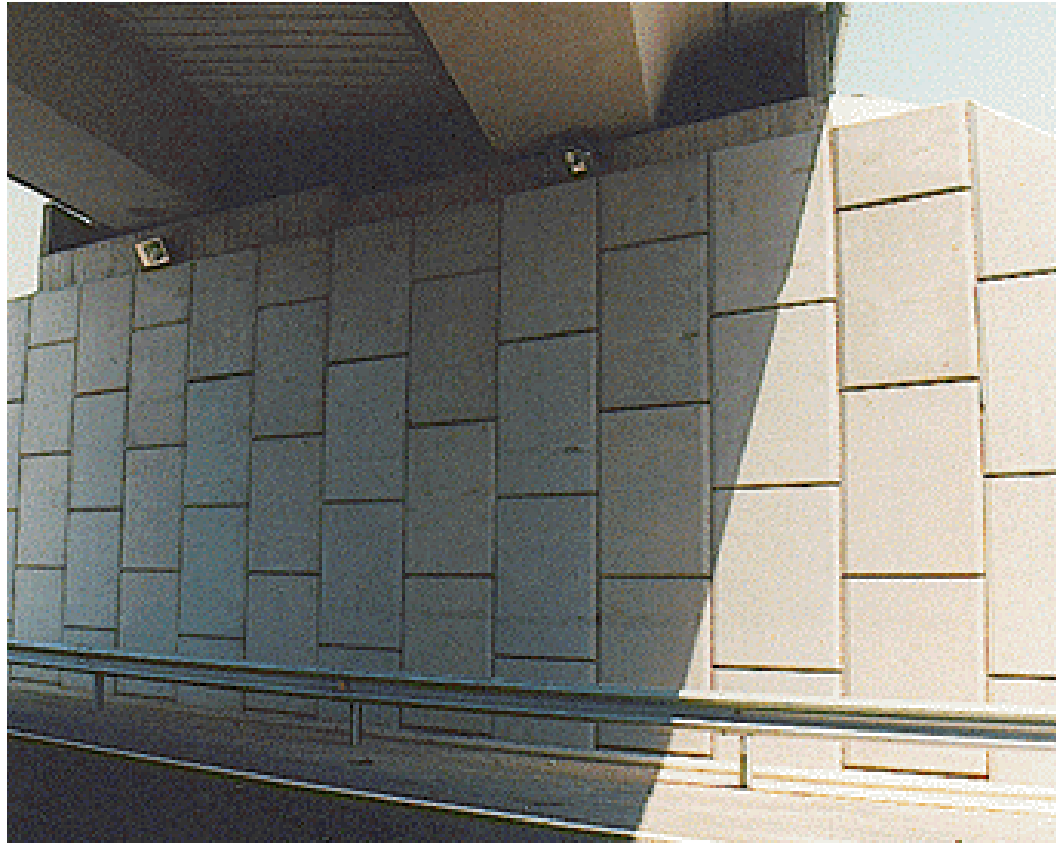


Mechanically Stabilized Earth (MSE) Walls or Segmental Walls



Mechanically Stabilized Earth (MSE) Wall





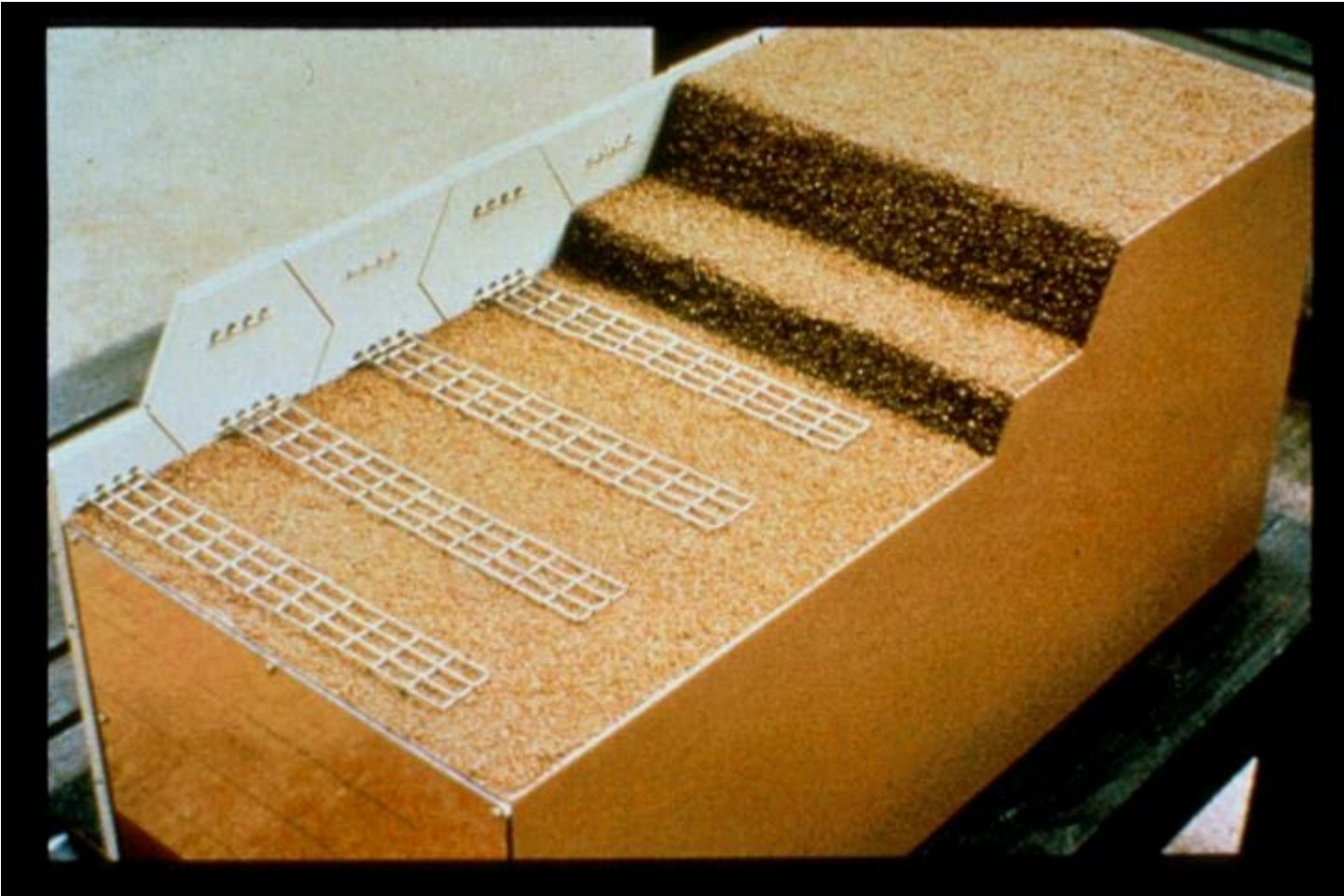
Mechanically Stabilized Earth Wall (MSE Wall)



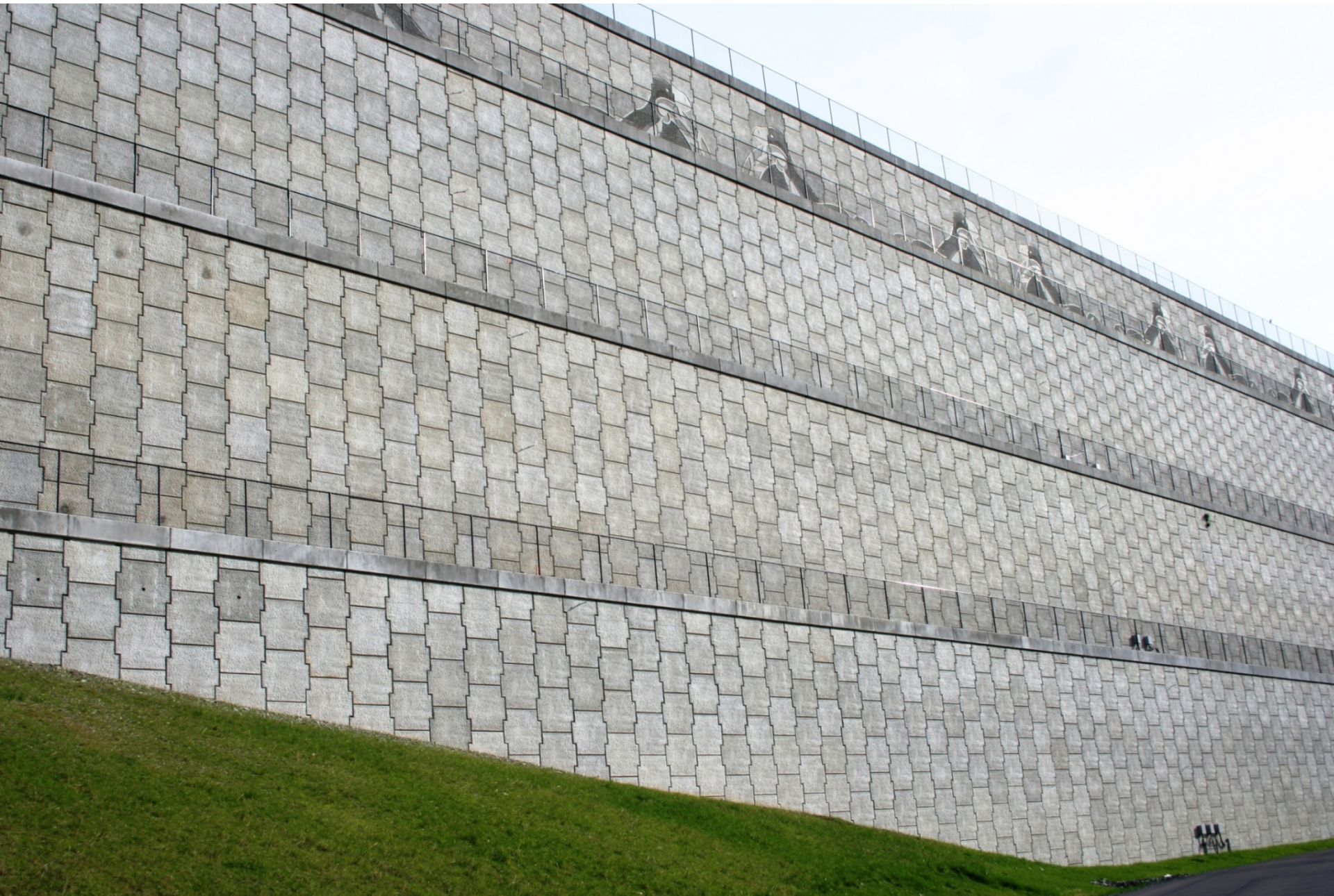


Mechanically Stabilized Earth Wall (MSE Wall)

Using Galvanized Steel



Seattle-Tacoma International Airport, WA







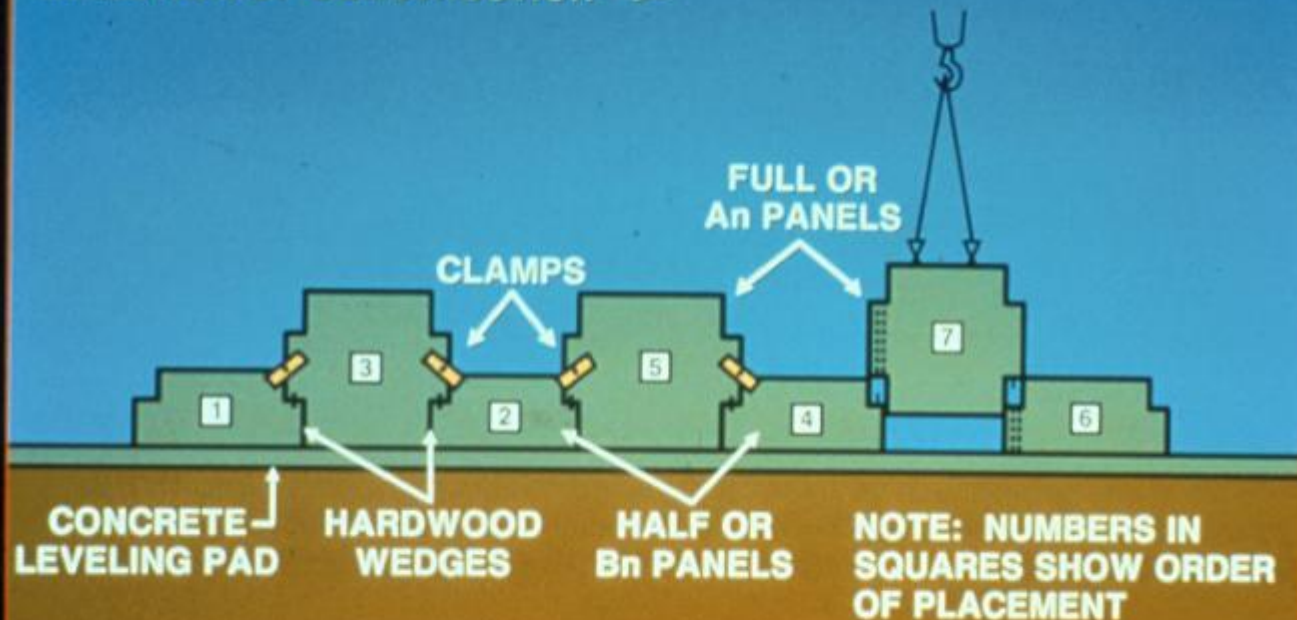








DIRECTION OF CONSTRUCTION →



CONCRETE LEVELING PAD

HARDWOOD WEDGES

HALF OR B_n PANELS

NOTE: NUMBERS IN SQUARES SHOW ORDER OF PLACEMENT

PANEL PLACEMENT FOR INITIAL COURSE









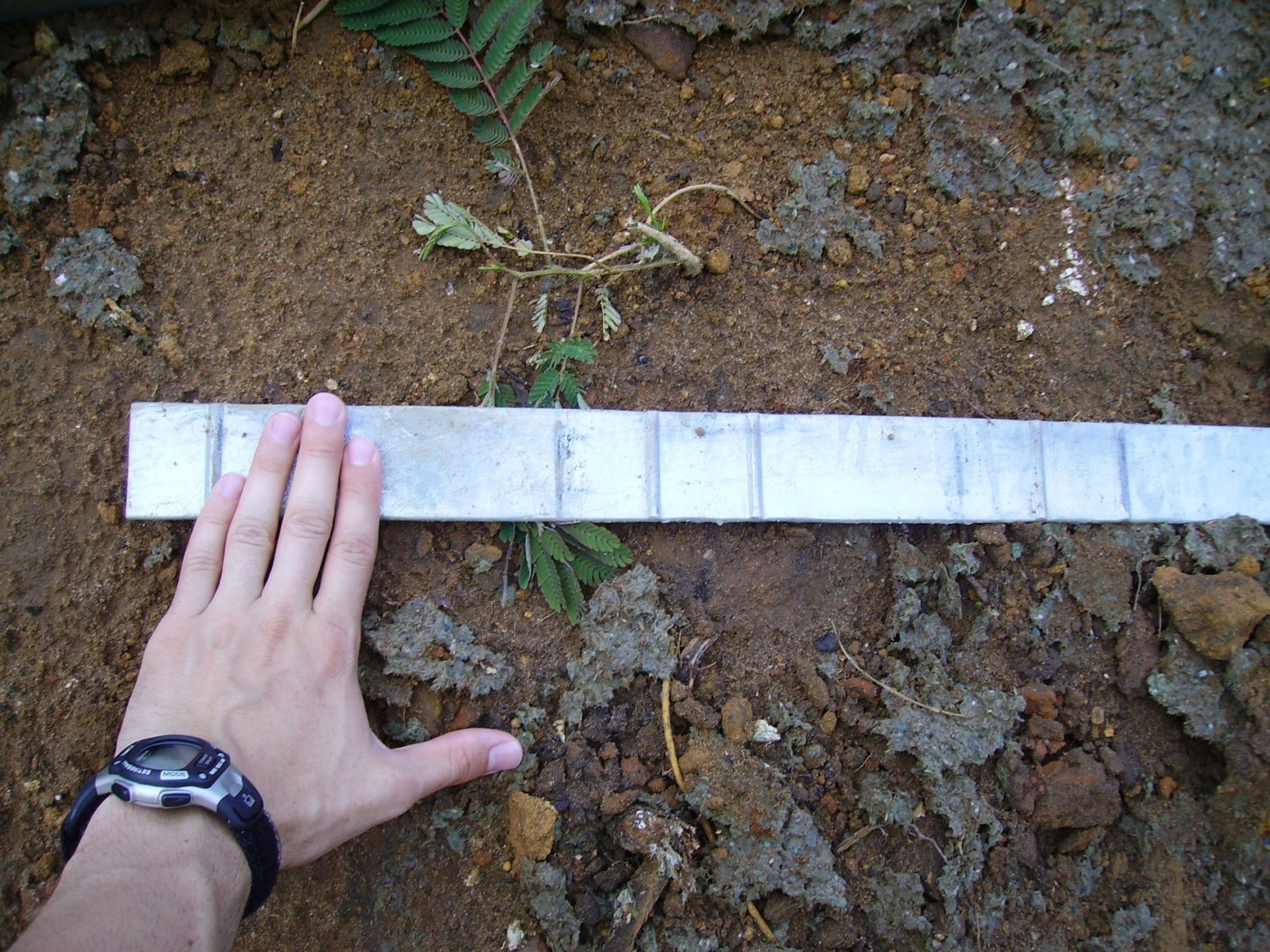








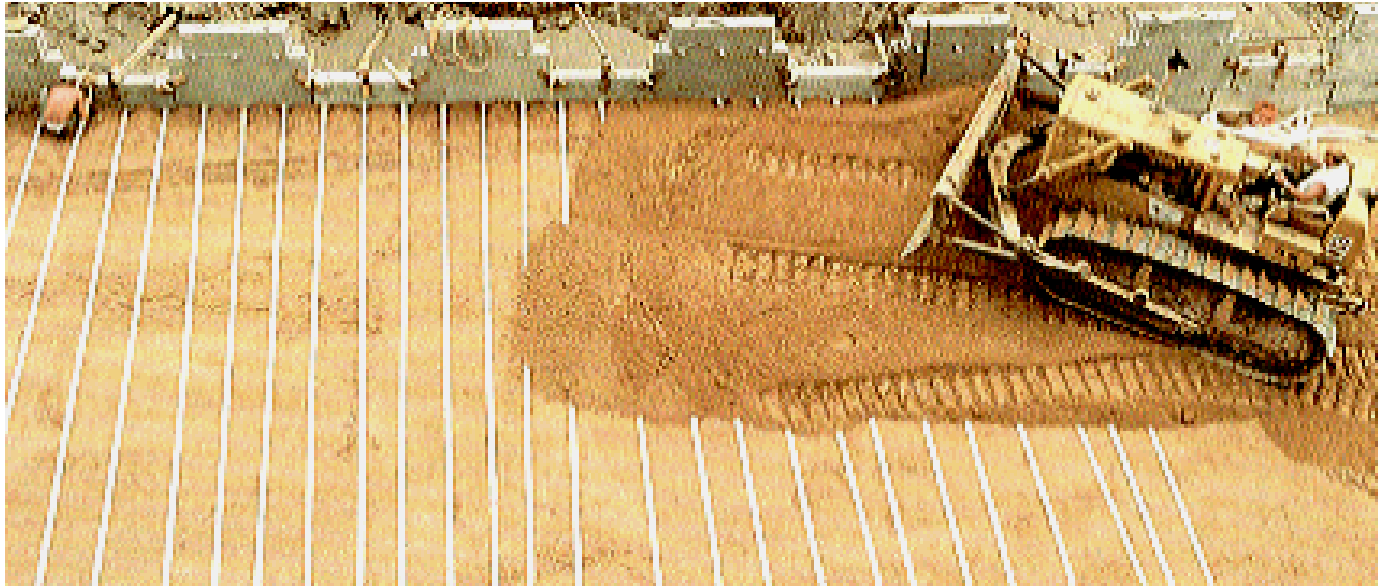










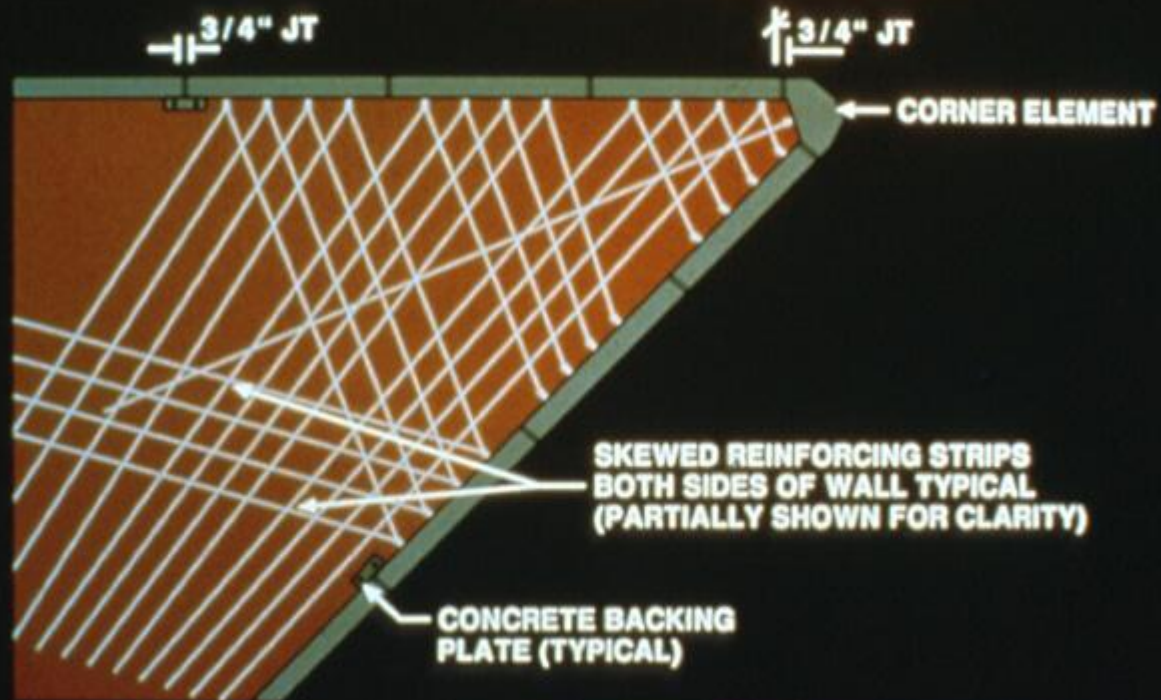


Mechanically Stabilized Earth Wall (MSE Wall)

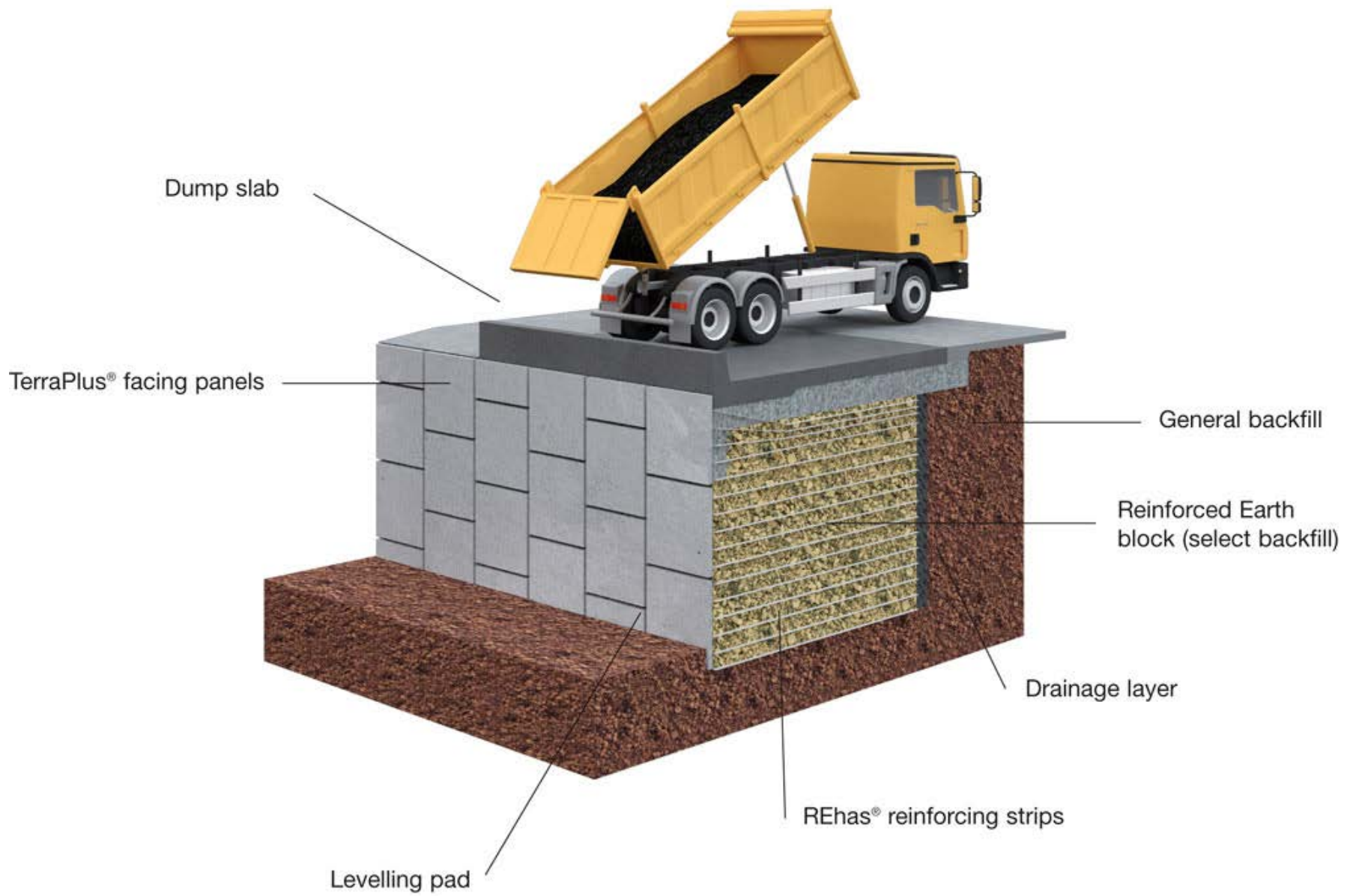




TYPICAL LAYOUT OF REINFORCING STRIPS FOR A 45° SKEW ABUTMENT













Using Geogrids





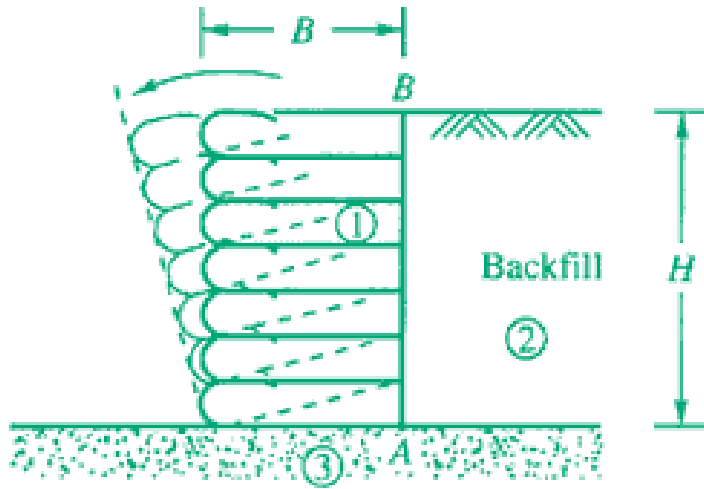


Tom Landry Highway, TX

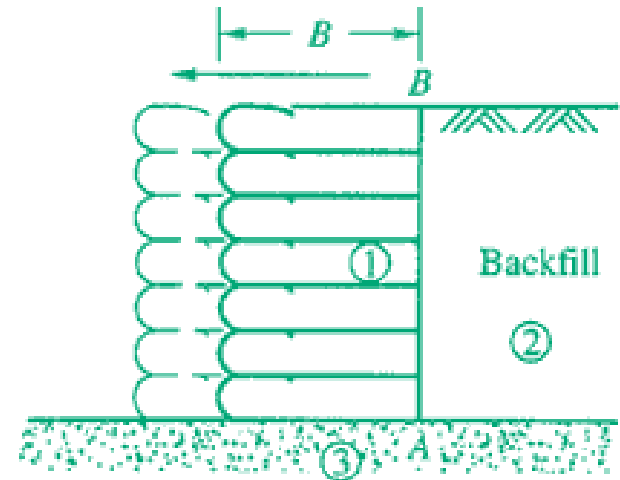


Stability of MSE Walls

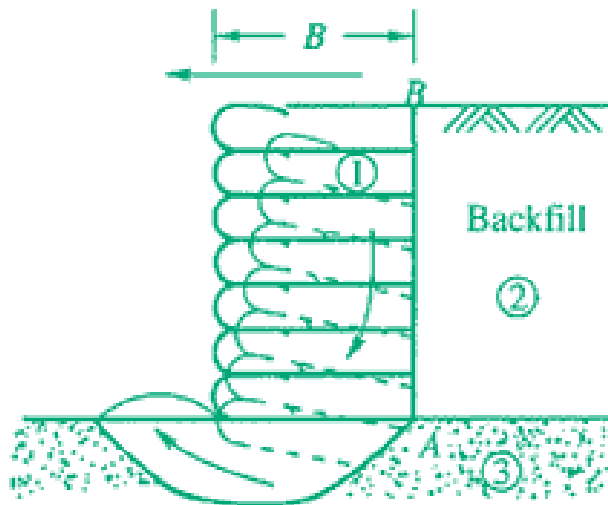
Stability of MSE Walls



(a) Overturning considerations

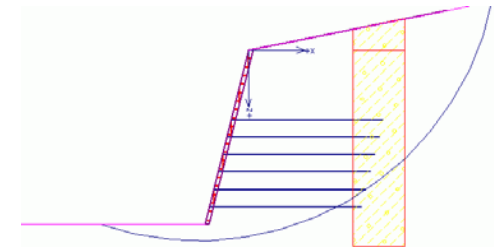


(b) Sliding considerations



(c) Foundation considerations

- ① Wall
- ② Backfill
- ③ Foundation soil



Block Failure



Geotechnical Design
CEG 4801
Fall 2004
By: Dr. Kamal Tawfiq



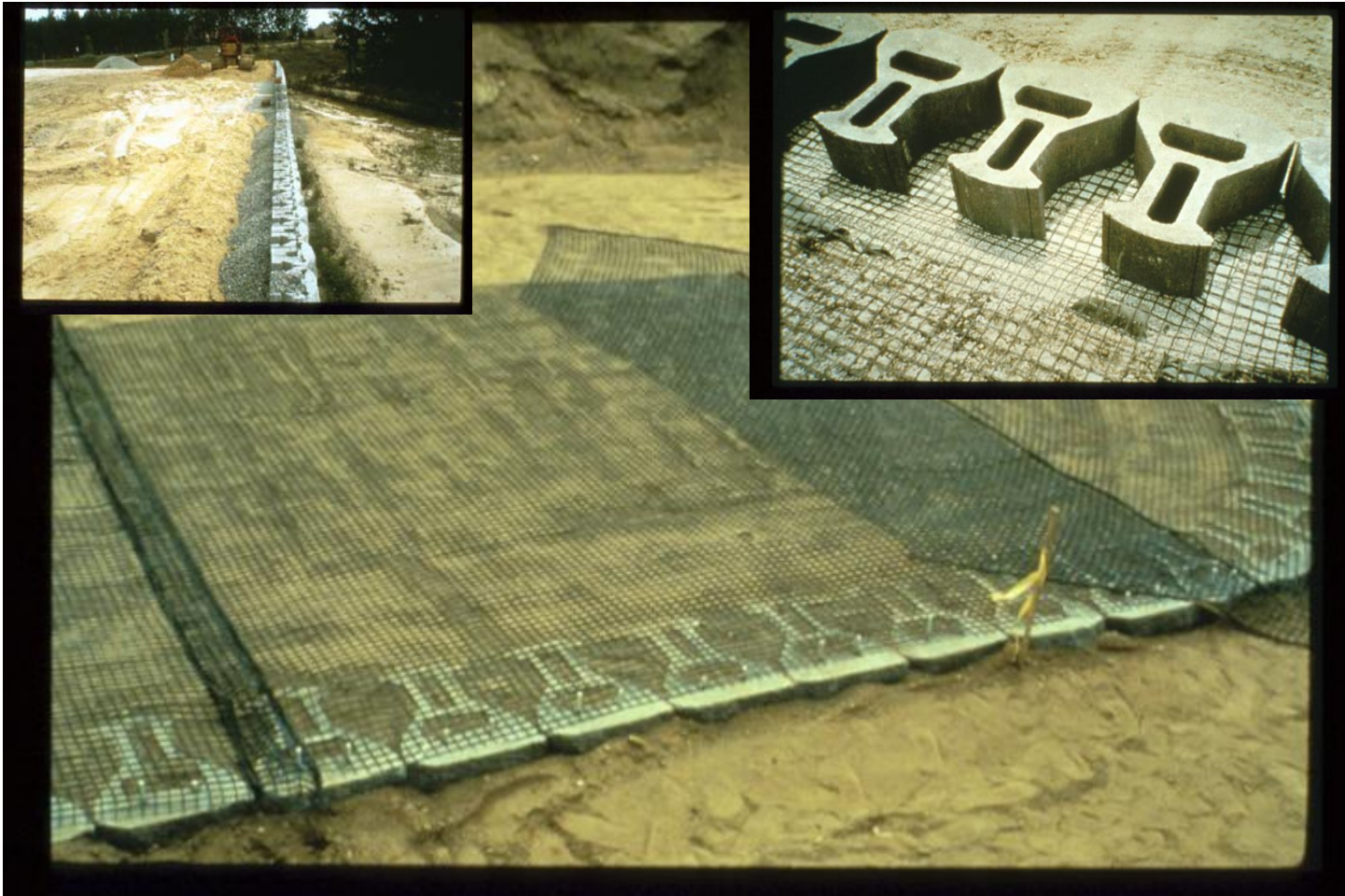
Mechanically Stabilized Earth Wall (MSE Wall)



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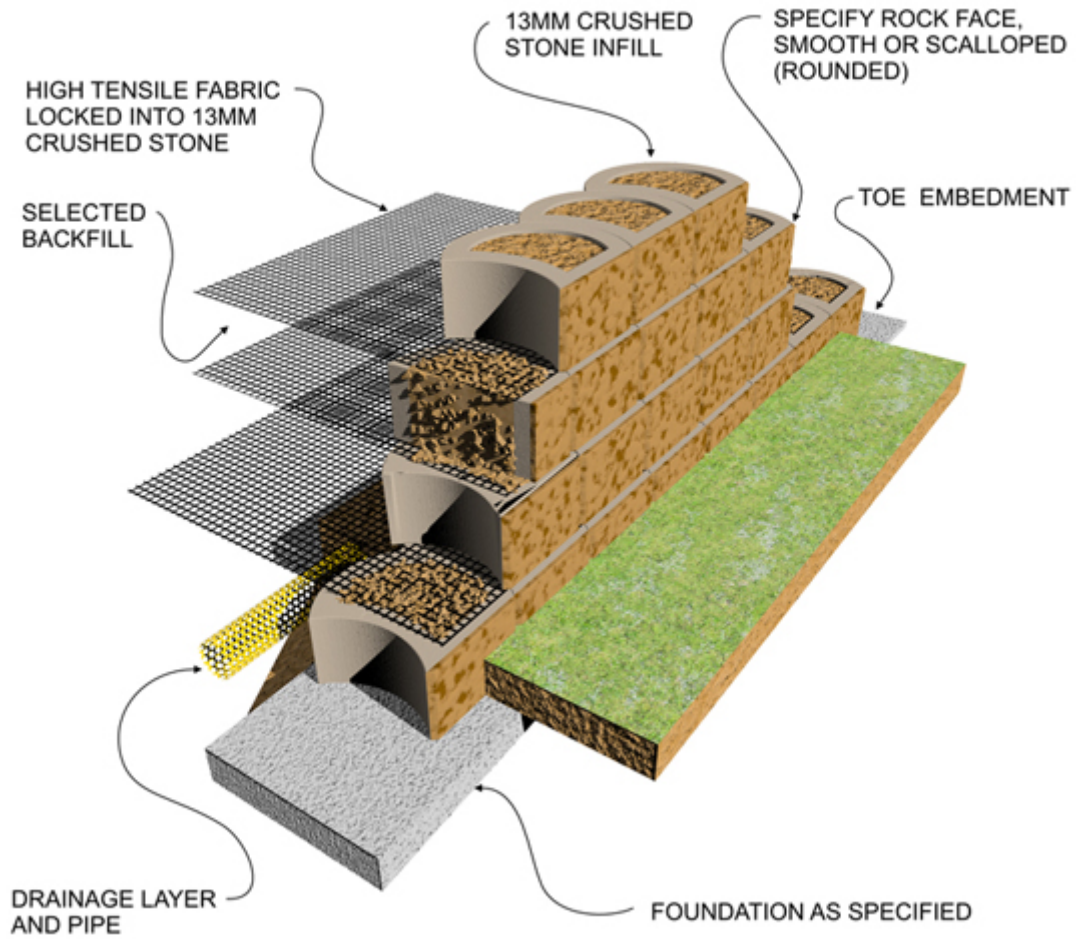
MSE Key Stone Wall

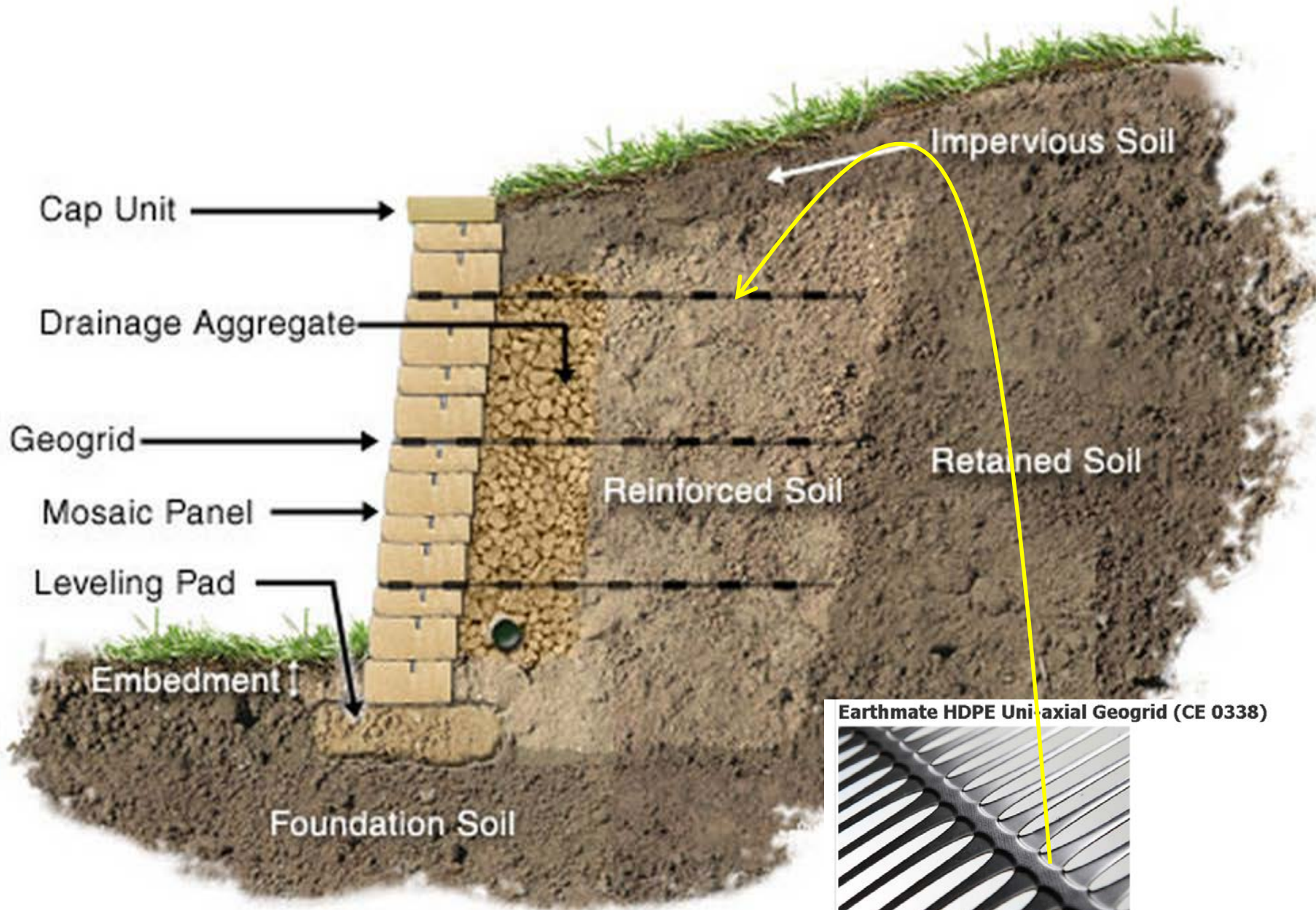
MSE Key Stone Wall



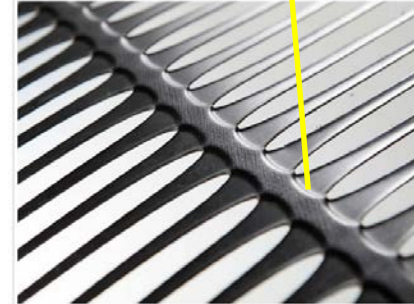


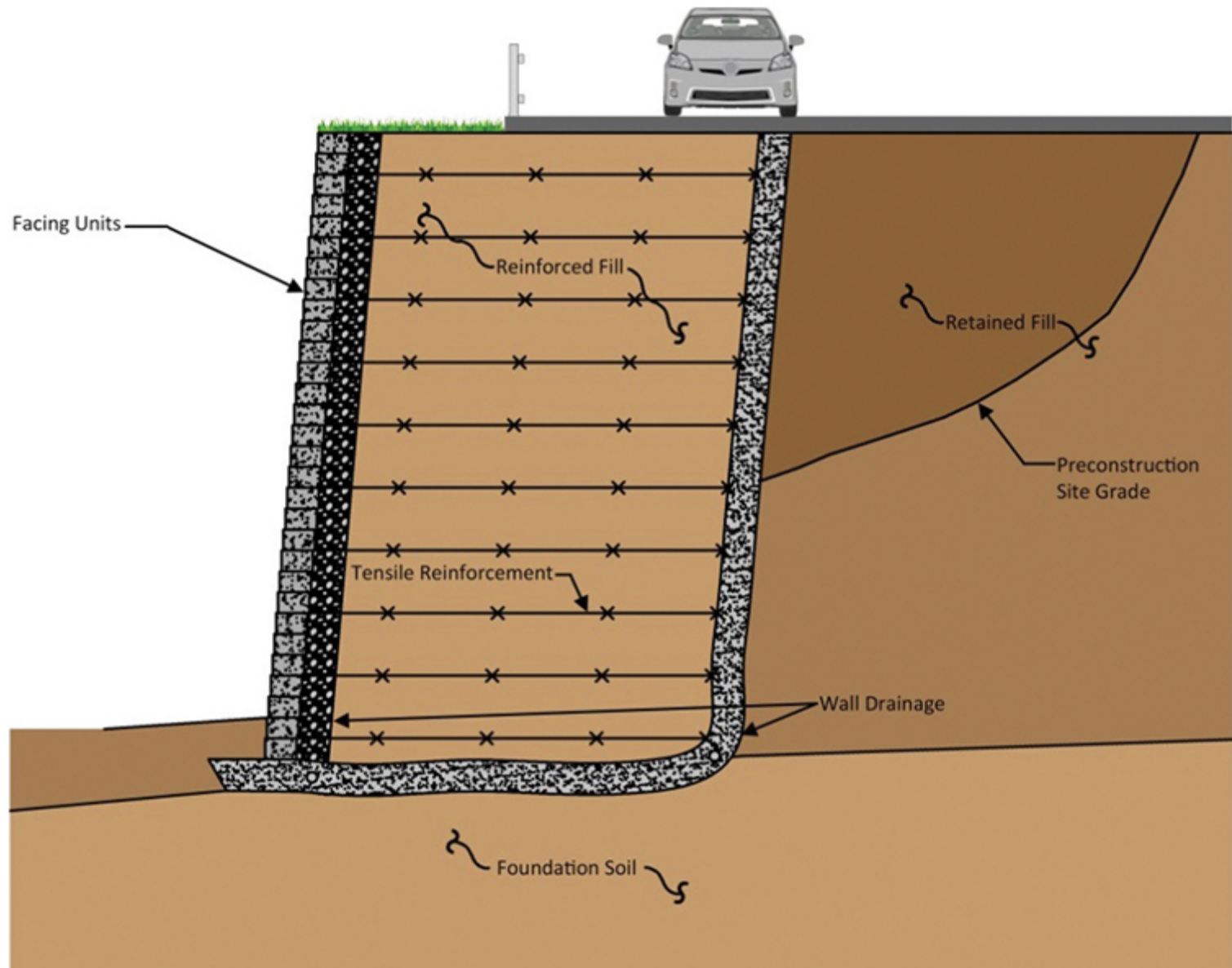


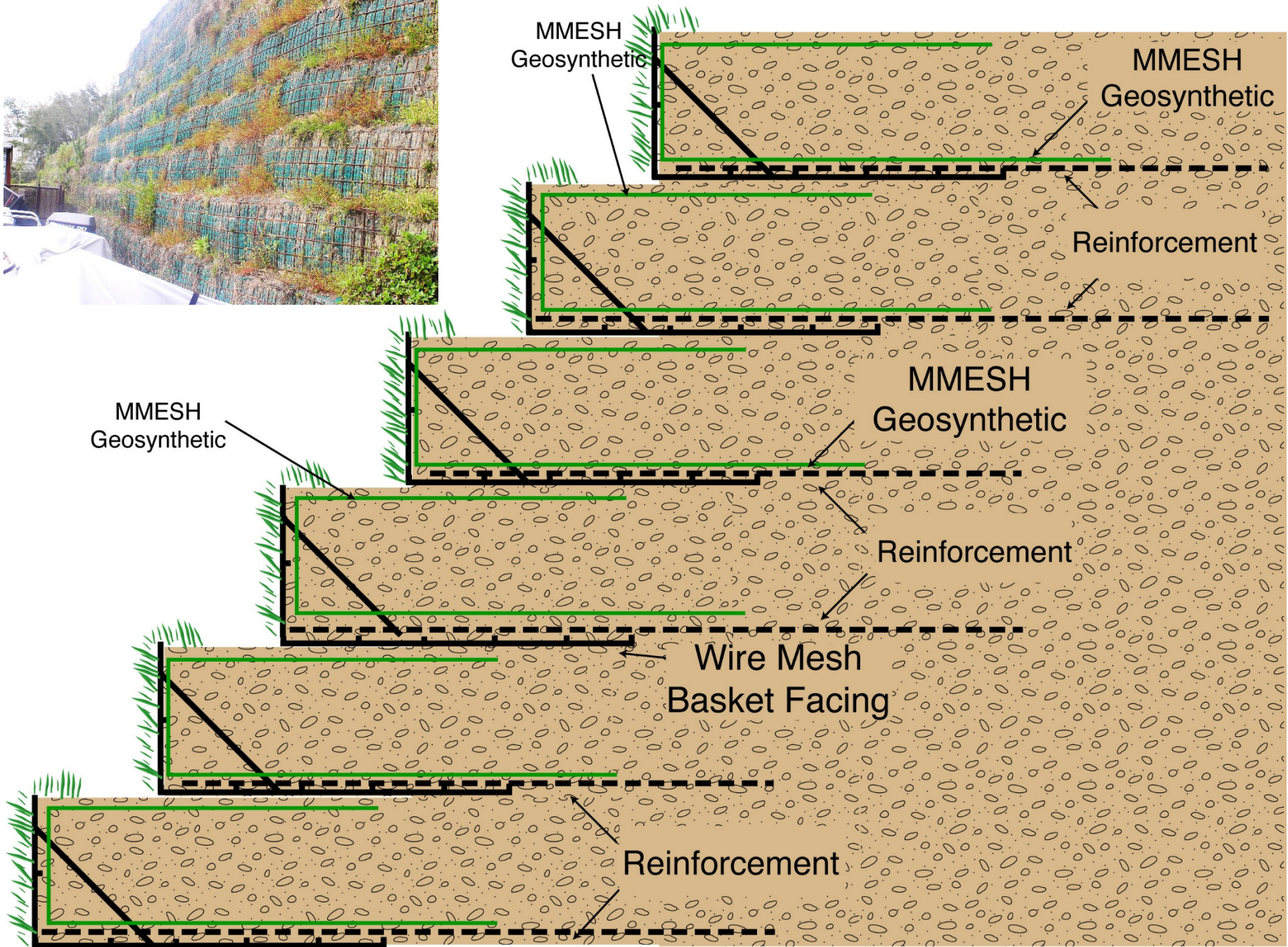
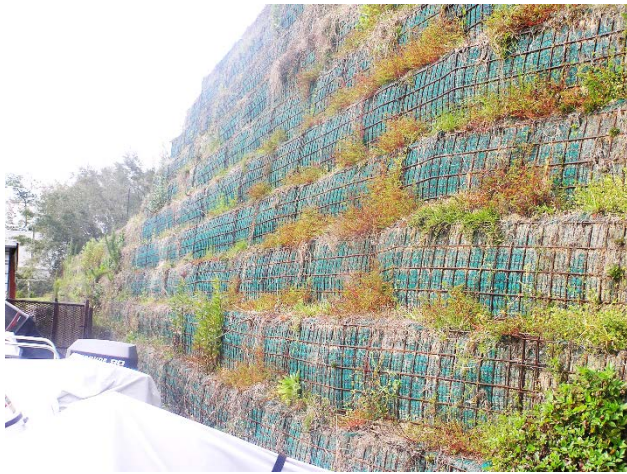




Earthmate HDPE Uni-axial Geogrid (CE 0338)

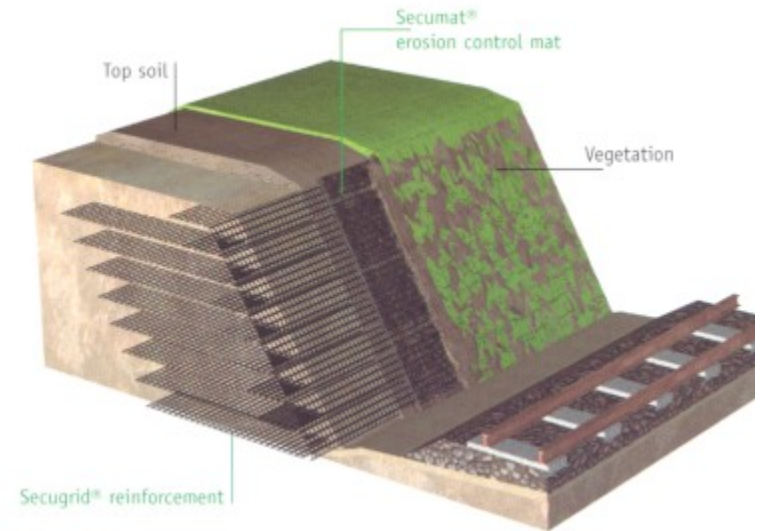
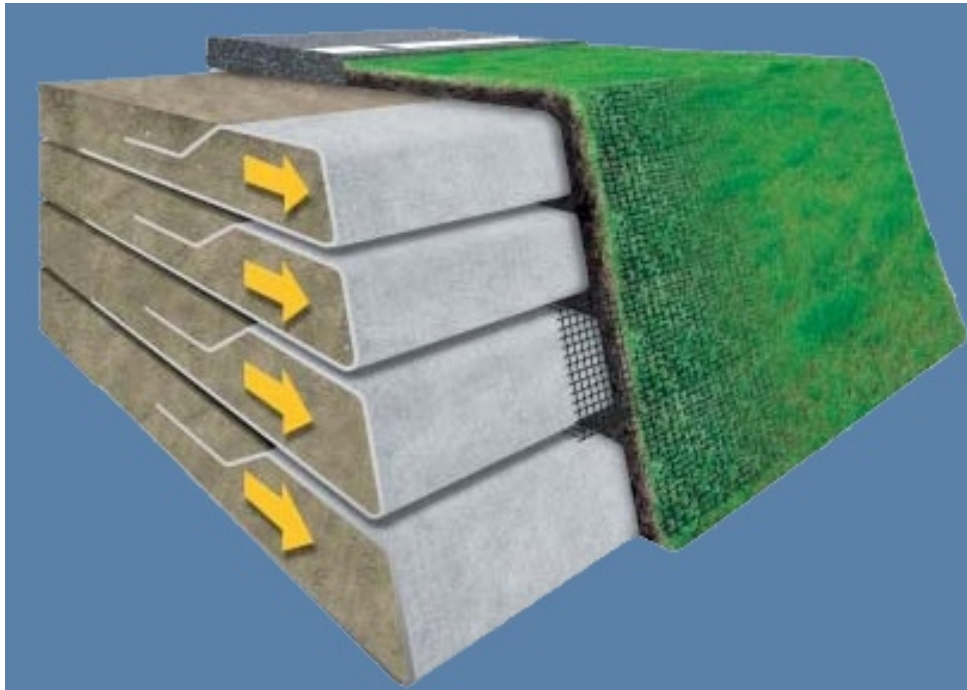




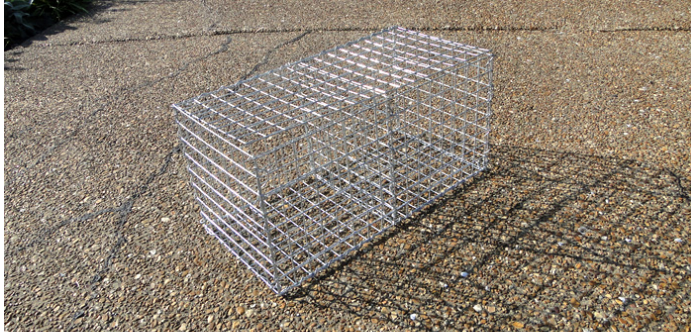




Geotextile Walls



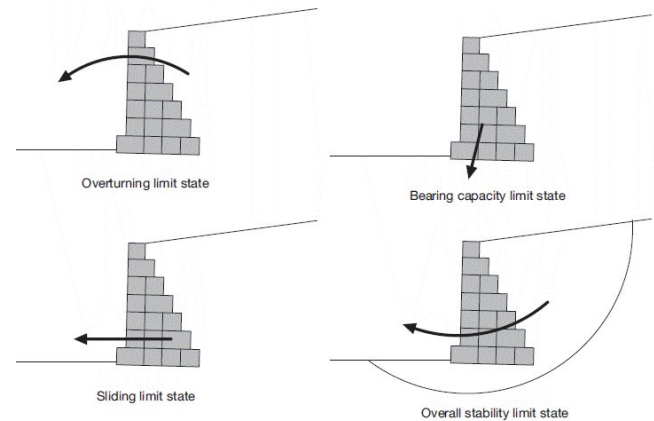
Gabion Walls



Each Gabion Basket is 1'-0" x 1'-0" and come in 2'-0" , 3'-0" and 4'-0" Lengths



Gabion Retaining Wall Design





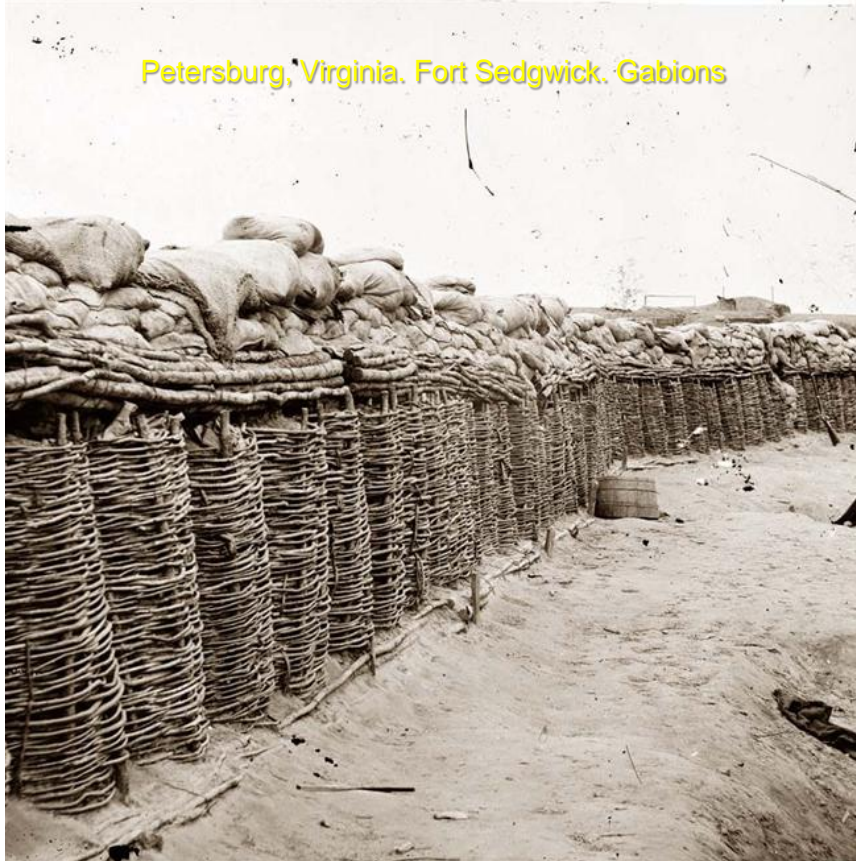
Gabion Walls

HESCO CONCERTAINER

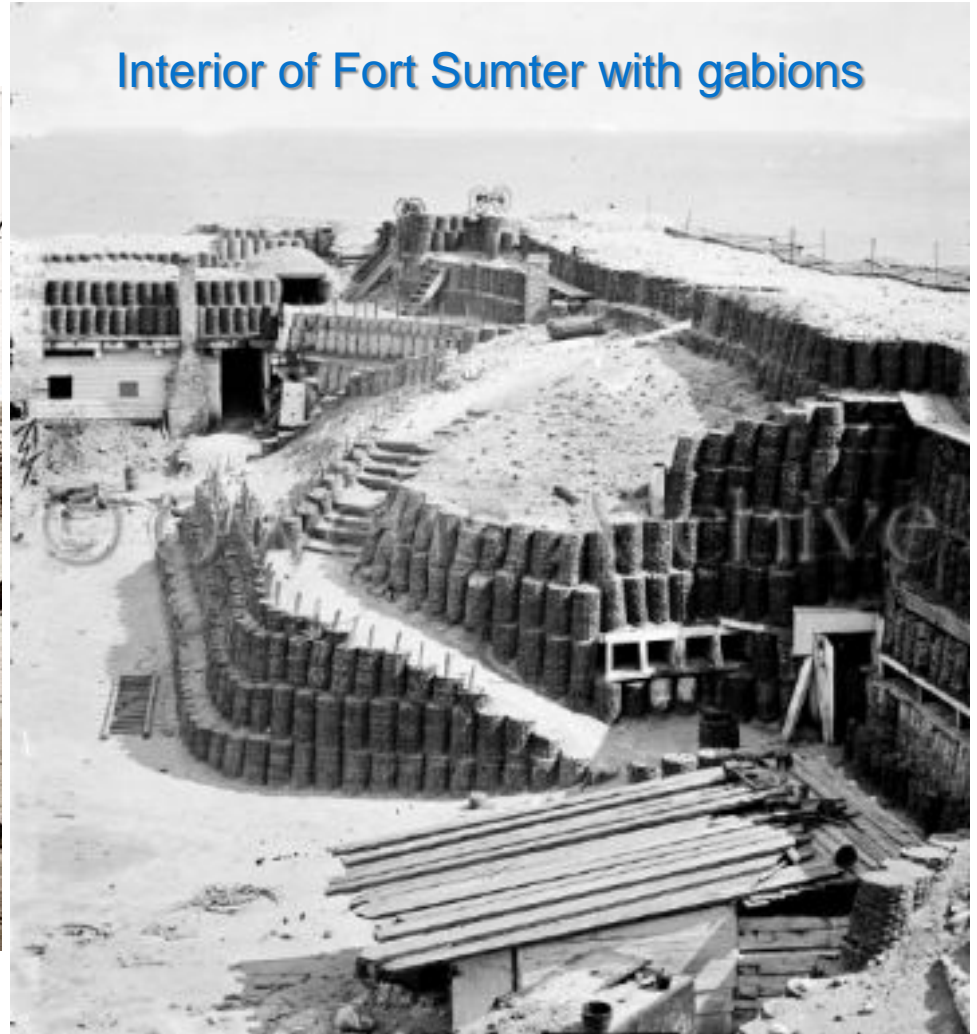
Military Accommodation Roofing, Personnel & Material Bunker Sets



Petersburg, Virginia. Fort Sedgwick. Gabions



Interior of Fort Sumter with gabions



Interior of the Union Fort Sedgwick, called by the Rebel Soldiers "Fort Hell,"
showing Union soldiers on the breastworks.
This View was taken the Morning after the storming of Petersburg, Va., April 2d, 1865.



Rebel fortifications in front of Atlanta, Georgia, in 1863 or 1864

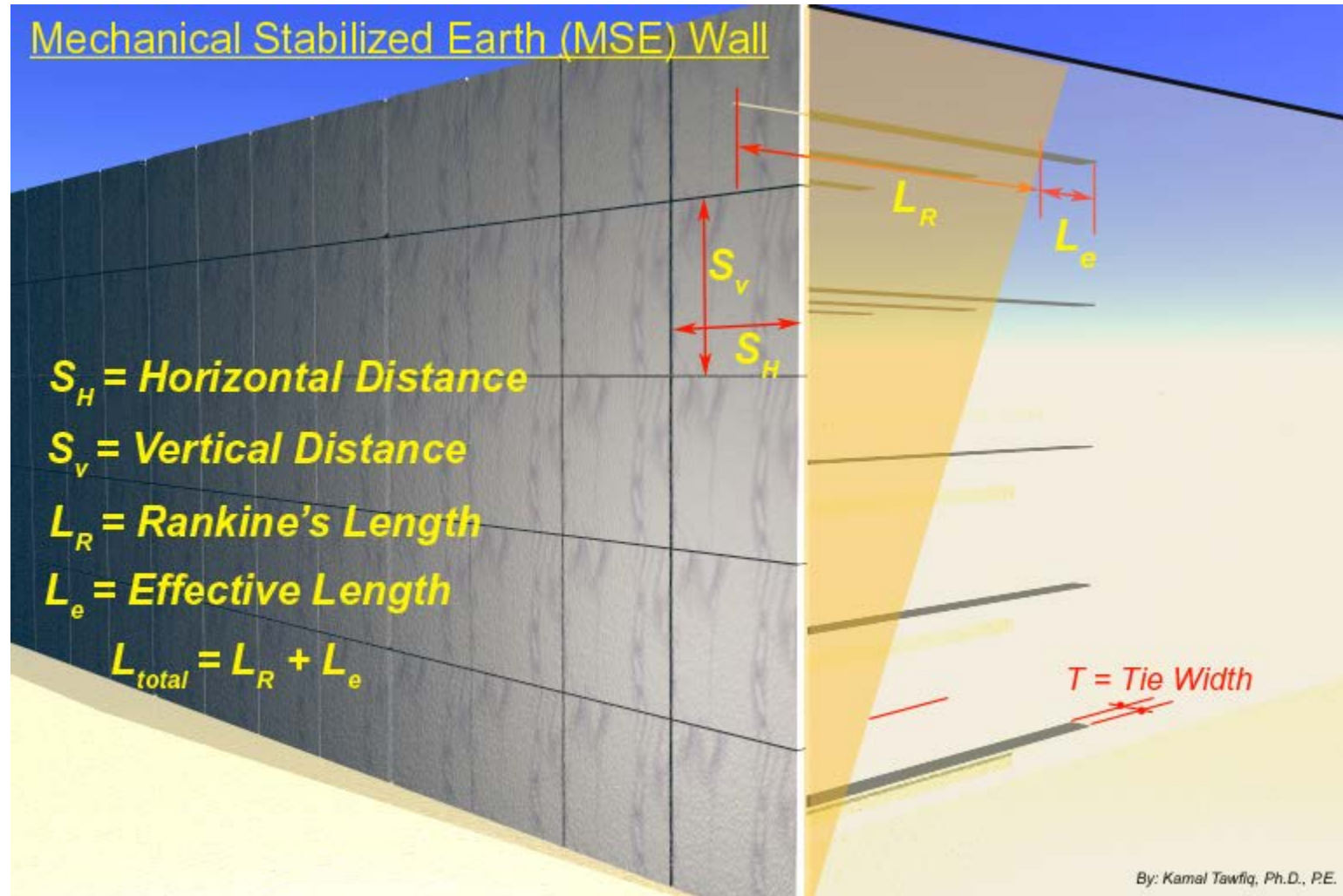


Gabions with **cannon**, from a late 16th century illustration.



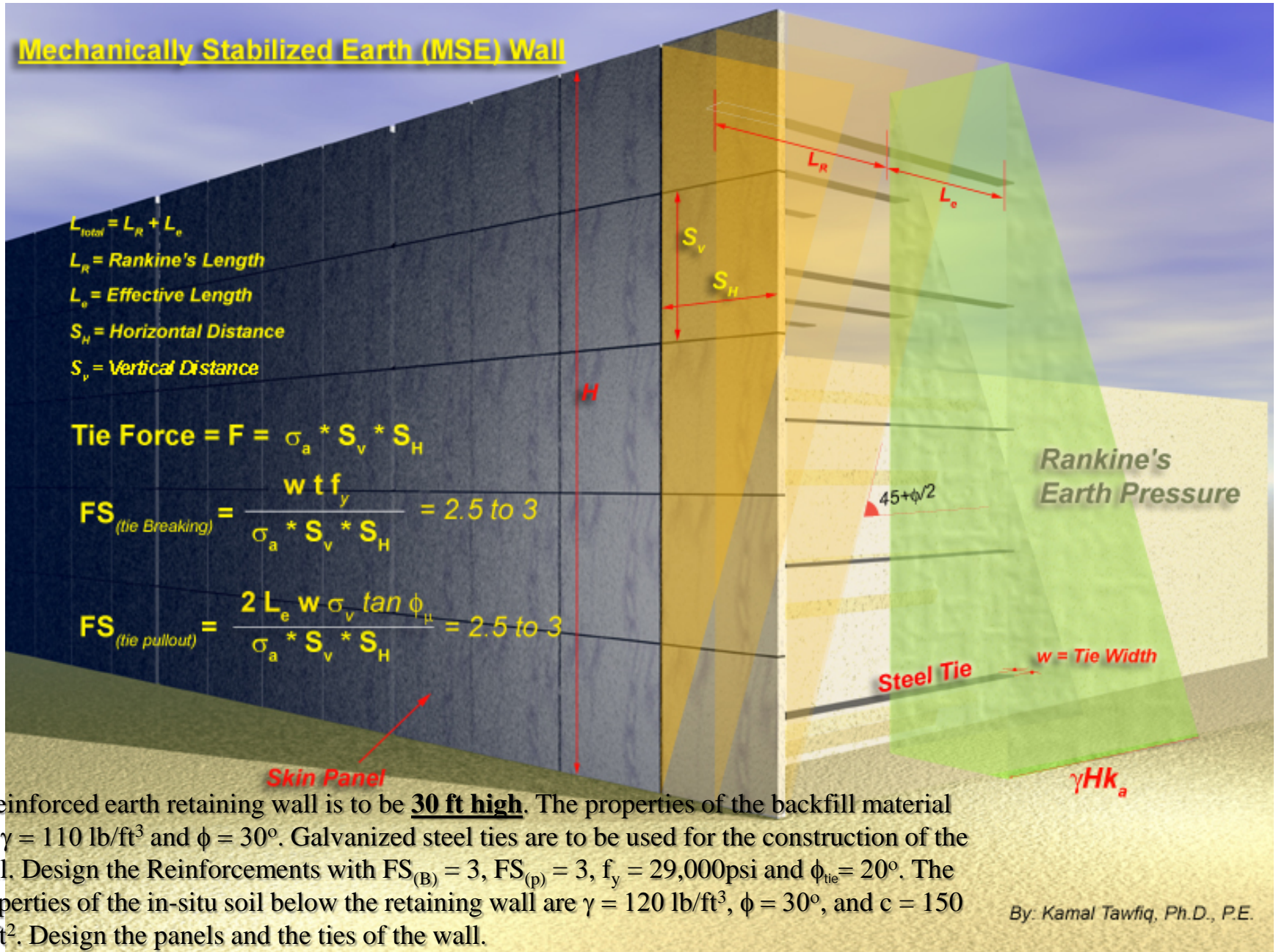
MSE Wall Analysis and Design

Mechanical Stabilized Earth (MSE) Wall



A reinforced earth retaining wall is to be **30 ft high**. The properties of the backfill material are $\gamma = 110 \text{ lb/ft}^3$ and $\phi = 30^\circ$. Galvanized steel ties are to be used for the construction of the wall. Design the Reinforcements with $FS_{(B)} = 3$, $FS_{(p)} = 3$, $f_y = 29,000 \text{ psi}$ and $\phi_{tie} = 20^\circ$. The properties of the in-situ soil below the retaining wall are $\gamma = 120 \text{ lb/ft}^3$, $\phi = 30^\circ$, and $c = 150 \text{ lb/ft}^2$. Design the panels and the ties of the wall.

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