Mechanically Stabilized Earth (MSE) Wall Project

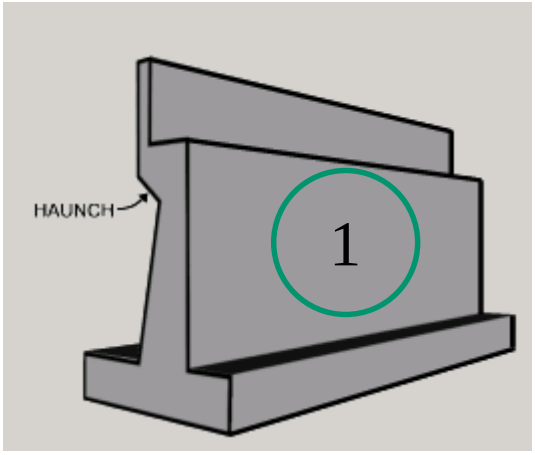
Geotechnical Design

CEG 4801

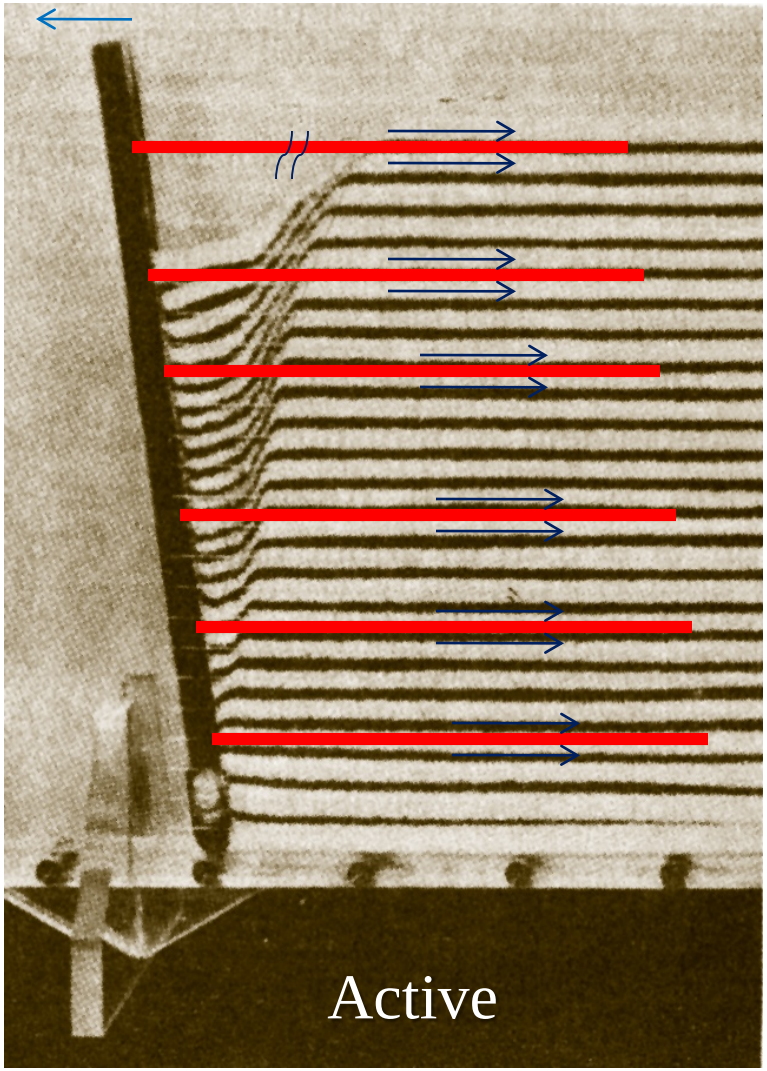
Spring 2017

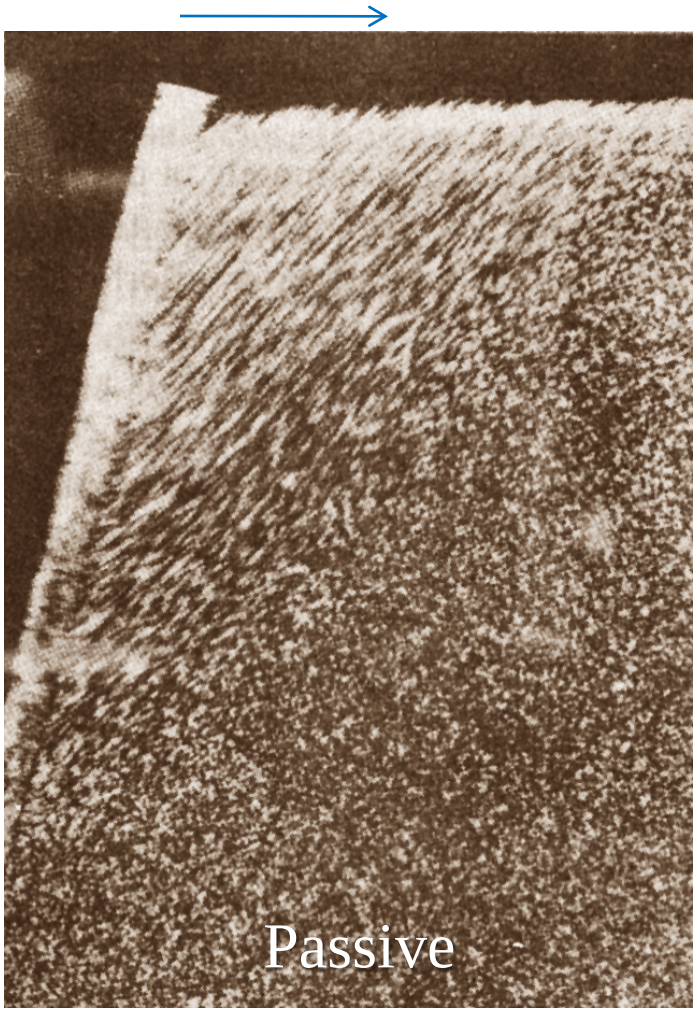
Kamal Tawfiq, Ph.D., P.E.

Choices for Bridge Abutments



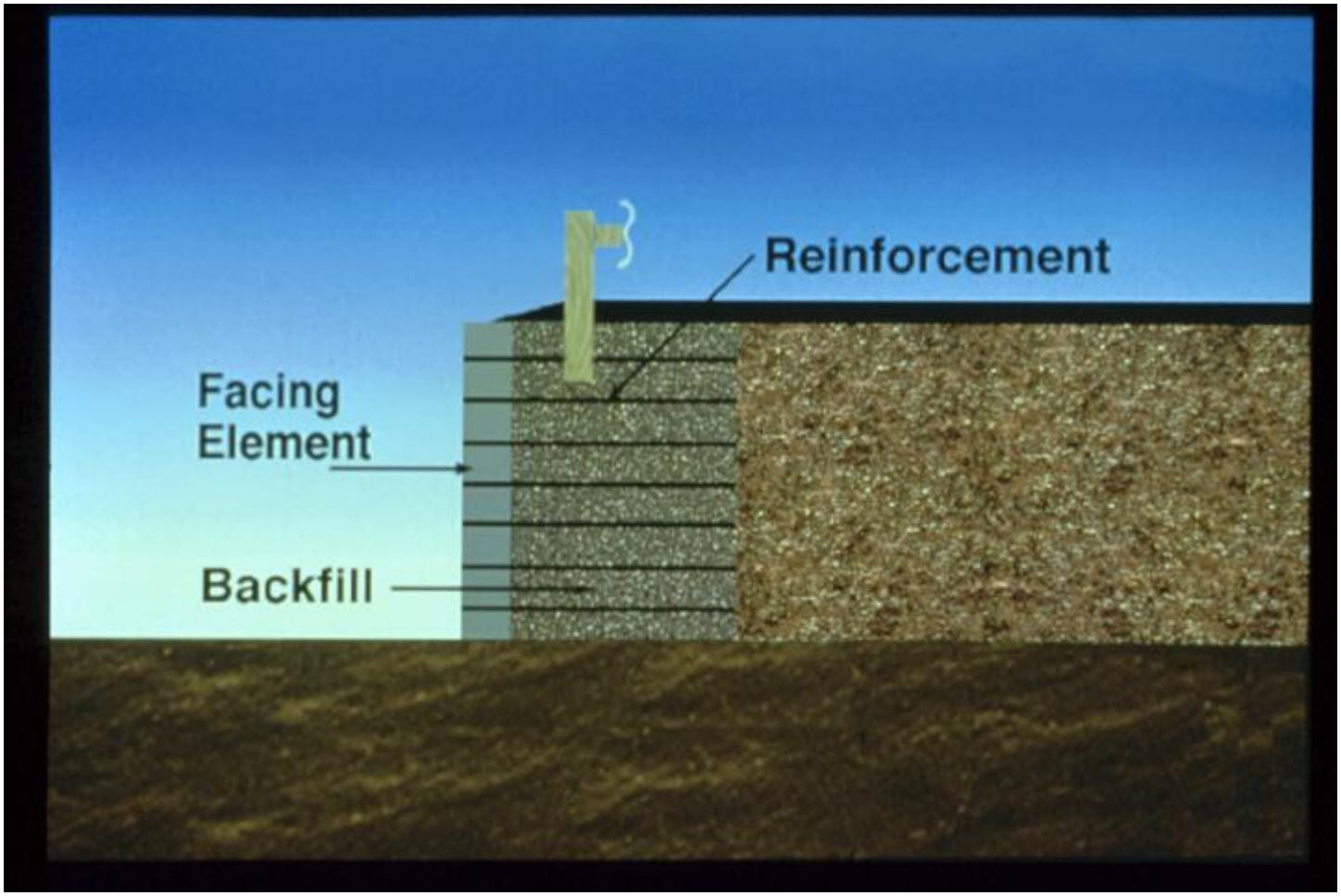
Geotechnical Design
CEG 4801
Fall 2010
By: Dr. Kamal Tawfiq



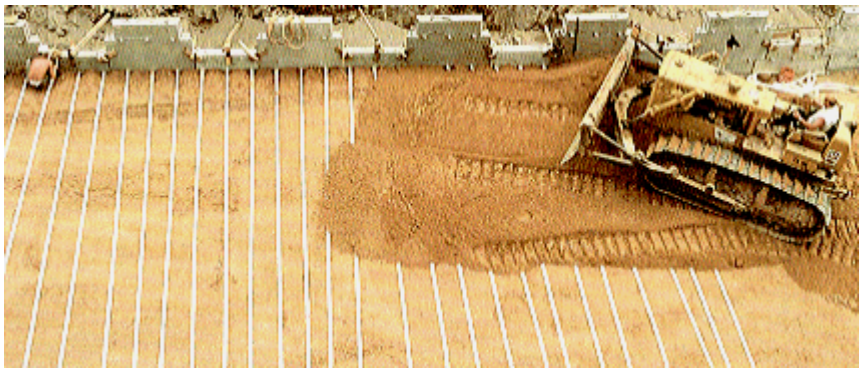


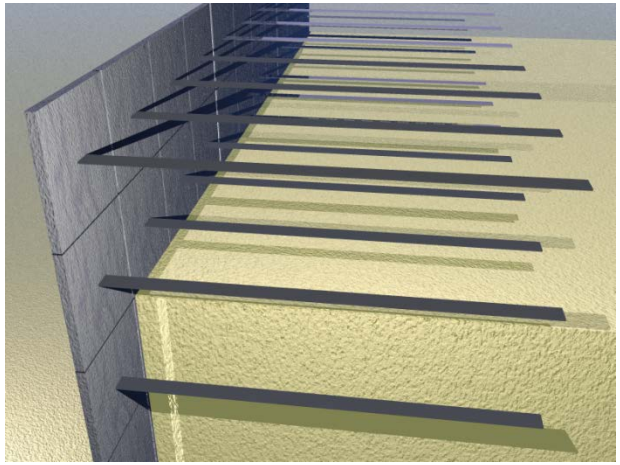
Earth Pressure Behind Retaining Wall

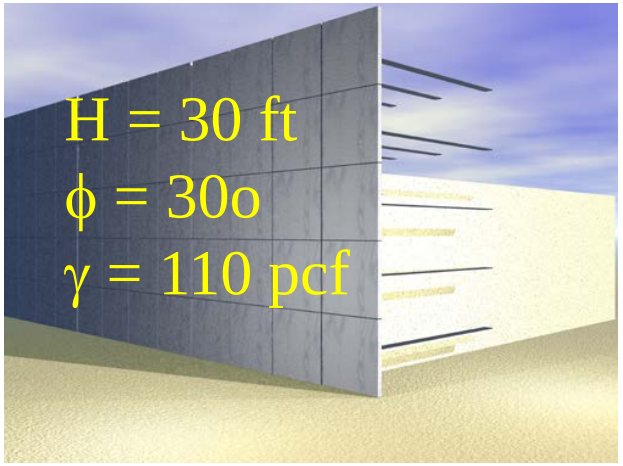
French architect and engineer
Henri **Vidal** in the early 1960s

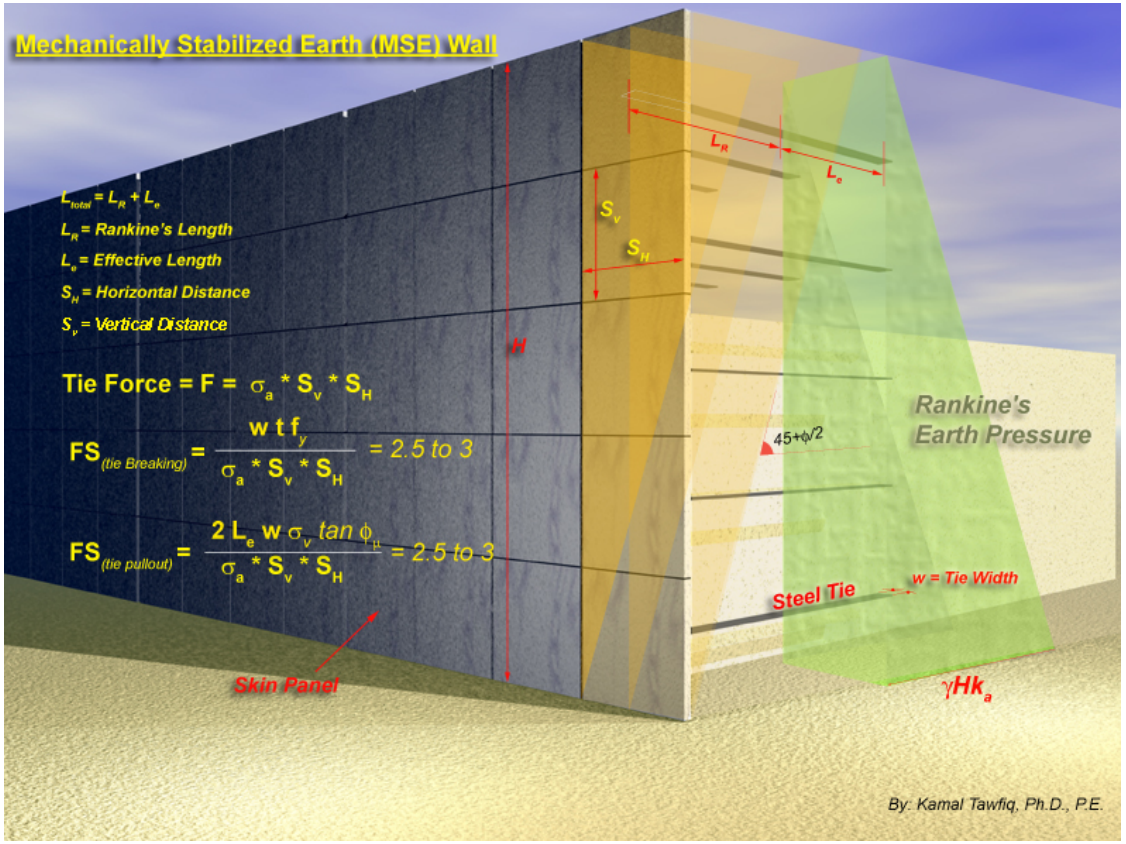

Reinforcement
Facing
Element
Backfill

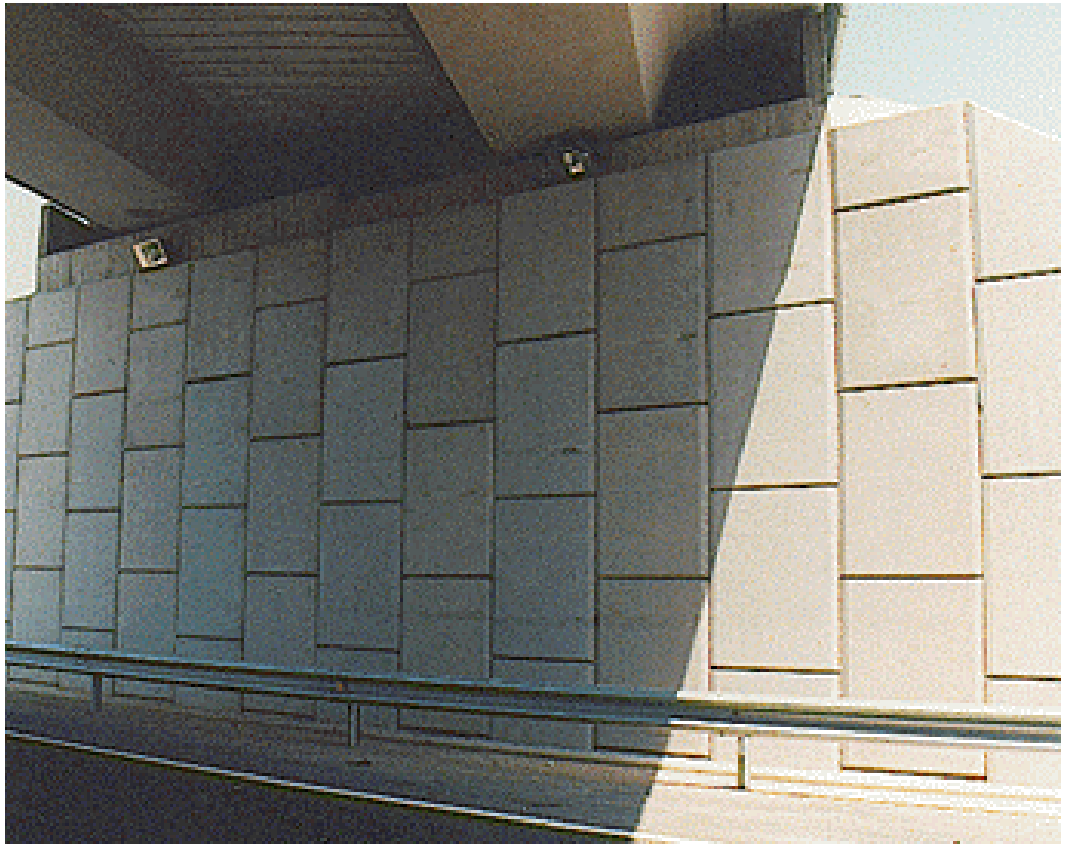
Mechanically Stabilized Earth (MSE) Walls or Segmental Walls







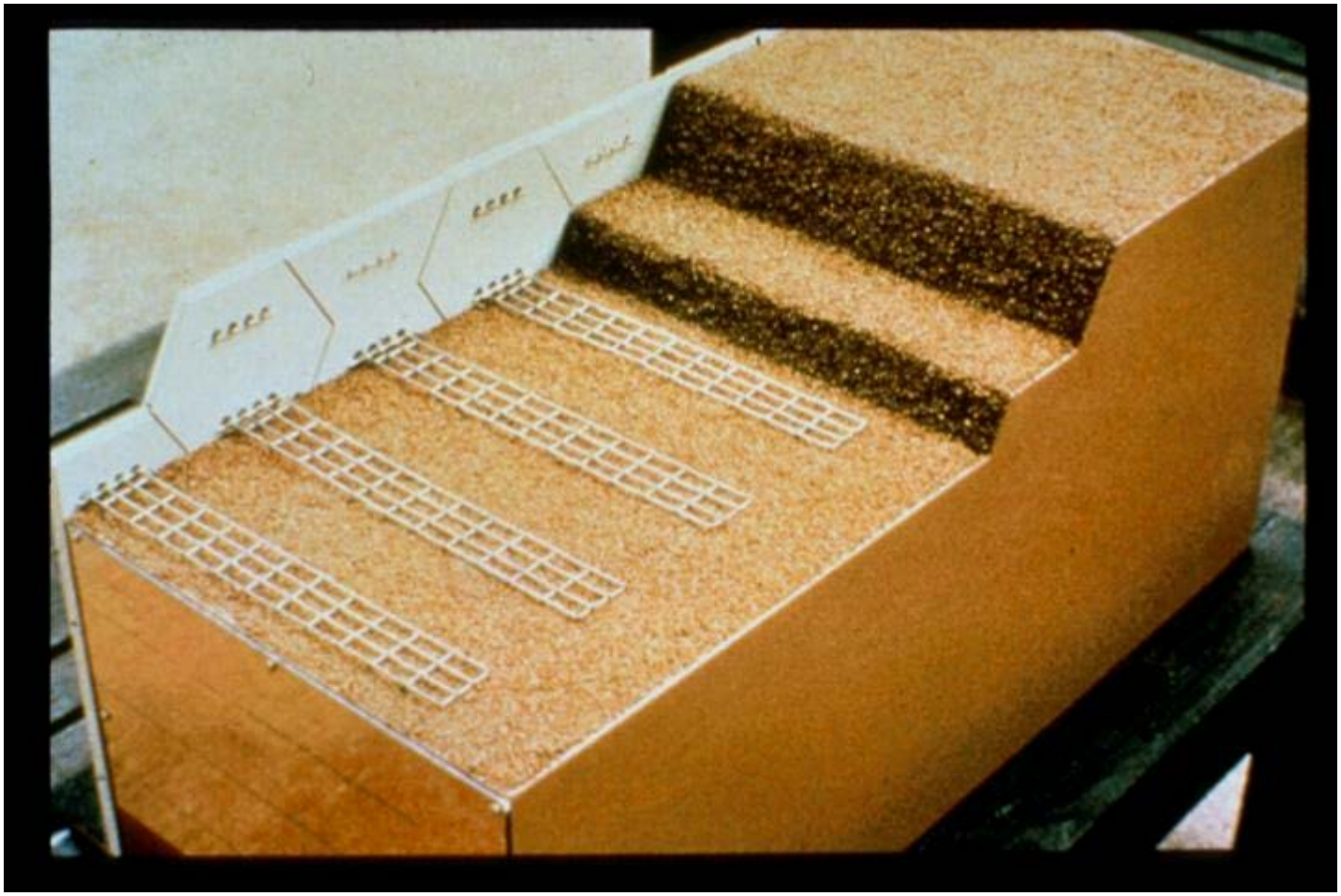




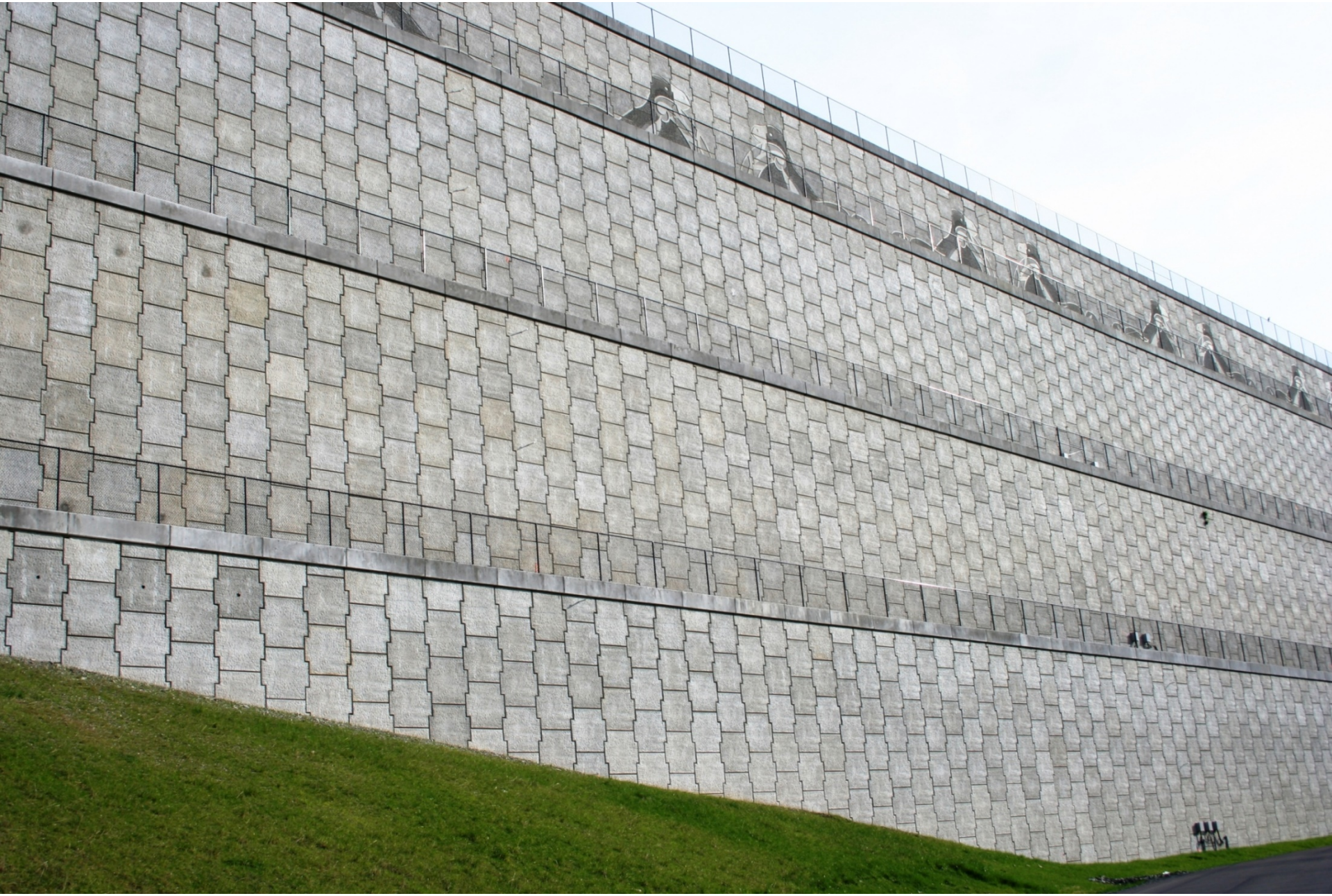
Mechanically Stabilized Earth Wall (MSE Wall)

Mechanically Stabilized Earth Wall (MSE Wall)

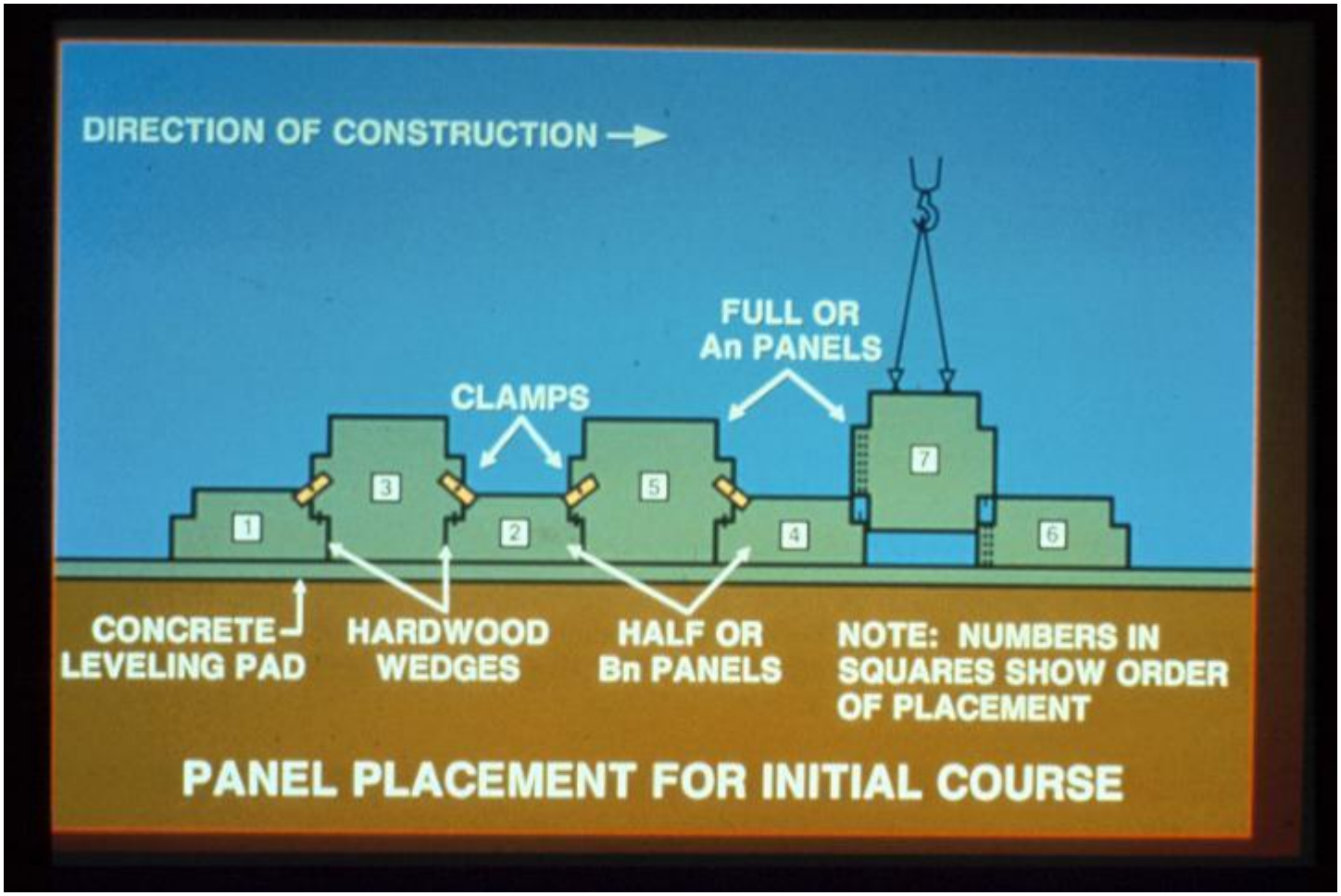
Using Galvanized Steel

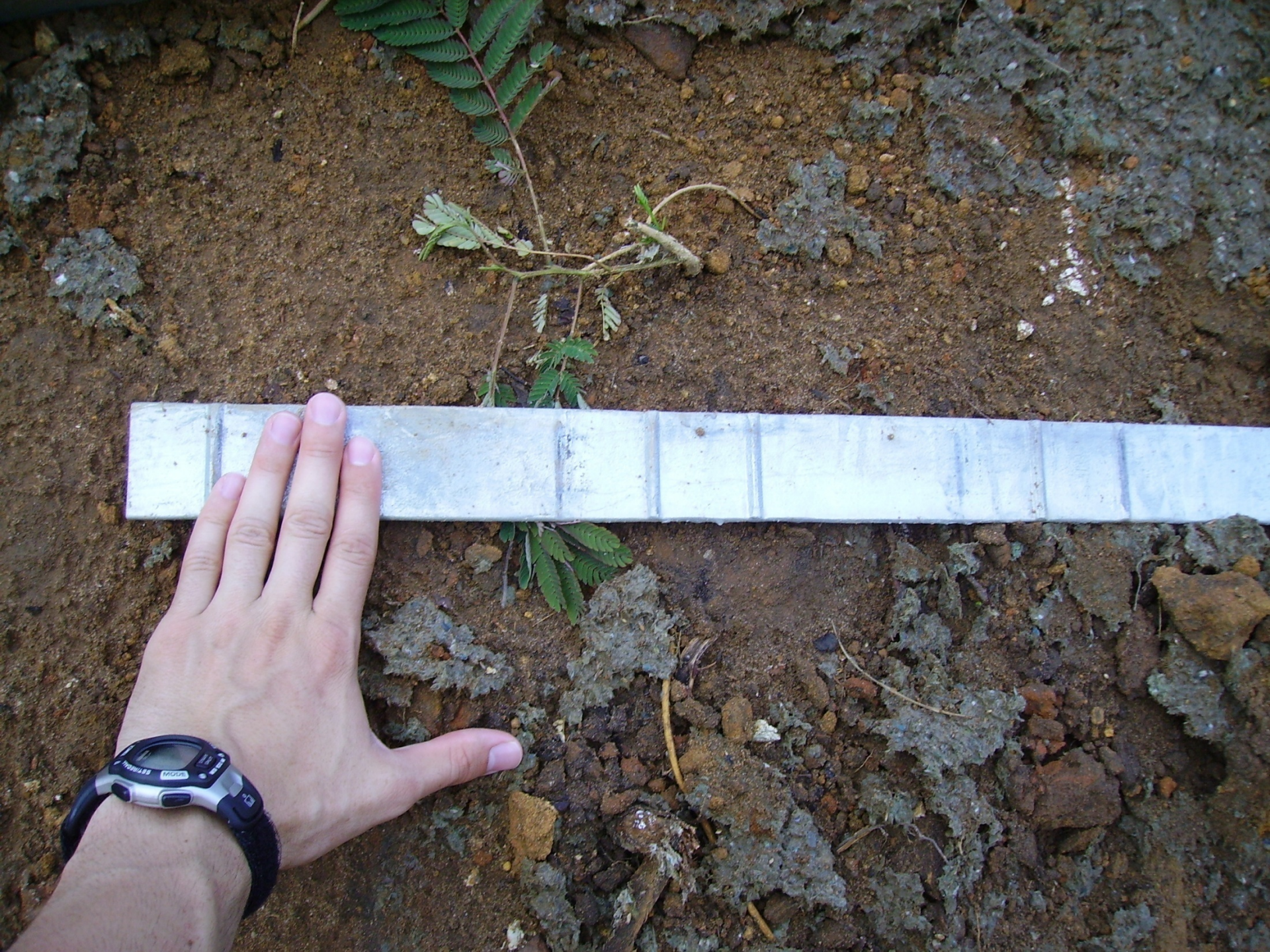


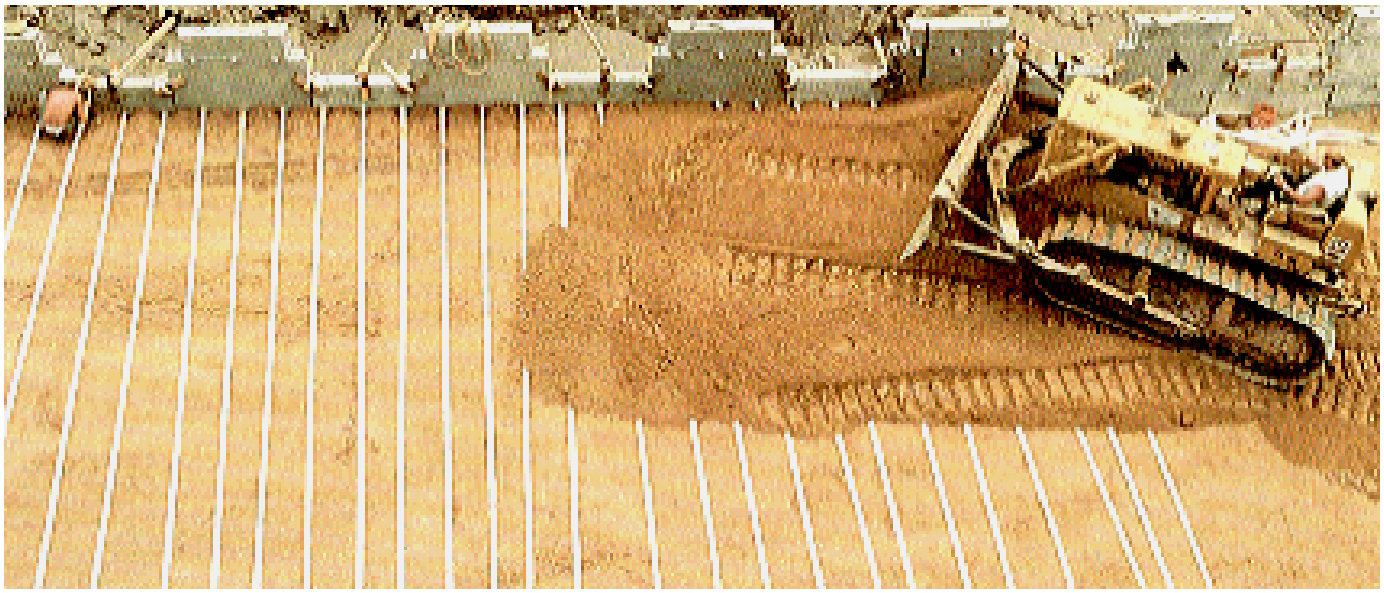
Seattle-Tacoma International Airport, WA



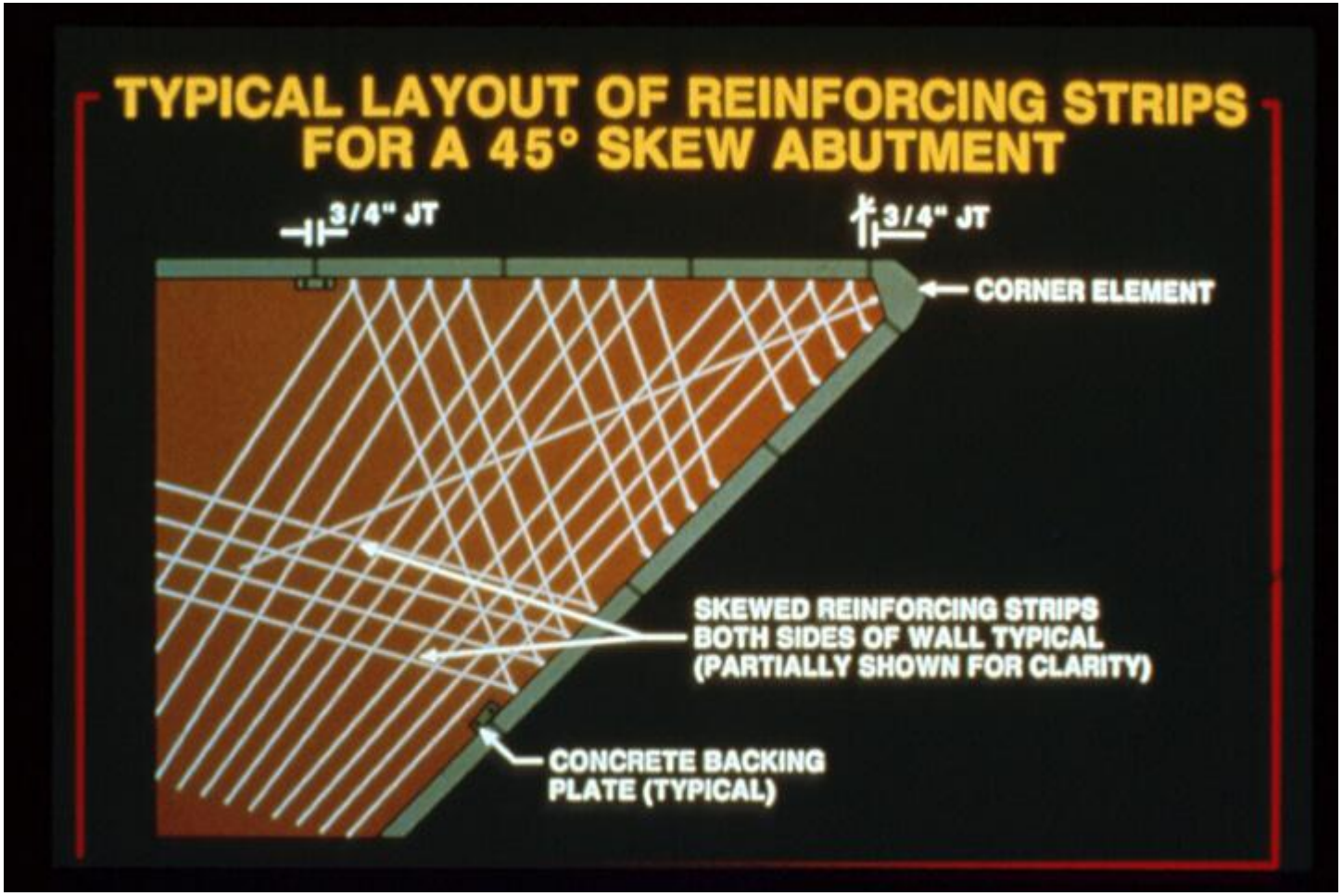

UNIFORMS
636-4080


DIRECTION OF CONSTRUCTION
FULL OR
An PANELS
CLAMPS
1
2
3
4
5
6
7
CONCRETE
LEVELING PAD
HARDWOOD
WEDGES
HALF OR
Bn PANELS
NOTE: NUMBERS IN
SQUARES SHOW ORDER
OF PLACEMENT
PANEL PLACEMENT FOR INITIAL COURSE

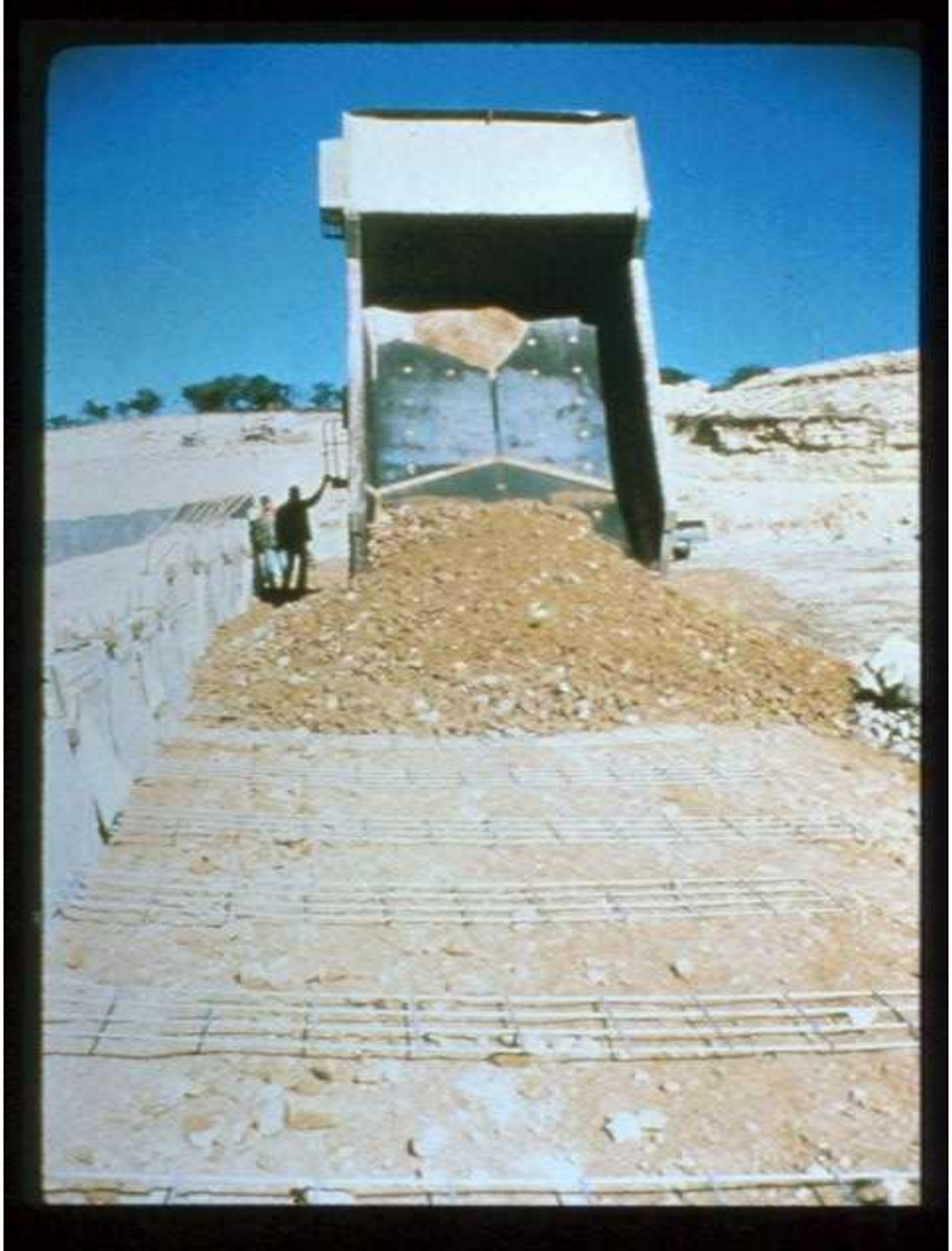




Mechanically Stabilized Earth Wall (MSE Wall)


TYPICAL LAYOUT OF REINFORCING STRIPS FOR A 45° SKEW ABUTMENT
3/4" JT
3/4" JT
CORNER ELEMENT
SKEWED REINFORCING STRIPS
BOTH SIDES OF WALL TYPICAL
(PARTIALLY SHOWN FOR CLARITY)
CONCRETE BACKING
PLATE (TYPICAL)


Dump slab
TerraPlus® facing panels
General backfill
Reinforced Earth block (select backfill)
Drainage layer
REhas® reinforcing strips
Levelling pad

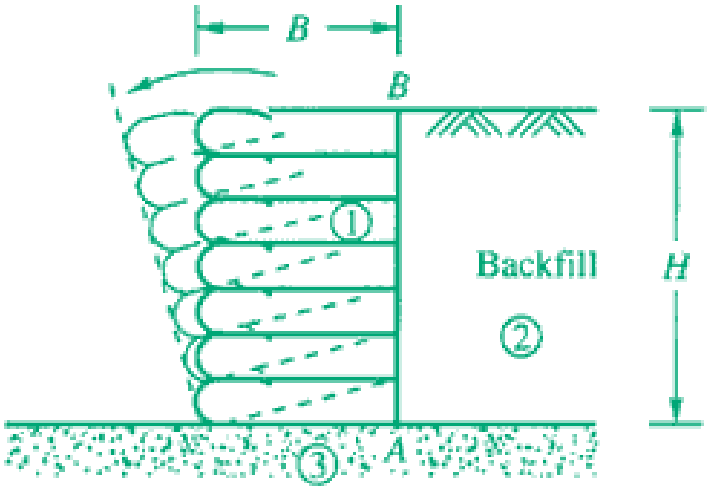


Using Geogrids

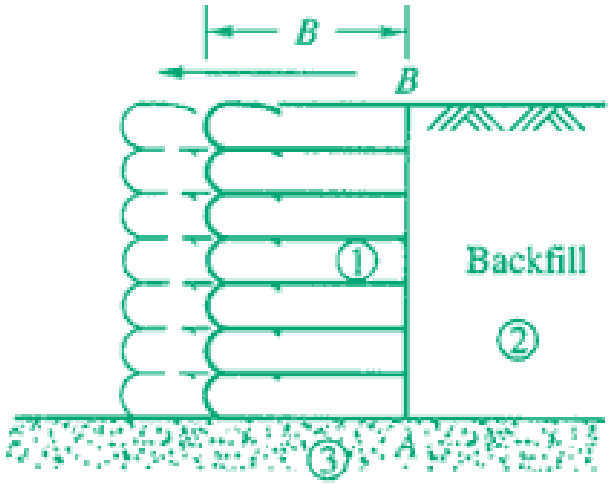
Tom Landry Highway, TX

Stability of MSE Walls

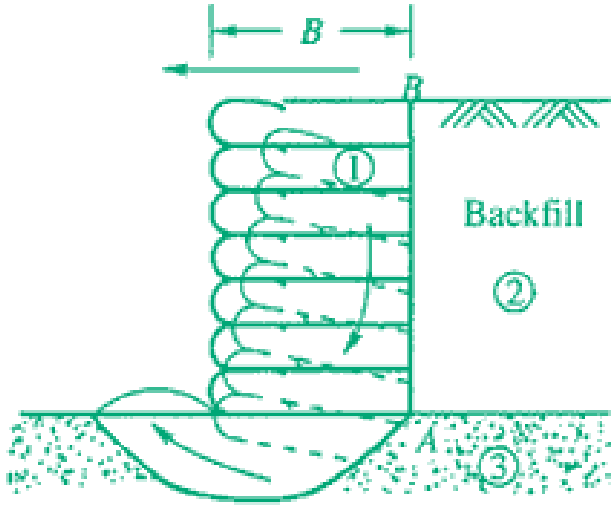
Stability of MSE Walls



(a) Overturning considerations



(b) Sliding considerations

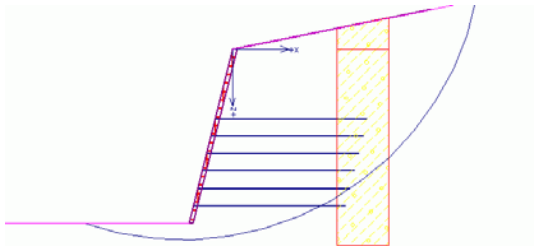


(c) Foundation considerations

① Wall

② Backfill

③ Foundation soil



Block Failure

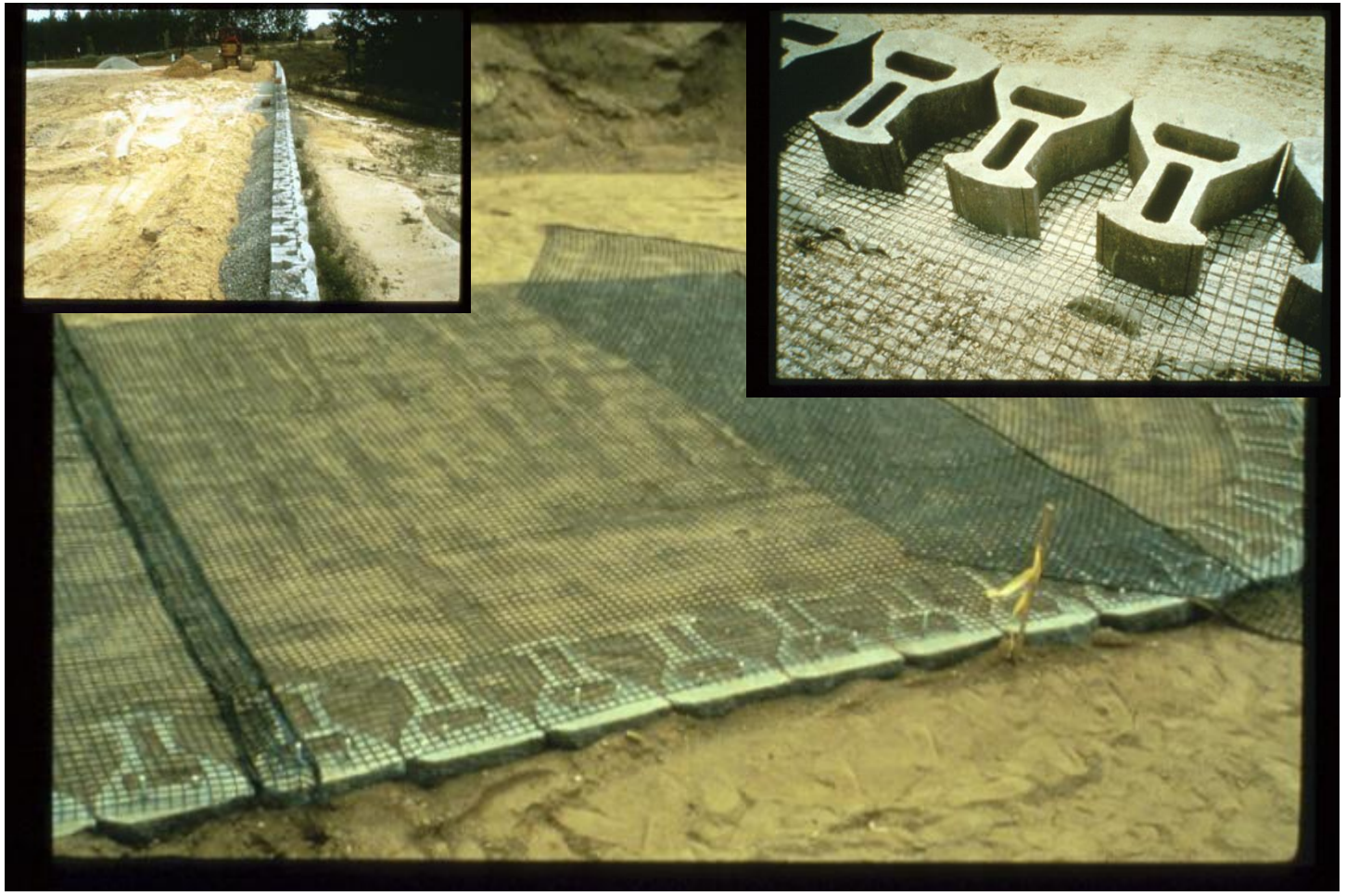
Geotechnical Design
CEG 4801
Fall 2004
By: Dr. Kamal Tawfiq

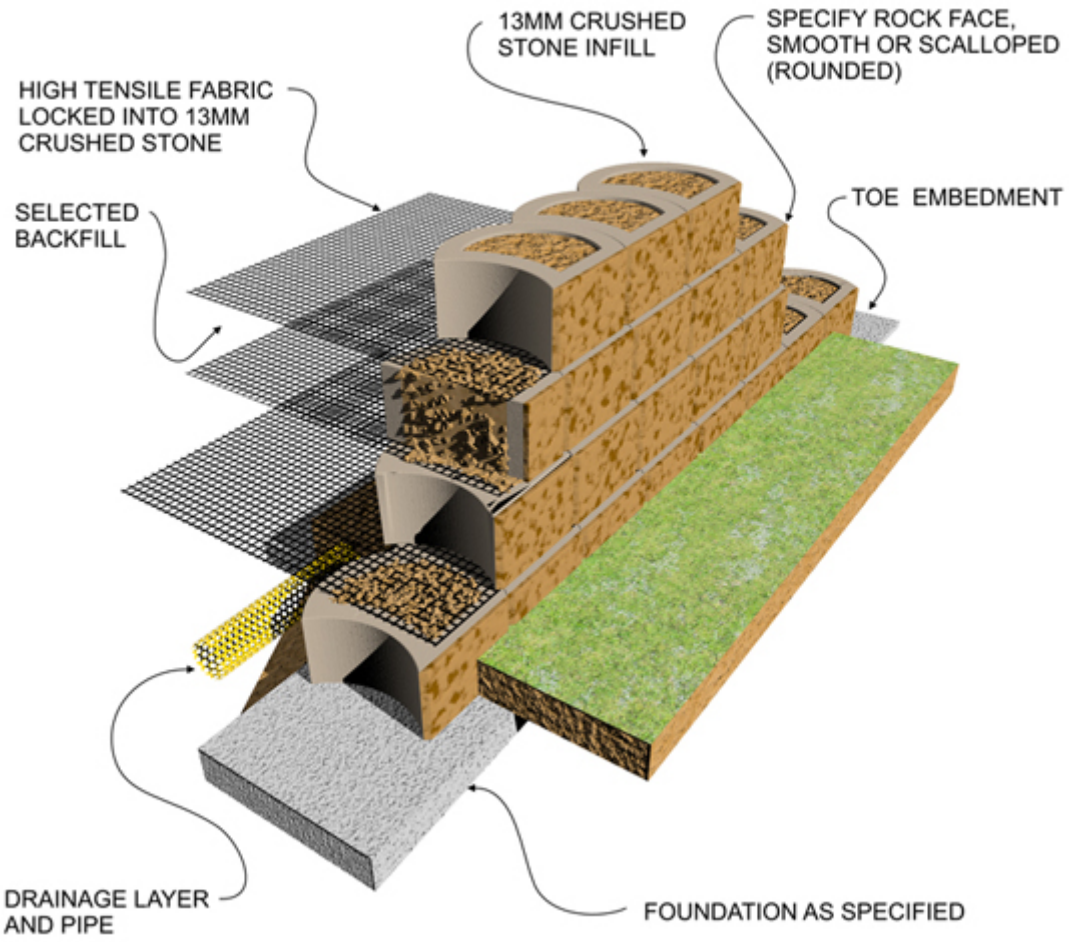
Mechanically Stabilized Earth Wall (MSE Wall)

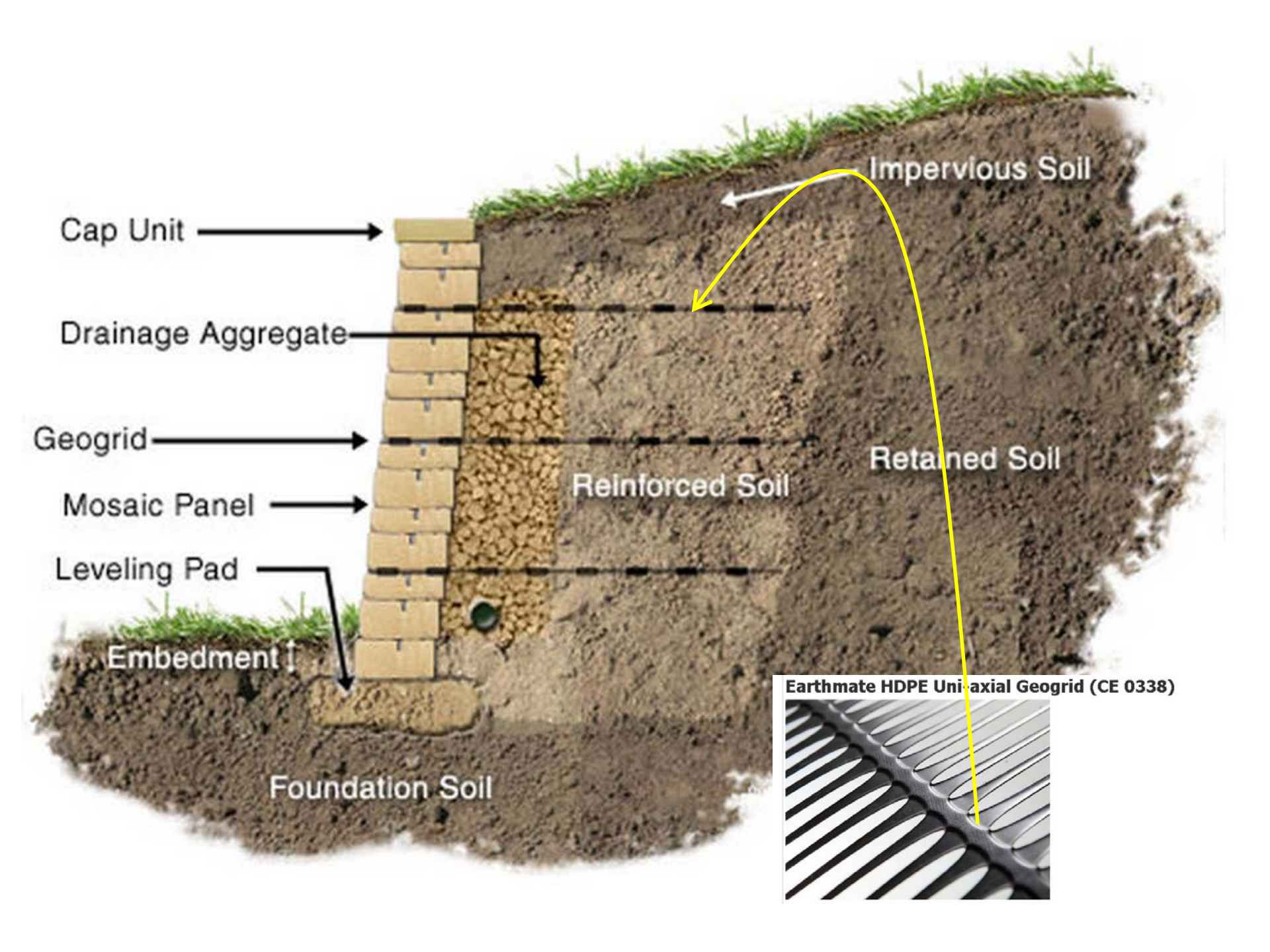
Mechanically Stabilized Earth Wall (MSE Wall)

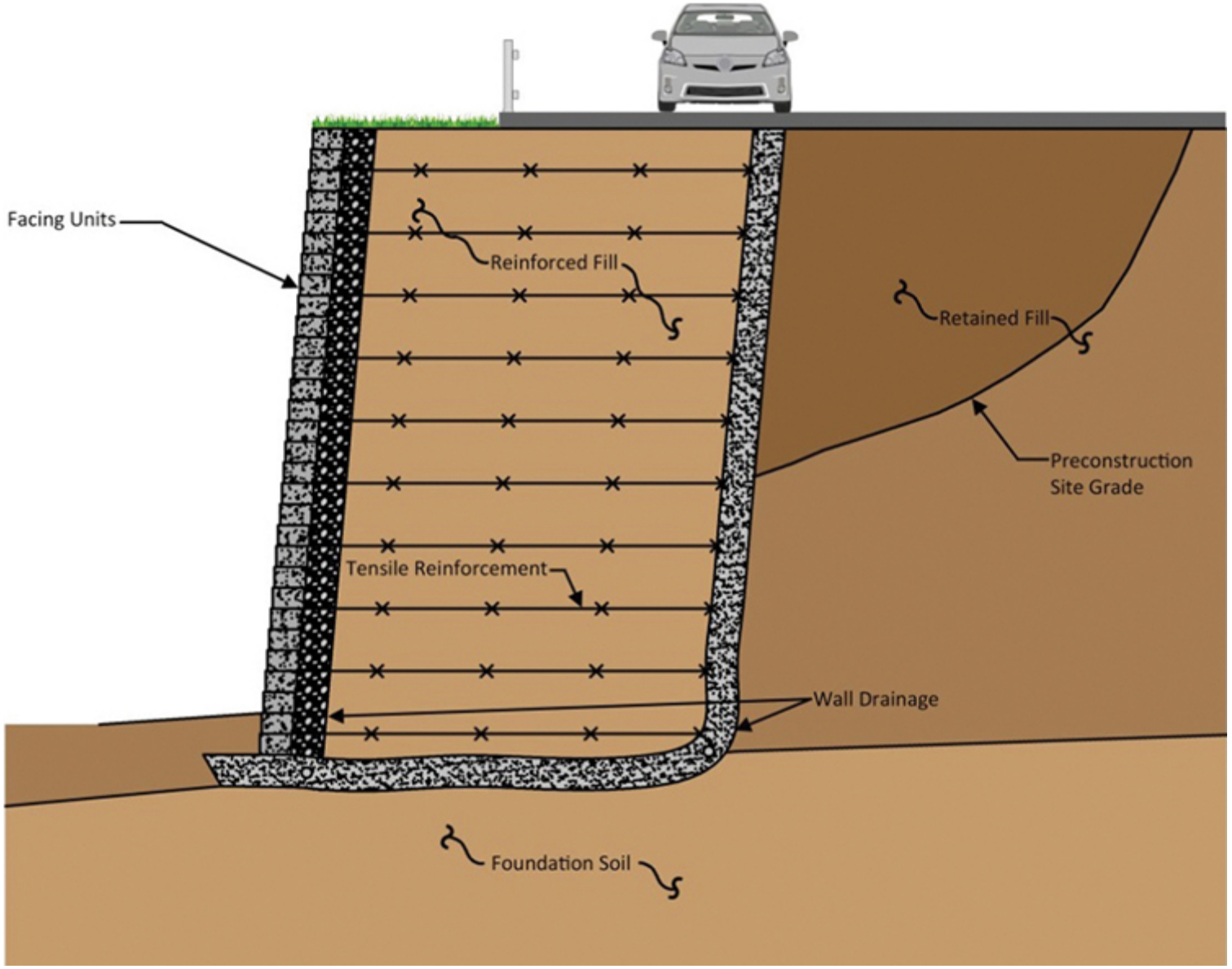
MSE Key Stone Wall

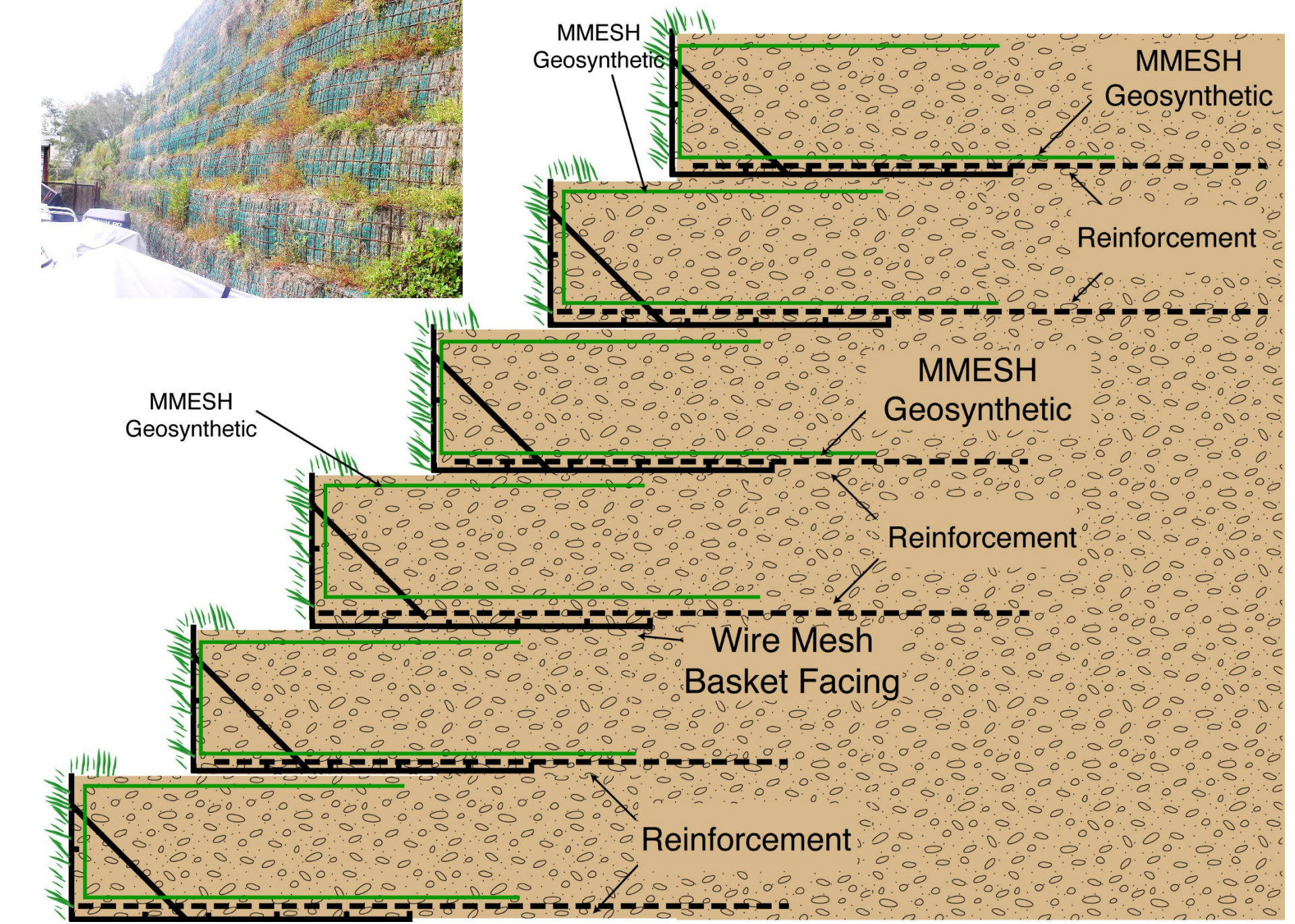
MSE Key Stone Wall




13MM CRUSHED
STONE INFILL
SPECIFY ROCK FACE,
SMOOTH OR SCALLOPED
(ROUNDED)
HIGH TENSILE FABRIC
LOCKED INTO 13MM
CRUSHED STONE
SELECTED
BACKFILL
TOE EMBEDMENT
DRAINAGE LAYER
AND PIPE
FOUNDATION AS SPECIFIED

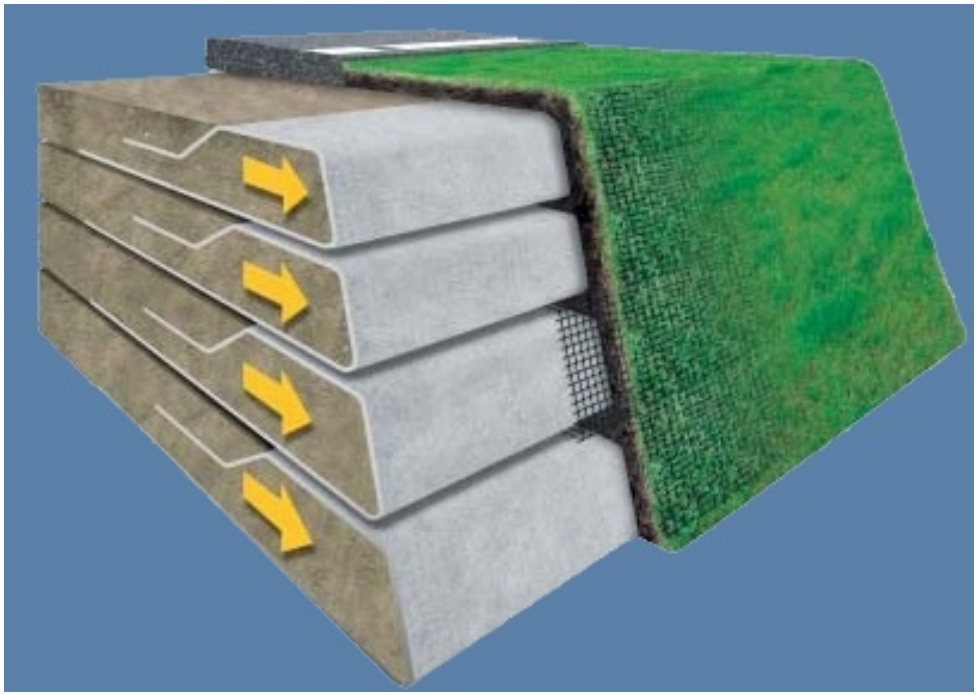

Impervious Soil
Cap Unit
Drainage Aggregate
Geogrid
Mosaic Panel
Leveling Pad
Embedment
Reinforced Soil
Retained Soil
Foundation Soil
Earthmate HDPE Uni-axial Geogrid (CE 0338)

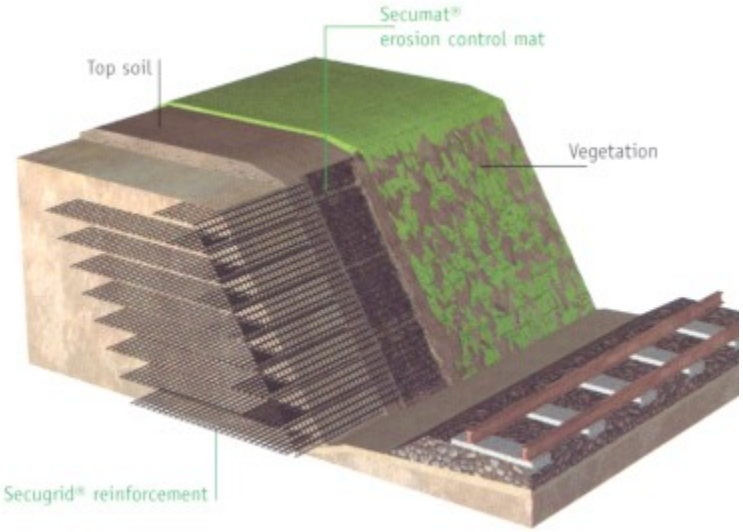

Facing Units
Reinforced Fill
Retained Fill
Preconstruction
Site Grade
Tensile Reinforcement
Wall Drainage
Foundation Soil


MMESH
Geosynthetic
MMESH
Geosynthetic
Reinforcement
MMESH
Geosynthetic
MMESH
Geosynthetic
Reinforcement
Wire Mesh
Basket Facing
Reinforcement

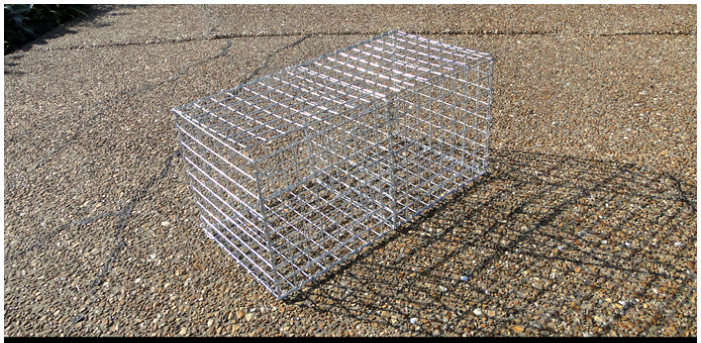

STOP
ENTER CODE
TO EXIT

Geotextile Walls

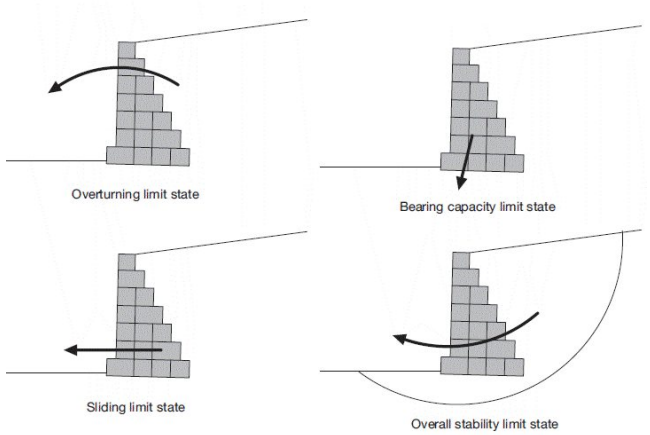




Gabion Walls



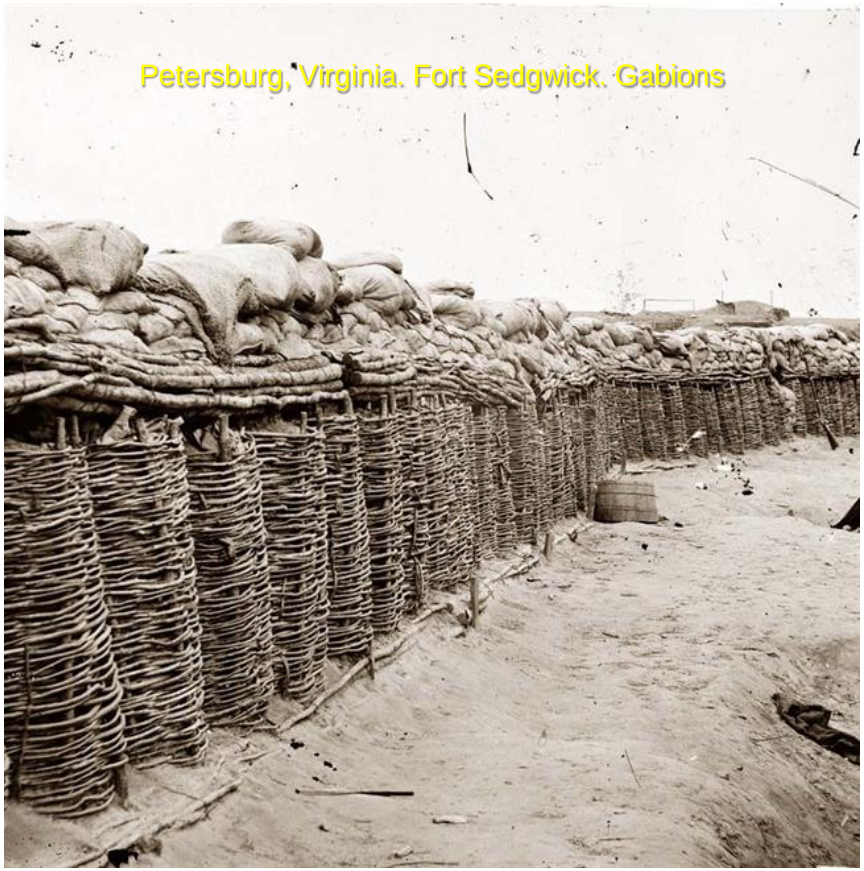
Gabion Retaining Wall Design



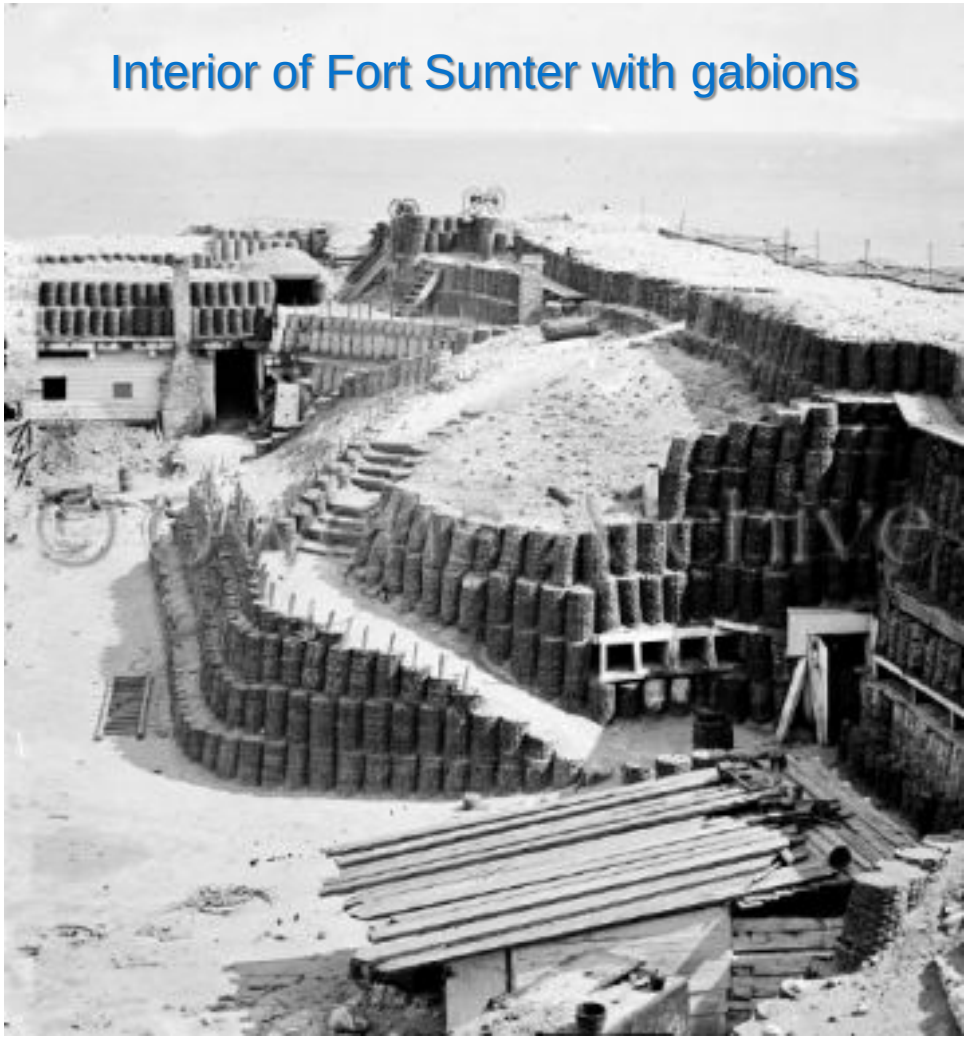
Gabion Walls

HESCO CONCERTAINER

Military Accommodation Roofing, Personnel & Material Bunker Sets



Interior of Fort Sumter with gabions



PHOTOGRAPHIC HISTORY

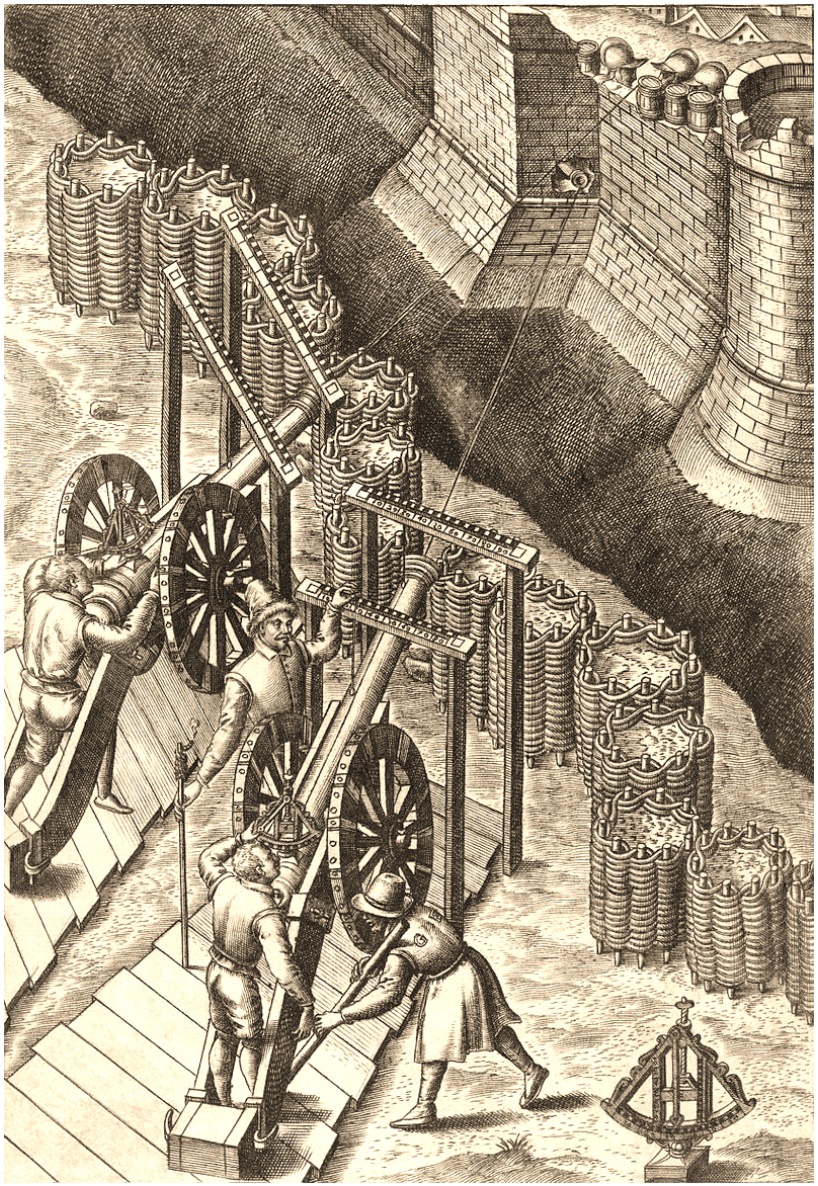
Interior of the Union Fort Sedgwick, called by the Rebel Soldiers "Fort Hell," showing Union soldiers on the breastworks.

This View was taken the Morning after the storming of Petersburgh, Va., April 2d, 1865.

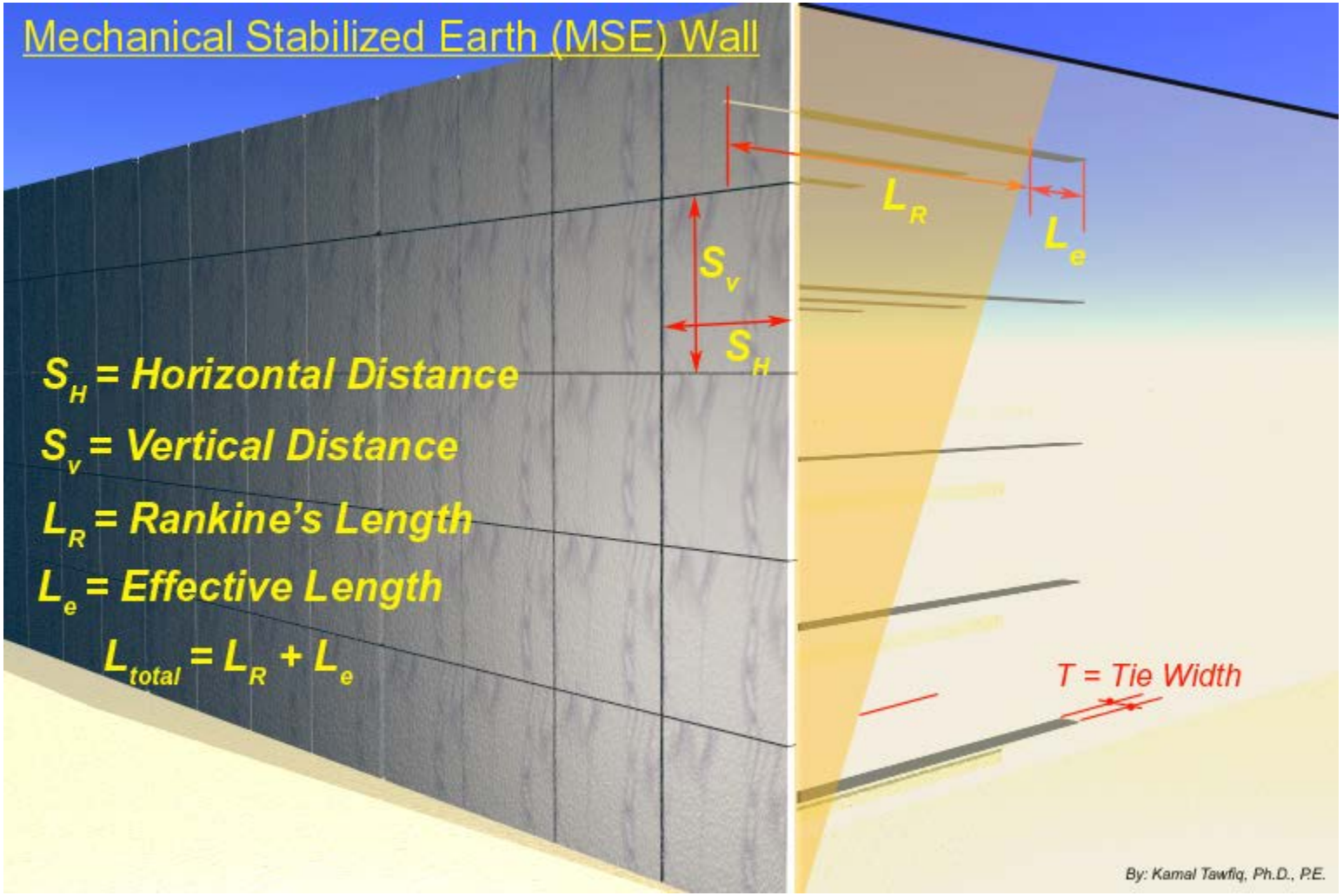
THE WAR FOR THE UNION.

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

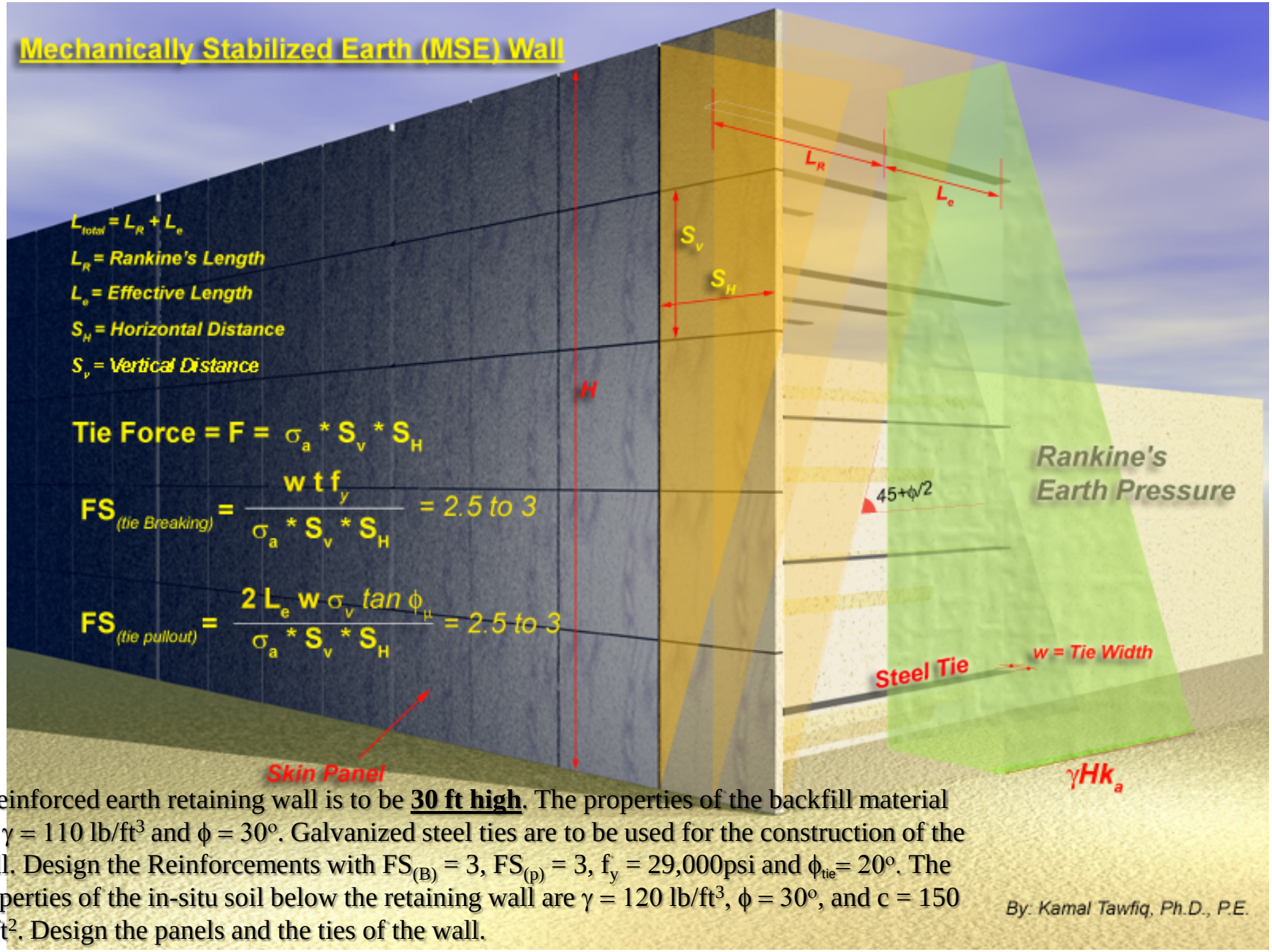
Gabions with cannon, from a late 16th century illustration.



MSE Wall
Analysis and Design



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



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