

Metric

5 - STEP

Particular Wall™

(Emergency)

Particular Concepts
LLC



"Bringing Ancient Technologies to Life"™

<http://particularconcepts.org>

<http://particularconcepts.com>

Elsie Spry

William J. Spry, PhD

Metric 5-Step Particular Wall™ Manual

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Particular Wall™ technologies achieve the following benefits:

- Stabilize the structure;
- Integrate the retained sand/shell/gravel/soil particulate itself;
- Act as a relief/stop system in earthquake soil liquefaction, and other horizontal movements;
- Remain stable longer than traditional systems;
- Catch and control landslide;
- Improve Mechanically Stabilized Earth (**MSE**) & Geosynthetic Reinforced Soil (**GRS**) systems.

They represent a paradigm shift in physics and engineering, countering the fluid nature of shifting earths and sands -- *By using their own forces against them.*

As the following shows, you can also safeguard threatened slopes in emergencies:

- [5-Step Particular Wall™ Manual](#)

Best Regards,

Elsie Spry

contact@particularconcepts.org / US Exchange 724.935.9062

Attachments: (1)

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LLC*



"Bringing Ancient Technologies To Life"™

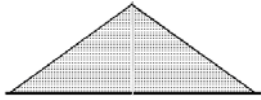
Metric 5-Step Particular Wall™ Manual

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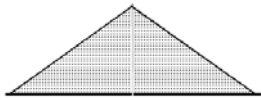
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The best fill for the Particular Wall™ has at least the same density as the earth held back. Filling buckets onsite, crews can easily compare fill choices to use the best available.	
2 MEASURE THE “PARTICULAR FILL” ANGLE	6
The angle of a pile of the “Particular Fill” directly determines the design of the Particular Wall™. By “eyeing” the height and width of a pile both wet and dry, two people can easily measure this (i.e. a “high” pile has a greater angle measurement than a “low” pile”).	
3 DESIGN THE PARTICULAR VALVE™	8
Imagine the Particular Wall™ as a ladder of concrete blocks -- turned 90° from normal use -- against a slope. If the “Particular Fill” piles “high”, a “ladder rung” depth of one concrete block hole will stop the fill from flowing out of the block. If the “Particular Fill” proportions are “low”, a “ladder rung” depth of two or more aligned concrete block holes will stop the “Particular Fill” from flowing out of the block. The holes in the concrete blocks ARE the Particular Valves™.	
4 STACK AND BRACE THE PARTICULAR WALL™	10
For short walls, the block can be stacked straight up. However, staggering the block courses further stabilizes both low and high walls. Plywood / stud bracing supports the wall only until the fill has flowed into the holes of the concrete block.	
5 ADD THE “PARTICULAR FILL”	11
When poured (or shoveled), the “Particular Fill” flows naturally into the concrete block holes. When the fill is stopped by these concrete block Particular Valves™, the wall’s center of gravity is closer to the retained earth than the outside of the wall, increasing stability. The fill exerts an equal force at each level, so there is significant reduction of wall rotation. Therefore, the Particular Wall™ needs less anchoring than a traditional wall.	
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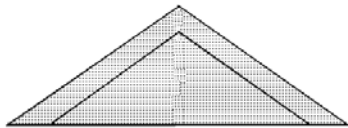
A Regular Sandbox



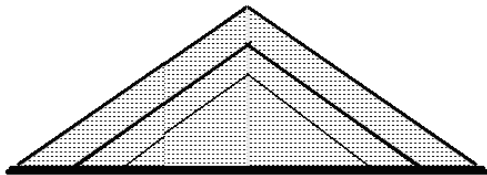
A Pile



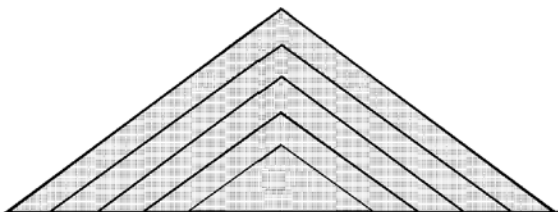
A Pile



Bigger Pile

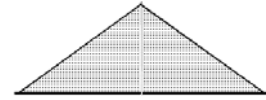


Bigger Bigger Pile

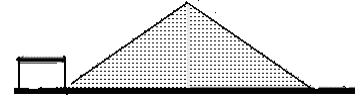


Bigger Bigger Bigger Bigger Pile

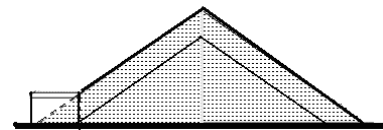
A Particular Concepts™ Sandbox



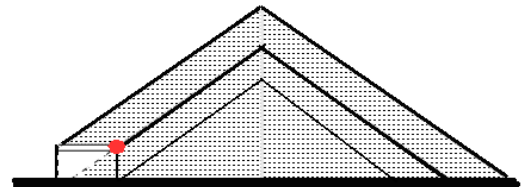
A Pile



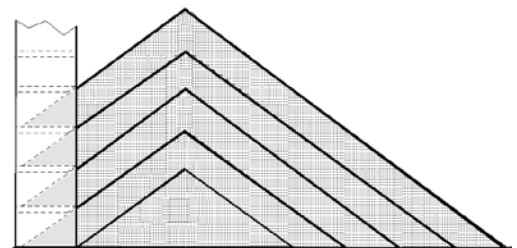
A Pile
With a "Step"



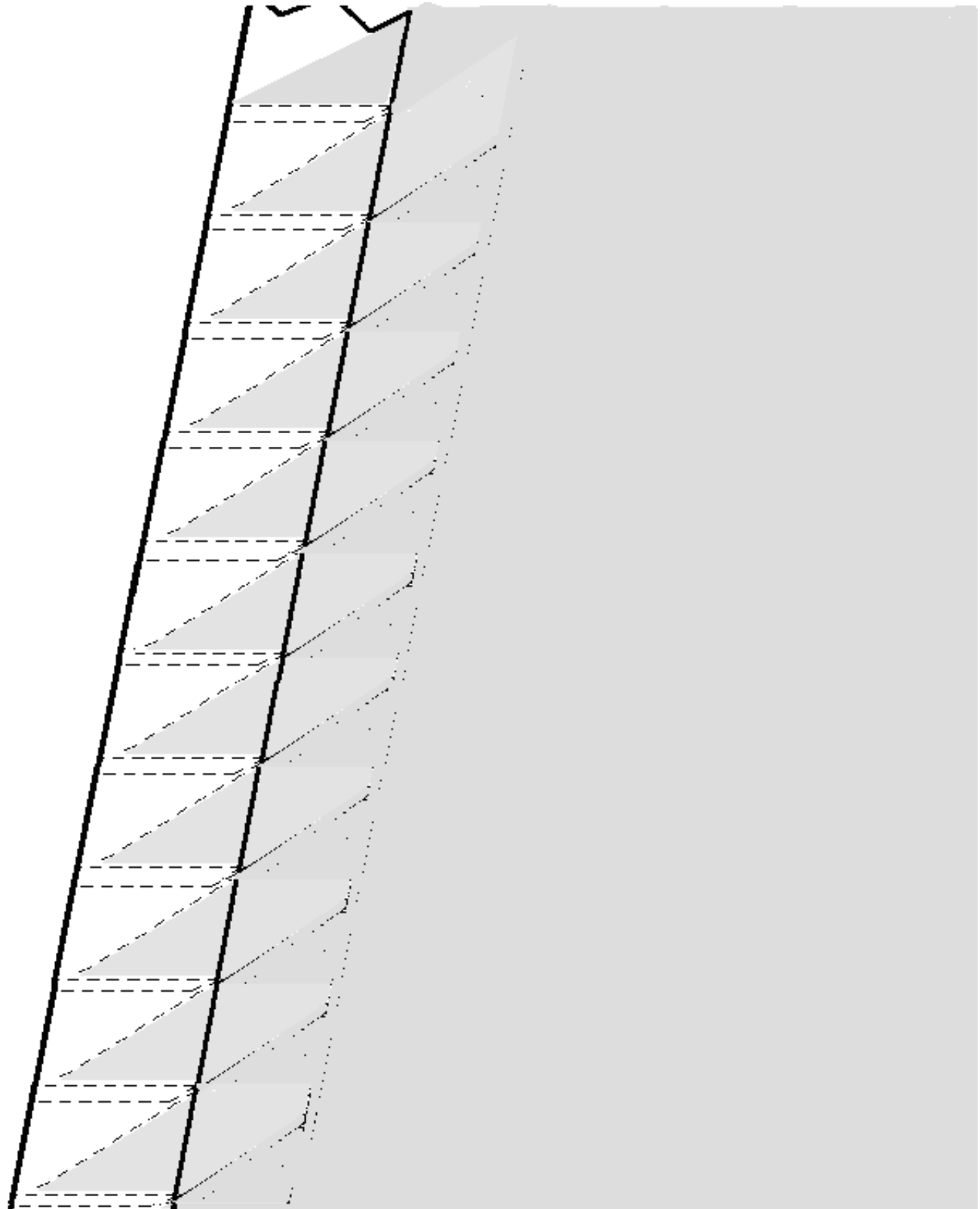
Bigger Pile
With a "Step"



Bigger Bigger Pile
With a Particular Valve™*



Bigger Bigger Bigger Bigger Pile
With a Particular Wall™



REALLY BIG (almost forever) Pile

With the Particular Wall™ Slanted at 11° for dfa = 30°

Resource Checklist

- Two People
- Two 20-Liter Buckets
- Shovels
- Tamper
- Scale (or block for a fulcrum, and a board)
- On-Site Fill Choices(sand, shell, gravel, etc.)
- Concrete Block
- Plywood (or large, flat-surfaced, sturdy item)
- 45 x 90 Studs (or sturdy branches)
- Ruler / Tape Measure
- Paper / Pencil
- Calculator (simple multiplication and division)
- Items to Mark Piles of Fill (wood/plastic/stones, etc.)

CHOOSE THE "PARTICULAR FILL"

Shovel, Tamper, Two 20-Liter Buckets, Scale (onboard and a block), Paper /Pencil

1-1 Shovel the onsite fill you want to test into one bucket, tamping it in so it is even with the 20-Liter mark. Shovel the earth you want to hold back into the second bucket, tamping it in at the 20-Liter marking also:



1-2 With the scale, weigh each bucket and write it down. If the fill you are testing is heavier (BEST) -- or equal -- go to "Measuring the "Particular Fill". If it is NOT, find and test another fill.

If you do not have a scale, set up one using a board and a block (continued next).

Weight of Bucket #1: _____

Weight of Bucket #2: _____

NOTES

For best performance, Fill SHOULD BE DENSER than the earth you want to hold back.

The fill can be equal in density to the earth held back. Just not LESS in density.

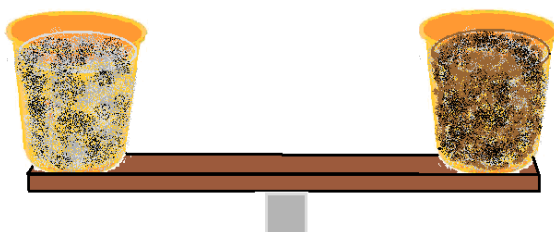
Additionally -- for best performance -- the fill should be uniform, and impervious to water.

CHOOSE THE "PARTICULAR FILL" (continued)

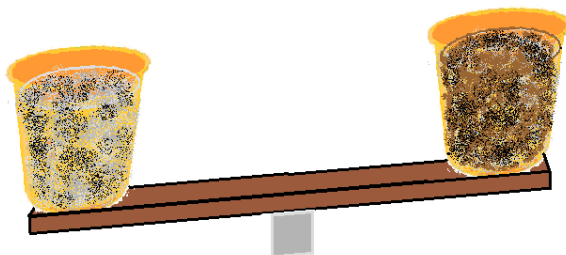
1-A Find the center of a board, and place this over the middle of a block.



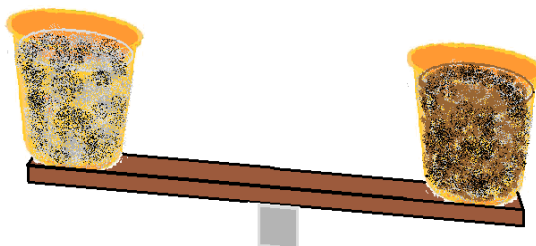
1-B Place the buckets the same distance from the center (you can use a ruler or measuring tape, and you can keep lengthening the distance to make extra sure of the comparison)



1-C If the test fill bucket drops lower than the earth bucket (BEST) -- or doesn't move -- go to the "Measure the "Particular Fill" section.



1-D If the test fill bucket is higher than the earth bucket, test another fill.



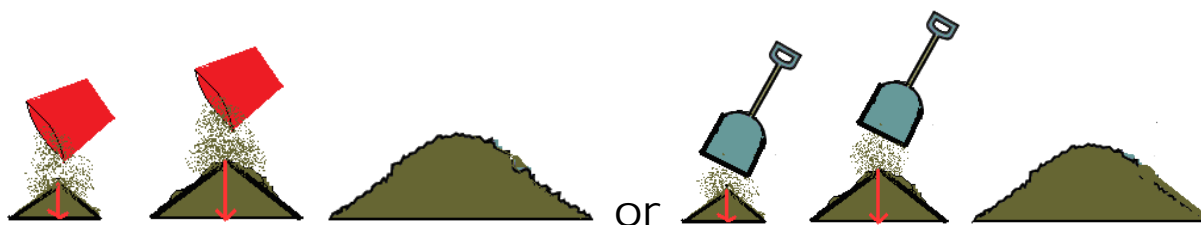
MEASURE THE "PARTICULAR FILL"

Shovel, Markers, Tape Measure, Paper / Pencil / Calculator.

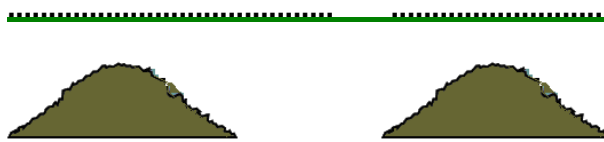
2-1 Either submerge half the chosen fill in a container before hand, or hose it down

2-2 With the shovel, make two equal volume piles of the fill (keep count of shovelfuls or bucketfuls):

- One wet and one dry.
- Either poured bucket loads over one point, or
- Shoveled to only one point.



2-3 Have one person step back so s/he can see and compare the piles.
If the piles are the same, **THIS IS BEST!!!!** Continue with either pile.



If they are not, continue with the lower, wider pile.



2-4 Have one person move markers to mark the center, edge, and top of the pile, using the direction of
of
the person standing back, with the whole pile in view ("move to the left/right", "move up/down",
etc.)

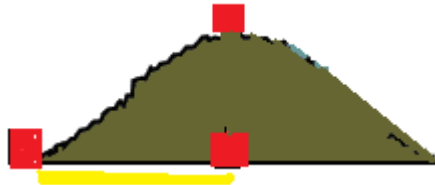


MEASURE THE "PARTICULAR FILL" (continued)

2-5 In centimeters / inches, measure the **HEIGHT** of the pile. Write it down.



2-6 In centimeters / inches, measure the **WIDTH** of half of the pile. Write it down.



2-7 With a calculator (or not), divide the **HEIGHT** by the **WIDTH**. Write this down as **"A"**

Example:

The Height is 75 centimeters (30 inches).

The Width is 50 centimeters (20 inches).

75 divided by 50 (and 30 / 50) = 1.5 = **"A"**

$$\text{HEIGHT} \text{ ____ } / \text{ WIDTH } \text{ ____ } = \boxed{\text{ ____ }} = \text{"A"}$$

DESIGN THE PARTICULAR VALVE™

Shovels, Fill, Measuring Tape, Concrete Block, Paper/Pencil,/Calculator.

3-1 In centimeters / inches, measure the height of the hole in the block. Write the height down.



3-2 Using the calculator, multiply the height by the "A" (from step 2) of the fill.

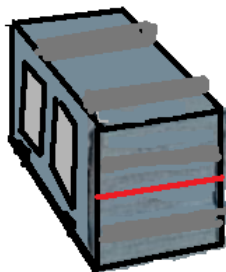
3-3 Write this down as "B".

Example: "A" is 1.5.

The height of the hole is 7 centimeters (cm) / 2.75 inches (in)

7 cm / 2.75 in times 1.5 = 10.5 cm / 4 in = "B"

3-4 In centimeters/inches, measure the depth of the block. Write the depth down as "C".

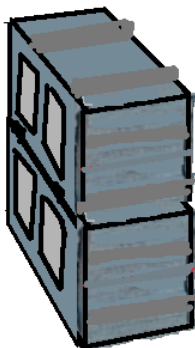


$$\text{HEIGHT} \quad \underline{\quad} \quad \times \text{"A"} = \boxed{\underline{\quad}} = \text{"B"}$$

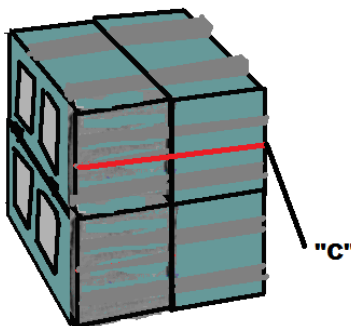
$$\boxed{\underline{\quad}} = \text{"C"}$$

DESIGN THE PARTICULAR VALVE™ (continued)

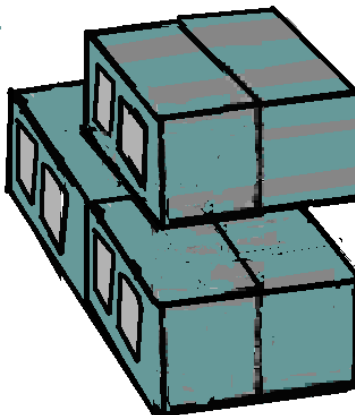
3-5 Is "B" less than "C" ? If "Yes", you can stack the block as is.



3-6 Is "B" more than "C" ? If "Yes", double up the block until "C" measures at least "B".



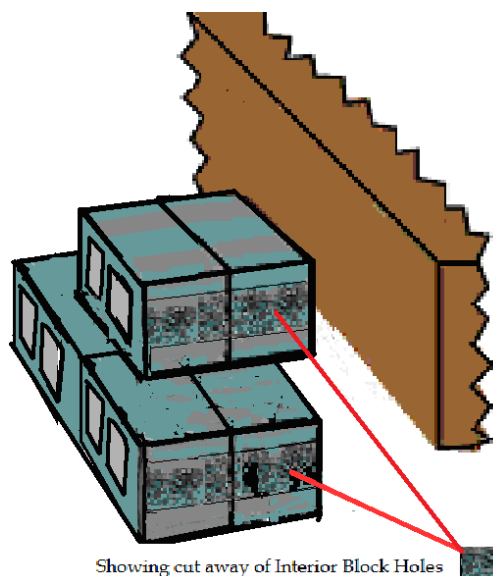
3-7 Staggering or "baffling" the courses even a few cm / in, builds an even more secure foundation -- as does staggering the runs -- safeguarding the highest walls.



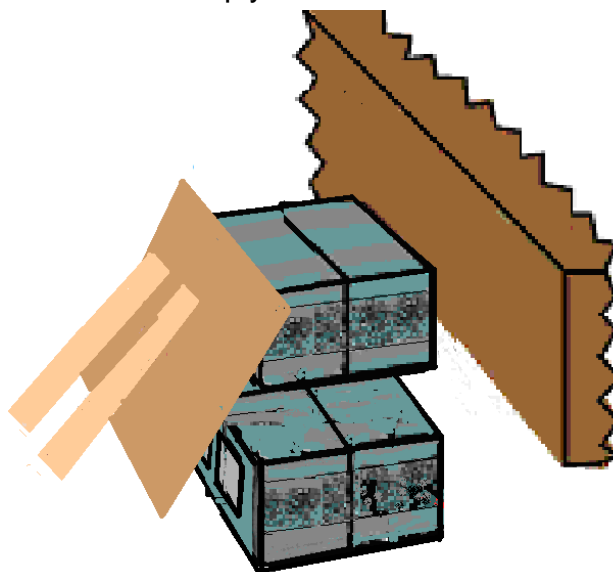
STACK AND BRACE THE PARTICULAR WALL™

Plywood, 45 x 90s / (US 2 x 4s)

- 4-1 Stack the Blocks in front of the earth slope (“Running” brick laying -- staggering the rows - is recommended).



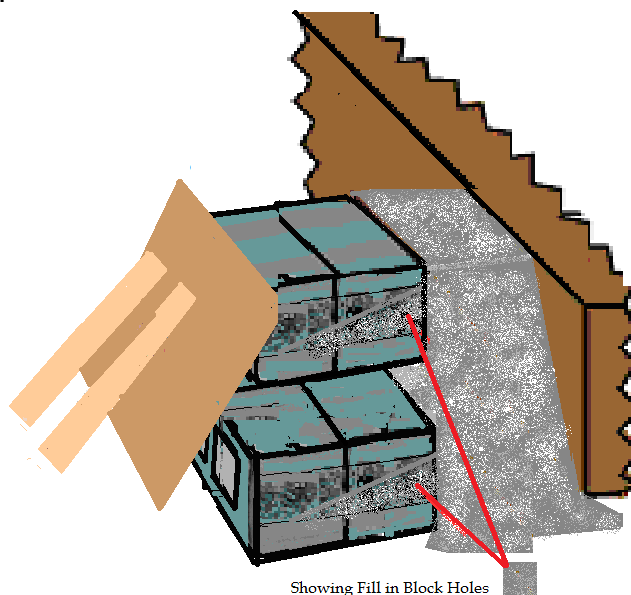
- 4-2 Anchor the blocks at the front with plywood sheets and 45 x 90s/US 2 x 4s/branches.



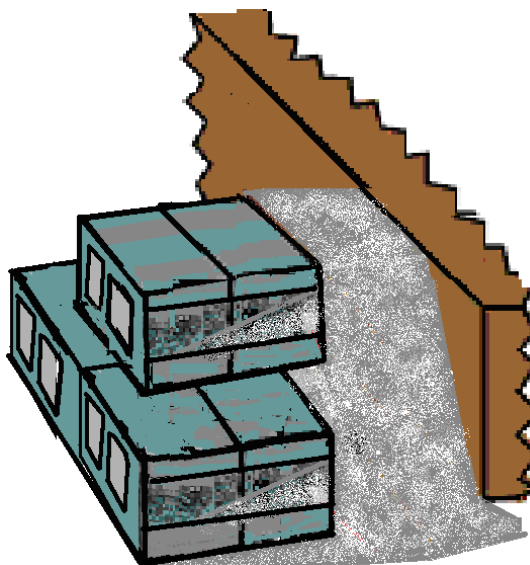
ADD THE "PARTICULAR FILL"

Shovels, Fill

- 5-1 Pour the "Particular Fill" behind block, which will flow -- and then stop at its natural angle -- in the opening of the block.



- 5-2 Remove anchoring.



Concluding Comments

“Particular Fill”

The best fill is uniform, impervious to water, of greater density than the retained earth, and flows (like water) -- UNTIL it reaches its natural angle of repose. Suggestions are: Gravel, Shell, Coral, Rock, etc.

As long as the density is equal or greater than the earth being held back, other fill can be used -- but will not be as predictable under all conditions as a true “Particular Fill”.

Bracing of the wall is necessary during the kinetic flowing of the particulate into the wall only.

Angle of Repose

The measurements for the **Measure the “Particular Fill”** section is a pragmatic, on-site method of determining the angle of repose. If you ship in, engineers can more precisely determine this characteristic. Angle of Repose determines the force vectors that are “turned” vertically-- within the Particular Wall™ -- by inserting this angle into Rankine’s formulary (conventionally used by highway and retaining wall engineers).

Non-Traditional Benefits

Hydraulic Formulary: By using the “Spry” valve, the properties of the chosen fill imitate water -- until the valve stops the flow. Used with the Particular Valve™, this fluid-aspect reduces traditional formulary aspects of rotation, overturning, and uneven push of earth forces on a solid wall. Current practitioners can readily apply new formulary reflecting these benefits.

Center of Gravity: There is the unquestioned benefit of shifting the center of gravity towards the retained slope, increasing stability. The weight of the “tall” side of the fill in the void shifts the center of gravity from the center (as in traditional walls) to closer to the retained slope.

Freeze Hoving: Because the valve allows movement, expansive horizontal displacement from earthworks is accommodated throughout the seasons.

Soil Liquefaction Relief/Stop: Because the Particular Valve™ is interspersed evenly throughout the “Particular Wall, uneven forces can “flow” through these individual valves as a “liquid”, without the whole structure failing. *Although the Particular Wall™ will fail in overwhelming circumstances, it will not fail as soon as a traditional retaining wall -- and more of the structure will remain.*

Particular Wall™ And MSE / GRS Synergy

A Particular Wall™ literally (and economically) stands alone when traditional walls fail. This is due to its:

- Shift of the center of gravity towards the back of the wall (see classroom demonstration Particular Wall™: <http://www.youtube.com/watch?v=nvOOgEsyXzM>)Its
- Equalization of Rankine Particulate forces by stabilizing each “pile” of particulate at every level (no rotation).

The Particular Wall™ can also supplement and improve Mechanically Stabilized Earth (MSE) and Geosynthetic-Reinforced Soil (GRS) systems.

MSE / GRS systems have worldwide acceptance. The Particular Valve™ is the final, synergistic piece to the MSE / GRS system potential.

Just as each layer of an MSE / GRS system distributes the forces horizontally -- under current practice -- the “end” of each layer still puts unnecessary force on the “wall” side of the system, and does not allow for ordinary or catastrophic earth movement. Particular Valves™ -- either alone or integrated into the MSE / GRS system -- not only distribute this remaining force through the valve, they allow pressure alleviation of disturbing forces.

Classroom demonstrations: Particular Valve™: <http://www.youtube.com/watch?v=jxXSASByECU>
Particular Barrier™: <http://www.youtube.com/watch?v=iomMCvDN3cQ>

With the integration of a Rankine drainable fill, the combination of the Particular Wall™ into the MSE / GRS systems achieve a complimentary and synergistic effect, producing an integrated wall structure stable under greater circumstances than each system standing alone.

