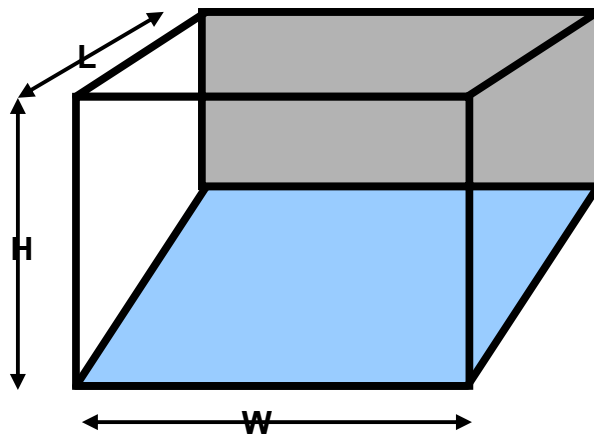


ESTIMATING SALT PILES

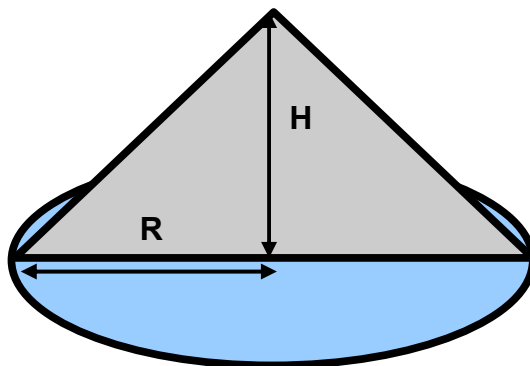
Estimating the volume of a salt pile can serve one of two purposes, either to estimate how much salt you can store in each space or how much salt is left in a pile.

SHAPES

First, look at your pile. Is it in the shape of a cone, a box, or a combination of the two. The idea is break the total area into simple shapes, calculate the volume of each shape add up the area of each for total volume.



BOX



CONE

The way to think about this with a shed is to consider filling a box. The box will hold a certain amount, and then the pile on top (which is roughly shaped like a cone) sits on top of that. If there is no box, then use just the cone calculations.

Basically, there are 2 areas to calculate.

THE BOX

Storage area 1 is the block of salt, defined as the salt held in place by the walls (box sides), say 6 feet deep and 40 feet on a side.

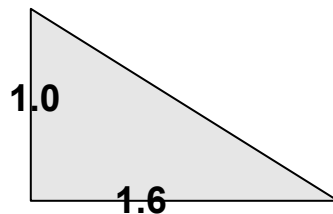
Math is width (**W**) X length (**L**) X height (**H**) = volume or

40 X 40 X 6 = 9,600 cubic feet for the box (inside the walls).

THE CONE

Storage area 2 is now the cone above the walls (box sides).

The natural angle of repose for salt is 32 degrees, thus forming a cone with a 32-degree angle at the base or a 1.6 (horizontal) to 1 (vertical) slope. This cone would start at the height of the wall (the top of the box) where forming a block of salt would stop.



The area of a cone is calculated as 1/3 base times height.

The base is a circle with a radius(**R**) of 20 feet.

The area of the base = Pi (π) times the radius squared (R^2) or

20 feet X 20 feet X 3.14 = 1256 square feet

The maximum height of the cone is equal to the radius(**R**) times the tangent of 32 degrees or

20 feet X 0.625 = 12.5 feet

The volume of the cone is 1/3 of base X height or

1/3 X 12.5 feet X 1256 square feet for a total of 5,233 cubic feet

SUMMING UP THE VOLUMES

Total storage available at 100% full is equal to area 1 plus area 2.

Area 1 = 9,600 cubic feet

Area 2 = 5,233 cubic feet.

Total cubic feet available is 14,833 cu ft

CONVERTING TO WEIGHT

The typical weight per cubic foot of salt is 72 pounds.

The weight of salt in the pile in this example at 100% full is equal to weight per cubic foot times the number of cubic feet divided by 2000 pounds to get tons or:

$$72 \text{ lbs. / cu ft} \times 14,833 \text{ cu ft} = 1,067,976 \text{ pounds}$$

$$1,067,976 / 2000 = 534 \text{ tons}$$

Bear in mind that this is the perfect pile, and things can be done to alter it. I would decrease this estimate by a bit for the real world. Also keep in mind that the maximum height of pile or cone can be determined by the slope of repose which for salt is 1.6(horizontal) to 1 (vertical). This cannot be changed without making the base larger.