Sabine Equation

$$T = K\frac{V}{A} \ (seconds)$$

V = Room volume in ft^3 (m^3)

A = "hole" area in ft^2 (m^2)

K = 0.049 in *secs*/*ft* (= 0.161 *secs*/*m*)

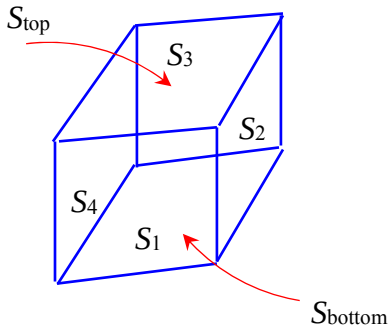
Reverberation Time, $T = T_{60} = 0.049\left(\frac{V(ft^3)}{A(ft^2)}\right) = 0.161\left(\frac{V(m^3)}{A(m^2)}\right)$ seconds

= time for sound to decay to 10^{-6} of its original intensity.

If the room has NO holes in it, the area A physically represents the effective area of the room that *behaves* as if it were a hole, *due to sound absorption*.

1 ft^2 =1 absorption unit

Suppose a room with volume V has a surface area S made up of same material on all 6 sides:



Total surface area of room S:

$$S = \overbrace{S_1 + S_2 + S_3 + S_4}^{\text{area of sides}} + \overbrace{S_{top} + S_{bottom}}^{\text{area of top and bottom}}$$

$$A = aS$$

$$a \equiv \frac{A}{S}$$

$a \equiv$ absorption coefficient, $0 \le a \le 1$

$a = 0 \Rightarrow$ **no** sound absorption (no "hole", *i.e.* $A = 0$)

$a = 1 \Rightarrow$ **total** sound absorption ("hole" = room area, *i.e.* $A = S$!!!)