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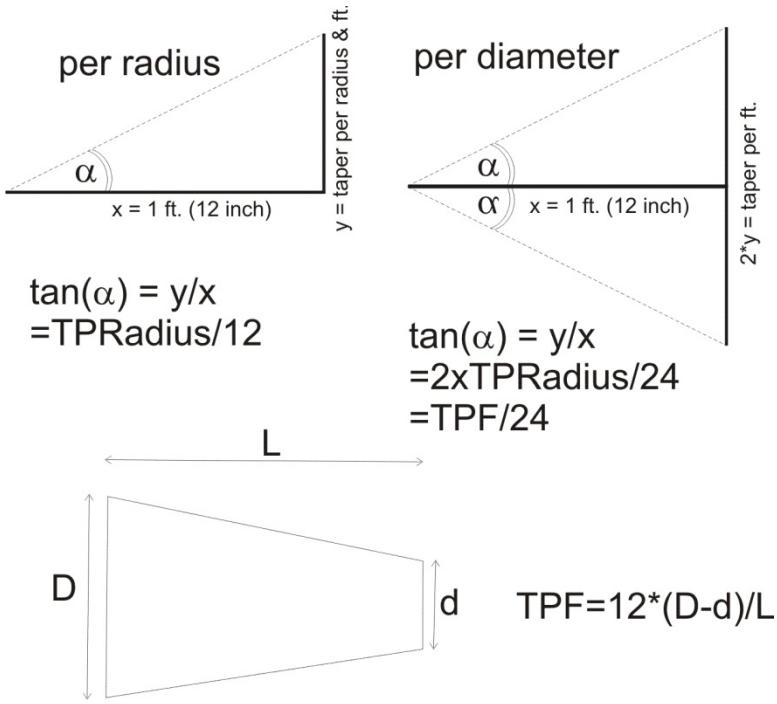

By the way, what is the **taper per foot** story all about? Taper per foot are often tabulated rather than the taper angle. Born in metric land "per foot" is already wearied to me – sorry. But, really, a taper is an angle, right? Well, the taper angle is given by $\alpha' = 2 \arctan(T/24)$ with T as the taper per foot. For example, a taper of T = 2" per foot would correspond to an angle of $\alpha' = 2 \arctan(2/24)$. Trigonometric functions are basically defined as the ratio of the lengths of two distances. Therefore, one can rewrite and measure an angle using that ratio. The 2" per foot taper means that when going 12" (adjacent) in the horizontal direction one needs to go 2" (opposite) vertically to generate the correct slope (hypotenuse). That is the definition of the tangent function. Machinists apparently use the total included angle, α', since one measures diameters on a taper rather than radii. Therefore, the factor 2 shows up in this equation and T/24 rather than T/12 (have a look at the figure, $\alpha'=2\alpha$). With diameters, 2" per foot taper means that when going 12" (adjacent) in the horizontal direction one needs to go 1" (opposite) vertically to generate the correct slope (hypotenuse). Or, one needs to have a diameter of 2" at a distance of 12". (That's what is tabulated.) Complicated and nonsense? Not really. Practically, distances are easy and precise to measure. Measuring angles "directly" is trickier. Therefore, at least historically, the TPF story makes sense. (One can do this also per cm - ☺). By the way, the same equation can be found in the Machinery's Handbook.

Equation: included angle $\alpha' = 2 \arctan(T/24)$

Example: MT2 has TPF = 0.59941 (diameter). Therefore, 0.59941/24= 0.02497 and α = atan(0.02497) = 1.43068° which is about correct or 2α = 2.8613° (included angle). The TPF tabulated is per diameter.

Example: B16 taper (used on China import drill chucks) has TPF = 0.6165. Therefore, 0.6165/24=0.02568 and atan(0.02568) = 1.47146°.