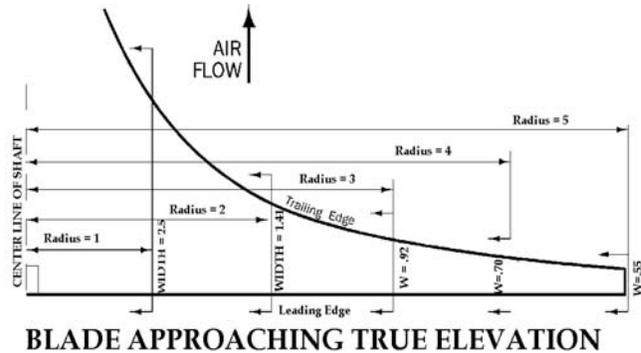




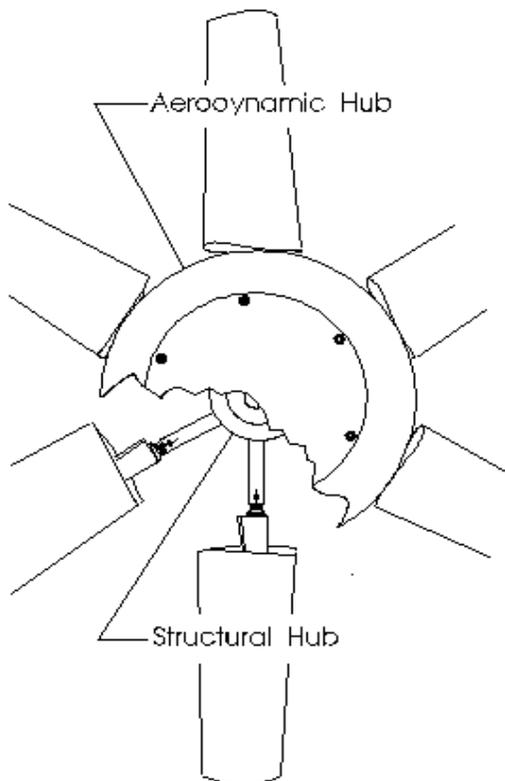
# TWO HUBS ARE BETTER THAN ONE!

The question of how large a fan hub should be is commonly asked. The answer is simple: A hub must be large enough to pick up where the blades are no longer able to carry the load. As the radius is reduced and the center of the fan approached, the reduction in the speed of the blade section reduces the potential work which may be accomplished by the blade and increases the mean blade angle. Blade width (the chord) will begin to increase abnormally and the blade angle will rise sharply until additional width and angle are no longer practical. At this point the hub must begin.



The hub serves two major (aerodynamic) purposes. It allows termination of the blades at a point where they would cease to function efficiently and it prevents back flow of air through the center.

If the hub is too large for the required performance, the result will be an increase in velocity pressure, due to the smaller net opening, and subsequent waste of power. If the hub is too small for the required performance, the result will be deterioration of the flow near the hub, possibly even a reversal of flow in this area.



Reference to the drawing at left will readily show the necessity of a hub of some proportion. As the centerline of the wheel is approached, the chord of the blade becomes infinite. For practical reasons, it is evident that the hub in this example should start at or near the “RADIUS = 2” point to avoid excessive blade depth.

The fan hub must, of course, also serve a structural function in connecting the blades and imparting rotation to them. The hub size required by the aerodynamic considerations discussed in the preceding paragraphs would result in an extremely heavy (and expensive) structural member. For this reason, fan manufacturers usually provide a hub that is inadequate from an aerodynamic point of view. Moore solves this problem by providing two hub designs for each series of fan: A smaller structural hub and a properly proportioned aerodynamic hub referred to as the Air Seal.