

FINITE ELEMENT MODEL HOLE SIZE CORRECTION

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When modeling holes using finite elements, some modelers place the nodes around the hole using the blueprint diameter. The elements span the hole, giving it a smaller effective radius and possibly making the hole stiffer. A slightly larger radius for the hole should be used so that the area of the polygon from the elements equals the blueprint hole area. The ratio of this radius and the blueprint radius is given by equation 1. Equation 2 gives the length of the element edges around the hole. Figure 1 shows a hole using the blueprint radius and figure 2 shows a hole using the enlarged radius.

$$\frac{R}{r} = \sqrt{\frac{2\pi}{n \sin(360^\circ/n)}} \quad (1)$$

$$B = 2R \sin(180^\circ/n) \quad (2)$$

Where:
R = Finite element model hole radius
r = Blueprint hole radius
n = Number of elements around hole (equal spacing)
B = Length of element edges

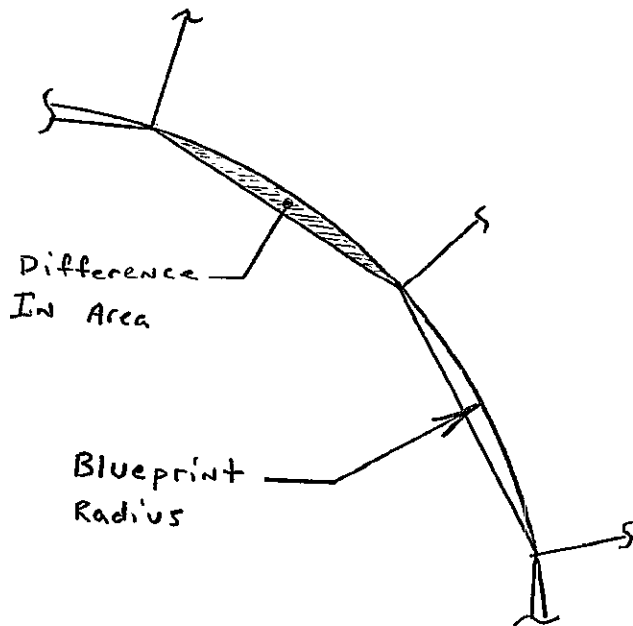


Figure 1

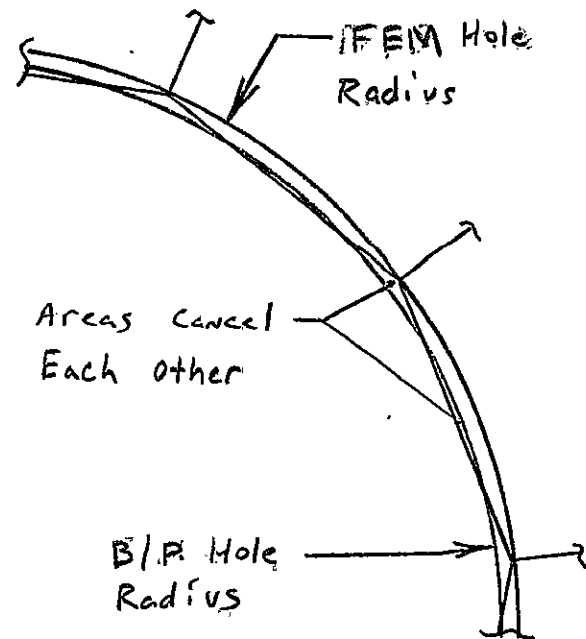


Figure 2