



FIGURE 8-44

Geometry for the derivation of the equation for pressure angle

where  $s$  is the instantaneous displacement of the follower from the  $s$  diagram and  $\dot{s}$  is its time derivative in units of length/sec. (Note that capital  $S$   $V$   $A$   $J$  denote time-based variables rather than functions of cam angle.)

But 
$$\dot{S} = \frac{dS}{dt}$$

and 
$$\frac{dS}{dt} \frac{d\theta}{d\theta} = \frac{dS}{d\theta} \frac{d\theta}{dt} = \frac{dS}{d\theta} \omega = v\omega$$

so 
$$b\omega = v\omega$$

then 
$$b = v \quad (8.30)$$

This is an interesting relationship which says that the **distance  $b$  to the instant center  $I_{2,4}$  is equal to the velocity of the follower  $v$**  in units of length per radian as derived in previous sections. We have reduced this expression to pure geometry, independent of the angular velocity  $\omega$  of the cam.