

$B > D$ is the length of the leg to be reduced to

$$(11.5)$$

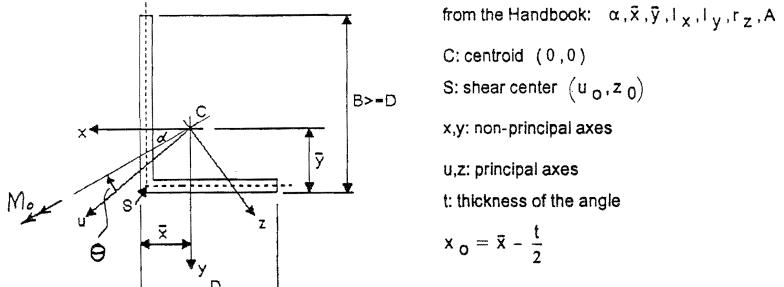
$$(11.6)$$

columns. Inevitably, some part of the angle to other than one leg only, the only a few solutions exist. An acceptable solution so that Eqs. 11.2

$$(11.7)$$

$$(11.8)$$

and z directions, respec-



from the Handbook: $\alpha, \bar{x}, \bar{y}, I_x, I_y, r_z, A$

C: centroid $(0, 0)$

S: shear center (u_0, z_0)

x,y: non-principal axes

u,z: principal axes

t: thickness of the angle

$$x_0 = \bar{x} - \frac{t}{2}$$

$$y_0 = \bar{y} - \frac{t}{2}$$

$$u_0 = y_0 \cdot \sin(\alpha) + x_0 \cdot \cos(\alpha)$$

$$z_0 = y_0 \cdot \cos(\alpha) - x_0 \cdot \sin(\alpha)$$

$$d = D - \frac{t}{2}$$

$$b = B - \frac{t}{2}$$

$$I_z = A \cdot r_z^2$$

$$I_u = I_x + I_y - I_z$$

$$J = \frac{2 \cdot A \cdot t^2}{3}$$

$$r_o^2 = u_0^2 + z_0^2 + \frac{I_u + I_z}{A}$$

$$C_1 = \frac{x_0^2}{2} \cdot [y_0^2 - (y_0 - b)^2] + \frac{y_0^4 - (y_0 - b)^4}{4} + \frac{y_0}{3} \cdot [x_0^3 - (x_0 - d)^3] - y_0^3 \cdot d$$

$$C_2 = \frac{x_0}{3} \cdot [y_0^3 - (y_0 - b)^3] - x_0^3 \cdot b + \frac{x_0^4 - (x_0 - d)^4}{4} + \frac{y_0^2}{2} \cdot [x_0^2 - (x_0 - d)^2]$$

$$\beta_z = \frac{t \cdot (C_1 \cdot \sin(\alpha) + C_2 \cdot \cos(\alpha))}{I_z} - 2 \cdot u_0$$

$$\beta_u = \frac{t \cdot (C_1 \cdot \cos(\alpha) - C_2 \cdot \sin(\alpha))}{I_u} - 2 \cdot z_0$$

Fig. 11.5 Definition of cross-sectional properties.

2. Compute an equivalent slenderness parameter:

$$\lambda_{eq} = \frac{1}{\pi} \left(\frac{L}{r} \right)_{eq} \sqrt{\frac{F_y}{E}} = \sqrt{\frac{AF_y}{P}} \quad (11.9)$$

3. Determine the buckling load using the formula in Section E2 of the AISC-LRFD specification.

Kitipornchai (1983) suggested the following approximations for the equivalent slenderness ratio from curve-fitting solutions to Equations 11.1 or 11.6: For equal-leg angles;

or 11.6, as appropriate.