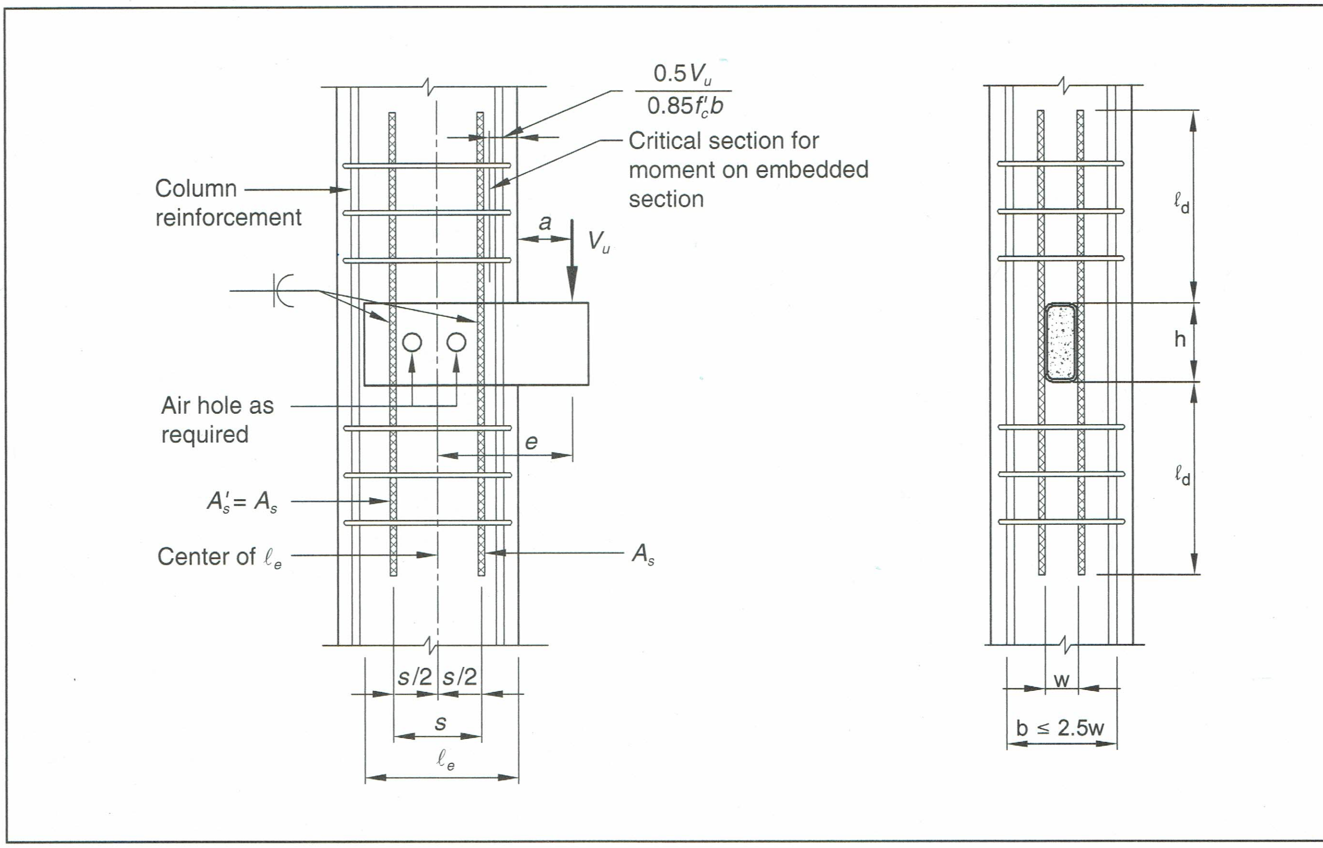

Fig. 6.8.3 Assumptions and notations – steel-haunch design.

The following assumptions and limitations are recommended:

1. In a column with closely spaced ties (spacing ≈ 3 in.) above and below the haunch, the effective width b can be assumed as the width of the confined region (that is, outside to outside of ties), or 2.5 times the width of the steel section, whichever is less.
2. Thin-walled members, such as the tube shown in Fig. 6.8.3, may require filling with concrete to prevent local buckling of the vertical tube walls.
3. When the supplemental reinforcement A_s and A_s' are anchored both above and below the members, as in Fig. 6.8.3, it can be counted twice, assuming adequate weld for the total force.
4. The critical section for bending of the steel member is located a distance $0.5V_u/0.85 f_c' b$ inward from the face of the column. .5(12.3)/.85(5)(5)

If the steel section projects from both sides, as in Fig. 6.8.2, the eccentricity factor e/ℓ_e in Eq. 6-75 should be calculated from the total unbalanced live load. Conservatively, e/ℓ_e may be taken equal to 0.5.

The design strength of the steel section can be determin by:

Flexural design strength:

$$\phi V_n = \frac{\phi Z_p F_y}{a + \dfrac{0.5V_u}{0.85 f_c' b}} \quad \text{(Eq. 6-77}$$

Shear design strength:

$$\phi V_n = \phi(0.6F_y)ht \quad \text{(Eq. 6-78}$$

where:

Z_p = plastic section modulus of steel section (s Design Aid 15.5.2)

F_y = yield strength of the steel

h, t = depth and thickness of steel web

ϕ = 0.90

The horizontal forces N_u are resisted by bond on the perim eter of the embedded section. If the bond stress resulti from factored loads exceeds 250 psi, then headed studs reinforcing bars should be welded to the embedded steel se tion to ensure sufficient load transfer.