

Find Maximum allowable spacing for stirrups

$$V_u = \phi V_c + \phi V_s \rightarrow V_s = \frac{V_u - \phi V_c}{\phi} \rightarrow V_s^{\max} = \frac{(V_u - \phi V_c)^{\max}}{\phi}$$

From the given table in page 109 we can find the max $(V_u - \phi V_c)$ to be 34.86 kips, therefore

$$V_s^{\max} = \frac{35.47}{0.75} = 47.29$$

since $V_s^{\max} = 47.29 \leq 4\sqrt{f'_c} b_w d = 4\sqrt{5000} \times 11 \times 16 \times \frac{1}{1000} = 49.78 \text{ kips}$
the maximum spacing is the smallest of the following S_{\max}

$$\text{Eq. 11-14 of ACI} \quad S_{\max} = \frac{A_v f_y}{50 b_w} = \frac{(2 \times 0.11 \text{ in}^2) \times (60,000 \text{ psi})}{(50 \text{ psi}) \times (11 \text{ in})} = 24 \text{ inches}$$

$$\text{ACI 11.5.4.1} \quad S_{\max} = d/2 = \frac{16}{2} = 8 \text{ inches} \text{ or } S_{\max} = 24 \text{ inches}$$

therefore, $S_{\max} = 8 \text{ inches}$ controls

$S_{\max} = 8 \text{ inches}$

CODE

COMMENTARY

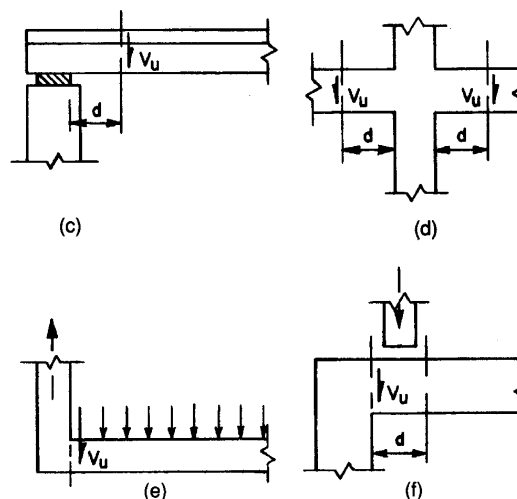


Fig. R11.1.3.1(c, d, e, f)—Typical support conditions for locating factored shear force V_u

Typical support conditions where the shear force at a distance d from the support may be used include: (1) members supported by bearing at the bottom of the member, such as shown in Fig. R11.1.3.1(c); and (2) members framing monolithically into another member as illustrated in Fig. R11.1.3.1(d).

Support conditions where this provision should not be applied include: (1) Members framing into a supporting member in tension, such as shown in Fig. R11.1.3.1(e). For this case, the critical section for shear should be taken at the face of the support. Shear within the connection should also be investigated and special corner reinforcement should be provided. (2) Members for which loads are not applied at or near the top of the member. This is the condition referred to in Fig. 11.1.3.1(b). For such cases the critical section is taken at the face of the support. Loads acting near the support should be transferred across the inclined crack extending upward from the support face. The shear force acting on the critical section should include all loads applied below the potential inclined crack. (3) Members loaded such that the shear at sections between the support and a distance d from the support differs radically from the shear at distance d . This commonly occurs in brackets and in beams where a concentrated load is located close to the support, as shown in Fig. R11.1.3.1(f) or in footings supported on piles. In this case the shear at the face of the support should be used.

11.1.3.2 — For prestressed members, sections located less than a distance $h/2$ from face of support shall be permitted to be designed for the same shear V_u as that computed at a distance $h/2$.

R11.1.3.2 — Because d frequently varies in prestressed members, the location of the critical section has arbitrarily been taken as $h/2$ from the face of the support.

11.1.4 — For deep flexural members, brackets and corbels, walls, and slabs and footings, the special provisions of 11.8 through 11.12 shall apply.