CODE

16.5.3.3 Required strength shall be calculated in accordance with the analysis procedures in Chapter 6, and the requirements in this section.

16.5.4 *Design strength*

16.5.4.1 Design strength at all sections shall satisfy $\phi S_n \geq U$, including (a) through (c). Interaction between load effects shall be considered.

(a) $\phi N_n \geq N_{uc}$
(b) $\phi V_n \geq V_u$
(c) $\phi M_n \geq M_u$

16.5.4.2 ϕ shall be determined in accordance with 21.2.

16.5.4.3 Nominal tensile strength N_n provided by A_n shall be calculated by

$$N_n = A_n f_y \qquad (16.5.4.3)$$

16.5.4.4 Nominal shear strength V_n provided by A_{vf} shall be calculated in accordance with provisions for shear-friction in 22.9, where A_{vf} is the area of reinforcement that crosses the assumed shear plane.

16.5.4.5 Nominal flexural strength M_n provided by A_f shall be calculated in accordance with the design assumptions in 22.2.

16.5.5 *Reinforcement limits*

16.5.5.1 Area of primary tension reinforcement, A_{sc}, shall be at least the greatest of (a) through (c):

(a) $A_f + A_n$
(b) $(2/3)A_{vf} + A_n$
(c) $0.04(f_c'/f_y)(b_w d)$

16.5.5.2 Total area of closed stirrups or ties parallel to primary tension reinforcement, A_h, shall be at least:

$$A_h = 0.5(A_{sc} - A_n) \qquad (16.5.5.2)$$

COMMENTARY

R16.5.5 *Reinforcement limits*

R16.5.5.1 Test results (Mattock et al. 1976a) indicate that the total amount of primary tension reinforcement, A_{sc}, required to cross the face of the support should be the greatest of:

(a) The sum of the amount of reinforcement needed to resist demands from flexure, A_f, plus the amount of reinforcement needed to resist the axial force, A_n, as determined by 16.5.4.3.
(b) The sum of two-thirds of the total required shear friction reinforcement, A_{vf}, as determined by 16.5.4.4, plus the amount of reinforcement needed to resist the axial force, A_n, determined by 16.5.4.3. The remaining $A_{vf}/3$ should be provided as closed stirrups parallel to A_{sc} as required by 16.5.5.2.
(c) A minimum amount of reinforcement, multiplied by the ratio of concrete strength to steel strength. This amount is required to prevent the possibility of sudden failure should the bracket or corbel crack under the action of flexure and outward tensile force.

R16.5.5.2 Closed stirrups parallel to the primary tension reinforcement are necessary to prevent a premature diagonal tension failure of the corbel or bracket. Distribution of A_h is required to be in accordance with 16.5.6.6. The total amount