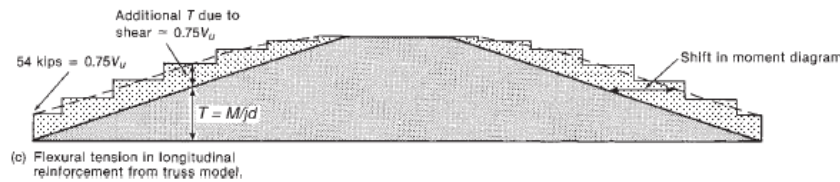
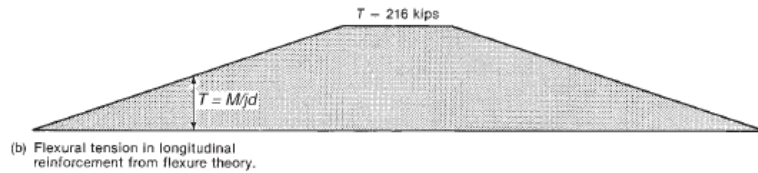
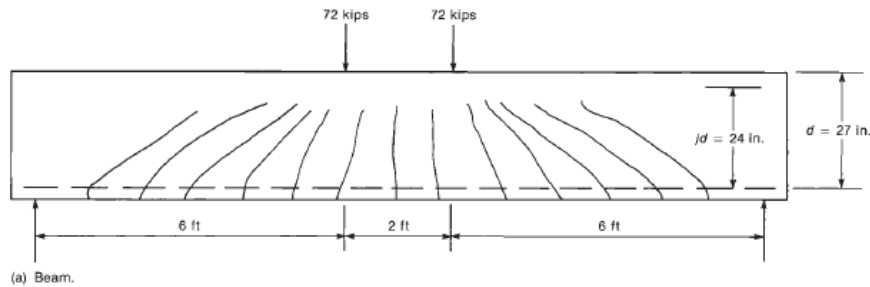


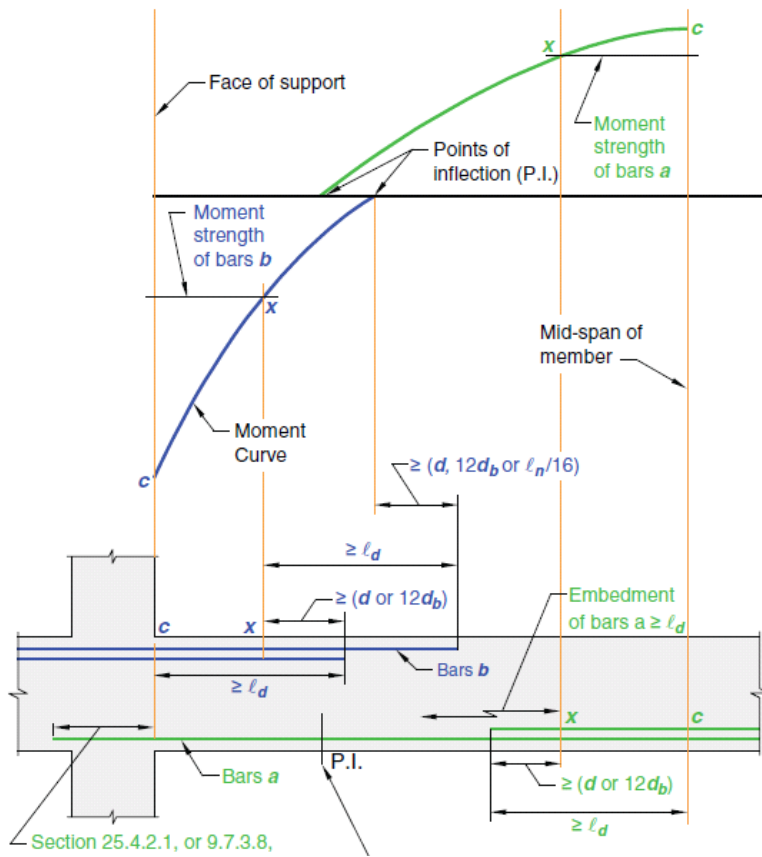
تأثیر برش در نیروی آرماتورها و محل قطع



9.7.3.3 Reinforcement shall extend beyond the point at which it is no longer required to resist flexure for a distance equal to the greater of d and $12d_b$, except at supports of simply-supported spans and at free ends of cantilevers.

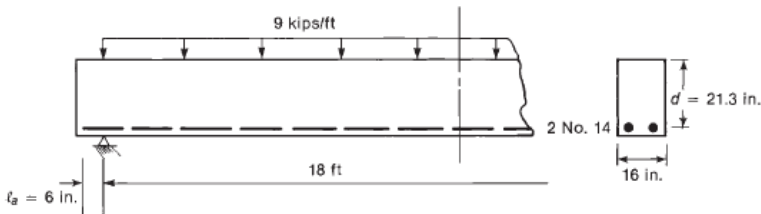
R9.7.3.3 The moment diagrams customarily used in design are approximate; some shifting of the location of maximum moments may occur due to changes in loading, settlement of supports, lateral loads, or other causes. A diagonal tension crack in a flexural member without stirrups may shift the location of the calculated tensile stress approximately a distance d toward a point of zero moment. If stirrups are provided, this effect is less severe, although still present to some extent.

To provide for shifts in the location of maximum moments, the Code requires the extension of reinforcement a distance d or $12d_b$ beyond the point at which it is calculated to be no longer required to resist flexure, except as noted. Cutoff points of bars to meet this requirement are illustrated in Fig. R9.7.3.2. If different bar sizes are used, the extension should be in accordance with the diameter of the bar being terminated.

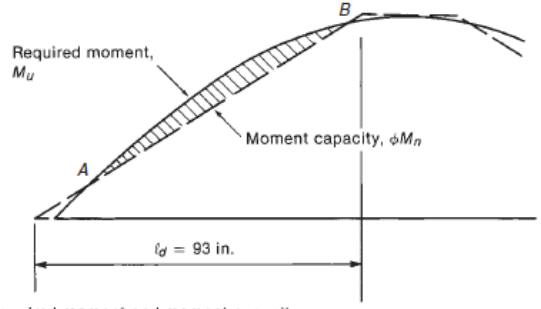


قطع آرماتورها مطابق آیین نامه

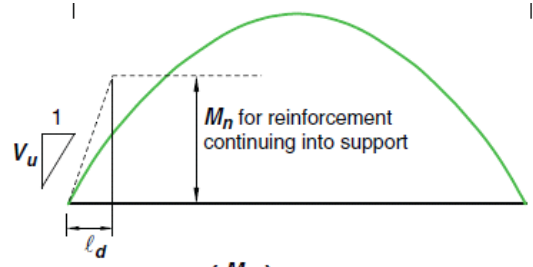
ماکزیمم قطر آرماتورهای مثبت (طول گیری آرماتورهای مثبت)



(a) Beam and section.



(b) Required moment and moment capacity diagrams.

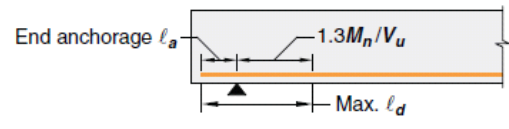


Capacity slope $\left(\frac{M_n}{l_d}\right) \geq$ Demand slope (V_u)

$$l_d \leq \frac{M_n}{V_u}$$

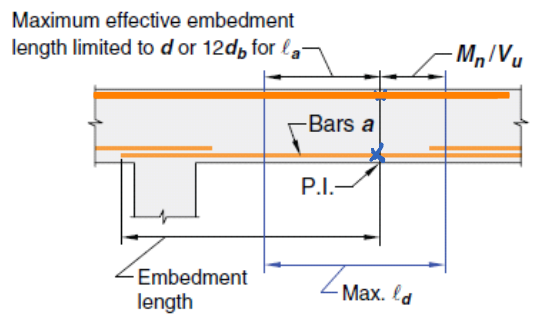
(a) Positive M_u Diagram

$$l_d \leq 1.3 \frac{M_n}{V_u} + l_a$$

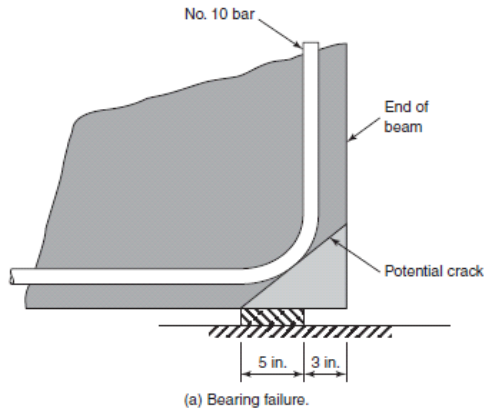


Note: The 1.3 factor is applicable only if the reaction confines the ends of the reinforcement

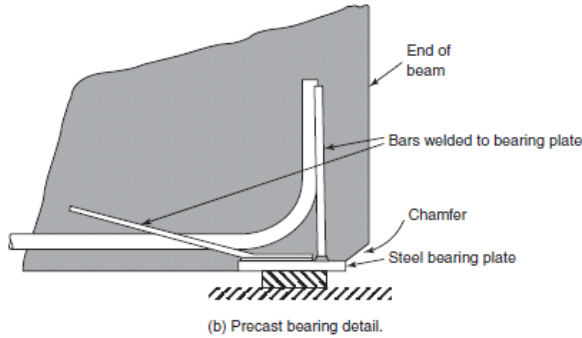
(b) Maximum l_d at simple support



(c) Maximum l_d for bars "a" at point of inflection



نحوه اجرای تکیه گاه ساده



کنترل برش در محل قطع آرماتورهای کششی

9.7.3.5 Flexural tension reinforcement shall not be terminated in a tension zone unless (a), (b), or (c) is satisfied:

- (a) $V_u \leq (2/3)\phi V_n$ at the cutoff point
- (b) For No. 36 bars and smaller, continuing reinforcement provides double the area required for flexure at the cutoff point and $V_u \leq (3/4)\phi V_n$
- (c) Stirrup or hoop area in excess of that required for shear and torsion is provided along each terminated bar or wire over a distance $3/4d$ from the cutoff point. Excess stirrup or hoop area shall be at least $0.41b_w s / f_{yt}$. Spacing s shall not exceed $d / (8\beta_b)$

R9.7.3.5 Reduced shear strength and loss of ductility when bars are cut off in a tension zone, as in Fig. R9.7.3.2, have been reported. The Code does not permit flexural reinforcement to be terminated in a tension zone unless additional conditions are satisfied. Flexural cracks tend to open at low load levels wherever any reinforcement is terminated in a tension zone. If the stress in the continuing reinforcement and the shear strength are each near their limiting values, diagonal tension cracking tends to develop prematurely from these flexural cracks. Diagonal cracks are less likely to form where shear stress is low (9.7.3.5(a)) or flexural reinforcement stress is low (9.7.3.5(b)). Diagonal cracks can be restrained by closely spaced stirrups (9.7.3.5(c)). These requirements are not intended to apply to tension splices that are covered by 25.5.