

CODE

COMMENTARY

supporting member, allowing for cover and avoidance of interference with column reinforcement, even though the resulting anchorage length may exceed ℓ_{dt} . Extending the bar to the far side of the column core helps engage the entire joint in resisting the anchorage forces and thereby improves the performance of the joint.

If closely spaced headed bars are used, the potential for concrete breakout failure exists. For joints as shown in Fig. R25.4.4.2c and R25.4.4.2d, anchorage strengths will be generally higher if the anchorage length is equal to or greater than $d/1.5$ (Eligehausen 2006b), as shown in Fig. R25.4.4.2c, or by providing reinforcement in the form of hoops and ties to establish a load path in accordance with strut-and-tie modeling principles, as shown in Fig. R25.4.4.2d. Strut-and-tie models should be verified in accordance with Chapter 23. Note that the strut-and-tie models illustrated in Fig. R25.4.4.2c and R25.4.4.2d rely on a vertical strut from a column extending above the joint. Beam-column joints at roof-level and portal frames are vulnerable to joint failure and should be properly detailed to restrain diagonal cracking through the joint and breakout of the bars through the top surface.

For cases where development length cannot be designed in accordance with 25.4.4.2, use of the provisions of Chapter 17 should be considered.

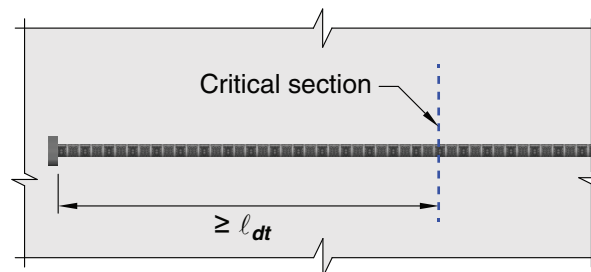


Fig. R25.4.4.2a—Development of headed deformed bars.