

CODE

25.9.4.3 Analysis of general zones

25.9.4.3.1 Methods (a) through (c) shall be permitted for design of general zones:

- (a) The strut-and-tie method in accordance with Chapter 23
- (b) Linear stress analysis, including finite element analysis or equivalent
- (c) Simplified equations in AASHTO LRFD Bridge Design Specifications, Article 5.8.4.5, except where restricted by 25.9.4.3.2

The design of general zones by other methods shall be permitted, provided that the specific procedures used for design result in prediction of strength in substantial agreement with results of comprehensive tests.

COMMENTARY

R25.9.4.3 Analysis of general zones

R25.9.4.3.1 The design methods include those procedures for which guidelines have been given in **AASHTO LRFDUS** and **Breen et al. (1994)**. These procedures have been shown to be conservative predictors of strength compared to test results (Breen et al. 1994). The use of the strut-and-tie method is especially helpful for general zone design (Breen et al. 1994). In many anchorage applications, where substantial or massive concrete regions surround the anchorages, simplified equations based on AASHTO LRFDUS and Breen et al. (1994) can be used except in the cases noted in 25.9.4.3.2.

Values for the magnitude of the bursting force, T_{burst} , and for its centroidal distance from the major bearing surface of the anchorage, d_{burst} , may be estimated from Eq. (R25.9.4.3.1a) and (R25.9.4.3.1b), respectively. The terms used in these equations are shown in Fig. R25.9.4.3.1 for a prestressing force with a small eccentricity. In the application of these equations, the specified stressing sequence should be considered if more than one tendon is present.

$$T_{burst} = 0.25 \sum P_{pu} \left(1 - \frac{h_{anc}}{h} \right) \quad (\text{R25.9.4.3.1a})$$

$$d_{burst} = 0.5(h - 2e_{anc}) \quad (\text{R25.9.4.3.1b})$$

where $\sum P_{pu}$ is the sum of the P_{pu} forces from the individual tendons; h_{anc} is the depth of the anchorage device or single group of closely spaced devices in the direction considered; and e_{anc} is the eccentricity (always taken as positive) of the anchorage device or group of closely spaced devices with respect to the centroid of the cross section (Fig. R25.9.4.3.1).

Anchorage devices should be treated as closely spaced if their center-to-center spacing does not exceed 1.5 times the width of the anchorage device in the direction considered.

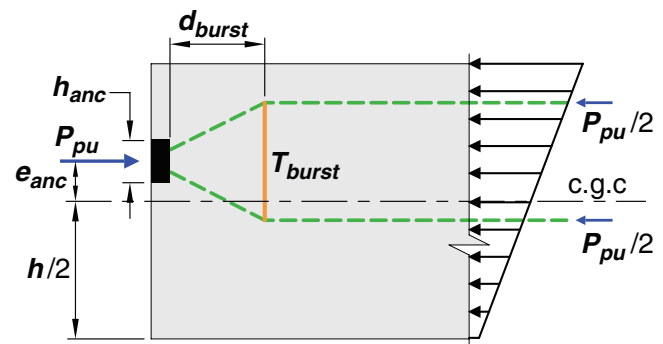


Fig. R25.9.4.3.1—Definition of terms used to define the general zone.

25.9.4.3.2 Simplified equations as permitted by 25.9.4.3.1(c) shall not be used for the design of a general zone if any of the situations listed in (a) through (g) occur:

R25.9.4.3.2 The simplified equations in the AASHTO LRFDUS are not applicable in several common situations listed in 25.9.4.3.2. In these cases, a detailed analysis is required. In addition, in the post-tensioning of thin sections,