

PART VI
Appendix H**References of Chapter 3 Part 6 (Soils and Foundations)**

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PART VI
Appendix I
Strut-and-Tie Models

I.1 Scope and Definitions

Scope: Strut-and-Tie model is elaborated in this Appendix. Sec. I.1 introduces the basic definitions. The design procedure by Strut-and-Tie model is described in Sec. I.2. Strength of struts, ties and nodal zones are given in Sections I.3, I.4 and I.5 respectively. Definitions and clauses in the above sections are followed by clarifications as necessary.

B-region: A region of a member where the plane sections assumption of flexure theory from Sec 6.3.2.2 can be applied. In general, B-region is any portion of a member outside of a D-region.

Discontinuity: An abrupt change in loading or geometry.

Clarification for Discontinuity: It is assumed that discontinuities extend a distance h from the section where the load or change in geometry occurs. Figure 6.I.1(a) shows typical geometric discontinuities, and Figure 6.I.1(b) shows combined geometrical and loading discontinuities.

D-region: The region of a member within a distance, h , from a force discontinuity or a geometric discontinuity.

Clarification for D-region: Typical D-regions are the shaded regions in Figure 6.I.1(a) and Figure 6.I.1(b). The plane sections assumption of Sec 6.3.2.2 is not applicable in such regions. Each shear span of the beam in Figure 6.I.2(a) is a D-region.

When two D-regions overlap or meet as shown in Figure 6.I.2(b), they can be considered as a single D-region for design purposes. The maximum length-to-depth ratio of such a D-region would be approximately 2. Thus, the smallest angle between the strut and the tie in a D-region is $\arctan \frac{1}{2} = 26.5^\circ$, rounded to 25° .

When there is a B-region between the D-regions in a shear span, as shown in Figure 6.I.2(c), the strength of the shear span is governed by the strength of the B-region if the B- and D-regions have similar geometry and reinforcement, as because the shear strength of a B-region is less than the shear strength of a comparable D-region. Shear spans containing B-regions-the usual case in beam design-are designed for shear using the traditional shear design procedures from Sections 6.4.1 to 6.4.4 ignoring D-regions.