APPENDIX B
DESIGN LOAD ASSUMPTIONS

[The information contained in this Appendix B is not part of this American National Standard (ANSI) and has not been processed in accordance with ANSI's requirements for an ANS. As such, this Appendix B may contain material that has not been subjected to public review or a consensus process. In addition, it does not contain requirements necessary for conformance to this standard.]

B1.1 DESIGN CONCEPTS

B1.1.1 Roofs, Ceilings, and Suspended Floors: These are designed as diaphragms to receive lateral loads from exterior walls (assuming the wind blows from any direction) and to transfer those loads to diaphragm edges where they will be resisted by shearwalls.

B1.1.2 Exterior Walls: These are designed to resist wind forces and transfer the lateral loads to diaphragms and to the ground. Exterior walls and foundations are designed to restrain uplift loads received from the roof by means of connected dead loads.

B.2 FOUNDATION DESIGN ASSUMPTIONS

B.2.1 General: This section provides an overview of design assumptions for Section 305 prescriptive continuous foundations for use with wood and steel light-frame buildings. Revision of the prescriptive foundation provisions was required as part of this update effort in order to conform to the load and load combination requirements of ASCE 7-05 and to adjust from the previous upper bound of the prescriptive design provisions (two-story, 130 mph, Exposure B) to the scope currently permitted by standards adopted by reference within this standard (three story, 150 mph, Exposure C).

B.2.2 Design Loads and Load Combinations: Design wind loads used to develop Sec. 305 foundation requirements are based on ASCE 7-05 analytical procedure for low-rise buildings. Calculations include increased end zone loads, but not torsional load cases. Increased wind loads due to the ASCE 7 topographical factor have not been included, consistent with the scoping limits of Sec. 104.5 of this standard. Because complex roof ridge configurations make it difficult to differentiate parallel and perpendicular to ridge directions, calculations are based only on perpendicular to ridge loading conditions. ASCE 7-05 allowable stress design (ASD) basic load combinations have been used, and in particular, ASCE 7 Sec. 2.4.1, load combination 7 was used to determine required weight of foundation to resist overturning forces: 0.6D + W.

B.2.3 Foundation Analysis Model: In order to determine foundation requirements to resist the ASCE 7 loading, development of a foundation analysis model is required. The model used for Sec. 305 prescriptive requirements is a global overturning model (Figure B.2-1). This model assumes that the supported building can act as a rigid box, and permits calculation of the weight required to resist overturning of the box (rolling over as a unit). This generally produces a foundation size greater that required by SSTD-10 in the past, but smaller than might be determined by a detailed engineering load path analysis. Out of three possible levels of analysis, this intermediate level was chosen as a compromise.

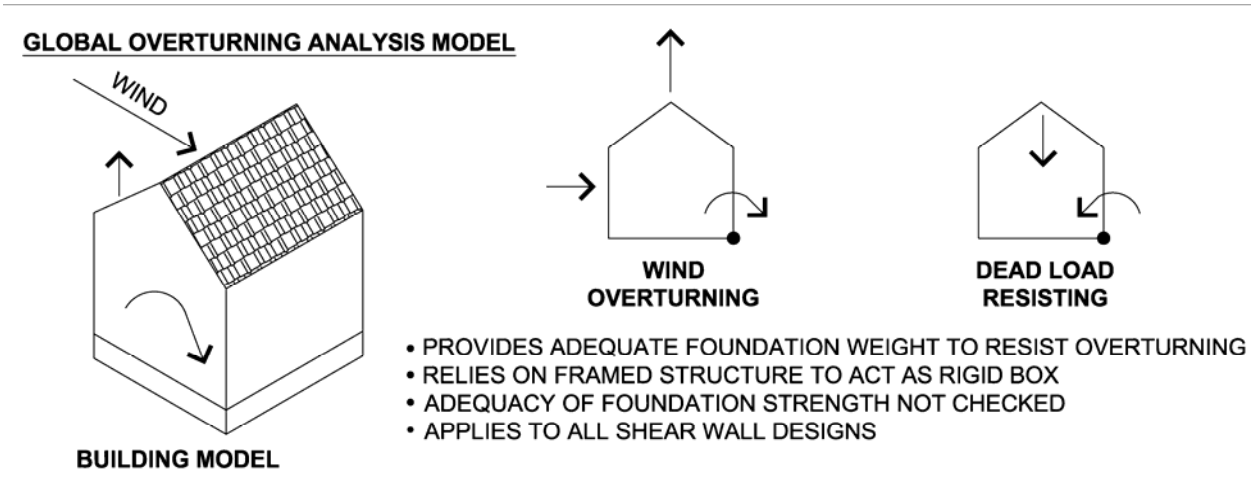

FIGURE B.2-1
FOUNDATION ANALYSIS MODEL, GLOBAL OVERTURNING

B.2.4 Resisting Dead Load: Dead load used to resist global overturning includes:
-Roof plus ceiling weight of 10 psf. Weight from ½ of the roof area is assumed to be acting at the windward wall.
-Framed floor weight of 12 psf. Weight from ¼ the floor area is assumed to be acting on the windward wall.
-Wall weight of 8 psf. Windward wall weight acting on windward wall, weight of walls parallel to wind acting at their mid-length.
-Slab on grade weight of 44 psf based on required 3-1/2 inch minimum thickness. A tributary width of 6 feet is assumed to be tributary to each foot of footing length where slab-on-grade occurs. Reinforcing requirements and detailing are provided.
-Footing weight is based on a calculation of the self weight of each footing type. Similar to the walls, it is assumed that the windward footing weight will act at the windward wall and the weight of footings parallel to the wind load will act at mid-length. Soil friction, soil suction and weight of soil mobilized have not been included in prescriptive foundation weight; however, provisions allow for the detailed calculation of footing resisting weight on a case by case basis when permitted by the building official.