

WALL ANCHORAGE ASSEMBLIES TO FLEXIBLE DIAPHRAGMS REVISED DESIGN CRITERIA

In collaboration with the Structural Engineers Association of Southern California (SEAOSC) and due to Northridge Earthquake, LADBS had published a previous version of the this Information Bulletin which outlined the wall anchorage assembly criteria of pre-manufactured anchor connections with tables for the allowable capacities of the connectors with Los Angeles research report (LARR) approvals. Since then, more products have been submitted directly to nationally recognized model code organizations for review to obtain approval with a Los Angeles supplement in lieu of LARR approvals. LADBS has decided to discontinue publishing the tables for the allowable capacities and defer to the respective model code organization approvals with LA supplements. However, the criteria under which these approvals were issued remains the same. The purpose of this revised Information Bulletin is to republish the LADBS criteria for wall anchorage assemblies for pre-manufactured anchor connectors.

The allowable loads for the approved anchor connectors when used in wall anchorage assemblies shall be based on the lower of the following three requirements:

1. The average ultimate load on a steel test jig divided by 3 x 1.4 for design per LABC Chapter 16 and ASCE 7 or 5 for design per LABC Chapters 91 or 96.
2. The average 1/8" deflection load on a steel jug divided by 3 for design per LABC Chapter 16 and ASCE 7 or 5 for design per LABC Chapters 91 or 96.
3. Fastener in wood value in accordance with LABC with 1/3 increase and with no increase for seismic load duration for allowable stress design per Chapter 91 or 96.

The above criteria are for flexible diaphragm to rigid wall anchor connectors (holdowns) only. The 1/8-inch deflection limitation is a critical control to prevent cross-grain bending/tension failure of the ledger which supports the roof or floor framing members from the flexible diaphragm to the rigid wall.

All other anchor bolts into concrete or masonry walls as well as the capacity of steel elements and wood members, beyond the tested anchor connection, shall be verified by a licensed engineer, registered in the State of California, to be equal or higher than the allowable capacity specified above.

Wall Anchorage Assembly Criteria for Custom Designed Steel Anchor Connectors

Deformation Criteria

The wall anchorage assembly shall include the following:

- Anchor rod into masonry or concrete wall,
- Anchor connector (holdown) connecting the anchor rod to the roof/floor framing, and
- Fasteners (bolts, screws or nails) connecting the anchor connector the roof/floor framing.

Wall Anchorage Assembly deformation calculations shall include, but not be limited to, the following:

- Slip in nails, bolts or screws in timber,
- Shrinkage of timber,
- Deformation in steel, concrete, or timber components, and
- Inelastic deformation in anchor connectors.

The total Wall Anchorage Assembly deformation shall not exceed 3/8" under the following wall anchorage forces:

- 3.0 Fp (ASD) - 2017 LABC Chapter 16, or
- 5.0 Fp (ASD) - 2017 LABC Chapters 91 or 96

The calculated deformation of a custom designed anchor connector shall be limited to 1/8" under the above anchorage forces.