

## MEMO #2

**Date:** September 17, 2003

**To:** Grover Sawyer, P.E.  
Deputy Commissioner, Engineering

**From:** Barry Gupton, P.E.  
Staff, Chief Building Code Consultant

**Re:** Residential Code  
Beam End Reactions

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The attached Tables were developed in cooperation with the Wood Truss Council of NC to provide prescriptive Code solutions (in lieu of a registered design professional) to beam end reactions that are greater than 3000# but not greater than 15000#. The allowable loads in the Tables were derived from the minimum design criteria, the maximum span conditions, and Tables published in the Code.

The “Load Chart for Jack Studs” provides the load capacity for studs that support beam end reactions. This Table is based on Tables R502.5(1), R502.5(1)b, and L-1.

**Example #1:** A 3-inch wide header with an end reaction of 6500# requires 4-jack studs (6800# capacity).

There are 2-sets of “Exterior Foundation Tables” based on available soil bearing capacity. The first set of 4-Tables is for “Frame Wall” construction (without brick veneer). The second set of 4-Tables is for “Frame Wall with Brick Veneer” construction. Each Table provides a maximum allowable column load based on the supported structure, the footing size, and the available soil bearing capacity.

**Example #2:** The end reaction of 6500# from the 4-jack studs to the foundation (assume 2000-psf soil bearing capacity, frame wall, supporting roof and ceiling) is adequately supported by an 8-inch thick by 16-inch wide footing (9417# capacity).

**Example #3:** An end reaction of 13000# (with the same assumptions as Example #2) requires 8-jack studs and is adequately supported by an 8-inch thick by 16-inch wide footing with 3000-psf soil bearing capacity (16862# capacity).

Bearing reactions less than or equal to 3000# are deemed to comply with the prescriptive Code requirements. The contractor shall refer to the attached Tables (derived from the prescriptive Code requirements) to determine the minimum foundation size and number of wood studs required to support reactions greater than 3000# but not greater than 15000#. A registered design professional shall be retained to design the support system for any reaction that exceeds those specified in the attached Tables. A registered design professional shall be retained to design the support system for all reactions that exceed 15000#.

**Definitions:**

Beam – A horizontal collector member used as a main support for a building (flitch plate beam, girder, header, LVL, steel W beam, truss girder, etc).

Beam End Reaction – A point load at each end of a beam where a concentrated load is transferred to the supporting structure.