

## STATE BUILDING CODE INTERPRETATION NO. I-17-03

November 5, 2003

The following is offered in response to your November 3, 2003 letter to me in which you seek an official interpretation of the provisions of sections 301.4 and 802.10 of the 1995 CABO One and Two Family Dwelling Code portion of the 1999 State Building Code.

**Question:** What is the appropriate bottom chord live load for a metal plate connected wood roof truss when the attic space is not intended to be utilized for rooms?

**Answer:** Both sections 301.4 and 802.10 of the 1995 CABO One and Two Family Dwelling Code portion of the 1999 State Building Code address this issue. Table 301.4 sets forth minimum live loads for attics where development of future rooms is not possible. These live loads are applicable to both conventionally framed roof/ceilings and to truss roofs not designed to accommodate rooms. The table requires that attics with no storage and a roof slope not steeper than 3 in 12 have a minimum live load of 10 pounds per square foot (psf). The no-storage requirement equates to no access, since any access to the attic space invites some degree of storage. Thus, in order to use the 10 psf load, one must have a roof pitch not steeper than 3 in 12 and no area of clear height over 30 inches, so that the attic access requirements of section 807.1 don't kick in. The table further requires a live load of 20 pounds in any attic with limited storage. Although not specifically defined in the 1995 CABO Code, I went to the 2003 International Residential Code (the successor to CABO) for clarification of what constitutes limited storage. In that code, attics with limited storage are those that are not accessed by means of a fixed stairway, so it follows that the intent of the code is that any attic with a scuttle or drop down stair requires a live load of 20 psf.

Section 802.10 of the 1995 CABO Code refers the reader to TPI-1985 for information specific to metal plate connected wood trusses. This standard differs somewhat from the requirements of CABO with respect to attic live loads. Appendix A provides guidance with respect to design loads "in the absence of other design criteria more suitable to the area". It defines an uninhabited attic as one that is served by a stair and has a minimum clear height of 6 feet, but that does not meet other parameters allowing the development of habitable rooms. An uninhabited attic requires a minimum bottom chord live load of 20 psf. An accessible attic, defined as an attic accessed by a scuttle (or, presumably a drop down stair), requires a total bottom chord load of 10 psf, while a non-accessible attic requires no live load, but in a residential application, must be designed for a minimum 10 psf dead load (thus, the bottom chord loading requirements for accessible and non-accessible trusses appear to be identical at 10 psf).

That having been said, we need to remind ourselves of section 104.2 of the 1995 CABO Code, which states in part that "where differences occur between provisions of this code and referenced standards, the provisions of this code shall apply". Since TPI-1985 is a referenced standard, the code language takes precedence in this matter. Thus, in a residence designed to CABO, any roof truss not designed to accommodate rooms that is accessed by a scuttle or drop down stair must be designed to accommodate a 20 pound live load in any areas that will accommodate limited storage

(any areas with over 30 inches vertical clear height between the bottom chord and any other truss member). Since the bottom chords of trusses are generally constructed of several short pieces of lumber, it is possible to alter the live load requirement on the various pieces that make up the bottom chord, so it is not required to carry the 20 psf live load across the entire bottom chord. In a residence designed to CABO, any truss without access (roof pitch not steeper than 3 in 12 and no area with a vertical height over 30 inches between the bottom chord and any other truss member) and in the spaces in accessible attics that will not accommodate storage must be designed to accommodate a minimum 10 psf live load. In both cases the bottom chord dead load must equal the weight of the materials with a minimum of 10 psf in residential construction.

To further complicate this issue, the requirements of the BOCA National Building Code/1996 portion of the 1999 State Building Code, which can also be used to construct one- and two-family dwellings as well as all other buildings and structures, differ from the requirements of CABO. Section 1606.2.3 of the BOCA Code deals with residential attics with trusses. It requires that a 20 psf live load be applied to those portions of the bottom chord of not less than 2 adjacent trusses with the same web configuration containing a rectangle 42 inches high or greater by 2 feet wide or greater, located within the plane of the truss and between the top of the bottom chord and any other truss member, providing there is access to the attic space and the bottom chord of the truss is relatively flat (has less than a 2 in 12 pitch). This section of BOCA also contains requirements for dead loads on the bottom chord of trusses. They must be designed for either: 1) actual dead load with a minimum of 5 psf where there is no space between the bottom chord and any member of the truss over 30 inches in height or where any space over 30 inches in height does not continue for a horizontal distance of more than 12 inches along the member, or; 2) actual dead load with a minimum of 10 psf in all other cases.

In view of the fact that the BOCA requirements are more specific to attic trusses, it would be appropriate for the local building official to accept compliance with section 1606.2.3 of BOCA as alternative compliance to the requirements of CABO, or to suggest to the applicant that they apply for a modification to use the appropriate section in BOCA rather than the CABO requirements.