

STATE BUILDING CODE INTERPRETATION NO. I-12-05

October 17, 2005

The following is offered in response to your letter to me dated October 6, 2005 in which you seek a formal interpretation of the provisions of Section R403.1.4.1 of the 2003 International Residential Code portion of the 2005 State Building Code. The scenario you describe is a dwelling on a sloping site wherein the lower level, which is partially below grade, consists of part basement and part unheated garage. Your questions are directed towards footings within the unheated garage portion and how they relate to Table R301.2(1) with respect to Frost Line Depth.

Question 1: Given the above scenario, is a footing in the middle of the unheated garage that supports a column carrying loads from a beam above required to have its lowest part 42 inches below the top of the garage slab?

Answer 1: Yes, if the garage will be subject to temperatures cold enough to allow frost to form below the slab. Unless the garage is supplied with sufficient heat to ensure that frost will not penetrate below the slab, all footings, including independent column footings, must extend below frost depth, which for footings is 42 inches. Simply thickening the slab in the vicinity of the column in an unheated garage that can go below 32 degrees F will not ensure that frost heave will not occur below the thickened portion. In addition, the code requires that footings be supported on undisturbed natural soils or engineered fill. Note that these requirements also extend to unheated garages attached side-by-side to dwellings.

Question 2: Do alternative methods of frost protection exist for unheated garages?

Answer 2: Yes, there are several. If the garage is freestanding with an area of 400 square feet or less and an eave height of 10 feet or less it is exempt from frost protection requirements. Section R403.1.4.1 also permits construction in accordance with ASCE 32-01 or erecting the footing on solid rock as alternative protection for unheated buildings. A report from an engineer licensed to practice in Connecticut stating that the footing was designed to resist frost would also suffice. In addition, Section R104.11 allows the local building official to accept alternative designs when he finds that the proposed design is satisfactory and complies with the intent of the provisions of the code. For example, even though a portion of a building is not heated, other factors such as walls below grade, heat loss from adjacent portions of the building that are heated and ambient heat from mechanical equipment may provide sufficient temperatures to ensure that frost will not penetrate below a thickened slab and cause frost uplift.

The integrity of the thermal envelope surrounding the garage also plays a part. If the walls and overhead door are uninsulated or the garage doors are left open in winter the garage will naturally be much colder than a garage that is insulated, finished with drywall and has an energy-efficient overhead door and windows that are shut in winter. In a garage with code compliant perimeter frost walls, the bottom line is – if the temperature in the garage cannot go below freezing, there is little likelihood that frost will penetrate below the slab.