

**Oregon**  
**Interpretive Ruling No. 99-1**  
**RESIDENTIAL SLAB EDGE INSULATION**

**REQUESTED BY:** Building Codes Structures Board Energy Committee

**REQUEST FOR RULING:** An interpretive ruling is requested to clarify how the slab-on-grade perimeter insulation requirements are applied to slab-on-grade construction when portions of the slab extend to below-grade conditions?

**CODE SECTIONS:** 1998 Oregon Structural Specialty Code (OSSC), Section 1307.1.6 and 1996 Oregon One & Two Family Dwelling Code (OTFDC), Section E401.7.

**BACKGROUND & DISCUSSION:** The energy code provisions of Oregon building codes require perimeter insulation to be in place below slab-on-grade construction.

"The insulation shall extend downward from the top of the slab for a minimum of 24 inches or downward to the bottom of the slab, then horizontally beneath the slab for a minimum total of 24 inches.

**Exception:** For monolithic slabs, the insulation shall extend downward from the top of the slab to the bottom of the thickened edge."

The question arises how to apply the code requirements in the case of daylight basements wherein only a portion of the slab is located on-grade and the rest of the slab is below grade as shown in Figure 1 below. As per the Oregon building codes, "slab on grade" perimeter is required to be insulated whereas "slab below grade" perimeter is not required to be insulated. The problem with applying this requirement is: where does "on-grade" end and "below-grade" begin (see left and right side on Figure 1). If slab-on-grade insulation does not extend far enough, there will be exposed uninsulated slab edge.

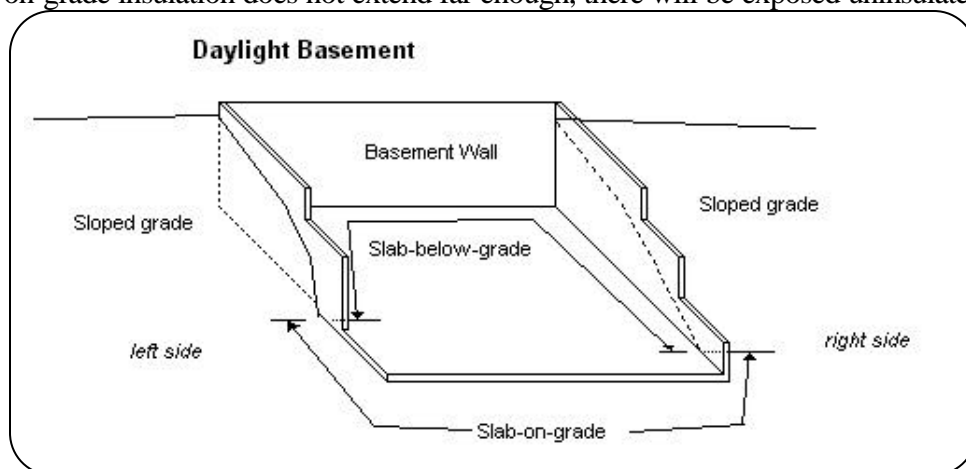


Figure 1 – Daylight Basement

The Washington State Energy Code handles this problem by defining slab-on-grade differently than slab-below-grade. It defines slab-below-grade as "any portion of a slab floor in contact with the

ground which is more than 24 inches below the final elevation of the nearest exterior grade" and slab-on-grade as "any portion of a slab floor in contact with the ground which is less than or equal to 24 inches below the final elevation of the nearest exterior grade." This distinction prevents confusion between basements that have wall insulation down to the top of the slab-below-grade and slab-on-grade applications that may have one or more corners located below grade.

The second problem is how to estimate where final grade is prior to the settling of any backfill. Because the exact heat loss characteristics of the soil are unknown, precision in this estimation is unnecessary. The depth of the stem walls or basement walls should provide some indication as to the future depth of the backfill. Jurisdiction staff should be able to estimate the depth of the final grade with sufficient accuracy. Erring on the side of extra insulation may require several extra feet of insulation. Erring on the side of less insulation may result in colder portion of the slab, but would unlikely have any significant negative impact.

The third problem is how to apply the Oregon Energy Code requirements when a slab-above-grade extends beyond the exterior building envelope, such as for an exit balcony or deck in a residential occupancy (Figure 2). Is the perimeter of the slab at edge of exterior envelope required to be insulated?

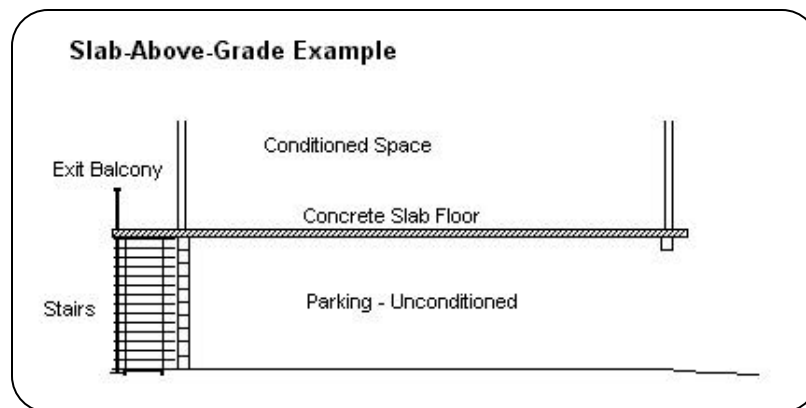


Figure 2 – Slab extended beyond envelope

Under this condition the slab should be treated as a floor above grade and should be insulated as per the code requirements. If the floor is located above a conditioned space, then it needs to be insulated as a roof to a conditioned space. Unfortunately, when the slab extends beyond the building envelope, as shown in Figure 2, it may not be possible for structural reasons to provide a thermal break. In effect, the slab may unavoidably behave as a “radiator fin” through which heat is conducted to the outside environment.

#### **FINDINGS:**

- The purpose of perimeter slab-edge insulation is to reduce heat conduction through the ground to the upper layer of soil and/or ambient air. Perimeter insulation which extends to a depth of 24 inches from the closest point of exterior grade can dramatically reduce heat loss.
- Partial insulation of the slab-on-grade is necessary on all slabs that are less than or equal to 24 inches below the final elevation of the nearest exterior grade. See Figure 3.

- The perimeter of a concrete slab in a basement 24 inches or greater below grade does not need to be insulated, as it does not classify as a “slab-on-grade” under Section 1307.1.6 of OSSC.
- All below-grade walls should be insulated in accordance with the energy code provisions.
- Where slabs extend beyond the building envelope, they shall be treated as a floor or roof depending on the proximity of conditioned spaces. See Figure 3. No thermal break is necessary.
- The building inspector shall have authority to estimate the location of grade for the purpose of determining the extent of the slab edge.
- Monolithic slabs need only be insulated downward to the bottom of the thickened edge of the slab, as per the code exception

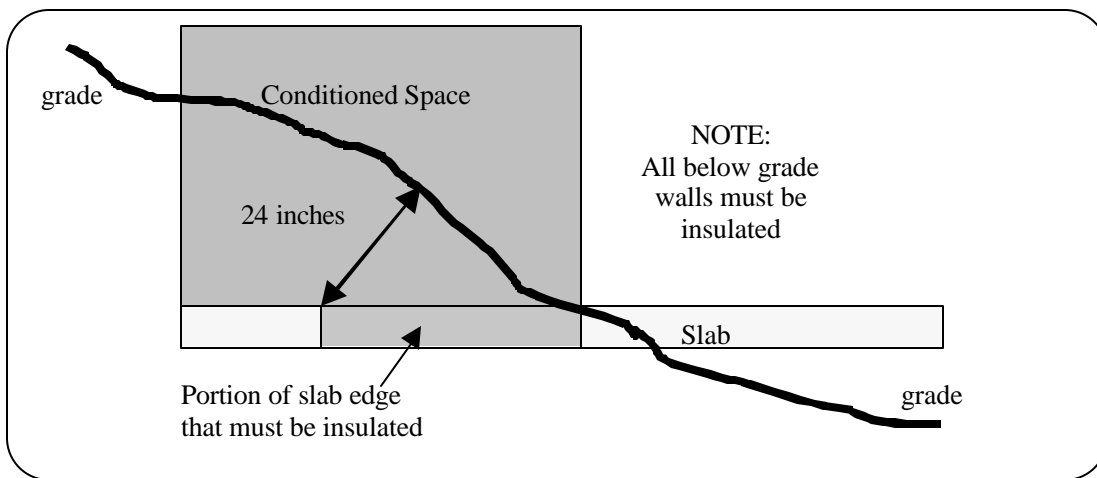


Figure 3 - Slab and conditioned space cross section on sloped grade

**CONCLUSION:** The Building Codes Structures Board accepts the recommendation of the Energy Committee and the findings as related to the residential slab edge insulation.

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 John A. Talbott, P.E., Chairman  
 Building Codes Structures Board

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 Date

**RULING:** The recommendations and findings of the Building Codes Structures Board are accepted.

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 Joseph A. Brewer III, Administrator  
 Building Codes Division

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 Date