2008 Residential Building Standards Project

Revision to the Residential ACM Calculation for Slab Heat Flow

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Agenda

- Background
- CEC Slab Loss Model
- Residential ACM Proposal
- Impact on TDV for typical homes
- Impact on Slab Insulation Savings
Background

- The Residential ACM specifies the rules and algorithms to be used in compliance Calculations.
- Slab edge insulation required only in Zone 16 (mountains).
- Default slab is 80% carpeted and 20% hard surface.
- 2005 ACM specifies conductance based on ASHRAE F2 to monthly ground temperature.
- Does not give enough credit for slab edge insulation and overestimates cooling heat losses.
CEC Slab Loss Model

- Developed in 2000 by Huang et. Al. at LBNL
- Simplified model for hourly simulation
  - Based on results of detailed 2D model
  - Regression coefficients for conductance to annual, monthly and weekly temperatures
  - Carpeted and hard surface slabs
  - Implemented in DOE2
Proposal for Residential ACM

- Keep current slab inputs
  - Area carpeted and hard surface
  - Perimeter length of each

- Add input for slab edge insulation
  - Location/type
  - R and depth of insulation
## Coefficients for defined cases

<table>
<thead>
<tr>
<th>Type</th>
<th>Carpeted</th>
<th></th>
<th>Exposed</th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Perim Week</td>
<td>Perim Month</td>
<td>Perim Year</td>
<td>Core Month</td>
<td>Core Year</td>
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<tr>
<td>R0</td>
<td>0.1157</td>
<td>0.0664</td>
<td>0.0028</td>
<td>0.0517</td>
<td>0.0257</td>
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<td>R5 2'</td>
<td>0.0320</td>
<td>0.0869</td>
<td>0.0103</td>
<td>0.0390</td>
<td>0.0310</td>
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<td>R10 2'</td>
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<td>0.0874</td>
<td>0.0131</td>
<td>0.0363</td>
<td>0.0322</td>
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</tbody>
</table>

User selects type from library
ACM Interpolates for R
ACM Interpolates for depth
Uninsulated Slab Annual TDV Increases 2%
Slab Insulation TDV Savings Increases

The graph illustrates the slab insulation TDV savings increases from 2005 to 2008 for various climates. The x-axis represents different climates, while the y-axis shows TDV/ft²-yr. The bars indicate the savings, with blue bars representing 2005 and red bars representing 2008. The graph shows a comparison of TDV savings across different climates.
Conclusion

- Proposed Model
  - Works with current inputs
  - Covers current prescriptive requirements
  - Offers path for future credits for slab insulation
  - Has minimal impact on compliance for current homes