

Illinois Energy Code Advisory Council Commercial Subcommittee
November 20, 2014 – 10:00 a.m.
Teleconference
MEETING MINUTES

In Attendance:

Lisa Mattingly, CDB
George Patterson, Bennett & Brosseau Roofing Inc.
Bruce Maxey, BLDD
Ryan Nation, Hanson Engineers
Tom Buchheit, BRiC Partnership
John Meek, Felmley-Dickerson Company

Bill McHugh, CRCA
Shannon Bookey, CDB
Joseph Zimmer, Architect
Jeff Mang, Polyisocyanurate Insulation Manufacturers Association (PIMA).
Dan Hohl, AIA
Darren Meyers, International Energy Conservation Consultants LLC

- Ms. Mattingly called the meeting to order at 10:05 a.m.
- Roll call of Subcommittee members was taken followed by introduction of guests.
- Chairman Maxey asked the Subcommittee to start with Mr. Zimmer's proposed amendments. Mr. Buchheit offered to lead the discussion. Mr. Zimmer gave an overview of his proposal related to Low Energy Conditioned Building Framework compliance. He stated that the energy modeling required for other compliance paths can add costs and be complicated which is problematic for designers and home owners.
- Mr. Zimmer was asked to highlight the differences between Sections 407 and 409. He said that he would do this.
- Chairman Maxey asked how the building would perform for this compliance path versus the others already in the Code. There are two existing compliance paths in the IECC, prescriptive (no measurements) and performance (energy modeling compared to baseline), this does not include ASHRAE. Mr. Zimmer stated that a building following his proposed method would safely be above the prescriptive and more than 15% over the baseline performance path.
- Mr. Meyers commented that a definition should be developed for "conditioned floor area". He also commented on semi-heated space vs. low energy. Mr. Zimmer responded that in ASHRAE semi-heated space is defined with a minimum temperature. He also noted that it does not provide temperatures in defining a conditioned space. IECC doesn't define semi-heated space but it defines low energy.

- Mr. Buchheit asked about C303.1.3 which allows the code official option to accept alternate products. He wanted to know why this was necessary. Mr. Zimmer mentioned certain products manufactured outside of the U.S. have better performance than those produced here. They have been tested but not in the U.S. yet. After a discussion between Mr. Zimmer and Mr. Meyers, Mr. Meyers stated that C102.1 already addresses C303.1.3, C402.5.2, C403.2.3, and C403.2.14. It was noted that Mr. Plass and Mr. Ayers should be consulted as code officials if they felt this amendment was needed.
- C402.5 was discussed next. This proposed alternative allows for testing of commercial buildings in same method as required in residential provisions, if the building is small enough to make that practical. Existing agencies or individuals with equipment capable of performing testing on residential buildings could also provide testing for smaller commercial buildings. The threshold is 100,000 c.f.
- The discussion then moved to C408.2 on commissioning.
- Chairman Maxey asked if there were any other questions or comments. He thanked Mr. Zimmer for his thoroughness and attention to detail.
- Chairman Maxey called on Mr. McHugh to provide an overview of the CRCA proposals.
- Mr. McHugh stated that for new construction CRCA was not requesting any changes to the Code. Their requests pertain to existing buildings. Some existing buildings are not designed to accommodate the new insulation thicknesses that are required with the new codes.
- Mr. McHugh then walked through the CRCA proposals.

a. Tapered Insulation

C402.2.2 Roof assembly. The minimum thermal resistance (*R*-value) of the insulating material installed either between the roof framing or continuously on the roof assembly shall be as specified in Table C402.1.3, based on construction materials used in the roof assembly. Skylight curbs shall be insulated to the level of roofs with insulation entirely above deck or R-5, whichever is less.

Exceptions:

1. Continuously insulated roof assemblies where the thickness of insulation varies 1 inch (25 mm) or less and where the area-weighted *U*-factor is equivalent to the same assembly with the *R*-value specified in Table C402.1.3.
2. ~~Where tapered insulation is used with insulation entirely above deck, the *R*-value where the insulation thickness varies 1 inch (25 mm) or less~~

~~from the minimum thickness of tapered insulation shall comply with the R-value specified in Table C402.1.3.~~

3. Unit skylight curbs included as a component of a skylight listed and labeled in accordance with NFRC 100 shall not be required to be insulated.

CRCA Suggested Exception:

2. R Value from Table C402.2 for tapered insulation with slope greater than 1/8" in 4" shall be calculated as average R-15.

REASON: For tapered insulation to build slope to drain, we understand the IECC requires minimum R-30 Insulation, 4' from drains for ¼" in 12" slope and 8' from drains in 1/8" in 12" sloped roofs.

CRCA suggests Average R of 15 for these roofs as flashing heights are limited due to equipment, perimeter edges, doors, windows and other projections on the roof. Tapered insulation is probably the most difficult condition to deal with at HVAC Units, and doors, walls, etc. Additionally, with more insulation the burning brand test gets more difficult to pass. Secondly, the wind uplift ratings may not be as available with insulation thicknesses greater than 8"-12", which occurs at building perimeter if minimum R-15 (or R-30) is used. Therefore, we seek an exception allowing 'Average R-Value', that can be listed on the DCEO website. If not an exception, a clarification to this effect would be acceptable as well.

b. CRCA Suggestions, Reroofing, Roof Replacement, Roof Recover

C402.2.2 Roof assembly. The minimum thermal resistance (R-value) of the insulating material installed either between the roof framing or continuously on the roof assembly shall be as specified in Table C402.1.3, based on construction materials used in the roof assembly. Skylight curbs shall be insulated to the level of roofs with insulation entirely above deck or R-5, whichever is less.

Exceptions:

1. Continuously insulated roof assemblies where the thickness of insulation varies 1 inch (25 mm) or less and where the area-weighted *U*-factor is equivalent to the same assembly with the *R*-value specified in Table C402.1.3.
2. Where tapered insulation is used with insulation entirely above deck, the *R*-value where the insulation thickness varies 1 inch (25 mm) or less from the minimum thickness of tapered insulation shall comply with the *R*-value specified in Table C402.1.3.
3. Unit skylight curbs included as a component of a skylight listed and labeled in accordance with NFRC 100 shall not be required to be insulated.

Exceptions:

4. R Value from Table C402.1.2 for existing buildings shall be minimum R-15.

REASON: This codifies the clarifications that CRCA worked with the State of IL on during the adaptation of the 2012 IECC and also requests R-15 instead of R-20. This would reduce the amount of time the building code officials have to spend on answering special requests while providing the building owner and manager increased energy use from old roof assembly to new roof assembly. Additionally, it seems there are very limited wind uplift ratings for thick insulation. Fire resistance may be compromised with R-30+ insulation thicknesses. Additionally, with more insulation the burning brand test gets more difficult to pass. Most important it seems that the payback when increasing insulation thicknesses from R-15-R-20 in the Chicago/IL region is about 15.6 years. With roofs lasting an average of 17.2 years, that does not give the building owner and manager much return time on the insulation investment at the R-15. The payback gets even longer at from R-20 to R-25 (25.2 years) and R-30. From research, it seems the best return on investment may be at R-15. (Research to be available next week)

5. R Value from Table C402.1.2 does not apply for existing buildings where insulation is used for slope between drains.

REASON: Insulation is used to create slope between drains. This exception clarifies that when adding insulation for reasons other than energy conservation, that the rooftop now does not have R-15 insulation installed.

Mr. McHugh stated that these provisions give the code official real enforcement ability. It was noted that the table number needs to be revised. It references the 2012 IECC and not the 2015. Chairman Maxey asked for clarification on this item. Mr. McHugh commented that their proposals focus on the issues that their organization members raise on a regular basis. They are hoping to add some clarification to these issues through their proposed amendments. Mr. Meyers asked what the combined effect of exceptions of 4 and 5 would have on a roof for an existing building. Current requirements in the IECC are R25 bat at the drains, it can be R20. Chairman Maxey noted that in ASHRAE allows for R20. Exception 5 was proposed specifically to assist the roofing contractor when they need to get slope for drainage. For exception 4, the average R-value for the roof will be R-15 in place of the current R-30. Mr. Meyers asked Mr. McHugh if this reduced the level of the current code. Mr. McHugh responded that it did, but stood by the reasoning of build ability, enforceability and pay back. Mr. Meyers suggested that the Code could be amended to the 2012 IECC provisions for these items.

6. R Value from Table C402.1.2 is not required for existing buildings where flashing heights will not allow. Insulation thickness shall be replaced with same or greater thickness with minimum R-5 per inch thickness insulation.

REASON: For existing building roofs where there is not much insulation, this allows the building owner and manager to replace the roof and upgrade insulation from lower R Value to higher R Value insulation.

Mr. McHugh reminded the Subcommittee that the focus is on existing buildings. Chairman Maxey asked who determines “will not allow” in Item 6. Mr. McHugh will re-write this proposal.

C402.5.1 Air barriers. A continuous air barrier shall be provided throughout the building thermal envelope. The air barriers shall be permitted to be located on the inside or outside of the building envelope, located within the assemblies composing the envelope, or any combination thereof. The air barrier shall comply with Sections C402.5.1.1 and C402.5.1.2.

Exception: Air barriers are not required in buildings located in *Climate Zone 2B*, or in existing buildings.

REASON: Although this is also shown in Chapter 5, existing buildings, it may be unclear to specifiers that there is a chapter 5 to the energy code, for existing buildings. Adding this simple exception ties together chapter 4 and 5 so they are consistent and not overlooked.

Mr. Meyers commented that he thought this was a good change, but suggested changing the language to say “or in existing buildings in accordance with C504.2.”

C402.5.1.1 Air barrier construction. The *continuous air barrier* shall be constructed to comply with the following:

1. The air barrier shall be continuous for all assemblies that are the thermal envelope of the building and across the joints and assemblies.
2. Air barrier joints and seams shall be sealed, including sealing transitions in places and changes in materials. The joints and seals shall be securely installed in or on the joint for its entire length so as not to dislodge, loosen or otherwise impair its ability to resist positive and negative pressure from wind, stack effect and mechanical ventilation.
3. Penetrations of the air barrier shall be caulked, gasketed or otherwise sealed in a manner compatible with the construction materials and location. Paths for air leakage from the building to the space between the roof deck and roof covering used air barrier, shall be caulked, gasketed or otherwise covered with a moisture vapor-permeable material. Joints and seals associated with penetrations shall be sealed in the same manner or taped or covered with moisture vapor-permeable wrapping material. Sealing materials shall be appropriate to the construction materials being sealed and shall be securely installed around the penetration so as not to dislodge, loosen or otherwise impair the penetrations' ability to resist positive and negative pressure from wind, stack effect and mechanical ventilation. Sealing of concealed fire sprinklers,

where required, shall be in a manner that is recommended by the manufacturer. Caulking or other adhesive sealants shall not be used to fill voids between fire sprinkler cover plates and walls or ceilings.

4. Recessed lighting fixtures shall comply with Section C402.5.7. Where similar objects are installed that penetrate the air barrier, provisions shall be made to maintain the integrity of the air barrier.

REASON: Adding the requirement to seal the penetrations at the deck protects the building owners' investment in insulation and new roofs. It seems that the paths to leakage of moisture into the roof assembly come from penetrations at the deck level. When the roof membrane is the air barrier and its location is on top of the insulation, the roof covering becomes the air barrier. This location of the air barrier, if penetrations are not sealed, has caused issues with moisture getting into the area under the roof covering. This can cause premature failure of the roof assembly and also make the insulation ineffective. Failures are experienced at roof insulation facer/roof covering interface and with the insulation effectiveness when wet as well.

Mr. McHugh explained how roof penetrations can cause moisture and changes in energy efficiency. Mr. Patterson mentioned that penetrations are typically not sealed well which causes failures in the roofing systems.

Mr. Buchheit asked about pipe penetrations and whether this was a thermal conductivity issue versus how it was sealed. He wanted to know if it should be addressed on a localized basis.

Chairman Maxey asked that two follow up items be noted in the minutes.

1. The Subcommittee will ask for feedback from Tom Ayers and Don Plass as code officials on Mr. Zimmer's proposal for code official option to accept alternative product testing.
2. Revised sections will be resubmitted by CRCA.

Chairman Maxey stated that he would, at this point, not want to go backwards from R-20 to R-15. He asked that CRCA provide just the code language without the reasons.

- Next teleconference is tentatively set for December 4th at 10:00 a.m.
- Meeting adjourned at 12:15 p.m.