Challenges and Complexity of Proposal for Mitigating Thermal Bridges

ANSI/ASHRAE/IES Standard 90.1 addendum is open for public comments through September 17, 2018

by Martha VanGeem

ASHRAE Standing Standard Project Committee 90.1 (SSPC 90.1) is responsible for continual maintenance of "Energy Standard for Buildings except Low-Rise Residential Buildings (ANSI/ASHRAE/IES Standard 90.1)," which is the primary reference for the energy codes in the majority of U.S. states (**www.energycodes.gov/state-code-adoption-tracking-analysis**). SSPC 90.1 has released for public review Addendum *av* to ANSI/ASHRAE/IES Standard 90.1-2016 (ASHRAE 90.1). This proposed addition to the standard is focused on mitigating thermal bridges in the building envelope. Addendum *av* will change how almost every building in most states will be built, as it restricts how floor slabs, balconies, overhangs, fins, parapets, exposed columns, projections, and penetrations can be detailed.

Mitigating thermal bridges is a known methodology for saving energy. While the concrete industry continues to make progress in this area (refer to the textbox), many stakeholders are concerned with the addendum to ASHRAE 90.1, largely because its provisions have not been tried on any real projects in any U.S. jurisdiction. ASHRAE 90.1 serves as the basis for minimum energy savings required by federal law, and it provides a compliance path for the International Energy Conservation Code, so it is important to ensure that new provisions are technically sound, practical, and cost-effective before incorporation by reference into the nation's building codes.

The goals for Addendum *av* are illustrated in Fig. 1. The prescriptive portion of the addendum is written in terms of an "ideal" structure completely wrapped in insulation. A few exceptions are provided where, for example, integral or interior insulation is allowed. These exceptions often mandate additional restrictive and costly requirements. The addendum requires perimeter insulation for intermediate floor slabs and restricts the amount of traditional cantilevered concrete balconies to a percentage of building perimeter at each story.

All penetrations and projections greater than 0.31 in.^{2} (200 mm^2) that are not already covered by a minimum requirement for cross-sectional area in Addendum *av* will need to be evaluated for compliance using a complex equation. This would include, for example, window sills and any structural members not wrapped in insulation. Also, although there are some exceptions allowed, glazing is required to be partially aligned with the insulation, which can be challenging structurally. Performance paths in the addendum offer alternatives. However, they have not been tried on an actual building, so it is not clear that they reflect the exceptions or that using them would provide any benefit or flexibility. Combined, the prescriptive and performance requirements total 25 pages.

Because of these and other complexities in the addendum, input is needed from practicing architects, structural engineers, and contractors. Comments are welcomed on specific wording, sections, or the addendum as a whole.

The public review period on Addendum *av* is scheduled for August 3 through September 17, 2018. Instructions for

New Standard by Joint ACI-TMS Committee 122

Joint ACI-TMS Committee 122, Energy Efficiency of Concrete and Masonry Systems, recognizes the importance of mitigating thermal bridges in concrete construction, and it has recently received approval from the ACI Technical Activities Committee to produce an ACI standard titled "Standard Methods to Evaluate and Mitigate Thermal Anomalies in Concrete and Masonry Building Envelope Components." The committee proposed this standard to address thermal bridging issues, with input from structural engineers, architects, contractors, and researchers.

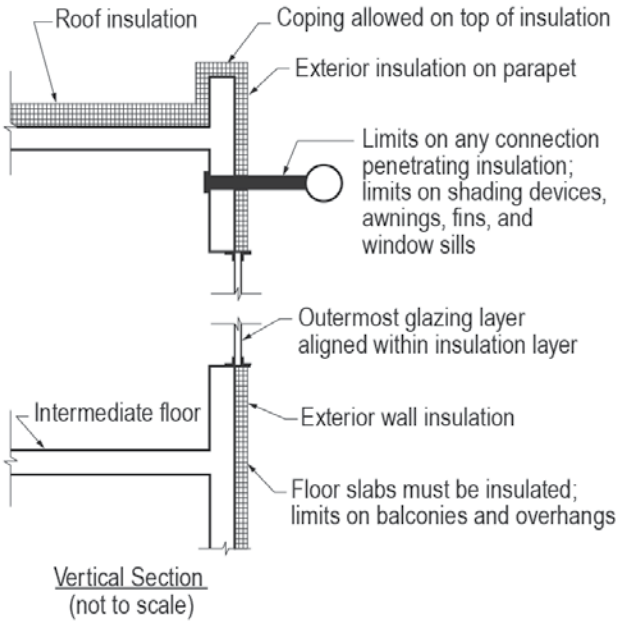

Fig. 1: Schematic of requirements of Addendum *av* to ANSI/ASHRAE/IES Standard 90.1-2016, without exceptions. For simplicity, roofing membrane and cladding materials are not shown *(illustration courtesy of Martha VanGeem)*

submitting comments are available at **www.ashrae.org/PCToolkit/OCD**. Membership in ASHRAE is not required. Nonmembers can comment on to public review drafts by creating an account by clicking on the "LOG IN" button and selecting the "+ Need a password?" link.

Selected for reader interest by the editors.

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