nerej
CELEBRATING 55 YEARS

Meeting code with Single-Wythe Masonry Walls

January 27, 2011 - Green Buildings

Myth: Pre-Insulated Single-Wythe Masonry Walls don't pass 2009 International Energy Conservation Code (IECC), because of the Continuous Insulation requirement.

Busted: Using the R-Values for Mass Walls from table 502.2(1) is only one method for complying with the code. There are several other options, which consider the entire wall assembly, and not just on one element complying independently.

Everyone wants to design energy-efficient buildings. They increase profit, they improve brand positioning, and they cut greenhouse gas emissions, among other things. So how do you comply with the 2009 International Energy Conservation Code?

There are three methods for this: Prescriptive, Trade-off or System Performance, and Total Building Performance. Each subsequent method offers increased design flexibility, and complexity.* This article will focus on the first 2 methods.

The first method is the prescriptive method. This option uses tables, and offers the least amount of flexibility - but it is the easiest to use. If R-Values from Table 502.2(1) are used, it only takes into consideration the insulation as a single component; if this table is used, continuous insulation is required. If the U-factors from table 502.1.2 are used, then the entire wall assembly is considered, and continuous insulation is not part of the requirement. The second method is the trade-off, or system performance, method using COMcheckTM. COMcheckTM is an accepted energy program used to show IECC code compliance, and is a free download from the U.S. Department of Energy Website.

This system shows compliance of the building envelope as whole, and not just individual elements. Local code requirements, building location and building envelope data (roof, exterior walls, windows, doors, floor, etc) are entered into COMcheckTM. The program will then display how close the envelope comes to meeting the specified code requirements. If the envelope fails to comply, it is typically a matter of adjusting individual elements to bring the envelope into compliance. For example, increasing the roof insulation or using windows with higher R-Values.

COMcheck assumes buildings are heated and cooled, and the internal building loads are determined by the user defined building type. COMcheck also takes into account thermal mass loads for mass walls, and building orientation.

The shape of Hi-R CMU's is engineered to minimize thermal bridging, thus increasing the overall energy performance of the CMU, while retaining itsf structural integrity. Choosing the option for "Concrete Block" - "Partially Grouted, Cells Insulated" assumes a regularly shaped CMU with fill insulation. This choice also assumes that there is no insulation in the grouted core - negating one of the major benefits of using Hi-R.

To enter the Hi-R CMU into the program, the option "Other (U-factor") should be selected from the assembly column, and then "Mass Wall". The U-Factor of the wall system can then be entered, and

will be incorporated into the building envelope.

In addition to being energy efficient, Concrete Masonry Units insulated with Hi-R inserts are durable, local, and have exceptional sound absorptive qualities. What options are there? They are available within the A. Jandris Sustainablock CMU Series which contains up to 40 - 50% Supplementary Cementitious Materials. This cement replacement not only utilizes a recycled material, but also reduces the amount of CO2 emissions and energy spent for cement production. Many colors are also available with recycled aggregates. Other options include NRG Insulated Concrete Block and Omni Block, among others - see a list of Concrete Masonry Units options from BuildingGreen. Learn more about the International Energy Conservation Code (LINK), and COMcheck from the Department of Energy, Single Wythe walls, and the Thermal Catalog of Concrete Masonry Assemblies.

Heidi Jandris is an R&D, architectural consultant with A. Jandris & Sons, Gardner, Mass.