



Cellulose Insulation Manufacturers Association

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April 28, 2003

TO: Building Officials / Architects / Engineers
FROM: Daniel Lea, Executive Director
SUBJECT: Cathedral Ceilings

Unvented cathedralized ceilings continue to be a matter of controversy, in spite of the fact that research by respected building scientists and years of real world experience have demonstrated the efficacy of this design. Published, peer-reviewed, research by Rose (University of Illinois), Silberstein, et al, (Saint-Gobain), and others, has shown that properly designed and constructed packed-cavity unvented roof-ceiling assemblies perform as well as—and in some cases better than—vented assemblies. Unvented, packed-cavity ceiling designs are given by Lstiburek and Carmody in *Moisture Control Handbook* (Oak Ridge National Laboratory, 1991) and Trechsel in *Moisture Control In Buildings* (ASTM 1994). Cellulose producers are virtually unanimous in recommending the unvented packed-cavity design, as opposed to the vented cavity with air space approach, which is more appropriate for ceilings insulated with fiber glass batts. The studies by Rose, which have been ongoing for more than 10 years, indicate that cellulose-insulated roof-ceiling assemblies perform best if the packed-cavity design is used. Rose also notes that similar assemblies insulated with fiber glass batts benefit from the presence of an air gap between the insulation and the underside of the roof sheathing. Interestingly, it does not seem to matter if this air space is vented or not.

It is recognized in the building science community that the building codes, even the latest I-codes, are in many cases far out of step with what has been demonstrated by research. Over a decade of research has proven that both the packed-cavity and the vented cavity are appropriate cathedralized ceiling designs. The deciding factors are design details and the materials that constitute the assemblies. Unfortunately, the codes provide only for vented cavities, even in cases where research and experience indicate the packed cavity approach should be used. It is generally assumed that these code provisions have some solid factual basis behind them. That assumption is incorrect. In a paper presented at the Sixth Thermal Performance of the Exterior Envelopes of Buildings Conference in 1995 Bill Rose reported that the requirement for venting attics and ceilings and the familiar 1:150 and 1:300 ratios have no apparent basis, other than guesswork.

Since there is no scientific support for arbitrary attic and ceiling venting requirements, and an impressive amount of authoritative documentation for a flexible approach to attic and ceiling design, I hope you will defer to the insulation manufacturers' recommendations in this matter. It is, after all, the manufacturers who are going to have to live with the installed performance of their products. They have every incentive to see that these products are installed properly in correctly-designed building assemblies. If they thought their insulation would perform best in vented ceilings that's what they would recommend.