Building America Expert Meeting on

Foundations: Research Results and Builder’s Handbook Review

Date: Tuesday, November 15, 2011
Time: 8:30 am to 4:00 pm
Meeting Location: University Hotel Minneapolis (formerly Radisson)
Meeting Hotel: University Hotel Minneapolis (formerly Radisson)
615 Washington Ave. SE
Minneapolis, MN  55414
612-379-8888
Facilitator: NorthernSTAR Building America Partnership
Meeting Managers: John Carmody & Pat Huelman, University of Minnesota
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List of Presenters: Pat Huelman, U of MN – Cold Climate Housing Program
Louise Goldberg, U of MN – Energy Systems Design Program
Kohta Ueno, Building Science Corporation
Philip Fairey, Florida Solar Energy Center
Achilles Karigiozis, Owens - Corning
Jeff Christian, Oak Ridge National Laboratory
John Carmody, U of MN Center for Sustainable Building Research

In order to register to attend the meeting in person in Minneapolis click the following link:
https://docs.google.com/spreadsheet/viewform?formkey=dHNDSlVMeWpBMVg3c0YyM0FzRG
NyN2c6MQ

In order to register to participate in the webinar only click the following link:
https://www1.gotomeeting.com/register/352960800

Objectives: To bring together foundation experts from Building America teams and other related programs and research activities to share information and determine future research issues and needs. Foundation heat loss represents a significant opportunity and challenge for both new and existing homes. Likewise, foundation insulation will be a critical need in meeting the Building America energy targets in a cost effective manner.

Cleary, foundation insulation is a viable and cost-effective means of achieving significant envelope conservation in colder climates for both new and retrofit applications. The principal drawback is hygrothermal durability. Without a thorough understanding of the underlying moisture transport mechanisms, it is easy to design and deploy foundation insulation systems that can produce significant distress and financial cost for homeowners. This expert meeting will focus on how to optimize the energy conservation and avoid the hygrothermal liabilities with a strong basis in experimental data.
Key Questions:
1. What experimental data is available to characterize the energy performance, hygrothermal behavior, and long-term durability of foundation insulation?
2. What are some of the current challenges for optimizing foundation insulation levels and materials for both new and existing homes?
3. What limitations are there with current tools and techniques for the evaluation of hygrothermal transport phenomenology of building foundations?
4. Is it possible, or even preferable, to use non-uniform R-values or treatments to optimize below grade energy performance?
5. Do we sufficiently understand the trade-offs, costs, and risks with various foundation insulation choices (types, designs, materials, etc.)?
6. Based on existing research and field experience, what are current best practices for basements, crawl spaces and slab-on-grade foundations?

Expected Results: This expert meeting will attempt to build consensus on the value of foundation insulation as a cost-effective and durable energy conservation measure, with a focus on cold climates. Also, it will highlight areas where investment in additional research can yield cost effective returns in increased foundation envelope energy savings and more clearly identify systems with full life-cycle durability.

Invitees: Participants will be key people working in foundations research, insulation waterproofing and drainage experts, building enclosure research and consulting, residential design, engineering and construction, and building energy efficiency. A blend of industry, research, and government participants will be sought.

Meeting Agenda: Below is a tentative agenda for this Expert Meeting.
• 8:30 Welcome and Meeting Introduction – Huelman & Booten
• 9:00 Foundation Research at FTF & CRRF - Goldberg
• 9:45 Foundation Research BA & BSC (basements) - Ueno
• 10:15 Break
• 10:30 Foundation Research BA – ORNL & O-C (basements) – Karagiozis
• 11:00 Foundations Research BA & FSEC (slabs) – Fairey
• 11:30 Foundation Research at ORNL (crawl spaces) – Christian
• 12:00 Lunch
• 1:00 Introduction of Foundation Handbook – Carmody
• 1:30 Review of basement best practices - Carmody
• 2:30 Break
• 2:45 Review of crawl space grade best practices – Christian
• 3:15 Review of slab on grade best practices – Christian
• 3:45 Discussion of Foundation Handbook & Next Steps
• 4:00 Adjourn meeting
• 4:30 Vans leave for Lab Tour and Reception

Presenter Bios:
**Louise Goldberg** obtained B.Sc, M.Sc and Ph.D degrees, all in Mechanical Engineering from the University of the Witwatersrand in South Africa. Currently she holds a part-time appointment at the University of Minnesota in the Department of Bioproducts and Biosystems Engineering as a Senior Research Associate and Director of the Energy Systems Design Program. She is also the Principal of Lofrango Engineering, an engineering and applied physics intellectual property development enterprise. During her tenure at the University, Louise has been a Principal or Co-Principal Investigator on 29 funded research projects and published over 30 refereed research papers and articles as well as numerous other articles and reports. During that period, she has amassed over 30 years of experience in the field of building physics.

**Kohta Ueno** (M.A.Sc.) is a senior associate of Building Science Corporation. His responsibilities at Building Science Corporation include project management, liaison work with builders and industry clients, HVAC design, energy analysis of house designs, computer modeling, field testing and verification, and forensic field investigations. He has been with BSC since 1998, and completed his Master’s degree with the Building Engineering Group under John Straube at the University of Waterloo in 2007.

**Achilles Karagiozis** is the Director of Building Science based at the Owens Corning's Granville, Ohio, Science and Technology Center. There he leads the company's Building Science Group to transform building science into a growth engine aimed at accelerating energy efficiency improvements in the built environment. Previously, Achilles was a distinguished research engineer and hygrothermal project manager at the Oak Ridge National Laboratory (ORNL). He was instrumental in the launch of a number of innovative construction material and system products, the development of design guidelines, software tools and code changes. Achilles received his Ph.D. from the University of Waterloo in Ontario, Canada, with work at the von Karman Institute in Fluid Dynamics in Saint-Genese Rode, Belgium. He received his M.Sc.E. and B.Sc.E. from the University of New Brunswick in New Brunswick, Canada.

**Philip Fairey** is Deputy Director of the Florida Solar Energy Center (FSEC) with more than 25 years of experimental and analytical experience in the field of building science. Philip initiated the building science research program at FSEC and currently President of the Residential Energy Services network (RESNET), a member of ASHRAE’s Standing Project Committee 140 on software verification test methods, a member of the Florida Building Commission’s Energy Technical Advisory Committee, and a founding member of the Florida Green Building Coalition. He is a graduate of Clemson University with a bachelor of science in architecture and a master of science in urban planning.

**Jeff Christian** is a researcher at the Oak Ridge National Laboratory (ORNL). Jeff’s research spans deep residential retrofits; low-energy residential and commercial buildings; advanced appliances; moisture control in buildings, roofs, walls, and foundation; cooling, heating, and solar power integrated systems; and whole building design and performance. Since 2002, he has focused much of his research effort on building systems integration.

**Pat Huelman** is an Associate Professor in Residential Energy and Building Systems with the University of Minnesota's Department of Bioproducts and Biosystems Engineering and serves as Coordinator of the Cold Climate Housing program with the University of Minnesota Extension. He is the lead faculty for the Residential Building Science and Technology undergraduate degree, a principal investigator for hygrothermal testing at the Cloquet Residential Research Facility, and is directing the new NorthernSTAR Building America Team. With more than 30 years in the field, Pat has extensive experience and expertise in energy-efficient design, innovative building systems, residential indoor air quality, mechanical ventilation, and moisture management.

**John Carmody** is the Director of the Center for Sustainable Building Research at the University of Minnesota. He has worked in building-related research for 30 years and is the author of several books on building design and construction including the *Building Foundation Design Handbook* and *Residential Windows: A Guide to New Technologies and Energy Performance*. Mr. Carmody is one of the co-leaders of the Northern STAR Building America team.