



NAHB Research Center, Inc. Sampling of Activities and Projects From 2010

A. Overview/Summary

The NAHB Research Center, located approximately 25 miles from Washington, DC, in Upper Marlboro, MD, was established in 1964 as a separately incorporated, wholly-owned subsidiary of the National Association of Home Builders (NAHB). The Research Center's staff includes engineers, economists, architects, planners, market demographers, and other professionals in related disciplines. The Research Center provides product commercialization consulting services to a wide variety of housing industry stakeholders, provides third-party quality assurance verification and testing services to building product manufacturers, builders, and trade contractors, and conducts a wide range of dissemination and training activities. The Research Center's services and books of business are sponsored by a variety of clients – including NAHB and other trade associations, public agencies – (US HUD, US DOE, US Army, USDA Forest Products Lab), and private-sector clients (manufacturers, builders, trade contractors).

B. Highlights

1. National Green Building Certification Update

- Standard (NGBS-ICC 700) was ANSI accredited in January 2009 – for single-family & multi-family buildings – new construction, renovation, addition, and land development. It offers two key services:
 - Certification: Green certification services for builders, developers, and remodelers that residential buildings and land development.
 - Green Product Labeling: Green-Approved Product program which provides recognition and branding for manufacturers of products that meet the scoring criteria for specific practices under the NGBS.

The ANSI revision process for the Standard is forthcoming in early 2011. The most recent stats for the program are:

- **Total Projects Certified = 1,803**
 - Single-Family Homes = 1,774
 - Multifamily Buildings = 18 (772 units)
 - Land Developments = 11
- **Inspections Scheduled = 691**
 - Single-Family Homes = 638
 - Multifamily Buildings = 43 (967 units)
 - Land Developments = 10
- **In the Pipeline = 4,500+**
- 159 Green Approved Products

2. Development of Green Building Educators' Toolkit

The philanthropic arm of NAHB, the National Housing Endowment commissioned the NAHB Research Center to conduct an assessment of two- and four-year colleges' and universities' needs for instructional materials on sustainability and green building. This resulted in The Green Building Educator's Toolkit--an annotated bibliography for two- and four-year university programs in Residential Construction Management. It represents an assessment of--and response to--these types of institutions' needs for instructional materials on sustainability and green building. It is not intended to be an

exhaustive treatment of all green building resources but rather a broad sampling. The Toolkit contains the following types of items.

- Standard (NGBS-ICC 700) was ANSI accredited in January 2009 – for single-family & multi-family buildings – new construction, renovation, addition, and land development. It offers two key services:
- Annotated bibliography of resources
- Instructional aides
- Course syllabi
- Approaches to green curriculum

<http://www.nahbgreen.org/Resources/Education/toolkit.aspx>

3. Pre-disaster Planning for Permanent Housing Recovery

The U.S. Department of Housing and Urban Development commissioned the NAHB Research Center to conduct extensive research pre-disaster planning. This resulted in the following preliminary draft publications.

- Volume 1: Overview
- Volume 2: Planning Strategy
- Volume 3: Planning Tools
- Volume 4: Basic Plant Design

A Housing Capacity Calculator has been developed as well, and final modifications are being implemented.

4. NAHB Research Center Industry Partnership's Building America (BA) Team 2011 Update

The Building America Program (BAP), sponsored by the U.S. Department of Energy (DOE), is a research and development program for the enhancement of energy performance of new and existing homes. The NAHB Research Center Industry Partnership is currently working with team members including Southface Energy Institute, Forest Products Laboratory, Business Excellence Consulting, and Residential Building Industry Consulting Services. In addition, the team is working with a variety of builders and remodelers in multiple climates as well as other residential construction industry partners.

5. Out of Plane Testing

The Research Center, in conjunction with the NAHB Construction Codes & Standards Technology Research Subcommittee, is investigating structural issues relative to out-of-plane wind loading specifically for non-structural insulating (foam) sheathing. This research stems from a growing interest (including ICC code development process and an upcoming ANSI standard for foam sheathing products) in the performance of insulating wall sheathing to resist out-of-plane wind pressure loading and the interaction of this loading relative to the siding material and the interior wall covering in residential construction. The Research Center developed a laboratory test plan for evaluating the pressure equalization of residential wall systems with exterior rigid insulation under dynamic out-of-plane wind pressure loading. The test results will provide the basis for establishing allowable wind loads for walls with exterior rigid insulation.

6. Assessment of FEMA P695 on Seismic Design of Light-Frame Wood Residential

This study was designed to expand and refine the FEMA P695 analysis of light-frame wood systems. FEMA P695 is a new methodology to quantify seismic performance factors for new and existing seismic force resisting systems. Woodframe shear wall test results were analyzed and building models produced and subjected to a suite of 44 ground motions through a Microsoft VBA application developed by the NAHB Research Center. The collapse performance was determined for systems including the following assumptions and parameters: analysis software, hysteretic formulations, wider variety of building configurations, lower seismic design categories, higher levels of viscous damping, soft-story configurations, and sensitivity studies of key input parameters.

7. Moisture Management and Design & Construction Best Practices – Hot Spot Videos: Instructional video series focuses on highlighting good construction practices. The first module within the series has been supported by the USDA Forest Products Laboratory and NAHB. The module focuses on illustrating construction practices for the building enclosure that minimize moisture issues. We have envisioned the videos being available on the internet, laptops, mobile phones, and other PDA devices in the field (during construction projects). The complete video series discusses general areas of the building enclosure – including the foundation, the exterior wall, and the roof and weather-resistive barrier, Exterior Windows & Doors, Stone & Brick Exterior Cladding, Insulation, Flashing, and other Weatherproofing details. First installment in the series should online by spring 2010.

8. Forest Products Laboratory

US Forest Service Forest Products Laboratory, formed the Coalition for Advanced Wood Structures (CAWS). CAWS brings together representatives from universities, industry and government to work together in a cooperative, complementary manner to foster sustainable, efficient use of our forest resources while improving the economy and performance of wood structures. The scope of activities includes all types of wood structures, focusing in three areas- residential and commercial buildings; and wood bridges. For housing, the Research Center is the primary representative performing research on single- and multi-family units using conventional in-place stick built, panelized, modular, or manufactured construction.

9. Department of Defense – Army

The Research Center’s Military Housing Division was established 15 years ago with the exclusive charge of responding to and fulfilling objectives related to the professional and successful management of military family housing programs. In addition, the Research Center has extensive direct experience working with government agencies, local industry groups, and other organizations to help them increase their awareness of--and technical capacity in--the military housing privatization arena. This unique experience is essential in developing the needed understanding of the US military housing system and its particular procedures and policies. The Research Center has been providing expert consultation and performing special studies for the military and the Office of the Secretary of Defense (OSD) for nearly 15 years via our MOBIS contract and other mechanisms.

10. Builder Practices Reports and Consumer Practices Reports

The Research Center’s Marketing Research Division continues to find answers to questions about residential construction. With two major surveys launched every year, the Marketing Research Division collects data on products and materials used in new residential construction and residential repair and remodeling efforts. Whether it using traditional efforts such as mailing a paper survey or creating and maintaining an online Builder Panel, the Marketing Research Division creates and publishes nearly 100 syndicated reports per year.

11. OSHA-Susan Harwood Scaffolding Safety Training

In conjunction with NAHB worker safety initiatives, a series of training course are being planned for delivery to more than 1,000 English-speaking and Spanish-speaking workers on fall prevention in the residential construction industry.

12. Moisture Test Huts

Thermal Performance of the Exterior Envelopes of Whole Buildings XI International Conference Envelopes (see Sample Publication 1 below).

C. Sample Publications for 2010

1. Drumheller C.S., and C.G. Carll (2010). *Effect of Cladding Systems on Moisture Performance of Wood-Framed Walls in a Mixed-Humid Climate*, ASHRAE Transactions (2010, vol 116, part 2).
2. Cantrell, R.; Nahmens, I.; Bryant, K.; and J. Peavey (Forthcoming). *Pre-disaster Planning for Permanent Housing Recovery - Volume 4: Basic Plant Design*, the U.S. Department of Housing and Urban Development.
3. DelBianco, M. and D. McKeever (Forthcoming). *Raised Wood Foundation Time and Cost Study in the Gulf Coast Region of the United States*, USDA Government Technical Report.
4. NAHB Research Center's Building America Postings on ToolBase Website
 - <http://www.toolbase.org/Best-Practices/Quality-Management/quality-assurance-roadmap>
 - <http://www.toolbase.org/Best-Practices/Quality-Management/hotspot-implementation>
 - <http://www.toolbase.org/Best-Practices/Quality-Management/quality-economics>
 - <http://www.toolbase.org/Best-Practices/Quality-Management/nhq-gap-analysis>
 - <http://www.toolbase.org/Best-Practices/Quality-Management/high-performance-scopes-of-work>
5. *EnergyValue Housing Award Winner Magazine*: Annual Research-Center prepared magazine outlining current year's winners of the EnergyValue Housing Award. <http://www.nahbrc.com/evha/>