

# NAHB Research Center, Inc.

## Sampling of Activities and Projects From 2009

2010 International Builders' Show  
January 15, 2010

### A. Overview/Summary

The NAHB Research Center, located about 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 of 70 employees 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. Research Center's services and book of business are sponsored by a variety of clients – including NAHB and other trade associations, public agencies – (DOE, Army, Forest Products Lab), and private-sector clients (manufacturers, builders, trade contractors).

### B. Highlights

#### 1. The National Green Building Certification

- 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.
- Stats as of January 13, 2010
  1. Green Approved Products – 102 manufacturers
  2. Certified Green Buildings - 744
  3. Scheduled Inspections – 544 rough-in phase
  4. Pipeline 4,500

#### 2. Development of Green Building Educators' Toolkit

The philanthropic arm of NAHB, the National Housing Endowment has 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 research will result in an annotated bibliography of resources, instructional aides, course syllabi, and approaches to a curriculum on green construction for the shelter industry. The assemblage of these resources--a toolkit--will be posted on NAHBgreen.org by September 2010.

#### 3. Disaster Relief Housing Alternatives

The U.S. Department of Housing and Urban Development has commissioned the NAHB Research Center to conduct extensive research on FEMA's post-disaster housing alternatives prototype project in areas affected by hurricanes – Texas, Louisiana, Florida and Alabama. The findings of this research will be reported to Congress by HUD.

#### 4. Strategy for Establishment of Housing Production Facilities Outside Disaster Areas

This U.S. Department of Housing and Urban Development funded study is to develop a primer for communities and governments to guide them with strategic planning tools they can use before and after a disaster when massive reconstruction is needed. NAHB Building Systems Councils and staff are consulting on this project.

**5. NAHB Research Center Building America (BA) Team**

The Building America Program is sponsored by the U.S. Department of Energy, and it is a research and development program for the enhancement of energy performance of new and existing homes. The goal for the Building America Program is net-Zero Energy Homes available for the US market by 2020. In 2009 the Research Center provided engineering support for builders and remodelers throughout the U.S. in designing, constructing, and testing energy-efficient, high-performance “prototype” houses. The Research Center is also the DOE team-lead on Quality Assurance- and has developed and published builder and trade contractor scopes of work. These are a part of a compendium of quality management system documents and resources that are posted on ToolBase.org. In 2010 the Building America program will embark on a new focused effort to bring energy improvements to the existing building stock.

**6. Wood Sole Plate Anchorage to Concrete under Monotonic and Cyclic Loading – will be reported on by the CTRSC – Construction Technology and Research Sub Committee.**

The objective of this NAHB project was to improve the accuracy of design methods for residential anchors by capturing representative failure modes, response variability, and applicable safety margins. Three methods were used to develop an understanding of concrete-to-wood sill anchorage systems: 1) Test full-scale shear walls to evaluate the response of anchors as part of the wall assembly with a loading mechanism representative of in situ conditions, including friction considerations; 2) Measure the variability in shear anchor performance through testing of an increased number of specimens of the same configuration; 3) Evaluate the performance of multiple-bolt connections, including load distribution between bolts in cracked and uncracked concrete.

**7. Assessment of FEMA P695 on Seismic Design of Light-Frame Wood Residential Construction – will be reported on by the CTRSC – Construction Technology and Research Sub Committee.**

This study is designed to expand and refine the FEMA P695 analysis of light-frame wood systems by conducting sensitivity studies to understand the effect of key assumptions made in the P695 simulations and the hysteretic parameters of the wood light-frame system. Some key assumptions and parameters investigated included: 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.

**8. Laboratory Sciences Testing Services**

In 2009 the Research Center commissioned its full scale hot box. This device is used to evaluate thermal performance of walls, horizontal and sloped roofs in a variety of indoor and outdoor temperature conditions.

**9. Builder Practices Reports and Consumer Practices Reports**

Two major surveys fielded every year--one to builders of new residential homes and a second to home-owners and renters asking about any residential repair and remodeling activities undertaken during the current year. These survey instruments allow the Surveys Department to produce a series of nearly 40 reports in each category, from Foundations to Roofing and Appliances to Windows. This data is used by a variety of clients for competitive analysis, marketing planning and analysis.

**10. OSHA-Susan Harwood Scaffolding Safety Training**

In conjunction with NAHB worker safety initiatives, a series of training course were delivered to approximately 1,200 English-speaking and Spanish-speaking workers on preventing falls from scaffolds and ladders in the residential construction industry.

**11. Award Programs**

Continued to support two national awards programs--the EnergyValue Housing Award and the National Housing Quality Award. For the 2011 cycle - the EnergyValue Housing Award will be expanded to include a new category for remodeling / existing buildings.

## 12. Quality Management System – 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.

## 13. Reed Business Information Publications

Starting January 2010, the NAHB Research Center will be a monthly contributor to Professional Builder Magazine and a quarterly contributor to Professional Remodeler Magazine as subject matter experts on a variety of topics intended to be actionable to help builders and trades do their jobs more effectively. Some information from the Research Center may also be turned into content for Reed's HousingZone.com online offerings.

## 14. Technical Assist Hotline

Great resource if you have questions regarding building products, techniques, technologies, and best practices. NAHB and the NAHB Research Center have teamed up to provide this outstanding free service that is designed to assist NAHB's builder, remodeler, and trade contractor members with hands-on construction issues. NAHB Members can call 888-NAHB-MEM (888-624-2636) 8:00 AM to 5:00 PM EST, Mon.-Fri. Or submit an inquiry on the web: <http://www.nahbrc.com/technical/hotline/index.aspx>

## C. Sample Publications for 2009

1. Ganguly, I.; Koebel, T.; Cantrell, R. (2009). *A Categorical Modeling Approach to Analyzing NewProduct Adoption and Usage in the Context of the Building Materials Industry, Technological Forecasting & Social Change (In-Press)*.

The research results indicate that though a higher proportion of large firms are more likely to adopt innovative insulation material, they continue using established products while slowly increasing their use of the innovative material over time. However, when smaller homebuilders adopt an innovative insulation material, it replaces the existing product from their material usage portfolio at a faster rate.

2. *EnergyValue Housing Award Winner Magazine*

Annual Research Center prepared magazine outlining that year's winners of the EnergyValue Housing Award (EVHA). The 2009 edition premiered at the 2009 Award Ceremony at the International Builders' Show in Las Vegas, NV. Following the release, the magazine was displayed at the Builders' Show as well as at other venues to a diverse audience of Builders and Remodelers. Available <http://www.nahbrc.com/evha>.

3. *Commentary for the National Green Building Standard ICC-700*

Published January 2010 provides guidance on the practices in the standard.

4. *Quality Management Products: Scopes of Work for High Performance Homes: Excavation and Backfill for Basement Foundation, Poured Concrete Basement Foundation, Framing, HVAC, Concrete Slab and Basement Slab, and Wall Assemblies with Rigid Exterior Foam and Vinyl Siding.*

NAHB Research Center Building America (BA) Team, November 2009. These four scopes of work are final and available on ToolBase at <http://www.toolbase.org/ToolbaseResources/level2.aspx?BucketID=5>