



**LSU**

DEPARTMENT OF  
CONSTRUCTION MANAGEMENT  
& INDUSTRIAL ENGINEERING

**2010 Annual Report**

**Prepared For  
The National Consortium of Housing Research Centers**

Prepared by

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**Overview**

Dr. Isabelina Nahmens is an Assistant Professor in the Department of Construction Management and Industrial Engineering at Louisiana State University (LSU). At LSU she teaches and assists students with construction management undergraduate courses and industrial engineering graduate courses. Some of her most recent research in the area of homebuilding has been sponsored by HUD, DOE, and private industries. Prior to her current position, Dr. Nahmens was a research assistant in the Housing Constructability Lab (HCL) at the University of Central Florida for seven years. While at HCL, she worked in various research projects funded by DOE, NSF, HUD, and Habitat for Humanity, among other agencies and private industries. Dr. Nahmens' projects focused in the introduction of advanced production technologies into the U.S. homebuilding industry and improving homes' energy performance. She has collaborated in several manuscripts for publication in peer reviewed journals and conferences. Among these are included publications in the Lean Construction Journal, ASCE Journal of Architectural Engineering, ASCE Journal of Construction Engineering and Management, Construction Innovation, and Human Factors journal. Dr. Nahmens received a B.S. in Industrial Engineering in 2001, a M.S. in Quality Engineering in 2003, and a PhD in Industrial Engineering in 2007 at the University of Central Florida.

## **2010 Research Projects**

Dr. Nahmens' research projects were related to sustainable construction and renovation along with lean production applications in the construction industry.

- **Improving Plant Operating Efficiency and Safety through Lean Production**, funded by Louisiana System Built Homes, Nahmens (PI) and Ikuma (PI). The purposes of this research was to improve plant operating efficiency and safety through lean production techniques and transform the way homes are manufactured, reducing housing costs and improving quality and safety. The strategy was to reduce waste in target stations by incorporating lean principles and safety design throughout the production process. Lean construction implementations resulted in significant environmental impact by reducing material waste by 64%, significant social impact by reducing or eliminating key safety hazards of muscle strain, poor posture, and struck-by, and significant economic impact by reducing production hours by 31%. Findings from this research will contribute to a better understanding of the impact of lean on homebuilding sustainability and promote lean and safe building techniques in modular homebuilding.
- **Helping Local Builders to achieve Builders Challenge certification- Modular Plant**, in this project, Dr. Nahmens worked with Dr. Claudette Reichel (from AgCenter and LaHouse) to help local homebuilders achieve Builders Challenge certification for their homes. This certification is given by U.S. Department of Energy and qualifies homes as energy efficient, and addresses issues of building durability, indoor air quality, environmental stewardship and occupant health, safety and comfort. By meeting Builders Challenge, homebuilders have a competitive advantage and homebuyers get high quality and energy efficient homes. Dr. Nahmens role was to identify possible improvements of the homes and incorporate those improvements efficiently in the construction process. This project raised awareness for energy efficient homes and had an impact in the state economy by helping homebuilders produce homes that use less resources (e.g. energy), have improved indoor air quality, and reduced construction time and waste.
- **Strategy for Establishment of Housing Production Facilities Outside Disaster Areas**, funded by U.S. HUD's Office of Policy Development and Research (PD&R), in partnership with NAHB Research Center, Nahmens (LSU-PI), LSU Funding. The objective of this project was to provide communities and governments with strategic planning tools they can use before a disaster to prepare for more agile and rapid reconstruction efforts; these tools should speed the reconstruction of housing during the recovery phase.

## **2011 Research Projects**

In 2011 LSU research team will continue our 2010 research efforts of implementing advanced production technologies and strategies, like Lean construction, into the U.S. homebuilding industry and improving homes' energy performance. Several new research initiatives are also anticipated.

- **Impact Study of Louisiana Weatherization Assistance Program (WAP) for the Louisiana Association of Community Action Partnership (LACAP)**, funded by U.S. DOE, Dr. Nahmens (PI) and Dr. Roider (Co-PI) in partnership with LACAP. The objective of this project is to conduct a field impact study of houses improved through the Louisiana Weatherization Assistance Program (WAP) and formative evaluation to enhance the training program of the Louisiana Association of Community Action Partnership's (LACAP) Weatherization Training Center.
- **Improving Onsite Construction Efficiency and Safety through Lean Production**, Nahmens (PI) and Ikuma (PI). The purpose of this research is to transfer the lessons learned from the modular plant lean implementation, to improve onsite efficiency and safety.

## Publications

**Nahmens, I.** and Mullens, M. (2011). Lean Homebuilding- Lessons Learned from a Precast Concrete Panelizer. Accepted for publication in ASCE Journal of Architectural Engineering.

Ikuma, L. H., **Nahmens, I.**, & James, J. (2010). The Use of Safety and Lean Integrated Kaizen (SLIK) To Improve Performance in Modular Homebuilding. Accepted for publication in ASCE Journal of Construction Engineering and Management.

Ikuma, L. and **Nahmens, I.** (2010). SLIK (Safety and Lean Integrated Kaizen) Operations: Making Modular homebuilding lean and safe. Industrial Engineer, October 2010, Volume 42, Number 10.

Soares, C., **Nahmens, I.** and Ballard, G.(2010). Lean and Green: A Qualitative Integration. 18th Annual Conference, International Group for Lean Construction (IGLC), Haifa, Israel, July14-16, 2010.

Khot, D., **Nahmens, I.** and Ikuma, L. (2010). The Impact of Lean Methods on Organizational Communication in Homebuilding, Associated Schools of Construction 46<sup>th</sup> Annual International Conference, April 7<sup>th</sup>-10<sup>th</sup>, 2010.

Weldu, Y. and **Nahmens, I.** (2010). The Application of Open Building Method as a Financial Strategy in Townhome Developments, Associated Schools of Construction 46<sup>th</sup> Annual International Conference, April 7<sup>th</sup>-10<sup>th</sup>, 2010.

**Nahmens, I.**, Ikuma, L. and Hassan, M. (2010). Applying Lean as a Strategy for Sustainable Homebuilding, 16th International Conference on Industry, Engineering, and Management Systems, Cocoa Beach, Florida, 2010.