

Cold-Formed Steel Wall Panels: A Case Study of On-Site Wall Panel Fabrication



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And

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Prepared by:

Newport Partners, LLC
Davidsonville, MD 21035
www.newportpartnersllc.com

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Background and Acknowledgements

The objective of this project is to gather state-of-the-art information to enable builders and framers to better integrate steel-framed wall panelization methods and processes into their construction systems, designs, and business models. This stage of the project consists of a series of case studies on builders, framers, and panel fabricators who are successfully using panelized construction in concert with cold-formed steel.

This report addresses a case study conducted on the use of cold-formed steel wall panels by a contractor who both manufactures panels and frames homes and commercial buildings. This case study focuses on the experience of the fabricator/framer and the builder they support. Although the framer works for a variety of builders, in this case, the builder and framer are affiliated companies with significant overlap in ownership.

This case study and report were prepared by Matt Hawkins and Mark Nowak of Newport Partners LLC. We extend special thanks to Todd Setter from the Steel Framing Alliance for collecting the on-site information throughout late 2007 and early 2008. Scott Shaddix from Craftsmen Homes and Debbie Adams from Lane Framing also provided significant assistance throughout the project. Funding was provided through a cooperative agreement between the Steel Framing Alliance and the U.S. Department of Housing and Urban Development's Office of Policy Development and Research.

Section 1 – General Information and Summary of Process

This case study is based on the observation of three model homes framed by Lane Framing Systems using steel wall panels fabricated on-site for Craftsmen Homes.

Lane Framing Systems (Lane Framing) is based in Anaheim, California and is a regional framing contractor serving the residential and light commercial building market. Lane Framing specializes in framing commercial, single-family, and multi-family buildings using cold-formed steel wall panels. They also frame homes with wood and hybrid steel-wood framing systems. Lane Framing has built thousands of homes since its inception in 1987.

Lane Framing utilizes the Lane System©, a proprietary integrated construction and budgeting software program that maximize efficiencies in all aspects of its operations. The Lane System provides precise procedures, predetermined protocols, computer-generated calculations, and budgetary controls to monitor and evaluate real-time performance.

Craftsmen Homes builds custom and semi-custom homes in the California market. Their homes are framed in steel by Lane Framing. Although the two companies are closely affiliated and have overlapping ownership, Lane Framing works with other residential and commercial builders. They apply the same approach described in this report independent of the builder on the project.

Contact information for Lane Framing Systems is as follows:

Debbie Adams, President
Lane Framing Systems
1038 E. Bastanchury Road, Suite 606
Fullerton, CA 92835
www.laneframing.com

Contact information for Craftsmen Homes is as follows:

Scott Shaddix, CEO
Craftsmen Homes
1157 N. Red Gum Street
Anaheim, CA 92806
www.craftsmenhomes.com

Housing Characteristics

The three homes in this case study are part of Craftsmen Homes', Citrus El Dorado development located within the La Quinta Resort & Golf Club community in La Quinta, California. When completed, the development will consist of 29 semi-custom homes based on three standard floor plans. The three observed model homes include:

- Home 1XB: Two-story home with 3,493 square feet
- Home 2XB: Two-story home with 3,767 square feet
- Home 3XB: Two story home with 4,195 square feet.

All three homes have slab-on-grade foundations with attached garages. Sales prices are expected to range from \$940,000 to \$1,400,000, depending on the model and level of up-grades selected.



Surrounding Housing Market

La Quinta, California is located west of Palm Springs, off Interstate 10. The city's main economic base rests on the area's natural beauty and outdoor activities, such as golfing and hiking. La Quinta has approximately 42,000 residents and the population is expected to grow, predominantly through relocation of older residents to the town's resort-based communities.

In 2004, La Quinta's median new home price was \$554,747 and the median price of all homes was \$307,045. In 2006, there were 18,726 homes in La Quinta. The 2006 median household income was \$64,844, slightly higher than the region's average.

Summary of Process

The first step in the framing process is to enter the home's details into the Lane System software program. The computer program not only determines the home's material needs but also focuses on efficiently designing openings for doors and windows.

The Lane System produces a preliminary framing plan, which is then evaluated by the project's lead layout person. A lead layout person makes adjustments to the layout configuration as needed.

For most projects, a model home is then framed using the revised preliminary layout. Lane Framing conducts a walk through of the home with various stakeholders, including the framing crew, builder, and sub trade representatives. The goals of the walk-through are to identify potential conflicts and to look for construction and framing efficiencies. Any changes identified during the walk through are then made to the panel layout configuration in the Lane System software program before the home's production-ready framing layout and cut-sheet are produced. The home's final cut-sheet, detailing every stud's height, width, and thickness, is then sent to cold-formed steel providers for bidding.

Lane Framing fabricates, or produces, the home's wall panels at the job-site with steel studs and tracks that arrived cut-to-length from a cold-formed steel supplier. The panels are fabricated either on a vacant slab or on a dry, flat section of the ground within the development. The builder doesn't use a framing table or other framing jigs commonly seen in off-site fabrication plants. To inform fabricators on each panel's dimensions and characteristics two coils are produced, one for the bottom track and one for the top track. The coil is secured on a spool and unrolled. The fabricators build the panels based off the guidelines and markings listed on the coils. Each home's coil is produced by the lead layout person, using the model home as a guide.



As a stack of panels is completed, it is moved away from the fabrication area to be stored until needed. A stack of panels is transported by forklift while individual panels are typically moved by three or four crew members. Since this observation was of three model homes, the panels were fabricated at another job-site and transported by flatbed truck to the framing site. Panel fabrication will occur on-site once full production begins.

The builder prefers to use an on-site fabrication framing strategy for developments with five or more homes. For projects under five homes, such as model home development, the builder will fabricate the wall panels at another job-site.