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Case Study - Panelization and Log Homes

Overview - The purpose of this article is to highlight the various aspects of panelized home building techniques as it relates to log homes. There are numerous log home companies scattered across the United States with the majority offering the same building techniques with varying types of wood.

Economy – In this economy it pays to explore all your options before deciding on a log home company and building technique. Most of the log home companies across the nation tend to offer similar structures with different styles and amenities, but they usually use one building technique, stacked logs versus a panelized system.

Log Home Building options –With stacked log home building techniques the whole log is utilized and stacked one on top of the other forming the structural outer wall and the interior wall. While many people prefer this historic log home look it has certain limiting features. One limitation is the lack of flexibility installing electrical, plumbing and other mechanical fixtures. Once a hole has been drilled down through the stacked logs it is very hard to change the placement of that wire or pipe in the future unless it is on the inside of the interior wall where it is visible. Also, while products for chinking (filling the gaps between the logs) are improving it is still an on-going, time consuming process to maintain and provide for proper insulating value.

What is panelization? Panelization is an efficient building process in a factory controlled environment like a traditional framed or stick-built home. In the case of Maine Cedar Log Homes (MCLH) in Windham, Maine panelization is the process used since 1926, although the equipment is more state of the art.

- a. **Construction** - the process starts by building the wall frame on a level table which ensures the framing will be square and true. Next they apply the Zip[®] system outer sheathing and house wrap all in one. The company recently switched to this method as it was more airtight and economical. Each seam is sealed with a tape similar to ice and water shield used in roofing. The windows are installed and hand hewn log siding is applied to the framing to form the completed outer wall panel. Logs are staggered so when erected in the field the vertical seam disappears.



- b. **Materials** - MCLH uses 3" x 6" hemlock

(rather than 2"x 6" pine) to frame their panels giving them a large surface to secure the logs. Completed panels are stacked awaiting shipment to the homeowner's building site. The company also constructs the gable ends of the house in the factory on a specially designed table going through the same log application process. In some cases, a wall, predominantly windows, may be partially framed and then finished onsite.

- c. This type of panelized building process has many advantages including:
 - i. Building in a climate controlled factory environment
 - ii. Traditional stud wall construction allowing for traditional installation of insulation, plumbing, heating and wiring
 - iii. Greater R-Value can be obtained—MCLH homes are a minimum R-26
 - iv. Interior walls can be finished with sheetrock, T&G pine or an interior log finish to give the 'full' log look or a combination of any of these looks.
- d. **Differences between panelized and modular or pre-fab**—Many people confuse the concept of panelized building with modular or pre-fabricated buildings. Modular homes are generally homes almost entirely built in a factory, including outer walls, interior walls and finishes, mechanicals, etc. The entire home is shipped in pieces, usually quarters or eights and pieced together on site. Unfortunately, over the years most modular home companies produced lower end smaller homes, which are easier to build and ship, so the term modular often evokes a negative image of a cheaply made home. While some modular companies moved into the larger, high end market it is a limited market at best. Once someone starts to spend significant money to build their dream home they want to see it built onsite.
- e. How shipped—Panelized homes are shipped by tractor trailer and delivered to the site as each stage is required so product does not need to sit outside in the elements for long periods waiting to be used. This 'Just in Time' method of delivery also frees up space at the job site which is an advantage for the builder, especially in small or tightly configured land parcels.

- f. How erected- In our case example of MCLH, the panels are created for each floor independently so the first floor can be erected once the deck is built on the foundation. Usually a boom truck or small crane is utilized but some homeowners have been known to hoist them up with a crew or block and tackle set up. The company supplies all the materials for interior wall studs built onsite. Once the first floor is framed the second floor is decked and the panels are erected in the same manner as the first floor. Gable ends and any



dormers are erected and the roof is finished onsite. When the MCLH panelized package is erected the homeowner has a weather-tight shell complete with doors, windows and roof. The homeowners or their builder will turn their attention and efforts to finishing the interior just as they would with a conventional stick built home with whatever mechanicals and amenities the homeowner chooses based on taste, and of course, budget.

2. Why is it better?

a. Pros-

- i. Building in a temperature controlled factory environment—The panels are constructed in a more controlled environment than having the outer wall framing done onsite. The advantage to being able to work in the factory setting is the ability to monitor and maintain excellent quality control. Tables can be calibrated and each step of construction can be reviewed for consistent quality which is not the case when framing on site.
- ii. Another advantage of having the outer shell completed in a factory setting is the timing. In most cases, a traditional home requires all the site work, footings, foundation and first floor decking to be completed before the framing can begin. A panelized home can be completed in the factory while that work is ongoing, saving several weeks of time. This can be advantageous for the homeowner if they are racing against the elements to create a weather-tight shell before winter or inclement weather seasons. It is also an advantage for builders as they can complete more homes per year with this ability to accelerate the building schedule. They also can get to the interior finish work sooner, which tends to be higher margin work.
- iii. Traditional stud wall construction allows for traditional installation of insulation, plumbing, heating and wiring. This advantage is huge for most prospective homeowners as they are becoming more discerning in their tastes and desires. Many of MCLH customers are retirees or vacation home buyers who want a certain look and feel to their homes. They are not interested in giving up traditional interior designs for the full log concept unless they are log home 'purists'.
- iv. Cost Containment is another huge benefit for the homebuyer. No unforeseen complications occur in the factory building process as can often occur when building on site. Once the design is finalized and approved the process flows from the design phase to the factory floor where construction is

completed in the controlled environment. The package price is finalized prior to production so no additional charges will ever occur, with the exception of any changes authorized by the homebuyer.



- v. Greater R-Value can be obtained—In our case study, MCLH wall panels have a minimum insulating factor of R-26 using conventional fiberglass insulation along with hand hewn Northern White Cedar logs. This species of wood has insulating values above most other woods. If the homeowner chooses a newer type of insulation like foam or dense packed cellulose the R-factor would go up even higher, perhaps to R-28 or R-30.
 - vi. Interior walls can be finished with sheetrock, T&G pine or an interior log finish to give the 'full' log look or utilize a combination of all three. This flexibility of design seems to be a huge draw for most homeowners. Some people like lots of wood on the interior walls while many prefer sheetrock to provide more light and an open pallet for various color schemes. The mix and match approach is often used by most couples to achieve the desired effect!
- b. Cons – For purists the log look is everything so one drawback of the panelized construction is the absence of the actual log on the interior of the home, but this can be accomplished with various products that give the interior wall the full log look.
3. Conclusions – There are many obvious benefits to panelized construction as noted in this article. The panelized building approach is often intimidating to the uninformed home buyer but once the process is fully explained and understood the benefits become obvious and very attractive to homeowners and builders alike. Panelization provides a superior quality product and moves the homeowner through the building process more quickly thus helping the home owner to sooner begin a lifetime of enjoyment in their dream home.