

Case Study: Energy Efficient Modular Homes

Oregon manufacturer, state agency play key role in Fort Lewis base family housing

The search for a contractor to build 460 energy-efficient modular homes for Fort Lewis soldiers and their families ended up in Oregon.

Champion Homes' Silverton manufactured home plant signed a contract to build modular homes to Northwest Energy Star site-built standards for the Fort Lewis base. It is the first time that modular construction has been used for permanent military housing on a US Armed Forces base.

The contract for the Fort Lewis modular homes added a nice economic boost to the mid-Willamette Valley community of 8,000. A year ago, Champion Homes' Silverton plant had 140 employees. Today there are 220 employees, and the contract is expected to provide Champion Homes work for the long term.

With extras such as hardwood floors, island kitchens, and nine-foot ceilings, the homes compete with the Pacific Northwest residential marketplace.

Homes with style

"It's neat to see families so elated to move into the new homes," said Tom Griffing, Operations Manager for Champion Homes Silverton plant.

And, who wouldn't be? The modular homes are built in a popular "Arts & Crafts" style—a far cry from the base housing they are replacing. The new homes come in several different open floor plans. For example, the "Lincoln" is a three-bedroom, two-bath, two-story triplex; the "Madison" is a two-bedroom, two-bath, two-story duplex. The homes range from 1,700 to 2,200 square feet in size.



A far cry from military base housing of the past, these modular homes built in Silverton and located at Fort Lewis, Washington, offer functionality and style for soldiers and their families.

With extras such as hardwood floors, island kitchens, and nine-foot ceilings, the homes compete with the Pacific Northwest residential marketplace.



625 Marion St. NE
Salem, OR 97301-3737

(503) 378-4040

Toll-free
1-800-221-8035

Fax
(503) 373-7806

Web site
www.oregon.gov/energy

Consumer and industry concerns about mold and mildew in new home construction are also addressed. The Fort Lewis modular homes are built with kiln-dried lumber inside a controlled environment.

Firm produces Energy Star® homes

Champion Homes' Silverton plant produces Super Good Cents® and Energy Star®-labeled manufactured homes as part of the Northwest Energy Efficient Manufactured Homes program. The firm increased its percentage of Super Good Cents/Energy Star homes from 10 percent 10 years ago to 40 percent today. Champion Homes is one of the nation's largest housing manufacturers. They have 29 homebuilding facilities located in 14 states and two Canadian provinces.

Champion Homes is required to build the Fort Lewis modular homes to Energy Star standards which is 15 percent above Washington's site-built code.

The homes have:

- More wall, ceiling, and floor insulation
- A specially designed -- and quiet -- ventilation system
- Sealed and tested heating ducts
- Energy Star built-in appliances
- Higher efficiency heating/ventilation equipment
- Energy efficient lighting in 50 percent of the lighting fixtures

Because of this high standard and the requirements of the Northwest Energy Star program, the contract also stipulated a third party inspector. The Oregon Department of Energy was the logical choice with its long-running track record administering the Northwest Energy Efficiency Manufactured home program (Super Good Cents/Energy Star).



A crane lifts the modular units in place. The units are built at the Champion factory in Silverton, Oregon and transported to Fort Lewis.

The Department of Energy staff performs its inspection of the homes in various phases of production on site at the Champion Homes plant. Washington State University's Energy Programs Office certifies that the homes meet the Northwest Energy Star standards by doing a final inspection, duct, and whole house air tightness testing once the homes are completed at Fort Lewis.

"It's been great for us to have the Department of Energy representative performing on-site inspections," said Griffing. "It means more eyes on the project and is part of our quality control."

The Oregon Department of Energy inspector, Al Rust, has worked for the Department of Energy and Building Code Division for the past nine years. Prior to his employment with the state, Rust worked in the manufactured home industry for 21 years.

Rust visits the Champion plant every other day during the production of the Fort Lewis homes. He meets informally with supervisors during his visits. He meets formally with supervisors and the four Champion quality control inspectors on a weekly basis.

The Fort Lewis modular homes are built in “units.” At one end of the plant, workers assemble the flooring for a unit. When the floor work is done and inspected, a chain mechanism pulls the unit forward to the next station on the assembly line where pre-assembled walls are attached. Each unit goes through 25 stations in four days. Champion builds its regular line of manufactured homes in addition to the Fort Lewis homes. Its goal is to complete two to three modular homes a week for the Fort Lewis project.

After the final inspection at the Silverton Champion plant, the Fort Lewis homes are placed outside to await pick-up for the trip up Interstate 5. At Fort Lewis, five Champion employees assemble the home and a number of Washington sub-contractors complete the finish work.



Al Rust, energy specialist with the Oregon Department of Energy, inspects the insulation in one of the modular homes being built for Fort Lewis base housing.

Rust sees his job as helping Champion employees produce a quality product in an efficient manner.

“Correcting mistakes takes time and will slow down the whole process,” Rust said. “It’s far more efficient to do it right the first time.”

On a recent visit, Rust gave a 20-minute visual presentation to station supervisors to make them aware of a problem with bathroom fan ducts that had to be corrected by Washington workers who set up the homes on site. Rust showed the supervisors how the problem could be avoided by making a minor change during the manufacturing process and checking that the change was made.



Al Rust (far-side of table) with the Oregon Department of Energy meets with Champion supervisors to discuss areas in the assembly process that can be improved.

“Doing it during manufacturing will save considerable time and money for the Washington crew on-site,” said Rust.

While nearly every Champion employee touches the home somewhere along the assembly line, the process is efficient. According to Griffing, all employees work the same day shift, while approximately 10 employees work a night shift devoted to painting and texturing.

“This is not easy work,” said Rust. “There is a lot of pressure to work quickly, safely and to do things correctly.”

In addition to being energy-efficient, the modular homes have to be built to stronger framing specifications than site-built home because they are transported by truck and lifted in place by a crane.

The modular homes cost less to build than site-built projects primarily because of building efficiencies in the manufacturing assembly-line process. Also, there are fewer construction workers needed on site thereby mitigating congestion and easing base security issues. There is less material waste than that created at a site-built housing project, too.

For some of the Fort Lewis soldiers and their family members, the modular units will offer a comfortable energy-efficient home. For that, they can thank Champion Homes of Oregon, the Oregon Department of Energy and Fort Lewis Communities, LLC.

Manufactured and Modular Homes

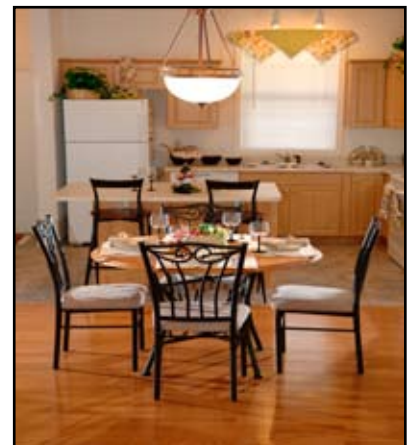
Manufactured homes are homes built in factories, rather than on site. When complete, they are pulled by tractor-trailers over public highways to the site where they will be occupied. Because of efficiencies in the assembly-line process, manufactured homes cost less to build than site-built homes.

Manufactured houses usually are placed in one location and stay there for the life of the structure.

All manufactured homes are built to conform to the national Manufactured Home Construction and Safety Standards (HUD code), rather than conforming to building codes at their individual destinations. In Oregon, Washington, Idaho and Montana, Super Good Cents/Energy Star manufactured homes are built to standards 30 percent above the national HUD code.



From beginning



To end



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