

Truss Technology IN BUILDING



Considerations for Contractors Building with Wall Panels



WTCA—Representing the Structural Building Components Industry, in cooperation with the Building Systems Council of the National Association of Home Builders, sponsored the **Framing the American Dream**® project to evaluate the costs associated with two wood frame construction methods. Two identical houses were completely framed—one using conventional stick-built construction, and the other with structural components (i.e., wood trusses and wall panels) exclusively.



Here's what we learned by using Wall Panels in the **Framing the American Dream**® project:

	Stick Frame	Component	Savings
Man-Hours to Frame	93 Hours	26 ½ Hours	66 ½ Hours
Quantity of Lumber	4,598 Bd. Ft.	4,598 Bd. Ft.	0 Bd. Ft.

ADDITIONAL OBSERVATIONS:

- ▲ Material quality and construction tolerances are more closely controlled assuring better consistency between panels.
- ▲ Sheathing and building wrap can be applied by the wall panel manufacturer in the factory, saving time in the field.
- ▲ Nailing patterns used to attach the studs to the plates and the sheathing to the studs and plates is more accurate and consistent than what is typically attained in the field.

- ▲ A wall placement diagram greatly simplifies the wall panel installation process by clearly identifying each panel and its intended location.
- ▲ Studs, columns and headers can be selected using the prescriptive requirements of the building code or, if provided by the Manufacturer, specifically designed to support the applied loads.

Note - The wall panels used for the **Framing the American Dream**® project were constructed using the prescriptive requirements of the building code. Greater efficiency is often possible with a fully engineered design. Check with your local wall panel manufacturer for the capability of providing an engineered design.

Because wall panels are manufactured "off-site" and shipped to the jobsite prior to installation, the information used to construct them must be accurate and complete. In order to maximize the efficiencies of using wall panels, take a few minutes to review the following checklist of information that is sometimes missing from the Construction Documents and make sure your wall panel manufacturer has all the correct information BEFORE manufacturing the wall panels:

ELEVATIONS & HEIGHTS

- Have all wall elevations been provided? *Note – Different ceiling heights do not necessarily mean different wall heights.*
- Are the locations and heights of all short walls (e.g. stairwell, fireplace chase walls, etc.), clearly marked?
- Are any changes in floor elevations that require changes in wall heights clearly marked?
- Are the garage foundation curb heights provided?

ROUGH OPENINGS

- Have all rough opening dimensions for doors and windows been provided?
- Are the stair rough opening dimensions clearly marked?
- Are bath tub and shower clearances provided? *Note – This is most often expressed as the distance from inside face of stud to inside face of stud.*
- What is the width of the interior door and window casing? *Note – Additional "return" distance is required between the edge of the rough opening and intersecting walls when wider trim is used.*

GENERAL

- Are all load bearing walls (interior and exterior) clearly marked?
- Are the locations of all walls, including skewed walls, clearly dimensioned?
- Are the dimensions for exterior walls out-to-out of stud or out-to-out of sheathing?
- What is the exterior wall sheathing type and thickness?
- Is a weather resistive membrane such as building paper to be installed by the manufacturer? If yes, what type should be used?
- Should the manufacturer provide the treated bottom plates for installation on concrete or masonry?
- Have corner and intersecting wall details been specified?
- For brick, concrete masonry or stone veneer, provide the width of the veneer as well as the air space between the veneer and the outside face of the sheathing.
- What is the governing Building Code for the project?
- Have all pertinent design loads been provided including floor and roof live and dead loads, snow loads, wind loads, seismic loads, etc.?

- What are the desired grade, size and spacing for the wall studs?
- What are the grades and sizes of the headers?
- Are the locations and type of all braced wall panels clearly marked?
- Have the sizes and types of columns been provided for supporting concentrated loads from girders, beams, headers, etc.?
- Will there be pockets for floor beams? Have the locations, sizes and elevations of these pockets been provided?

RECOMMENDED PROCEDURE** FOR INSTALLATION OF WALL PANELS

**** Note - Many builders use a crane or a forklift to set panels. There are also other methods of installation. Check with your wall panel manufacturer.**

STEP 1: It is absolutely critical to start with a foundation that is level and square. Anything less will potentially slow the installation process and reduce the economic benefits that can be gained through the use of wall panels. If the foundation is not level or square, **plan for any adjustments before the wall panels are manufactured.** It may be necessary to begin wall panel placement near the center of a wall line to distribute any dimension discrepancies equally within the wall line. (See figure 7 and follow numbered wall placement.)

STEP 2: Note all measurements before installation.

STEP 3: Measure the subfloor or slab. Compare these measurements with the dimensions on the wall placement diagram. Check all floor openings (e.g. stairway, fireplace, etc.).

STEP 4: Inspect the wall panel bundles and adjust for placement. Wall panel manufacturers cannot always stack the wall panels in the “order of installation”, but must stack them in a way that is safe and shippable.

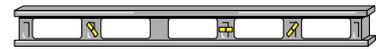
STEP 5: Snap chalk lines at the location of the inside face of the exterior walls.

STEP 6: Write the panel numbers on the floor, in accordance with the wall panel layout, in order to better identify the location of each wall panel.

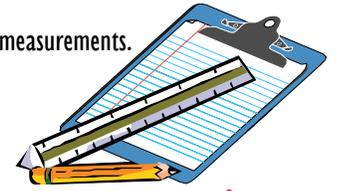
STEP 7: Set the first two exterior wall panels and fasten together tightly. Fasten the wall panels together at the top, middle and bottom of the adjoining studs and attach the bottom plate of the walls to the floor.

STEP 8: Brace each wall panel as it is set. Use minimum 2x4 stress-graded lumber anchored to the wall and floor or ground. **This is very important for ensuring stability of the walls as constructions proceeds.**

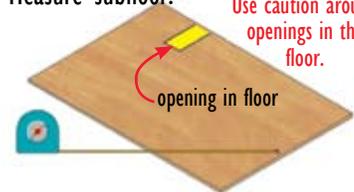
1 Check for a level foundation.



2 Note all measurements.



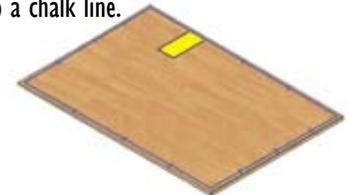
3 Measure subfloor. Use caution around openings in the floor.



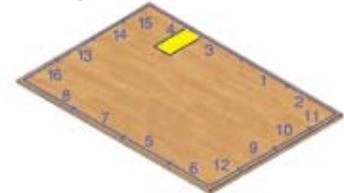
4 Inspect bundles.



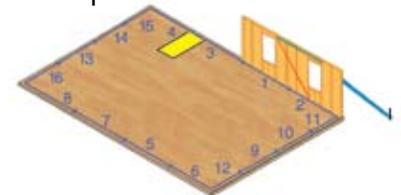
5 Snap a chalk line.



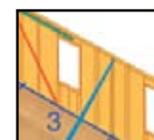
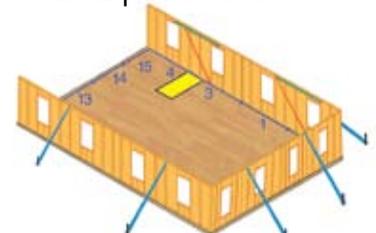
6 Write wall panel numbers on subfloor.



7 Set first two panels and fasten.



8 Brace each wall panel as it is set.



Stake each brace in ground, or attach securely to the floor deck.

STEP 9: Continue setting exterior wall panels leaving a couple panels out, to allow the interior walls to be brought in. A few important details to keep in mind:

- It may be necessary to shim the walls to compensate for deviations in slab or subfloor elevations. If required, be sure to shim so that there is full contact between the wall panel and the slab or subfloor. Extra caution is required for walls with plumbing runs.
- If the slab or subfloor slopes and the walls must be “racked” in order to get the studs vertical (i.e., plumb), the openings will no longer be square.
- Wall panels used in long wall lines MUST be butted together tightly by hand or mechanical means to keep the length of the wall line from “growing”. The Wall Panel Manufacturer can often compensate for this by purposely undersizing the length of each wall panel by 1/16” or 1/8”.

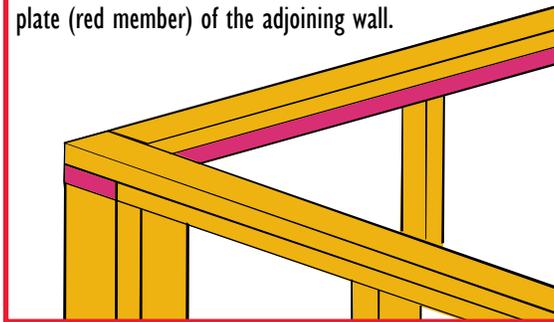
STEP 10: After all interior wall panels have been brought in, finish setting the remaining exterior wall panels.

STEP 11: Set interior wall panels following the sequence provided on the wall placement diagram.

STEP 12: Install the upper top plates at all locations where they have been omitted during the installation of the wall panels. Whenever possible, overlap top plates by at least one stud spacing.

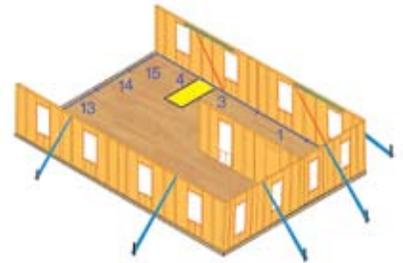
STEP 13: Check fastenings at all panel joints and add additional bracing as necessary to maintain wall stability. See also Step 8.

Lap top plates at wall intersections:
Wall intersections are strengthened when the upper top plate is lapped over the lower top plate (red member) of the adjoining wall.



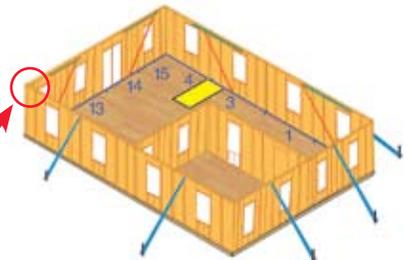
9 & 10

Continue setting exterior panels, leaving a few panels out to bring in interior wall panels. Bring in interior walls and finish setting exterior walls.



11 & 12

Set interior wall panels and install upper top plates.



13

Check all fastenings.



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WTCA – Representing the Structural Building Components Industry

6300 Enterprise Lane • Madison, WI 53719
608/274-4849 • 608/274-3329 fax
www.sbcindustry.com • wtca@sbindustry.com

Truss Technology in Building

An informational series designed to address the issues and questions faced by professionals in the building construction process.

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