Chapter 2: General Construction Procedures

Preparing Site

To allow proper drainage plan to keep building grade higher than surrounding site. On an ideal site, water drains naturally away from building. Since few sites are ideal, in most cases, grade work will be required to keep surface water away from building. Keeping finished building floor higher than the surrounding site reduces flooding chances during heavy rainfall or rapid snowmelt.

In flood plains, consult *first* with your building department to determine their requirements. Typical recommendation is to establish grade level at finished floor top higher than flood level. This may require importing fill to raise grade. A surveyor can be hired to expertly determine these heights. In some cases, vents may be installed, below flood level, to equalize interior and exterior pressures,

Many sites can be graded with a skid steer (a.k.a. Bobcat) or backhoe. Some cases will require heavy equipment to properly grade site to allow water to drain away from building. If a professional is engaged for site grading, make certain finished grade prepared is adequate *before* making final payment. In far too many cases "flat" sites which are out of level have been experienced by disappointed owners.

At a *minimum*, site preparation includes:

- Remove all sod and vegetation.
- For ideal site preparation, remove topsoil and stockpile for later use in finish grading. In frost prone areas, remove any clays or silty soil from within the future building "footprint".
- Replace subsoil removed from around building with granulated fill to help drain subsurface water from building.
- Distribute all fill, large debris free (no pit run), uniformly around site in layers no deeper than six inches.
- Compact each layer to a minimum 90% of a Modified Proctor Density before next layer is added. Usually, adequate compaction takes more than driving over fill with a dump truck, or earth moving equipment.
- When any building portion sits on fill, rest columns, as well as any concrete encasement, on or in undisturbed soil. In many cases, building inspectors will require a soils engineer to confirm compaction adequacy on filled sites. Soils engineers can be expensive, but are even more costly when called in to do analysis "*after the fact"*. Our Building Engineers are unable to visit sites; therefore they cannot perform or provide any soils or other similar reports, design retaining walls or any other work beyond the building shell.

Be certain to know local Building Department requirements *before* starting to move dirt.

In many jurisdictions, a separate grading permit may be required. In some cases soil may not be allowed to be moved until after a building permit has been issued. Get started on the right foot with permit authorities – **ask first before digging!**

Also, **prior to doing any excavation call 811**. This is a free service to mark underground utilities. Property owners and contractors can be held financially liable if they fail to locate underground utilities (like gas, electric, telephone, cable, water) and damage them in any way (not to mention potential for severe injury or death).

Below, actual photo – post hole dug without calling for a locate.

Grade actual building "footprint" area as level as reasonably possible. A grade change beyond eight inches will often result in having to acquire longer building posts.

Grade change is ideally checked before placing building order, however this is not often feasible as a practical matter. If grade has not been checked before order placement, do so within 24 hours. Longer posts are far more economical when provided with original lumber delivery. In some instances, building posts have been specially ordered (due to dimension, length, treating specifications or a combination) and cannot be returned to original producer for credit, even if they have not yet been delivered to jobsite.

Create an adequate work area. At a minimum clear at least five feet beyond each building side. Grade the area beyond building perimeter away from building with a 1% to 5% slope to drain surface water away in all directions. **A 5% slope is a 3 inches drop in 5 feet.**

Building Plans

Before printing building plans (if no engineer seals required) or sending to engineering (if this option has been purchased), they will be made available, on line, for your review. Everything from the order confirmation and signed door location sheet is on these plans. In the event it is unclear as to how to open and review plans, request help. Review building plans promptly and either approved or advise of any requested corrections.

We ***CANNOT*** emphasize this enough -- thoroughly and carefully review all building plans, instructions and material takeoff lists ***prior*** to beginning construction.

▶ Any deviation from building plans places responsibility for the building's structural integrity squarely upon you. ◀

▶ A professional has designed your Hansen Building. Rely upon their experience. ◀

> ***The cost to purchase "additional" materials and/or engineering if building is not built according to building plans is your responsibility*** (or between you and your building contractor in the event one has been hired).

Rules For Reading Building Plans

Never, we repeat, **never** "scale" a blueprint. **Written dimensions take precedence over any drawings.**

Never count boards depicted on a drawing and automatically assume building will have the same. Draftspersons will at times draw more or fewer pieces than will be required on the actual building. Sometimes lumber grade or size determines girt or purlin number and spacing. If there is more than one lumber grade listed on building plans, match lumber received to appropriate wording on plans.

The designer's structural review will establish actual required size, grade and spacing members and connections. These all will be spelled out ***in writing*** on building plans.

Pay careful attention to girt and purlin grade and spacing. They are ***NOT*** automatically going to be at 24" on center. In fact, the assumption they will be at some other spacing than 24", is much safer.

There may be isolated instances when wainscot, eavelights, an entry door or window height or location may, out of installation practicality, require a slight spacing deviation from what is indicated on building plans. For this reason, as construction progresses, compare with actual materials provided, to avoid having to redo work performed, or purchase extra materials.

The symbol **BL** on building plans denotes "Building Line". Used in cases where measures are made from building column "outside" edges.

The symbol **CL** is used to denote "center line" measure. Can be applied to building columns, or other sub-components.

If anyone, including any building department plan checker, field inspector, other official, or a contractor, makes *any* changes or deviations from provided building plans our advice is to obtain a signed statement to the effect they have now become "designer of record". In effect, they have assumed all liability for the building's structural design. Again, ***any deviation from the building plans*** relieves Hansen Building, the building designer or engineer from all responsibility for project design.


While building plans have been reviewed by many eyes (including yours), prior to printing, there is potential for inadvertent error, however small. If an apparent conflict is found between Emailed plans and printed building plans and/or this construction guide, contact Hansen Buildings ***BEFORE*** proceeding further with construction.

Choosing Fasteners

Hansen Buildings provides all required fasteners for pole building kit structural assembly, other than those which could normally be driven by a nail gun. For best results, and least time spent doing installation, we've found power-driven fasteners to be a superior choice. Power-driving equipment come in many brand and style varieties. Due to this, providing these fasteners with our building kits becomes an impossible task.

Nail Note: Either conventional or power-driven nails are acceptable. Whichever is chosen, be certain to use galvanized or other corrosion-resistant nails. (Vinyl or otherwise coated "sinkers" are not adequate.) Inadequately protected nail use will result in unsightly rust streaks on framing lumber, if rain or other moisture gets on nails prior to "closing in" building.

- We recommend, at a minimum, hot-dipped galvanized (hdg) fastener use, as opposed to electroplated galvanized (e.g.).
- Some building departments require stainless steel fasteners into pressure treated wood. As well, some new generation pressure treating techniques require stainless steel fastener use. Fasteners which are rated for use with new generation pressure treated lumber will be specified as such on nail carton exteriors.
- Most building plans and prefabricated truss drawings will specify 10d galvanized commons for framing installation. These are 3" long with an 0.148" diameter. Here are three of many places to purchase:
  www.SteelheadFasteners.com/hotdipped_frc.htm Item Number ST10D148HD
  http://www.bestmaterials.com/detail.aspx?ID=15045

  Nails greater in length than 3", used for general framing, can cause lumber splitting with catastrophic results. Smaller diameter 3" nails (typically referred to as "box") may be substituted by increasing nail quantities in any connection by 25% (example: using 5 nails rather than 4), or by a ¼ decrease in nail spacing (example: 9 inches on center, rather than 12).
  Researchers have found when a nail is driven into a board, further than the lumber face width, the board will likely split (example: driving nail 2" into 1-1/2" board face).
- Joist hangers will typically require a galvanized 1-1/2" long "joist hanger" or "teco" nail. These are 10d common diameter (0.148")
- Endwall Shearwalls, or other wood or composite sheeting products, generally require 8d galvanized commons (2-1/2" long 0.131" diameter).
- Several pounds of 3" or 3-1/2" duplex nails for easy temporary bracing installation and removal, may prove convenient.
- Some 1" roofing nails (with big plastic washers) can be handy to have to temporarily hold reflective insulation in place until steel is applied.

Staples: Some installers prefer to use staples to hold trims in place, or to install soffit materials. In general, the same guidelines apply to staples as to nails.

- Either conventional or power-driven staples are acceptable if they are appropriately corrosion-resistant.
- In addition, staples are to be at least 16 gauge semi-flattened to an elliptical cross-section.
- Staple crown at least 7/16" wide with legs long enough to penetrate into framing at least 3/4".
- NOTE: The State of Florida has specific requirements for use of staples, which the Building Official can provide.

Screws: Although many methods are acceptable, we have found ½" drywall screws to be handy for installing soffit panels.

Estimating for Fasteners

- For 10d framing nails, a general rule is five pounds for each 20 dimensional 2" lumber pieces.
- Nailing wood or composite sheeting with 8d? Usually a pound will do about two 4'x8' sheets.
- For joist hanger nails, conventional 2x6 hangers take a pound for each eight hangers.

Keep in mind these are merely approximations. Actual usage may vary due to specific building design requirements or individual installation techniques.

Tools Needed

Required tools:

Most work will require the following ***standard carpentry tools:***

Framing Hammer	Tape measures, 25' & 100'	Utility knife
Tin snips	Framing square	Carpenter's level
Chalk line	Hand saw	String line
Transit (or building level)	Shovel	Clam Shell digger
Come-Along w/cables	Carpenter's pencil	Wooden stakes
Plumb bob	Nail apron	Shims
Caulking gun and caulk	Gloves	Safety glasses or goggles
Ear protection	1" punch or cold chisel	Saw horses
Adjustable wrench	Hack saw	Protective rubber sole boots
Nail puller	Screwdrivers	Hand saw

(2) 15/16" wrenches (if 5/8" truss bolts are used)

Screw gun

No steel roofing and siding job is complete without this tool! Use equipment which provides drive screw force control. Under or over driven screws ***WILL*** create adverse situations and cause leaks. While battery powered screw guns can be convenient, limited battery life usually makes a corded tool far more practical. Screws have 1/4" hex-heads. Hansen Buildings recommends purchasing several Master Surface Magnetic Drive bits (available through Hansen Buildings). Alternate bit brands may damage the screws powder coating. For sliding door assembly, a Phillips head bit sufficient to drive a #8 pan head screw will be required.

HELPFUL HINT: Buy extra Master Surface Magnetic Drive bits as they do wear out. Usually a bit will do 750-1000 screws. If you have extras and have not opened packages, they can be returned for credit. This is much cheaper than having to make an extra trip (or trips!) to the hardware store.

Under no circumstance use drive bits from Ryobi, Black and Decker or Ridgid, as they WILL damage screw heads.

Drill motor and bits

¼" Drill Motor. For pre-boring nail holes, 7/64" and 1/8" bits are required. The same size bit can be used for pre-drilling steel roofing and siding. LedgerLok truss fasteners require a 9/64" bit with 5" of net penetration as well as a 7/32" bit. For pre-drilling eave light panels a 3/8" bit is required. A 5/8" diameter wood bit is required for drill holes for re-bar hairpins, if installing a concrete slab. For LedgerLok column/truss fasteners, a ½" Drill Motor and 5/16" hex head drive bit. For sliding doors a 17/32" metal bit is required. For bi-parting (split) sliding doors, a 9/32" metal bit.

If rafter or truss to column bolts are used, an 11/16" wood bit.

Not required, but helpful (time saving) tools:

Save time by adding these ***power tools*** and their accessories to the list:

Auger

Normally best if mounted on a skid steer or other similar equipment. Refer to building plans for required hole diameter. Hole diameters less than 18" will not be adequate, in any case.

** If in an area where steel roofing and siding manufacturer does not offer unloading service, hole digging and steel delivery coordination can be convenient. If renting a skid loader, for digging holes, have delivered with forks which can then be used to unload steel truck.

Circular saw

With sharp blades for both rough cutting and a fine-tooth plywood blade. Carbide tipped blades often give best results and greatest longevity. A power saw saves time and assures straight cuts. An abrasive saw blade may be handy as well. When using a power circular saw, work on a stable surface with ample clear area for cutting materials.

12" Miter saw

Handy for repetitive cutting for both speed and accuracy.

Palm Nailer

Palm nailers are small, air-powered tools which fit into one palm and strap on to keep stable. Unlike conventional nailers, a palm nailer simply uses standard nails. Fit nail into tip and press unit down on head, and nailer takes charge. An internal "hammer" begins a pounding action, and bam! - nail is driven.

The first time a palm nailer is tried out can be a little disconcerting: there's a rapid vibration in the palm and the nail disappears into a board - and fast. The nailer runs at 2300 blows per minute on 100 pound pressure (almost 40 blows a second). A 10d common nail takes but an instant to be driven to the head in treated pine. And what's more, when the nail's been driven flush, nailer stops pounding to keep from marring surface.

Using a palm nailer takes a little practice, mainly getting used to pressing down with palm, getting nail to stand upright (with much practice, this can sometimes be done without using the other hand), and getting accustomed to the noise.

Pneumatic or power driven stapler or nailer
Nice to have for maximum productivity, but to assure installation quality, use power fasteners correctly. Nailing tips and requirements will be given throughout this guide.

Metal nibbler or shear

Chain saw

Optional tools:

Finally, here are recommendations for ***other equipment*** which can make work go easier:

Genie Superlift Contractor
Designed specifically for the construction industry, these heavy-duty units can be operated by one person and can lift, lower and move loads up to 650 lbs (295 kg) to heights of up to 24 ft (7.32 m). Glide rails allow one person to easily load or unload the unit, as well as lift it in or out of a pickup truck. Ideal for lifting trusses.

Truss jacks
Also known as “winch boxes” to raise trusses. In simple terms, these normally are a steel box (or cap) designed to fit the building’s sidewall column tops (or attached to column face, with a pulley wheel on column top). Welded to this cap is a reduced drive boat trailer winch. While truss jacks are not currently commercially available, most experienced installers own at least two pair. This allows roofs to be framed on ground in “bays” and lifted with all framing in place.

Extension ladder (Only use OSHA-approved.)
Verify ladder is sturdy and upper side rails are padded to prevent damage to installed siding.

SAFETY TIP: When working with a ladder(s), set on dry, level ground, avoiding snow, mud, or wet grass. Wear work boots or shoes with non-slip soles and keep hips within ladder vertical rails. Leaning too far to the side will cause ladder to topple over.

Winding Bars

For overhead door installations. Takes two ½" x 18" long steel rods.

Scaffold

If working on a tall building, a stable scaffold can save time and provide added safety. (Again, use OSHA-approved equipment.) Different types are available, from pump jacks to bracket scaffolding. Whichever is chosen, mount scaffold correctly and use sturdy, properly sized planks to stand on.