



CONSTRUCTION SAFETY MANUAL

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Chapter 1: Introduction

Overview

Construction activities result in more fatalities and serious accidents than any other occupation, except farming. A construction site is inherently dangerous due to the nature of the process: working on unfinished surfaces, construction methods that require vigorous activity and mobility, and the variability of the skills and experience of the Habitat for Humanity – Grand Traverse Region (Habitat-GTR) employees and volunteers. Nonetheless,

All accidents are preventable.

The operative issue in preventing accidents is not years of experience, but rather awareness of the potential for injury and conscious consideration of steps to prevent injuries. The Habitat for Humanity construction process includes volunteers with a wide range of experience. While some have recent experience in construction environments, many volunteers are inexperienced and may not be aware of the inherent hazards or know the steps that should be taken to prevent injury.

The Habitat-GTR safety program is designed to ensure that staff members and volunteers are provided with job site safety rules, are trained to recognize and eliminate or avoid hazards associated with construction activities, and to monitor construction activities and remove hazards before they result in accidents.

All employees and volunteers have the responsibility to follow the guidelines and information in this manual and to work safely while on a Habitat-GTR job site. By providing the safety and awareness training and monitoring work sites, Habitat-GTR can continue to provide housing for families in need and make volunteer opportunities memories that will last a lifetime.

Safety Program Overview

The Project Manager, Construction Manager and/or Crew Leaders are responsible for implementing and enforcing safety requirements on the work sites and have the responsibility to provide coaching to volunteers about safe work practices. Individuals who are unwilling or unable to respond appropriately to this coaching will be asked to leave the worksite. Any controversies that result from this request will be addressed by the Habitat-GTR Project Manager, Habitat-GTR Outreach Manager, and/or the Habitat-GTR Construction Manager.

Job Site Youth Policy

The Secretary of Labor has set out guidelines from which Habitat for Humanity – Grand Traverse Region has adopted for all construction sites. In addition, Habitat requests all construction leaders to help with the compliance of this policy.

The **only** exception to this policy is when a **school-supervised** and **school-administered** work experience or career exploration program has been coordinated through Habitat. In this case, **the sponsoring school is required to certify that the exception applies to each child.**

Youth ages 13 and under

Are not allowed on job sites when construction is being performed, but they can do non-construction related projects off site. For a list of possible projects please call our office and request a copy of our youth project guide.

Youth ages 14 and 15

Are not allowed on job sites when construction is being done, but they can do any of the following:

1. Site clearing
2. Clean up work
3. Landscaping work that does not involve the use of power tools or machinery
4. Carpentry that is done off site and does not involve the use of power tools, or working on a ladder or any other heights

Youth ages 16 and 17

Are allowed on job sites while construction is in progress when working alongside an adult. They may not do any of the following, which are considered hazardous jobs:

1. Work involving power tools or heavy machinery
2. Wrecking and demolition
3. Excavation/working around open holes or excavations
4. Roofing or activities involving heights on ladders or scaffolding
5. Driving Habitat owned motor vehicles

All youth under the age of 18 must have a Release & Waiver of Liability for Minors signed by a parent or guardian before beginning to volunteer. Anyone 18 and over must have signed an adult waiver form before beginning to volunteer.

All youth under the age of 18 must have adult supervision, with no more than 5 youths to 1 adult.

Changes to the Safety Program

Any changes to the Safety Program will be made jointly by the Habitat-GTR Project Manager and appropriate Habitat-GTR staff. Any recommended changes will then be presented to the Board of Directors for their comments and approval, prior to implementation.

The Safety Program shall be reviewed periodically by the Project Manager to determine if additional practices, procedures, or training may need to be implemented by the Construction Manager and Crew Leaders or to incorporate any new technologies or techniques that would be applicable to the way Habitat-GTR works on site.

Once changes to the program have been implemented, individuals shall be notified and trained, if necessary, in the new procedures. A copy of the most recent revision of this plan shall be maintained at the jobsite, in the Volunteer Sign-In & Job Site Safety Binder.

Chapter 2: Habitat-GTR Safety Process

Overview

While unsafe conditions abound on construction sites, statistical reviews of injuries indicate that about 90% of the accidents result from unsafe acts rather than from unsafe conditions. These unsafe acts almost always result from either a lack of awareness on the part of the participant or the employment of a short-cut method or practice. Constant awareness of and respect for hazards, and compliance with all safety rules is required when working on a Habitat-GTR worksite.

Most volunteers are novices who work only once or a small number of times on Habitat-GTR work sites. Therefore, it is important to take as much time as is needed to provide safety training and work technique guidance. Safety training must be provided in a very condensed manner at the beginning of each work day and augmented throughout the day with reinforcement by more experienced and/or trained volunteers.

The Habitat-GTR Safety Process employs the following interdependent components:

Safety Training Program

Habitat-GTR staff, Crew Leaders, and Habitat Volunteers shall participate in the training programs indicated in the table below. The formal Safety Training Class will cover, in detail, the information outlined in this manual (**APPENDIX A**).

The Habitat-GTR Project Manager, Construction Manager and Outreach Manager are responsible for making sure that Crew Leaders, Habitat-GTR staff and frequent volunteers are properly trained prior to engagement of their work activities.

Worker Category	Formal Safety Training Class	On-Site Review of Applicable Sections of the Construction Safety Manual	Daily Safety Huddle & On-The-Job Training	Morning Planning Meeting
Habitat-GTR Staff	REQUIRED	REQUIRED	REQUIRED	ENCOURAGED
Crew Leaders	REQUIRED	REQUIRED	REQUIRED	ENCOURAGED
Frequent Volunteers	ENCOURAGED	ENCOURAGED	REQUIRED	N/A
All Other Volunteers	ENCOURAGED	ENCOURAGED	REQUIRED	N/A

NOTES:

(a) Frequent Volunteers – For Safety Program purposes, volunteers who expect to work more than four times per year are considered Frequent Attendance Volunteers and will be encouraged to complete the Formal Safety Training Class and help Habitat-GTR implement the safety program by becoming Crew Leaders, and/or by filling other key volunteer roles.

(b) Enforcement – Habitat-GTR staff and all volunteers acknowledge and abide by the following jobsite safety enforcement rules:

- ❑ 1st Violation – verbal warning
- ❑ 2nd Violation – verbal warning
- ❑ 3rd Violation – suspension from jobsite – If the individual is asked to leave the site, the time and reason should be noted in the daily sign in sheet.

Gross disregard for safety procedures can result in immediate removal from jobsite

Safe Work Site Design & Practices

The Habitat-GTR Project Manager, Construction Manager and Crew Leaders carry the primary responsibility for operating a safe work site. Responsibilities include the following:

- **Site Design** - A thorough hazard assessment of the site should be done prior to the start of work. This assessment will allow the House Leader, Crew Leader or House Lead Assistant to identify any on existing or potential on site hazards and take the appropriate corrective measures.
- **Crew Leader** - If a formally trained Crew Leader is available, that person should be updated on the day's safety issues at the morning planning meeting and introduced to the volunteer crew during the safety huddle. If a Crew Leader is not available, a suitable volunteer may be recruited to assist the Project Manager and/or Construction Manager in duties (such as sign-in and mini mobile organization) which are not pertaining to safety responsibilities.
- **Safe Equipment** - Ensure that all equipment and tools and their associated safety devices and guarding are in good working order at all times.
- **Volunteer Training** - Review safety factors with the Crew Leaders prior to the arrival of the other volunteers. Attend the Daily Safety Huddle with all volunteers prior to the beginning of construction activities.
- **Promotion and Monitoring** – Continually promote safety awareness and coach all volunteers to ensure adherence to all safety checklists and safe practices throughout the site at all times

- **Safety Coaching –**

Safety coaching is provided when it is observed that there is either an unsafe condition or an unsafe act that needs to be brought to their attention.

It is best to provide safety coaching in a positive way to the person or persons at risk. Be sure to provide coaching remarks in terms of the risk to which the worker may be exposed rather than specifically critiquing the 'behaviors' which may cause the risks.

- **Effective Delegation –** Utilize the services of the Crew Leaders and House Lead Assistants to accomplish the training and supervision of the volunteers and to inspect equipment
- **Incident & Accident Investigation -** Investigate and report all accidents that result in injury to workers or significant near misses that could easily have resulted in injury to workers, so that the cause and means of prevention can be identified to prevent a recurrence.
- **Persistent Safety Hazards –** Report any recognizably persistent and reoccurring unsafe conditions or practices to the Habitat-GTR Project Manager and Construction Manager.

Daily Volunteer Safety Training

Project Managers, Construction Manager and Crew Leaders must all be prepared to:

- Explain the hazards and the potential for injury involved with the various tasks and equipment, including the use of appropriate Personal Protective Equipment and the safest methods for accomplishing each task.
- Remind volunteers of the importance of Safety Coaching and the idea of pointing out unsafe acts or conditions to each other, and asking questions about the safety or procedures for a particular task.
- Remember that safety is a team effort, so don't hesitate to solicit help or information from the Habitat-GTR Project Manager and Construction Manager, when dealing with volunteers and safety concerns.

Morning Planning Meeting

Project Manager, Construction Manager and Crew Leaders are encouraged to:

- Meet at the site prior to the scheduled arrival of the other volunteers.
- Plan the day's work, adjusting for site conditions, weather, etc.
- Discuss technical aspects, materials, tools and tasks for the day.
- Assess hazards, safety issues, and preventative measures and choose which Site Safety Checklists will be reviewed.
- Identify the Crew Leader and/or Key Volunteers for the day.

Daily Safety Huddle

- Project Manager, Construction Manager or Crew Leader provide devotional and/or general Habitat orientation.

- Project Manager, Construction Manager or Crew Leader discuss day's work plans and makes crew assignments.
- Project Manager, Construction Manager or Crew Leader introduces key staff/volunteers and describes their role.
- Project Manager, Construction Manager or Crew Leader Reviews the previously chosen Site Safety Checklists (**APPENDIX B**).
 - Identifies the location of the Safety Board, first aid kit, fire extinguisher, etc.
 - Identifies volunteers with first aid and/or safety training or experience.
 - Identifies volunteers who have cell phones for possible emergency use.
 - Reviews the daily safety topics that relate to the scheduled daily tasks.

Notes:

Crew Leaders may lead portions of the Daily Safety Huddle to the extent that they are competent and confident in the topics

Safety Promotion and Monitoring

The novice nature of volunteers requires continuous promotion of safety principles to reinforce the training provided in the Daily Safety Huddle.

Project Manager, Construction Manager or Crew Leader discuss the work crew's assignment and reinforce safety issues as appropriate.

All volunteers including Project Manager, Construction Manager or Crew Leader must be willing to point out unsafe acts observed on the construction site.

This should be done in an atmosphere of caring and consideration, and accepted graciously.

Any individual who persists in unsafe practices or acts despite effective safety coaching will be directed by the Project Manager, Construction Manager or Crew Leader to leave the site.

Habitat-GTR Staff, Project Manager, Construction Manager and Crew Leader are responsible for the following:

- **On-the-Job Training**
 - For observing and monitoring volunteer activities during the work period
 - Providing additional training and safety coaching as tasks change or as work practices or conditions become unsafe.
 - Explaining and demonstrating safe techniques and practices as volunteers use hand tools, power tools, ladders, etc.

- Coaching each other, bringing any unsafe acts or conditions to the attention of the Project Manager, Construction Manager or Crew Leader.
- **Ad Hoc Training**
 - For being alert for additional volunteers who arrive at the site after the Daily Safety Huddle and briefing them on the safety issues that were discussed.

Work Site Safety Audits

The Habitat-GTR Construction Manager and Crew Leaders will periodically visit each work site. They will conduct an audit using the Work Site Audit Form (**APPENDIX C**) and provide analysis and report to the Board of Directors as required by the Safety Policy. While conducting an audit, the Construction Manager and Crew Leaders should answer safety-related questions as asked.

Emergency Preparedness

- Prominently display the **Safety Board** including:
 - emergency numbers
 - street address
 - nearest cross streets.
- Provide a readily available fully stocked **first aid kit**
- Provide readily accessible fully charged **fire extinguishers**
- Identify individuals on site that have first aid, CPR or other applicable expertise and would be willing to assist in an emergency.
- Provide plenty of **fresh potable water** in a convenient place on the site.

Accident Procedures

If an accident occurs on-site and a volunteer/staff member is injured, appropriate accident procedures must be followed. The Habitat-GTR Project Manager, Construction Manager or Crew Leader is responsible for communicating with and assisting the injured party. Additionally, they are responsible for ensuring that the Lockton Insurance Incident and Witness Reports (**APPENDIX D**) are complete. Key volunteers may be asked to assist in the completion of the Incident or Witness Reports.

Maintaining the Mobile Tool Trailer

- Having the tools and materials organized inside the trailer helps keep the job running efficiently
- The trailer itself can become a safety hazard. Keep a clear path and make sure tools and materials are secured from falling.
- Keep valuable tools inside the trailer overnight, not in the house.

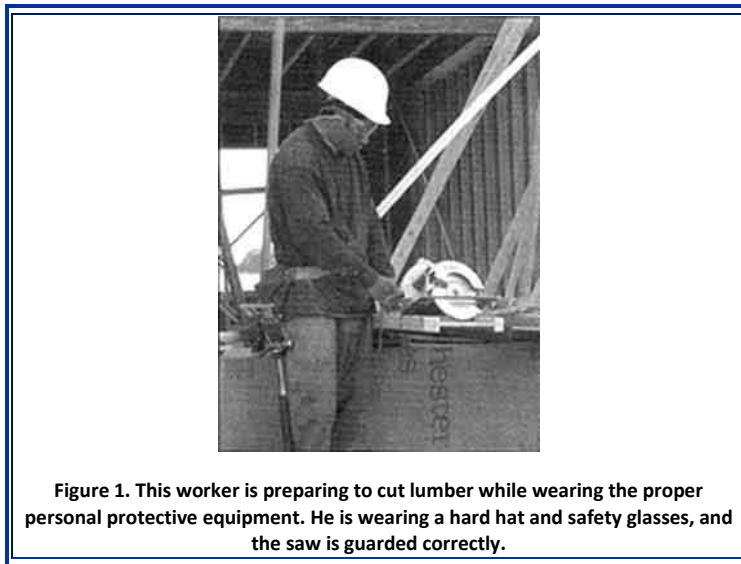
Chapter 3: Safe Work Practices

Introduction

This information is designed to identify safe work practices that have an impact on the most hazardous activities in the construction industry. This manual does not replace any requirements detailed in the actual OSHA regulations for construction (Title 29 Code of Federal Regulations, Part 1926); the manual should be used as a companion to the actual regulations. If any inconsistency ever exists between the manual and the OSHA regulations, the OSHA regulations (29 CFR 1926) will always prevail.

Personal Protective Equipment

Workers must use personal protective equipment, but it is not a substitute for taking safety measures. Workers still need to avoid hazards (Figure 1).



Head Protection

- Workers must wear hard hats when overhead, falling, or flying hazards exist or when danger of electrical shock is present.
- Inspect hard hats routinely for dents, cracks, or deterioration.
- If a hard hat has taken a heavy blow or electrical shock, you must replace it even when you detect no visible damage.

- Maintain hard hats in good condition; do not drill; clean with strong detergents or solvents; paint; or store them in extreme temperatures.

Eye and Face Protection

- Workers must wear safety glasses or face shields at all times when on the project site.
- Eye and face protectors are designed for particular hazards so be sure to select the type to match the hazard.
- Replace poorly fitting or damaged safety glasses.

Foot Protection

- Habitat-GTR staff and volunteers must wear shoes or boots with slip-resistant and puncture-resistant soles (to prevent slipping and puncture wounds).

Hand Protection

- High-quality gloves can prevent injury.
- Gloves should fit snugly.
- Glove gauntlets should be taped for working with fiberglass materials.

Hearing Protection

- Hearing protection can be used to prevent hearing loss when exposed to excessive noise levels.
- Individuals should wear appropriate hearing protection, such as ear plugs or ear muffs when operating power tools or equipment which produce noise levels above 90 decibels. Power saws (circular, skill, table, etc.) are potential sources of excessive noise

Tools and Equipment

- Maintain all hand tools and equipment in a safe condition and check them regularly for defects. Tag and remove broken or damaged tools and equipment from the jobsite.
- Follow the requirements for safe use of all tools.
- Use double insulated tools, or ensure that the tools are grounded.
- Equip all power saws (circular, skill, table, etc.) with blade guards.
- Make sure guards are in place before using power saws (Figure 2). Don't use power saws with the guard tied or wedged open.

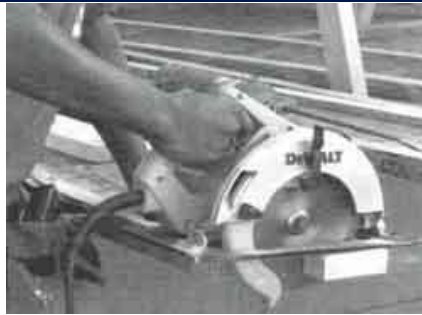


Figure 2. This worker is using a power saw that has all moving parts, including the saw blade, properly guarded.

- Turn off saws before leaving them unattended.
- Raise or lower tools by their handles, not by their cords.
- Don't use wrenches when the jaws are damaged to the point of slippage. Replace them.
- Don't use impact tools with mushroomed heads. Replace them.
- Keep wooden handles free of splinters or cracks and be sure the handles stay tight in the tool.
- Only use tools and equipment that you have been trained on for their correct and safe use, i.e. saws, pneumatic tools, etc.

Electrical

- Don't use frayed or worn electrical cords or cables.
- Use only 3-wire type extension cords designed for hard or junior hard service. (Look for any of the following letters imprinted on the casing: S, ST, SO, STO, SJ, SJT, SJO, SJTO.)
- Maintain all electrical tools and equipment in safe condition and check regularly for defects.
- Tag and remove broken or damaged tools and equipment from the jobsite.
- Protect all temporary power (including extension cords) with ground fault circuit interrupters (GFCIs). Plug into a GFCI-protected temporary power pole, a GFCI protected generator, or use a GFCI extension cord to protect against shocks (Figure 3).
- Extension cords that are exposed to automobile or equipment traffic must be protected from damage.
- Don't bypass any protective system or device designed to protect employees from contact with electrical current.
- Locate and identify overhead electrical power lines. Make sure that ladders, equipment or materials never come within 10 feet of electrical power lines.

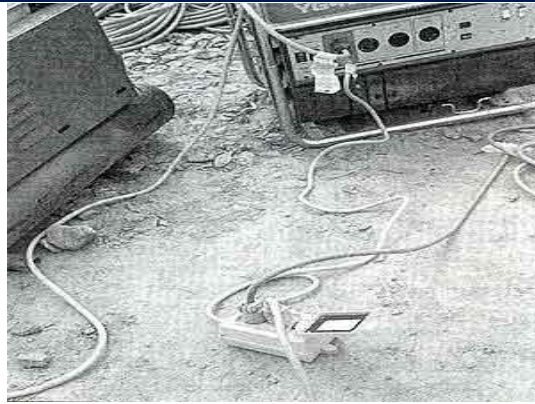


Figure 3. The generator is a temporary power source. Typically the generators used by HFHGC are equipped with ground fault circuit interrupters (GFCI). If not, then the cord should be protected by a GFCI as shown in the figure above.

Fire Prevention

- Provide fire extinguishers on site.
- Keep fire extinguishers easy to see and reach in case of an emergency.
- Provide one fire extinguisher within 100 feet of employees for each 3,000 square feet of building. Individuals should be trained on the proper use of a fire extinguisher prior to use (Figure 4).
- Don't store flammable or combustible materials in areas used for stairways or exists.
- Avoid spraying of paint, solvents, or other types of flammable materials in rooms with poor ventilation. Build-up of fumes and vapors can cause explosions or fires.

THE PASS METHOD

Pull the pin.
Aim the nozzle.
Squeeze the lever.
Sweep the nozzle.



Figure 4. Individuals should be trained to use the PASS method to extinguish a fire.



Figure 5. Gasoline and other flammable liquids need to be stored in a safety can.

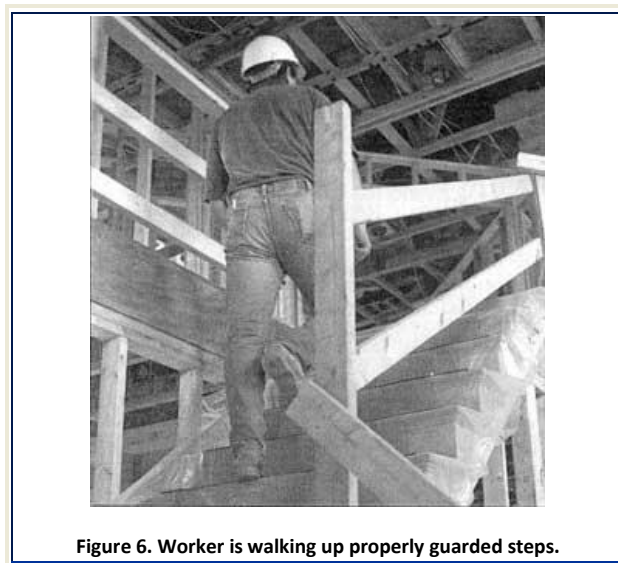
- Store gasoline and other flammable liquids in a safety can outdoors or in an approved storage facility (Figure 5).
 - Don't store LP gas tanks inside buildings.
 - Keep temporary heaters at least 6 feet away from any LP gas container.
 - Ensure that leaks or spills of flammable or combustible materials are cleaned up promptly.
-

Housekeeping and Access at Site

- Keep all walkways and stairways clear of trash/debris and other materials such as tools and supplies to prevent tripping.
 - Keep boxes, scrap lumber and other materials picked up. Put them in a dumpster or trash/debris area to prevent fire and tripping hazards.
 - Provide enough light for workers to see and to prevent accidents.
-

Stairways and Ladders

- Install permanent or temporary guardrails on stairs before stairs are used for general access between levels to prevent someone from falling or stepping off edges (Figure 6).
- Do not store materials on stairways that are used for general access between levels.
- Keep hazardous projections such as protruding nails, large splinters, etc. out of the stairs, treads or handrails.



- Correct any slippery conditions on stairways before they are used.
- Keep manufactured ladders in good condition and free of defects.

- Inspect ladders before use for broken rungs or other defects so falls don't happen. Discard or repair defective ladders.
- Secure ladders near the top or at the bottom to prevent them from slipping and causing falls.
- When you can't tie the ladder off, be sure the ladder is on a stable and level surface so it cannot be knocked over or the bottom of it kicked out (Figure 7).

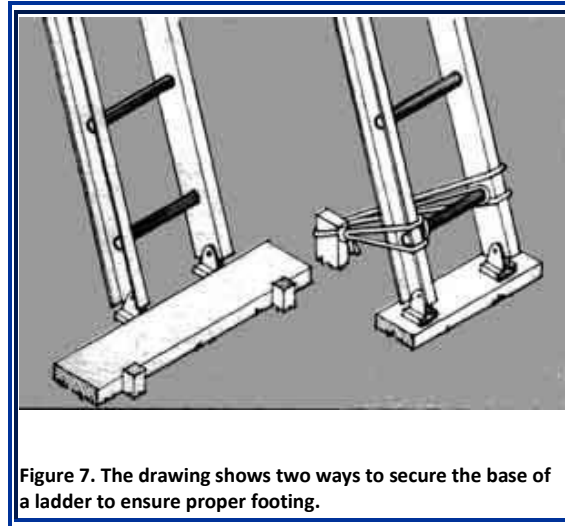


Figure 7. The drawing shows two ways to secure the base of a ladder to ensure proper footing.

- Place ladders at the proper angle (1 foot out from the base for every 4 feet of vertical rise, Figure 8).

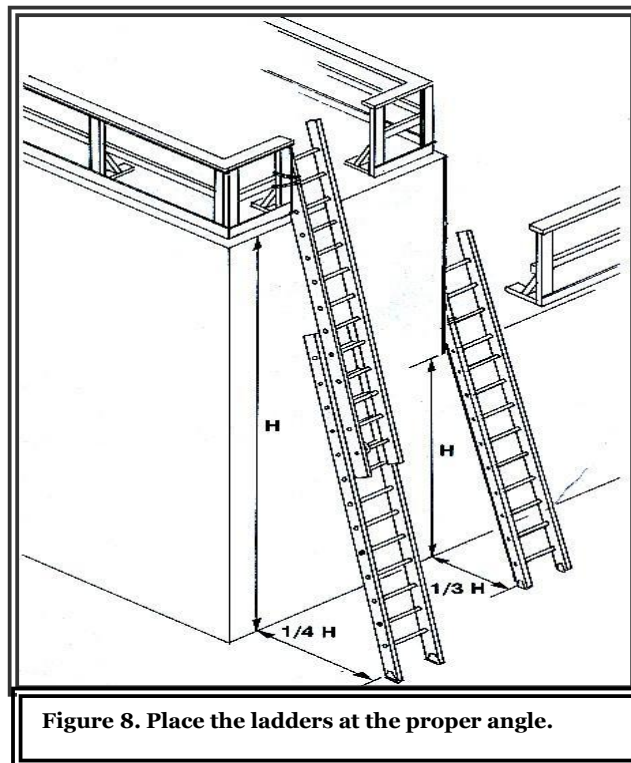


Figure 8. Place the ladders at the proper angle.

- Extend ladders at least 3 feet above the landing to provide a handhold or for balance when getting on and off the ladder from other surfaces (Figure 9).
- Do not set up a ladder near passageways or high traffic areas where it could be knocked over.
- Use ladders only for what they were made and not as a platform, runway, or as scaffold planks.
- Always face the ladder and maintain 3 points of contact when climbing a ladder (Figure 10).



Figure 9. When ladders are used for access to an upper level they must extend at least 3 feet above the roof surface.



Figure 10. This worker is climbing a ladder set at the proper angle (4:1) with a three-point contact grip (two hands and one foot).

Fall Protection

Habitat-GTR has a duty to provide fall protection for everyone that works at elevated locations in the construction process. This Fall Protection Plan is designed to meet the intent of the OSHA CFR 29 1926.500 Subpart M.

The purpose of this plan is to supplement our safety and health program and to ensure that everyone recognizes workplace fall hazards and takes the appropriate measures to address those hazards.

The areas or tasks may include, but are not limited to:

- Installation of Floor Joists and Sheathing

- Erecting Exterior Walls.
- Setting and Bracing of Roof Trusses and Rafters
- Roof Sheathing Operations, and
- Roofing Work

This plan is designed to enable individuals to recognize the fall hazards associated with construction and to establish the safest procedures that are to be followed in order to prevent falls to lower levels, including falls through holes and openings in walking/working surfaces.

It is the responsibility of Habitat-GTR to ensure that everyone reads and understands the fall protection plan, receives the appropriate training, and adheres to the procedures of this plan.

Fall Protection Systems to Be Used on the Job

Installation of roof trusses/rafters, exterior wall erection, roof sheathing, floor sheathing, and joist/truss activities will be conducted only by individuals who are familiar with this type of work and have been informed of potential fall hazards and safe work practices.

Individuals will strictly adhere to these procedures except when doing so would expose them to greater hazard. If the employees or volunteers think this is the case, they are to notify the Project/House Leader of their concern and have the concern resolved before proceeding.

A. Work Site Conditions

The work site will be prepared using “Safe Site Design” practices.

- For example, the work site below elevated locations will be cleared of all movable materials which could increase the severity of an injury that might result from a fall.
- Materials which can not be moved will be covered in a manner which would serve to reduce the effect of a fall (for example, foundation rebar should have protective caps).

B. Controlled Access Zones

A “**Controlled Access Zone**” can be used to prevent hazards associated with falling objects during installation of floor joists, floor sheathing, exterior walls, roof trusses, roof sheathing and roof work. A controlled access zone can be accomplished with the use of caution tape and or the assigning and positioning of workers to warn others of potential dangers.

C. Installation of Floor Joists/Web Floor Trusses and Deck

- The first several joists/web floor trusses shall be installed by workers supported by

- interior ladders,
- the ground,
- or from the exterior grade.
- Each successive floor joist can be moved into place and secured from a platform created from a sheet of plywood laid over the previously secured floor joists or from interior ladders or the exterior grade.
- After several joists are installed and braced, trained workers may work from a platform comprised of sheets of plywood attached to the braced floor joists. Ensure that the placement of plywood does not extend beyond the supported area in order to prevent the sheet from moving or tipping.
- Work performed **within four feet of the leading edge** should be done facing the edge of the deck while in a crouching position.
- Minimize the need to stand within four feet of the leading edge.
- Any workers not engaged in the leading edge construction while leading edges still exist (e.g., nailing off partially fastened sheets of sheathing or cutting the deck for the basement stairs) shall not be permitted within six feet of the leading edge under construction.
- Stairway openings and other openings must be either
 - protected by sturdy hand rails or
 - securely covered with well-supported temporary sheathing to prevent workers from falling through.

D. Erecting Exterior Walls

- Make sure there are enough people to comfortably lift and hold the wall and have bracing ready so it can be fastened immediately when raising walls
- Make sure the wall is fully supported until the bracing is securely fastened.
- Workers constructing exterior walls shall complete as much cutting of materials and other preparation as possible
 - away from the edge of the deck or
 - by standing on the exterior grade.
- Guardrails must be installed in doorway openings that involve an elevation change in excess of 19" as soon as operations directly associated with the doorway are complete.
- Guardrails must be installed in windows or other wall openings whose lower sill is less than 39" above the interior floor and more than 6' above the exterior grade as soon as operations directly associated with the wall opening are complete.
- The Project Manager, Construction Manager and/or Crew Leaders should *monitor this work and warn anyone who approaches the unprotected edge*.
- Materials for operations shall be conveniently staged to minimize fall hazards.

E. Installation Procedures for Roof Truss and Erecting Rafters

- Individuals should be positioned at the outside walls on ladders, or suitable work platforms (Figure 14) in order to attach the end of the roof truss to the exterior wall.
- Individuals can be positioned in the web of the trusses in order to position the truss and install temporary bracing.
- Work should be started at one end and proceed to the opposite end.



Figure 14. This worker uses a recognized safe work practice by standing on a work platform to secure the end of the roof truss.

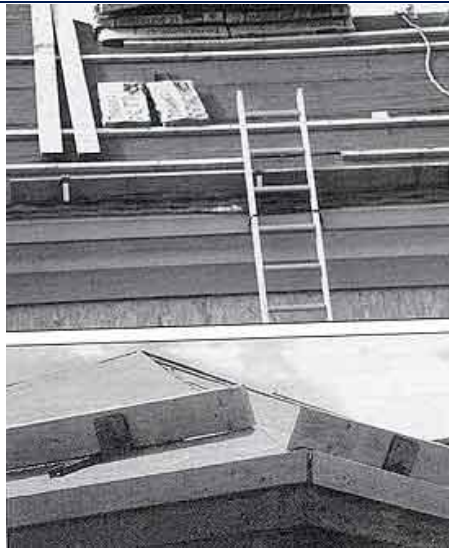


Figure 15a and 15b. These photographs show properly installed slide guards along the roof eave. The slide guard is a roof bracket with a 2x6 at a 90-degree angle.

F. Roof Sheathing Operations

- Workers typically install roof sheathing after all trusses/rafters and any temporary truss bracing is in place. Only trained workers shall install roof sheathing.
- Once roof sheathing installation begins, workers not involved in that activity shall not stand or walk below or adjacent to the roof opening or exterior walls in any area where they could be struck by falling objects.
- Once the first row of sheathing has been installed, the slide guard should be placed at 2' above the eave, on each side of the roof.

G. Roofing Work

- Roofing work must be started with the removal of the slide guard on the first row of sheathing.
- Once the building felt and the first three rows (or courses) of shingles have been installed then the slide guard must be replaced in the appropriate location, at 2' above the eave, on each side of the roof.
- Inspect for and remove frost and other slipping hazards before getting onto roof surfaces.
- When the pitch exceeds a 6:12 pitch, install slide guards along the roof eave after the first 3 rows of roofing material are installed and again every 8 feet up the roof (Figures 15a, 15b, and 16).
- Stop roofing operations when storms, high winds or other adverse weather conditions create unsafe conditions.
- Remove or properly guard any impalement hazards.
- Wear shoes with slip-resistant soles.

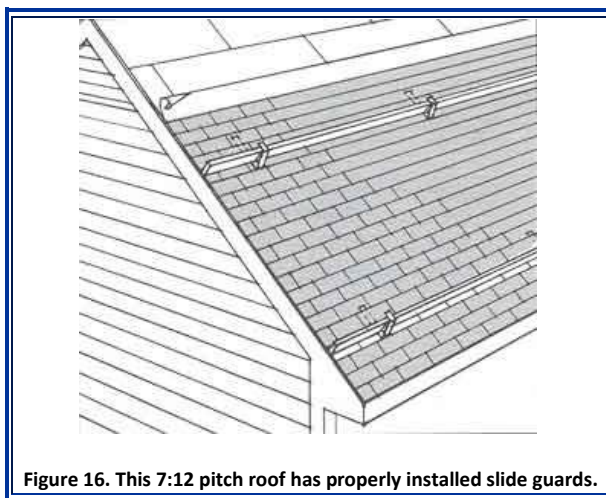


Figure 16. This 7:12 pitch roof has properly installed slide guards.

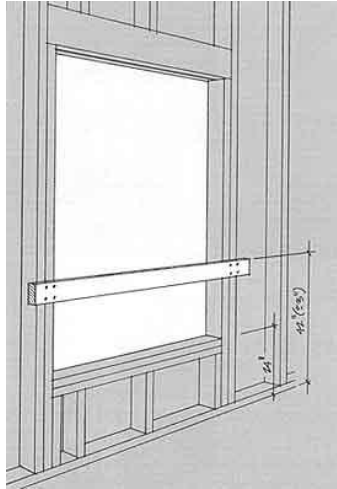


Figure 17. This window opening has a guardrail because the bottom sill height is less than 39 inches. Because the distance between the studs is less than 18 inches, no guardrails are needed between the studs.

H. Floor and Wall Openings

- Install guardrails around openings in floors and across openings in walls when the fall distance is 6 feet or more. Be sure the top rails can withstand a 200-lb load (Figures 17 and 18).
- Construct guardrails with a top rail approximately 42 inches high with a midrail about half that high at 21 inches (Figure 19).
- Install toe boards when other workers are to be below the work area.

- Cover floor openings larger than 2x2 inches with material to safely support the working load.

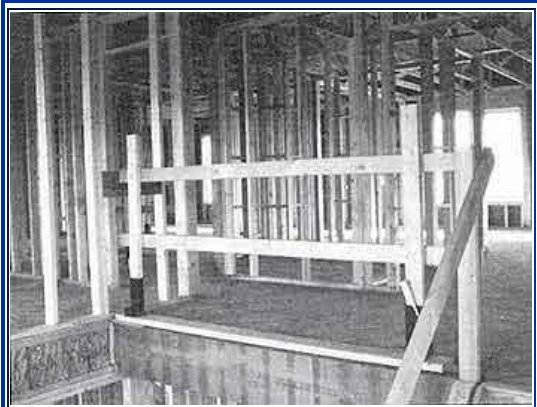


Figure 18. This photograph shows a proper guardrail around a floor opening.

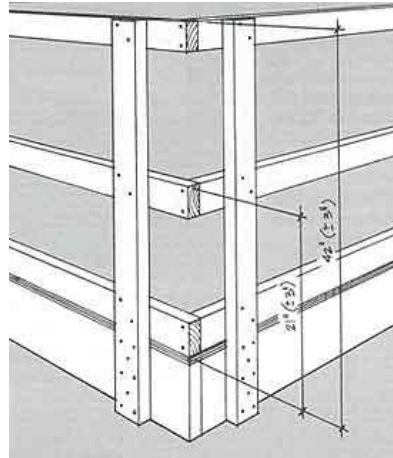


Figure 19. This drawing shows the correct height for guardrails and midrails - about 42 and 21 inches high respectively.

Excavations and Trenching

General

- Find the location of all underground utilities by contacting the local utility locating service before digging.
- Keep workers away from digging equipment and never allow workers in an excavation when equipment is in use.
- Keep workers from getting between equipment in use and other obstacles and machinery that can cause crushing hazards.
- Keep equipment and the excavated dirt (spoils pile) back 2 feet from the edge of the excavation (Figure 20).



Figure 20. The dotted line shows the profile of this excavation, as it was sloped at $1\frac{1}{2} : 1$. Usually residential excavations are type C soil and will require such a slope. The spoils pile is at least 2 feet back from the edge of the excavation.

- Have a competent person conduct daily inspections and correct any hazards before workers enter a trench or excavation.
- When the excavation exceeds 4 feet the workers must be provided a way to get into and out of a trench or excavation such as ladders and ramps. They must be within 25 feet of the worker.
- For excavations and utility trenches over 5 feet deep, use shoring, shields (trench boxes), benching, or slope back the sides. Unless soil analysis has been completed, the earth's slope must be at least 1½ feet horizontal to 1 vertical (Figure 18).
- Keep water out of trenches with a pump or drainage system, and inspect the area for soil movement and potential cave-ins.
- Keep drivers in the cab and workers away from dump trucks when dirt and other debris are being loaded into them. Don't allow workers under any load and train them to stay clear of the backs of vehicles.

Foundations

After the foundation walls are constructed, take special precautions to prevent injury from cave-ins in the area between the excavation wall and the foundation wall (Figure 21).

- The depth of the foundation/basement trench cannot exceed 7½ feet deep unless you provide other cave-in protection.
- Keep the horizontal width of the foundation trench at least 2 feet wide. Make sure no work activity vibrates the soil while workers are in the trench.

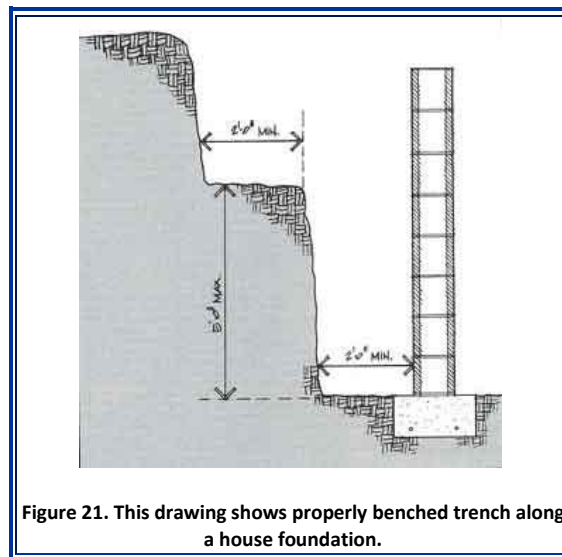


Figure 21. This drawing shows properly benched trench along a house foundation.

- Plan the foundation trench work to minimize the number of workers in the trench and the length of time they spend there.
- Inspect the trench regularly for changes in the stability of the earth (water, cracks, vibrations, spoils pile). Stop work if any potential for cave-in develops and fix the problem before work starts again.

Vehicles and Mobile Equipment

- Train workers to stay clear of backing and turning vehicles and equipment with rotating cabs.
- Be sure that all off-road equipment used on site is equipped with rollover protection (ROPS) (Figure 22).



Figure 22. This worker has been properly trained to operate this piece of equipment, and it is equipped with the appropriate safety devices.

- Maintain back-up alarms for equipment with limited rear view or use someone to help guide them back.
- Be sure that all vehicles have fully operational braking systems and brake lights.
- Use seat belts when transporting workers in motor and construction vehicles.
- Maintain at least a 10-foot clearance from overhead power lines when operating equipment.
- Block up the raised bed when inspecting or repairing dump trucks.
- Know the rated capacity of the crane and use accordingly.
- Ensure the stability of the crane.
- Ensure the “Swing Radius” of the crane is defined and ensure individuals are clear of the area.
- Use a tag line to control materials moved by a crane.
- Verify experience or provide training to crane and heavy equipment operators.

APPENDIX A - Formal Safety Training Class Description

Formal Training Program Topics

Site Leadership, Site Binder & Morning On-Site Orientations

Morning Planning Meeting

Emergency Preparedness

Daily Safety Huddle

Volunteer Sign-In

Waiver of Liability for Adults/Minors

Job Site Youth Policy

Safety Monitoring & Enforcement

Safety Topics

- Personal Protective Equipment
- Hand & Power Tools
- Electrical Safety
- Stairways and Ladders
- Fall Protection