

GRID Alternatives
Construction Safety Manual

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Employee Health and Safety Education

The Importance of Safety Culture

GRID Alternatives greatly values the safety and security of all staff, volunteers, and homeowners that are engaged in our organization and mission. Each person plays a key role in the success of GRID Alternatives and the best way to demonstrate our appreciation for those involved in the organization is by making safety a number one priority.

GRID Alternatives also aims to be a leader in both solar installation for affordable housing and hands-on training practices. With this visibility comes opportunities to be role models for job trainees and influence the adoption of elevated safety practices in the greater solar industry.

GRID Alternatives is working to enhance safety practices so that everyone involved in the organization can join together in the interests of implementing standardized safety procedures that reduce workplace hazards and accidents. Each member engaged in the organization has a responsibility to not only implement but also encourage safe practices on the job site. All employees and volunteers are encouraged to detect and report conditions that can cause injuries. No employee or volunteer is required to work at a job that he or she feels is not safe or healthful or perform a task that they have not been properly trained in or feel uncomfortable doing.

Employer Responsibility

GRID Alternatives is responsible for providing all staff and volunteers with the best resources possible to achieve maximum safety during the installation process including written policies, training, personal protective equipment (PPE), and open door communication channels. The GRID Alternatives Construction Safety Manual supplements the Injury and Illness Prevention Program (IIP Program) outlined in the GRID Alternatives Operations Manual. The IIP Program is a **policy** of GRID Alternatives and its Affiliates and compliance with the IIP Program is **not optional**. The organization requires that all Regional/Executive Directors, Construction Staff, and Volunteers complete mandatory safety training, read and acknowledge their understanding of all materials provided in the Construction Safety Manual, and go forth in promoting safety awareness (See Operations Manual, Appendix VII-B – All Employee Safety and Health Training/Review Checklist).

Director of Construction Responsibility

Director of Construction safety responsibilities may include (but are not limited to):

- Keep construction safety policies and trainings up-to-date and inform staff of the location of key resources.

- Be a point person or resource for all staff regarding safety-related questions.
- Facilitate Construction Safety Manual training to new staff. Record and document attendance.
- Conduct safety trainings on a monthly basis through the organization-wide construction huddle meetings in order to keep safety in the forefront of our minds as well as to continue an on-going discussion about best practices.
- May conduct internal investigations and publish incident case studies in an effort to improve safety practices.

Regional/Executive Director Responsibility

Regional/Executive Director safety responsibilities may include (but are not limited to):

- Authorize purchase of safety equipment and PPE and other recurring expenses of the Safety Program.
- Follow communication protocol outlined in the Emergency Response Plan.
- Ensure staff attend required training based on their role. Record and document attendance.
- Enforce Safety Compliance Program.

Construction Manager/Safety Officer Responsibility

Each GRID Alternatives office is unique in its departmental organization and delegation. In offices where there is a Construction Manager who oversees regional construction staff, the Construction Manager takes on the responsibility of always ensuring that Installation Supervisors are engaged in demonstrating and teaching the best safety practices on site with volunteers. For offices with no Construction Manager, responsibilities may be clearly distributed among the construction team or a designated construction staff member may serve as the safety authority.

Construction Manager/Safety Officer safety responsibilities may include (but are not limited to):

- Ensure adequate safety equipment, PPE, and first aid supplies.
- Ensure that safety equipment and PPE are regularly inspected and/or tested and replaced as needed. Document inspection.
- Read all instruction manuals for safety equipment.
- Ensure staff attend required training based on their role. Record and document attendance.
- Enforce Safety Compliance Program.

Solar Installation Supervisor Responsibility

On GRID Alternatives installations, the Solar Installation Supervisor is considered the designated “competent person” as per OSHA standards. A competent person is defined as “one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.”¹ Installation Supervisors take on the challenge of engaging volunteers in not only solar installation safety, but also standard residential installation processes and techniques. Supervisors work with volunteers coming from various backgrounds and levels of expertise in regards to construction safety. All volunteers receive safety training during their initial volunteer orientation, but it is the responsibility of the Installation Supervisor to make sure that volunteers are actively implementing GRID Alternatives safety policies and practices.

Solar Installation Supervisor safety responsibilities may include (but are not limited to):

- Ensure that all volunteers upon arrival read and sign the “Volunteer Agreement, Assumption of Risk and Release from Liability” form. The Installation Supervisor is responsible for communicating to all volunteers that this document must be read and that their compliance with this document is indicated upon signing. The waiver must be signed for all volunteer assignments including installations, site visits, and office or warehouse work.
- Lead morning safety talks and post-lunch safety refreshers and point out site-specific hazards on each day of the installation. Supervisors may choose to review the safety talk one-on-one with any late arrivals. Supervisors have the authority to send away any late arrivals or volunteers who refuse to abide by GRID Alternatives safety practices, appear to be under the influence, or pose an immediate threat to site security.
- Prepare a site-specific Site Safety Plan for each installation.
- Ensure that the on-site project paperwork includes the Safety Talk, Site Safety Plan, Emergency Response Plan and hospital directions, Accident Report Forms, and applicable Material Safety Data Sheets (MSDSs).
- Ensure that a first aid kit is stocked and accessible at installations.
- Report all injuries, incidents, and close calls. Follow communication protocol in the Emergency Response Plan.
- Train Team-Leaders-in-Training in GRID Alternatives safety policies and practices.

¹ 29 CFR 1926.32 (f)

Construction Staff Responsibility

Additionally, all construction staff including Project Managers, Construction Assistants, SolarCorps Fellows, etc. must respect and abide by the safety standards outlined by GRID Alternatives. Construction staff safety responsibilities may include (but are not limited to):

- Report all injuries, incidents, and close calls. Follow communication protocol in the Emergency Response Plan.
- Attend mandatory monthly organization-wide construction huddle meetings and follow-up with the Director of Construction regarding any missed trainings.
- Attend First Aid, CPR, and OSHA 10-hour trainings and maintain current certifications.

Volunteer Coordinator Responsibility

Volunteer Coordinator safety responsibilities may include (but are not limited to):

- Train volunteers and job trainees in GRID Alternatives safety policies and practices at volunteer orientations.

Employee Responsibility

All employees shall receive basic safety training during a mandatory volunteer orientation as part of their new staff training. In the event of a special installation, some non-construction GRID Alternatives staff may be present on the job site. When hosting guests, staff should check-in with the Installation Supervisor upon arrival and help guests sign waivers and distribute hard hats. It is the responsibility of these employees to respect and implement the same level of safety as GRID Alternatives construction staff and volunteers.

Volunteer Responsibility

Volunteers are provided with basic safety training during the volunteer orientation and are required to understand and implement all items addressed in the safety talk read at every installation. All volunteers are obligated to read and sign the “Volunteer Agreement, Assumption of Risk and Release from Liability” form when performing work with GRID Alternatives. This form is part of the sign-in process for all volunteers as communicated by the Installation Supervisor. Volunteers are required to follow any and all safety instructions given by the Installation Supervisor. As on any construction site, workers are responsible for the safety and well-being of themselves at all times and the best way to do this is by adhering to GRID Alternatives safety practices, speaking up if potential hazards are identified, and making the Installation Supervisor aware of any health conditions.

Accident Prevention

Standard Prevention Procedures & Identifying Job Site Hazards

The best way to minimize accidents on the job site is for the Installation Supervisor to plan ahead by envisioning potential safety hazards and determine a means to prevent them from happening. It is part of GRID Alternatives' best practices in accident prevention to encourage all construction staff to never work alone while on the job site. By following the steps listed below and communicating this process to volunteer crews, all workers involved on installations can enhance their own safety awareness, reducing the likelihood of accidents from occurring:

1) *Evaluate and Identify the Hazards*

The initial evaluation and identification of hazards must be performed during the site visit. If any items exist that could potentially pose a threat to the safety and security of the worker crew, these hazards should be documented on the Job Hazard Analysis Checklist. Not all hazards may be evident during the time of the site visit. It is the responsibility of the Installation Supervisor to be aware of any further hazards recognized during the time of installation as well as inform Team Leaders and volunteer workers that they must report any identified hazards to the Installation Supervisor. The Job Hazard Analysis Checklist must be used to create the Site Safety Plan.

THE JOB HAZARD ANALYSIS CHECKLIST CAN BE USED TO IDENTIFY POTENTIAL HAZARDS AT THE SITE VISIT AND CREATE A SITE-SPECIFIC SAFETY PLAN.

2) *Eliminate or Remove the Hazards*

Once a safety hazard has been identified, it is the responsibility of the Installation Supervisor to evaluate if the hazard can safely be removed or

A PRINTABLE COPY OF THE JOB HAZARD ANALYSIS CHECKLIST CAN BE FOUND IN APPENDIX B.

eliminated. If possible, the Installation Supervisor should remove or eliminate the imposed safety threat before the volunteer work crew arrives and the installation begins. If a safety hazard is recognized during the time of installation, it is at the Installation Supervisor's discretion to see that the hazard is removed either by him/herself or an authorized Team Leader or volunteer worker.

3) *Control the Hazards that Can't be Eliminated*

In the event that a safety hazard is present but cannot be eliminated from the site, it is the responsibility of the Installation Supervisor to develop and implement a plan for controlling or avoiding the hazard. This plan must be clearly communicated to all Team Leaders,

A SAMPLE SITE SAFETY PLAN CAN BE FOUND IN APPENDIX D.

volunteer workers, and staff that are present on the job site. If a safety hazard that cannot be eliminated has been identified during the initial site visit, this item must be addressed in the Installation Supervisor's Site Safety Plan.

4) *Recover from the Accident*

All installations are required to have the Emergency Response Plan on-site. This plan includes a general outline of what to do in the case of an emergency, communication protocol, and how to respond to safety hazards.

WHAT DOES A SITE SAFETY PLAN LOOK LIKE?

FALL PROTECTION PLAN MARKED UP ON A COPY OF SITE PLANS INCLUDING FALL PROTECTION EQUIPMENT TYPES AND QUANTITIES AND ANY ADDITIONAL JOB HAZARDS AND RESPECTIVE HAZARD CONTROLS.

Emergency Response Plan

Standard Emergency Procedures

The Installation Supervisor is required to provide the Emergency Response Plan along with hospital directions on-site for each installation. At the beginning of every installation, it is the responsibility of the Installation Supervisor to communicate to the volunteer workers the basic items stated in the Emergency Response Plan. Volunteer

workers should have a general understanding of how to react and what resources are available in the event of an accident. In the event that the Installation Supervisor is incapacitated, an

VOLUNTEERS MUST KNOW WHERE TO FIND THE EMERGENCY RESPONSE PLAN ON SITE.

A PRINTED COPY OF THE EMERGENCY RESPONSE PLAN INCLUDING HOSPITAL DIRECTIONS IS REQUIRED ON EVERY SITE.

A PRINTABLE COPY OF THE EMERGENCY RESPONSE PLAN CAN BE FOUND IN APPENDIX C.

already predetermined trained individual, either a Team Leader or staff member, shall take on the responsibility of implementing the Emergency Response Plan. Please see

Appendix C for a printable version of the Emergency Response Plan. The following is a general outline of required steps to be taken in the event of an accident during an installation:

1) *Provide Proper Medical Treatment*

When an accident has occurred on the site, it is critical to stop all work and first ensure the safety of those individuals involved in the incident. Depending on the severity of the accident, the Installation Supervisor must act accordingly by treating the injured individuals with first aid, arranging the transport of the individuals to an appropriate medical facility, or contacting 911 immediately.

2) *Correct the Safety Hazard*

As soon as it is practical to do so, the Installation Supervisor must work to remove or eliminate any remaining safety hazards involved in the accident scene. Caution must be exercised while dealing with any continuing safety threats. If the site is evaluated to be unsafe, all individuals must evacuate the job site and a qualified technician must be contacted to clear the area of the identified safety hazard.

3) *Notify the Essential Organization Personnel & Emergency Contacts*

IN THE EVENT THAT THE INSTALLATION SUPERVISOR IS INCAPACITATED, AN ALREADY PREDETERMINED TRAINED INDIVIDUAL, EITHER A TEAM LEADER OR STAFF MEMBER, TAKES ON THE RESPONSIBILITY OF IMPLEMENTING THE EMERGENCY RESPONSE PLAN.

For any incident involving more than basic first aid, call down the phone list until someone is reached and notify them to contact the others on the list:

- i) Regional/Executive Director
- ii) Human Resources
- iii) Founders
- iv) Depending on the level of severity of the accident, the emergency contact of the injured individuals should also be contacted with the location of the hospital, etc.

4) Preserve the Accident Scene for Investigation

It is the responsibility of the Installation Supervisor to document the scene of the accident and the implicated safety hazards to the best of his/her ability once the emergency has passed. Proper documentation protocol includes photos, video, and volunteer worker testimony.

5) Submit Appropriate Accident Report Forms to Human Resources Immediately

As stated under "Accident and Injury Reporting," Supervisors must document all accidents by means of the "OSHA Form 301 Injury and Illness Incident Report" and the "Witness Report Form." These forms must be promptly filled out and submitted to the Regional/Executive Director, Katie Kerr, and Tim Sears within 5 calendar days.

Special Site Conditions

Depending on the location of the site, some installation crews may be subject to additional safety hazards including natural disasters, severe weather, and internal community threats. The following addresses several specific emergency scenarios and what measures can be taken to effectively respond to the given situation.

Damp or Wet Site

No volunteers on the roof when it is raining. Installation Supervisors and authorized Team Leaders may stay on the roof to close junction boxes and make the roof weather-tight. Extra caution should be used on damp or wet roofs as well as ladders and wet areas around electrical equipment.

Thunder and Lightning

No one shall work outside if thunder or lightning are observed. No outside work until 30 minutes has passed since last observed thunder or lightning.

Natural Disasters (Fire, Earthquake, Severe Storm, Wind, etc.)

In the event of a natural disaster, the following steps can be taken to effectively respond to the episode:

1) Stop Work Immediately

Any volunteers and staff working on the roof should immediately return to the ground and gather in a safe place away from any structures and power lines. All instruction dispensed by the Installation Supervisor must be followed.

2) Follow Instructions as Outlined in the Standard Emergency Response Plan

Every work site is required to have a written Emergency Response Plan detailing how to respond in the case of an emergency. As with any accident, implement the response protocol as relevant to the situation.

3) Evaluate the Safety and Security of the Site

Based on the level of severity of the event, the Installation Supervisor will decide to either cancel the installation or continue working if the site is deemed safe.

Extreme Heat

Sunburn and dehydration represent our most common and immediate risks. GRID Alternatives provides resources and suggestions that encourage workers to protect themselves from the potential effects of extreme heat. Workers are advised to wear light-colored clothing that is loose fitting, protect their skin from the sun through the application of sunscreen, drink plenty

of water before and throughout the installation process, as well as take breaks frequently to prevent exhaustion. It is the responsibility of the Installation Supervisor to ensure that ample water is provided on every installation. Installation Supervisors cannot rely on the homeowner to provide ample water for volunteers. Additionally, Installation Supervisors are responsible for seeing that a shading device (pop-up canopy) is available and definitely erected if there is not sufficient shading provided on site.

IT IS THE RESPONSIBILITY OF THE INSTALLATION SUPERVISOR TO ENSURE THAT AMPLE WATER IS PROVIDED ON EVERY INSTALLATION. INSTALLATION SUPERVISORS CANNOT RELY ON THE HOMEOWNER TO PROVIDE WATER FOR VOLUNTEERS.

For moderate activity, at least one pint (two 8-oz cups) of water per hour is needed to maintain good hydration. For heavy exertion in hot weather, a minimum of one quart (four 8-oz cups) per hour is recommended. Avoid substituting water with soft drinks, coffee, or other drinks containing caffeine or sugar.

Heat cramps, heat exhaustion, and heat stroke are conditions caused by exposure to heat and the loss of fluids and electrolytes. Symptoms of heat exhaustion include clammy, pale skin, headache, dizziness, nausea, and fatigue. In the event that a worker has become exposed to heat exhaustion, the following steps must be taken to respond to the affected individual:

- 1) *Evaluate if Immediate Medical Attention is Required*
If the affected individual is unconscious, disoriented, has high body temperature, or is experiencing difficulty breathing, call 911 immediately.
- 2) *Lower Body Temperature*
The affected individual should be placed in a cool, shaded environment immediately. Apply cool water to the individual.
- 3) *Rehydrate*
Provide the individual with hydrating fluids.
- 4) *Rest*
The affected individual should refrain from working for the remainder of the installation. Provide the individual with over the counter pain reliever if experiencing a mild headache.
- 5) *Connect with Emergency Contact if Symptoms Persist*
If symptoms get worse or last for over an hour, call the affected individual's emergency contact and advise that the individual see a health care provider.

Threat of Violence

Due to the nature of GRID Alternatives' work, installation crews have the potential of being witness to internal community violence. In the event of an act of neighborhood violence, the following steps can be taken to respond to the situation:

1) *Remain Calm*

It is the responsibility of the Installation Supervisor to remain calm and composed in the event of a violent threat. The Installation Supervisor should advise the worker crew on an appropriate line of action in a manner that encourages a quick response without creating panic.

2) *Stop Work Immediately*

The Installation Supervisor should instruct all workers to stop work even if the installation is incomplete. In the event of a violent threat, worker crew safety must be prioritized over job completion.

3) *Get to a Safe Place Isolated from the Violence*

The Installation Supervisor must direct all worker crew members into a safe and secure location. Roof crew should immediately descend from the roof. In the event of gun violence, ground crew members should immediately fall to the ground to avoid potential contact with harmful elements.

4) *Evaluate the Severity of the Situation*

The Installation Supervisor should exercise his/her best judgment in determining on what level the event could potentially impact the worker crew. Stay aware and alert of the surrounding environment. If the area becomes a crime scene, work must be stopped for the remainder of the day.

5) *Contact Law Enforcement Officials*

If not already contacted, GRID Alternatives strongly encourages the Installation Supervisor to call law enforcement officials to report the incident. If the Installation Supervisor chooses to contact law enforcement officials, it is important for him/her to do so in a private space to prevent community members from identifying who reported the incident, keeping the reporter's identity anonymous.

Accident and Injury Reporting

Importance of Reporting All Incidents

As compliant with OSHA safety standards, GRID Alternatives requires that all major accidents and injuries be documented utilizing the appropriate forms identified below.² Additionally, accidents that are resolved on site with basic first aid as well as close calls and near misses should be reported. By reporting workplace injuries, GRID Alternatives can identify how certain risks arise and how they can be prevented in the future. In effect, reporting workplace injuries makes GRID Alternatives a safer place to work.

RECOGNIZING AND REPORTING NEAR MISS INCIDENTS CAN SIGNIFICANTLY IMPROVE WORKER SAFETY AND ENHANCE GRID ALTERNATIVES SAFETY CULTURE.

Standard Reporting Procedures

For any major injuries, the Installation Supervisor must use the following two forms to document the incident:

1) *“OSHA Form 301 Injury and Illness Incident Report”*

This *replaces* the previous Incident Report Form. Note "volunteer" where the form states "employee" if applicable.

2) *“Witness Report Form”*

This form can also be used to document property damage.

These forms can be found in the following location on the server:

"O:\OSHA & Safety\Incident Report Forms - Shortcut.Ink"

GRID Alternatives safety policy requires that hard copies of these forms be available on site so as to promptly document any accident or injury. All non-fatal accidents or injuries must be documented and reported within 5 calendar days of the event to the Regional/Executive Director, Katie Kerr, and Tim Sears.

As per OSHA requirements, any accidents resulting in the death of a worker must be reported to OSHA within 8 hours of the event.³

ALL NON-FATAL ACCIDENTS OR INJURIES MUST BE DOCUMENTED AND REPORTED WITHIN 5 CALENDAR DAYS OF THE EVENT.

² 29 CFR 1904.7 (a)

³ 29 CFR 1904.39 (a)

Open Door Safety Policy

Whenever a GRID Alternatives employee becomes aware of a hazard that may put the safety of a client, employee, or volunteer at risk, he or she should immediately and directly notify their Regional/Executive Director, and if that person is unavailable, immediately notify the GRID Alternatives Chief Operations Officer or Chief Executive Officer. Notification of such a hazard should be made immediately regardless of time of day or whether the situation presents itself on a weekend or holiday. Regardless of the immediacy of their nature or resolution, all such incidents should ultimately be reported to the Chief Operations Officer or Chief Executive Officer. GRID Alternatives encourages reporting under this policy and will not retaliate against an employee who in good faith, has made a notification based on a reasonable belief of the existence of a risk or potential risk concerning the health, safety, or welfare of clients, employees, volunteers, partners, or other affected persons.

Personal Protective Equipment (PPE)

GRID Alternatives Policy on PPE

In order to reduce employee and volunteer exposure to hazards, GRID Alternatives requires the use of PPE on every job site. Required PPE, as determined by GRID Alternatives, will be paid for

REQUIRED PPE ON SITE INCLUDES, BUT IS NOT LIMITED TO, HARD HATS, SAFETY GLASSES, GLOVES, AND EAR PROTECTION.

REGULAR INSPECTIONS AND CLEANING OF ALL PPE MUST BE DONE BY THE CONSTRUCTION TEAM.

IT IS THE RESPONSIBILITY OF THE CONSTRUCTION MANAGER OR DESIGNATED CONSTRUCTION STAFF AT EVERY OFFICE TO ENSURE AMPLE AND APPROPRIATE PPE IS AVAILABLE ON EVERY INSTALLATION.

and provided by the employer. As per OSHA requirements, all equipment must be maintained in a sanitary and reliable condition.⁴ Based on a comprehensive evaluation of site hazards, GRID Alternatives has determined the essential PPE to be worn on residential solar installation jobs. This PPE includes, but is not limited to, **hard hats, safety glasses, gloves, and ear protection.**

Correctly sized protective equipment must be provided to accommodate all staff and volunteers on the job site. GRID Alternatives must provide training to staff and volunteers required to wear PPE in order to ensure that all workers understand the proper use and

implementation of the protective equipment. Regular inspections and cleaning of the equipment must be performed.

PPE is designed to protect staff and volunteers from possible workplace hazards and must be worn at appropriate times to promote worker safety. It is the responsibility of the Construction Manager or designated construction staff at every office to ensure ample and appropriate PPE is available on every installation.

Routine PPE Inspection

Having a care and maintenance plan for all PPE is critical in ensuring staff and volunteer safety. GRID Alternatives construction staff are responsible for reading and understanding all PPE product literature including the equipment's service life and limitations. Routine PPE inspection must be performed by someone who has been properly trained on PPE inspection by using the PPE Compliance Inspection Form. This form serves as a formal log of GRID Alternatives PPE quality and quantity. During standard PPE inspection, equipment must be cleaned, replenished, and replaced as deemed appropriate in order to ensure that GRID Alternatives staff and

⁴ 29 CFR 1910.132 (a)

volunteers are provided with quality resources to protect themselves from work site safety hazards. In order to consistently provide sanitary PPE, alcohol wipes or other sanitizing resources should be made available on every installation.

First Aid Kit Requirements

GRID Alternatives requires that every job site be equipped with an adequate first aid kit that can be easily accessed by all staff and volunteers. It is the responsibility of the employer to supply each work crew with first aid resources, and the responsibility of the

Installation Supervisor to ensure that a first aid kit is ready and accessible on the day of the installation. Based on OSHA standards, GRID Alternatives' minimum first aid kit requirements include the following for work sites consisting of approximately 12 people⁵:

IN ORDER TO CONSISTENTLY PROVIDE
SANITARY PPE, ALCOHOL WIPES OR OTHER
SANITIZING RESOURCES MUST BE MADE
AVAILABLE ON EVERY INSTALLATION.

- Twelve gauze pads (at least 4 x 4 inches)
- Eight large gauze pads (at least 8 x 10 inches)
- Box adhesive bandages (Band-Aids)
- Four packages gauze roller bandage at least 2 inches wide
- Eight triangular bandages
- Wound cleaning agent such as sealed moistened towels
- Scissors
- At least one blanket
- Tweezers
- Adhesive tape
- Latex gloves
- Resuscitation equipment such as resuscitation bag, airway, or pocket mask
- Eight elastic wraps
- Splint
- Directions for requesting emergency assistance

Hard Hats

In accordance with GRID Alternatives head protection policy, hard hats are required to be worn at all times on the job site. This requirement applies to both ground and roof work crews as well as homeowners, staff, and any on-site guests. Upon arrival at a GRID Alternatives

⁵ 29 CFR 1910.266 App A

installation site, staff and volunteers must put on hard hats immediately. Hard hats are to be worn throughout the entire duration of the installation and are the last items to be put away at

HARD HATS MUST BE WORN AT ALL TIMES THROUGHOUT THE INSTALLATION BY STAFF, VOLUNTEERS, HOMEOWNERS, AND ANY GUESTS ON SITE.

the end of the work day. Appropriate signage must be visible to encourage, promote, and remind work crews and site visitors of GRID Alternatives work site hard hat policy. It is the responsibility of each office to purchase proper hard hat signage. Hard hats must be Class E rated which provide high voltage electrical protection.

Safety Glasses

GRID Alternatives strongly encourages the use of safety glasses at all times on the work site. Ample safety glasses must be provided on every installation work site to accommodate all staff and volunteers. Best practice is to provide all workers with properly rated safety glasses to ensure accessibility and encourage use.

Safety glasses are always required when staff or volunteers are either utilizing, or adjacent to another individual utilizing, power tools such as drills, impact wrenches, and the

band-saw. All workers must use safety glasses that are ANSI Z87.1 rated.⁶ Unless rated to ANSI Z87.1 standards, sunglasses and eyeglasses are not permitted for use as safety glasses. While utilizing power tools, GRID Alternatives staff or volunteers may be exposed to hazardous flying debris that can come into contact with the eyes.

SUNGLASSES AND EYEGLASSES ARE NOT PERMITTED FOR USE AS SAFETY GLASSES UNLESS ANSI Z87.1 RATED.

Gloves

GRID Alternatives requires the use of protective gloves whenever handling flashings or other sharp objects, shingle or other abrasive objects, lumber, and during a wire or rope pull. Best practice is to provide all workers with gloves to ensure accessibility and encourage use. Palm

GLOVES ARE REQUIRED WHENEVER HANDLING SHARP OR ROUGH OBJECTS, LUMBER, AND DURING WIRE AND ROPE PULLS.

coated gloves allow for dexterity and grip while also providing protection.

Ear Protection

GRID Alternatives requires that short term exposure to excessive noise levels be prevented through the use of appropriate ear

⁶ 29 CFR 1910.133 (b) (1)

protection equipment. Single-use earplugs or earmuffs must be ready and available on every job site for workers utilizing noise-intensive power tools, such as the band-saw or sawzall.

Working in Confined Spaces

GRID Alternatives requires the use of the following PPE in order to prevent the potential exposure to harmful elements often found in unfinished attics and crawl spaces: hard hat, safety glasses, gloves, respirator, and coverall. These confined spaces can contain cancer-

HARD HAT, SAFETY GLASSES, GLOVES, RESPIRATOR, AND COVERALL MUST BE WORN WHILE CONDUCTING WORK IN CONFINED SPACES.

causing chemicals such as fiberglass and asbestos as well as infection-inducing elements such as vermin droppings and molds. It is critical that all required PPE be worn while conducting attic and crawl space work in order to protect worker health and safety.

Fire Extinguishers

GRID Alternatives requires that appropriate fire extinguishers be kept available on every job site. Fire extinguishers are rated to combat specific categories of fires. Fire extinguishers with multiple category ratings are common and available for purchase. It is important to purchase and utilize fire extinguishers for their intended purpose:

- Class A extinguishers are for ordinary combustibles such as paper, cardboard, scrap, etc.
- Class B extinguishers are for fires involving flammable or combustible liquids such as gas or kerosene.
- Class C extinguishers are for electrical fires.

Hand and Power Tools

General Requirements

GRID Alternatives is responsible for furnishing hand tools and power-operated hand tools that are in adequate and working condition during each installation. Hazards associated with hand and power tool use can easily be prevented by taking basic safety precautions. Tools should regularly be maintained and always kept in good condition. During installations, it is ultimately the responsibility of the Installation Supervisor to oversee the proper use of hand and power tools. Similarly, Team Leaders should be properly trained on tool use and possess the expertise to oversee and guide volunteers in appropriate tool use.

Hand Tools

Non-powered hand tools can potentially pose safety hazards if not used for their intended purpose or not properly maintained. The following OSHA regulations on proper hand tool use can be applied to tools specific to GRID Alternatives solar installations⁷:

- Tools with wooden handles exhibiting splinters, cracks, or loose joints are strictly prohibited as they have the potential to break down during use causing splinters, cuts, or the head of the handle to detach and strike a worker.
- Wrenches possessing weakened or sprung jaws are considered defective and must not be used as the tool can easily slip during use causing injuries ranging from minor scrapes and cuts to serious falls.
- In general, the use of tools in a manner which they are not intended for is prohibited since this can cause the tool to break or otherwise perform in a way that can adversely affect the safety of workers.
- Tools that are not in adequate condition must be removed, eliminated, or restored as they can potentially cause harm to workers. For example, dull tools or blades must be reconditioned, sharpened, or replaced immediately.

Power-operated Hand Tools

GRID Alternatives requires that extreme caution be exercised during both the training of power tool use and the general use of power tools on every job site. Installation

Supervisors and Team Leaders must always stay aware of volunteer power tool use as every volunteer may have a different level of experience in using the respective tool. The following

WHEN USING POWER TOOLS, BEST PRACTICE IS TO ALWAYS OPERATE TOOL USING TWO HANDS.

⁷ 29 CFR 1926.301

are general OSHA recommendations on how to safely operate and control the use of power tools on the job site⁸:

- Volunteers observing the use of any power tool must keep themselves at a safe distance from the work area and/or wear safety glasses.
- Any materials being cut by the band-saw should be secured with clamps or a vise, or be otherwise properly supported, in order to safely operate the tool with two hands and avoid inadvertently damaging the tool during use.
- The high torque created by power drills can injure wrists when tightening screws if handling the drill with one hand.
Adjust the torque settings on the drill so that it “breaks” before twisting.
- Appropriate clothing must be worn, hair must be tied back, and all jewelry must be removed in order to prevent loose articles from catching in the power tool.
- Use well charged batteries for any cordless tools. Tools can be dangerous when operated on low batteries since they tend to catch on hardware; this is especially true with a cordless reciprocating saw when cutting conduit.
- Power tools must always be disconnected either by means of unplugging from the main electrical source or by battery removal before servicing. The power source of the tool must be removed in order to safely change out any blades.
- Tools being powered directly by an electrical source must use a ground fault circuit interrupter.
- Tools should not be powered unless being used for the intended job.
- Power tool cords should never be abused in any way such as carrying the tool by the cord, yanking the plugged-in cord from an outlet, or manipulating the cord in any other way that may compromise its integrity.
- Any power tools or extension cords that are damaged or defective must be removed from the work site and tagged “Do not use.”

TOOLS BEING POWERED DIRECTLY BY AN ELECTRICAL SOURCE MUST USE A GROUND FAULT CIRCUIT INTERRUPTER.

⁸ U.S. Department of Labor, OSHA Office of Training and Education, “Hand & Power Tools”

Site Tool Management

All tools should be handled with care in a safe and secure manner on the job site. The following are best practices that should be implemented on the job site in regards to tool management:

TRANSPORT TOOLS TO THE ROOF BY MEANS OF A ROPED BUCKET OR THREE PERSON HAND-OFF.

- Transport tools to the roof by means of roped tool buckets or bags to allow workers to climb ladders without tools in their hand, to prevent worker injuries, and to help preserve tools in good condition. Alternatively for single-story installations, implement a hand-off system of 3 workers-one roof, one ladder, one ground-to safely transport tools up and down the ladder.
- Tool bags and buckets should always be secured to prevent tools from spilling out.

Fall Protection

Overview

GRID Alternatives is dedicated to implementing safe practices to prevent falls during the installation process. GRID Alternatives staff must be properly trained on recognizing the potential hazards of working on residential roofs with volunteers in order to avoid falls on the job. GRID Alternatives staff must also be trained in the proper use of fall protection systems and equipment. Staff must be advised that different fall protection regulations and standards apply as contingent on the purpose of site work: site survey, installation, inspection, and maintenance. These regulations and requirements are stated within and must be followed in accordance with GRID Alternatives safety policy on fall protection.

General Site Survey and Inspection Policy

As per OSHA fall protection standards, no fall protection is required during the initial pre-contract site survey visit when GRID Alternatives staff evaluates the site. Similarly, fall protection is not required during the inspection of the system. Any evaluations or inspections undergone on the site prior to the installation or after the installation is complete do not require fall protection systems to be in place.⁹ However, GRID Alternatives mandates that extreme caution be exercised while staff conduct themselves at any height, although fall protection systems may not be required. Best practice is to inspect the roof structure from the attic first to verify support and identify any rot or termite damage. Do not get on any roofs that are suspected to not be structurally sound or safe.

BEST PRACTICE IS TO INSPECT THE ROOF STRUCTURE FROM THE ATTIC FIRST TO VERIFY SUPPORT AND IDENTIFY ANY ROT OR TERMITE DAMAGE. DO NOT GET ON ANY ROOFS THAT ARE SUSPECTED TO NOT BE STRUCTURALLY SOUND OR SAFE.

If the Site Supervisor does not feel safe or comfortable working on a roof with extreme pitch (greater than 6:12) without fall protection, do not do so! Measurements and photos can be taken from the ladder or ground.

Steep Roofs

The following equipment can be utilized to help prevent falls when conducting site visits without fall protection or to install or remove fall protection on steep roofs:

Chicken Ladder System

Chicken ladders hook to the peak of the roof and aid in climbing steep roofs. Chicken ladders

⁹ 29 CFR 1926.500 (a) (1)

serve as a means to increase a worker's safety while installing or removing fall protection but are never a means for an effective fall protection plan. Never use chicken ladders as an anchorage point as the equipment is not designed or rated to serve this purpose. For further resources on chicken ladder purchasing, please refer to the following:

Acro Building Systems Chicken Ladder #11601 and #11610

100% Fall Protection Policy

For installation, clean-up work, maintenance, and troubleshooting, GRID Alternatives enforces a **100% fall protection policy**. In accordance with OSHA fall protection safety standards, GRID

GRID ENFORCES A 100% FALL PROTECTION POLICY FOR INSTALLATION, CLEAN-UP WORK, MAINTENANCE, AND TROUBLESHOOTING.

Alternatives requires that fall protection systems be implemented when any work is being conducted at or above 6 feet, or if staff and volunteers are in danger of falling into hazardous equipment.^{10 11} Upon arrival at the site, the Installation Supervisor is responsible for installing

the appropriate fall protection system. In the best interests of volunteer safety, no volunteers are allowed on the roof top until a proper fall protection system is installed and secured by the Installation Supervisor or an authorized Team Leader.

Equipment Inspection Protocol

Checking and maintaining all fall protection-related equipment and devices is critical in preserving staff and volunteer safety. Using the equipment product's literature as a reference guide, staff must routinely monitor the integrity of fall protection devices. Best practice to ensure regular equipment inspection is for the Site Supervisor to integrate the inspection into morning installation protocol by engaging volunteers in the process. Regular inspections of the equipment must be performed by construction staff.

The following are general equipment control points for fall protection utilized on GRID Alternatives installations:

NO VOLUNTEERS ARE ALLOWED ON THE ROOF TOP UNTIL A PROPER FALL PROTECTION SYSTEM IS INSTALLED AND SECURED BY THE INSTALLATION SUPERVISOR OR AN AUTHORIZED TEAM LEADER.

¹⁰ 29 CFR 1926.501 (b) (1)

¹¹ 29 CFR 1926.501 (b) (8) (i)

Body Harnesses

Webbing, D-rings, buckles, and grommets must all be inspected upon use during every installation. Key items to look for include damage to the fiber and metal components of the harness. Any harness with unusual and excessive wear and tear must be replaced by a harness of fair quality.

Lanyards

The primary items to examine for all types of lanyards include the metal snap hook and thimble. Carefully check all metal for any cracks, corrosion, or other damage. The latch on the snap hook must fit into place, firmly closing and locking into place. Check that the thimble and splice are secured together and no excessive wear and tear is present on the splice. All lanyard webbing and fiber must be thoroughly examined for deterioration.



BEST PRACTICE TO ENSURE REGULAR FALL PROTECTION EQUIPMENT INSPECTION IS FOR THE SITE SUPERVISOR TO INTEGRATE THE INSPECTION INTO MORNING INSTALLATION PROTOCOL BY ENGAGING VOLUNTEERS IN THE PROCESS.

Self-Retracting Lifelines

Several components must be checked when examining self-retracting lifeline devices including the frame, retraction, braking, and snap hook. The frame of the device must be intact, free of cracks and damage. The device's retraction and braking mechanisms must be in working order and all webbing must be in a state that does not affect the integrity of the retraction and braking mechanisms.

All equipment should be properly maintained and stored in clean, dry space. Please refer to fall protection product literature for specific equipment control instructions.

Roof Types and Fall Protection Requirements

GRID Alternatives installation staff must be prepared to implement proper fall protection systems based on the roof type present on the site. Roof structure, pitch, and other job site factors can affect the type of fall protection required to ensure staff and volunteer safety. The following are different roof categories with respective fall protection requirements listed within:

Flat Roofs

As per OSHA standards regarding walking-working surfaces, GRID Alternatives requires that staff and volunteers working on any open-sided surface six feet above ground must be protected by means of guardrails OR a personal fall arrest system.¹²

¹² 29 CFR 1926.501 (a) (1)

Flat Roofs with Parapets

In accordance with OSHA fall protection standards, when GRID Alternatives staff and volunteers are working on flat roofs that include a low protective wall that is less than 39 inches in height, a guardrail system must be installed or a personal fall arrest device must be utilized.¹³

Low-Slope and Steep Slope Roofs

While working on any sloped roof, GRID Alternatives requires the use of guardrail systems with toe boards or personal fall arrest systems.¹⁴

FLAT ROOFS WITH PARAPET WALLS LESS THAN 39 INCHES IN HEIGHT MUST IMPLEMENT A FALL PROTECTION SYSTEM.

Personal Fall Arrest Systems

In order to ensure staff and volunteer safety, GRID Alternatives requires the use of personal fall arrest systems for all roof top workers during the installation process unless otherwise protected by an alternative fall protection system. GRID Alternatives utilizes the following personal fall arrest system components: body harnesses, lanyards, self-retracting lifelines, anchors, and connectors. Each component works together to satisfy OSHA personal fall arrest system requirements. As per OSHA requirements, personal fall arrest systems must achieve the following:

WHEN IMPLEMENTING A PERSONAL FALL ARREST SYSTEM, WORKERS MUST BE HOOKED INTO A LIFELINE WHEN TRANSITIONING ON AND OFF THE ROOF AT THE TOP OF THE LADDER.

- (1) Completely halt the fall of the worker.
- (2) Not allow a worker to free fall for more than 6 feet.
- (3) Be capable of arresting a force up to 1,800 pounds.
- (4) Not allow the deceleration distance of the fall to exceed 3 1/2 feet.

(5) Possess the structural integrity to support a worker falling 6 feet.¹⁵

When implementing a personal fall arrest system on site, GRID Alternatives requires that workers be anchored and secured to a lifeline before getting off the ladder. Best practice for implementing this requirement includes installing an anchor and self-retracting lifeline near the top of the ladder. The most vulnerable position for a volunteer to fall is during the ladder/roof transition. By installing and implementing a personal fall arrest device near the top of the

¹³ 29 CFR 1926.502(b)(1)

¹⁴ 29 CFR 1926.501 (b) (10) (11)

¹⁵ 29 CFR 1926.502 (d)

ladder, this adds a heightened sense of security for volunteer workers as well as secures the individual in the case of a fall when mounting or descending from the roof.

Body Harnesses

Body harnesses are designed to work in conjunction with lanyards, self-retracting lifelines, anchors, and connectors to arrest workers in the event of a fall. When properly implemented, body harnesses will secure the worker during a fall, distributing the force of the fall through the thighs, pelvis, waist, chest, and shoulders. In order to safely and effectively utilize the body harness, GRID Alternatives construction staff are required to read and understand their respective harness instruction manual as well as guide volunteers on proper use of the body harness. Appropriate harness sizing and fit is critical to the proper implementation of a personal fall arrest system. GRID Alternatives construction staff are responsible for seeing that a wide range of harness sizes are always available on installations and checking that volunteers are fitted for a suitable harness. The harness should fit snugly so that it is not displaced when under tension and can properly support the body in the event of a fall. A loose harness may not work as intended. Best practice is for the Installation Supervisor to possess a personal body harness that is comfortable when custom fitted.

Lanyards

On GRID Alternatives installations, lanyards serve as a flexible line of rope that connect a worker between the body harness and an anchorage point. The stretch in a lanyard works to absorb the shock of a sudden stop in the event of a fall. OSHA requires that lanyards have a minimum breaking strength of 5,000 pounds and be kept clear from items that could cut or otherwise affect the rope's webbing.¹⁶ To ensure proper use of lanyards, GRID Alternatives construction staff are required to read and understand the lanyard's instruction manual and enforce the lanyard's proper use on all installations.

GRID ALTERNATIVES CONSTRUCTION STAFF ARE RESPONSIBLE FOR SEEING THAT A WIDE RANGE OF HARNESS SIZES ARE ALWAYS AVAILABLE ON INSTALLATIONS AND CHECKING THAT VOLUNTEERS ARE FITTED FOR A SUITABLE HARNESS.

Shock-absorbing Lanyards

Shock-absorbing lanyards specifically serve as a means to reduce the impact of a fall by extending no more than 3 ½ feet to absorb the arrest force as per OSHA personal fall arrest system requirements.¹⁷ OSHA specifications require that the arrest force be limited to 1,800

pounds but shock-absorbing lanyards can limit the arrest force to as little as 900 pounds.¹⁸ The

¹⁶ 29 CFR 1926.502 (d) (9)

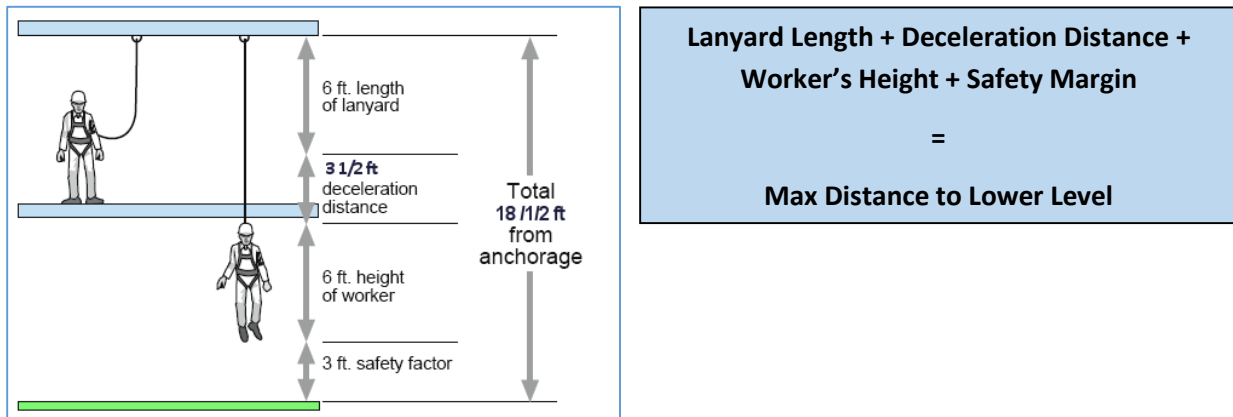
¹⁷ 29 CFR 1926.(d) (16) (iv)

¹⁸ 29 CFR 1926.502 (d) (16) (ii)

total distance of a possible fall must always be evaluated when implementing shock-absorbing lanyards on site. This estimate can be calculated by evaluating the following:

Example: Determining Total Fall Distance with a Shock-absorbing Lanyard

EXAMPLE TOTAL FALL DISTANCE



Self-Retracting Lifelines

Self-retracting lifelines (also known as yo-yo's) are cased deceleration devices that are secured between an anchorage point and a worker's body harness. The cased device contains a cord that extends and retracts to simultaneously allow for a free range of motion while working but also locks in place if under tension to keep workers secured as well as arrest a fall. Like lanyards, self-retracting lifelines must have a minimum breaking strength of 5,000 pounds.¹⁹ During installations, construction staff and volunteers must exercise caution to avoid crossing lines as this presents a safety hazard.

Standard metal cable used in some retractable lifelines can damage PV module frames and may increase shock hazard. However, synthetic webbing used in other retractable lifelines may not be durable enough for use on abrasive asphalt-shingle roofs or against racking and module edges. Custom retractable lifelines can be ordered with a protective coating over the metal cable which provides a nonconductive layer.

¹⁹ 29 CFR 1915.159 (b) (4)

Anchors

GRID Alternatives uses multiple anchor types throughout our offices to secure lanyards and self-retracting lifelines. In securing anchors to the roof it is critical that the fasteners pass through the initial layers of roofing material and into the actual support structure. Upon each installation, new fasteners should be utilized to secure down the anchors. If anchors are modified or not installed correctly, rendering the anchor ineffective, this may compromise the safety and security of the worker utilizing the anchor in the event of a fall. OSHA requires that the anchor's attachment point possess the structural capacity to support 5,000 pounds.²⁰ One

ONE ANCHOR MUST BE INSTALLED FOR EACH ANTICIPATED ROOF WORKER INCLUDING THE INSTALLATION SUPERVISOR AND TEAM LEADER SO THAT THERE IS ONLY ONE WORKER TO AN ANCHOR POINT AT A TIME.

anchor must be installed for each anticipated roof worker including the Installation Supervisor and Team Leader so that there is only one worker to an anchor point at a time. The following highlights some anchor types seen in the field and their respective specifications:

Miller RA 35-1 Roof Anchors (Recommended)

Miller RA 35-1 roof anchors are strictly designed for use by only one person and rated for a maximum capacity of 310 pounds. Anchors must be secured to the identified roof member (rafter or truss) by means of three 1/4" x 2-1/2" lag screws or six 16d nails as per the manufacturer's instructions.²¹

Permanent Anchors

Permanent anchors are a good choice particularly for new construction where they can be properly flashed and waterproofed. These anchors remain in place ready for use on future site visits.

Connectors

Connectors are the critical attachment points between different personal fall arrest system components. GRID Alternatives uses connectors that are already integrated into fall arrest system devices such as D-rings in harnesses, snap-hooks spliced or sewn into lanyards or self-retracting lifelines, and O-rings on anchors. As per OSHA requirements, both D-rings and snap-hooks must have a minimum tensile strength of 5,000 pounds.²² All snap-hooks must be designed to lock into place in order to prevent disconnection from the system. Unless designed for such use, snap-hooks must never be connected:

²⁰ 29 CFR 1915.159 (a) (9)

²¹ "Miller by Honeywell: Temporary Roof Anchors & Roofing Fall Protection System Kits: User Instruction Manual"

²² 29 CFR 1915.159(a)(3)

- (1) Directly to webbing, rope, or wire.
- (2) To each other.
- (3) To a D-ring to which another snap-hook or connector is attached.
- (4) To a horizontal lifeline.
- (5) To any object which is incompatibly shaped in relation to the snap-hook such that the connected object could depress the snap-hook keeper and release itself.²³

Guardrail Systems

Depending on the job site evaluation, guardrail systems may be used in lieu of a personal fall arrest system. Guardrail systems are passive systems that once installed, do not require much worker awareness or participation. They allow for freer range of movement and minimal roof surface penetrations. General OSHA guardrail requirements and guidelines enforced by GRID Alternatives include the following unless otherwise specified by the manufacturer²⁴:

- Guardrails must be installed on all fall edges where people will be working.
- The top of the guardrail must be between 39 and 45 inches above the surface of the edge of the roof.
- A mid rail must be installed in between the edge of the roof and the top of the guardrail at a height of no less than 21 inches.
- All supporting rail posts should be at intervals not exceeding 8 feet.²⁵
- Gaps between guardrail end posts must not exceed 19 inches.
- When toe boards are required, they must possess a minimum height of 4 inches and securely attach to the implicated platform.²⁶
- The guardrail must possess the structural integrity to support 200 pounds of force without deflecting the rails in place.
- The mid rail must possess the structural integrity to support 150 pounds of force.
- Guardrail systems must structurally be free of any potential safety hazards.

Based on the type of overhanging roof structure, an appropriate guardrail system must be installed in order to ensure staff and volunteer safety as well as minimize the amount of wear and tear the installation process imposes on the client's home. The following is a list of guardrail product recommendations based on the type of overhanging roof structures or eaves:

²³ 29 CFR 1926.502 (d) (1)

²⁴ 29 CFR 1926.501 (b) (1)

²⁵ 29 CFR 1926 Subpart M Appendix B

²⁶ 29 CFR 1910.23 (e) (4)

Eaves with Gutters: HUGS Model

Product

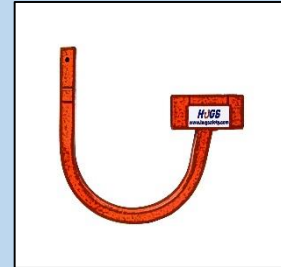
HUGS One LLC:

Mini HUG: Product #HB1002

Detachable Stanchion: Product #ST42

Hawaii Bracket 2 x 4: Product #H24

Stanchion Clip: Product #ST42 Clip



Eaves without Gutters: HUGS Model

Product

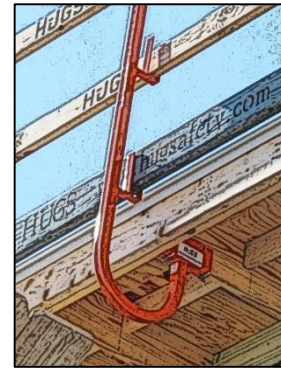
HUGS One LLC:

HUG: Product # HB1001

Detachable Stanchion: Product #ST42

Hawaii Bracket 2 x 4: Product #H24

Stanchion Clip: Product #ST42 Clip

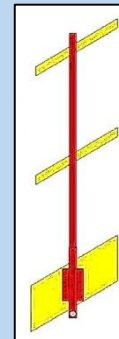
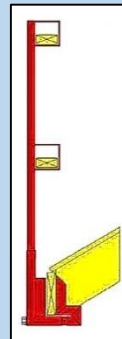


Eaves without Gutters and with Fascia, Gable Ends/Rakes with Fascia: Red HUGS "RUGS"

Product

Fall Protection Guardrail Systems LLC:

Roof C-Clamp: Product #RCC120



Eaves with Covered Soffits or Gable Ends/Rakes without Fascia and Minimal Overhang:
Ground or Surface Mounted Rails

Product

HUGS One LLC:

Ground HUG Kit: Product #GH1002

Ground HUG kit is conducive to heights from 2'4" to 12'4":

- (2) 72" Extensions: Product # E72
- (1) 42" Detachable Stanchion: Product #ST42
- (1) Wall Arm Bracket: Product #WAB1001
- (1) Ground Mounted Bracket: Product #GMB1001

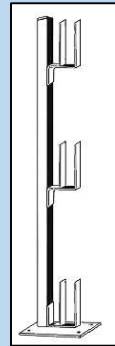
Edge Bracket: Product #EMB1001



Product

HUGS One LLC:

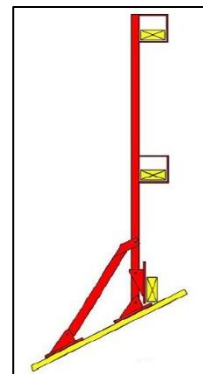
Stanchion HUG: Product #SH1001



Product

Fall Protection Guardrail Systems LLC:

Basic Rail System: Product #BR100



Scaffolding

GRID Alternatives permits the use of scaffolding as an acceptable means for a fall protection system assuming that the scaffolds are properly erected with appropriate guardrails in place. The following outlines the appropriate use and erection of scaffolding as an effective fall protection system.

General Requirements

In order to securely construct the scaffolding system, the Installation Supervisor must adhere to the following guidelines:

- Footing or anchorage must be secured in a way that does not compromise the scaffold's structural integrity; no unstable items can be used to support the scaffold. Use adequate sills as a foundation for the scaffold and securely fasten base plates to sill with screws or nails.
- Once an initial scaffold level has been constructed, the system should be plumbed and leveled to enhance structural security.
- The GRID Alternatives Installation Supervisor is responsible for overseeing any erection, moving, or dismantling of the scaffolding system.
- Any scaffolding system erected 10 feet or more above ground is required to have both guardrails **and toe boards** installed on all open sides and ends of the platform.^{27 28}
- Any scaffolding system erected between 4 and 10 feet above ground is required to have guardrails installed on all open sides and ends of the platform except where a ladder may be attached. Additionally, toe boards are required if workers will be passing beneath the open sides.²⁹
- All platforms must be completely secured to prevent displacement; Planks can be cleated, restrained by hooks, or overlapped by 12 inches with the platform extended at least 6 inches over the centerline of the support.³⁰
- An appropriate and secured ladder must be provided to safely access the top of the scaffold.³¹
- For scaffolds with a height to base width ratio of more than four to one (4:1), guys, ties,

USE ADEQUATE SILLS AS A FOUNDATION FOR THE SCAFFOLD AND SECURELY FASTEN BASE PLATES TO SILL WITH SCREWS OR NAILS.

²⁷ 29 CFR 1926.451 (g) (1)

²⁸ 29 CFR 1926.451 (h) (2) (ii)

²⁹ 29 CFR 1910.23 (c) (1)

³⁰ 29 CFR 1926.451 (b) (4)

³¹ 29 CFR 1910.28 (a) (12)

or braces shall be installed according to the scaffold manufacturer’s recommendations or at the closest horizontal member to the 4:1 height and be repeated vertically at locations of horizontal members every 20 feet or less for scaffolds 3 feet wide or less, and every 26 feet or less for scaffolds greater than 3 feet wide. The top guy, tie, or brace shall be placed no further than the 4:1 height from the top. Such guys, ties, and braces shall be installed at each end of the scaffold and at horizontal intervals not to exceed 30 feet.³²

- Defective or damaged scaffolding equipment must be promptly removed and tagged for service or replacement.³³
- All guardrails must be installed in accordance with GRID Alternatives’ guardrail policy adhering to OSHA guardrail requirements as well as the manufacturer’s specifications.
- The vertical distance between the working edge of the roof and the scaffold platform must not compromise the ability for a worker to safely dismount the roof onto the scaffolding system. The use of steps, stools, or other mounting devices are strictly prohibited between the scaffold platform and the working edge of the roof.
- The horizontal distance between the working edge of the roof and the scaffold platform must be kept to a minimum and not compromise the ability for a worker to safely dismount the roof onto the scaffolding system.

THE USE OF STEPS, STOOLS, OR OTHER MOUNTING DEVICES ARE STRICTLY PROHIBITED BETWEEN THE SCAFFOLD PLATFORM AND THE WORKING EDGE OF THE ROOF.

Warning Lines and Safety Monitoring Systems

During a GRID Alternatives installation, the use of warning lines as a fall protection system is only permissible on flat roofs and when used in conjunction with a safety monitoring system.

WARNING LINES MUST BE PLACED AT LEAST 6 FEET AWAY FROM THE EDGE OF THE ROOF IN ORDER TO COMPLY WITH OSHA STANDARDS.

Warning lines must be placed 6 feet away from the edge of the roof in order to comply with OSHA standards and meet the following criteria³⁴:

- Be flagged at every 6 feet with high visibility material.
- Be rigged so that the line is 34 to 39 inches from the walking/working surface.
- Have a minimum tensile strength of 500 pounds. Plastic caution tape supported by

³² 29 CFR 1926.451 (c) (1)

³³ 29 CFR 1910.28 (a) (6)

³⁴ 29 CFR 1926.502 (f)

traffic cones is not an acceptable warning line system.

PLASTIC CAUTION TAPE SUPPORTED BY TRAFFIC CONES IS NOT AN ACCEPTABLE WARNING LINE SYSTEM.

- Be attached to each stanchion so that the tension on one section of the line will not cause an adjacent stanchion to tip over. Stanchions must be able to support a force at least 16 pounds applied horizontally in the direction of the roof edge without tipping over.

A proper safety monitoring system consists of an active, dedicated competent person (a Team

IT IS REQUIRED THAT WARNING LINE SYSTEMS ARE USED IN CONJUNCTION WITH A TEAM LEADER SERVING AS THE OFFICIAL SAFETY MONITOR THROUGHOUT THE DURATION OF THE INSTALLATION.

Leader authorized by the Installation Supervisor trained in recognizing fall hazards) working to prevent fall hazards by careful observation and communication with GRID Alternatives staff and volunteers.³⁵ The safety monitor must be on the same working

plane and shall not have other responsibilities that could distract the monitor's attention from the monitoring function.

Skylights & Holes

When working on roofs with skylights or holes GRID Alternatives requires that Installation Supervisors follow the following protocol in order to ensure worker safety when working around such spaces:

- Skylights and holes must be guarded with a skylight screen meeting OSHA criteria or by erecting a guardrail on all exposed sides of the opening.³⁶
- The OSHA compliant skylight screen must be capable of withstanding a force of 200 pounds applied perpendicularly without deflecting in a capacity that could break a glass below. The screen must consist of a grillwork with openings not exceeding 4 inches long or slat-work with openings not exceeding 2 inches in width with an unrestricted length.³⁷

Working in Attics

In order to reduce the risks of falls while conducting work inside attics, GRID Alternatives requires an initial evaluation of the space to be included as part of the site visit hazard analysis.

³⁵ 29 CFR 1926.502 (h) (1)

³⁶ 29 CFR 1910.23(a)(4)

³⁷ 29 CFR 1910.23(e)(8)

The hazard space must be evaluated for the following:

- 1) Determine if the structural integrity of the truss chords and ceiling joists possess the capacity to support workers safely.
- 2) Identify any further fall hazards such as exposed nails, cables, wires, low-hanging rafters or cross-beams, hot conditions, poor lighting, or truss chords hidden by deep insulation.

If hazards are identified, GRID Alternatives requires that protective measures be taken as compliant with OSHA rules and regulations regarding fall protection and walking-working surfaces.

Fall Protection & Rescue Plan

GRID Alternatives requires that a written Fall Protection and Rescue Plan be included in the Site Safety Plan. A detailed list of fall protection equipment including type and quantity must be documented as well as a strategic plan that indicates where fall protection equipment will be installed. In the event of a fall, the following steps can be taken by the Installation Supervisor to respond effectively to the emergency situation:

- 1) Call 911 and report the injury and site location.
- 2) Stop all installation work and ask volunteers not to crowd the injured worker.
- 3) Evaluate if the emergency situation allows for safe access to the suspended worker through use of a ladder and appropriate fall protection by the Installation Supervisor.

Rescue ladders should be immediately accessible. If safe access is not possible, determine how long it will take for a trained fire or rescue unit to arrive. If the rescue team's response time is anticipated to be more than 5 minutes, be aware that medical

attention may become necessary. Suspension trauma poses a serious threat on the implicated victim and immediate rescue of the worker is critical. Trauma relief steps can aid in self-rescue.


- 4) Communicate with the worker implicated in the fall.
- 5) Evaluate and establish the implicated worker's state of consciousness.
- 6) Evaluate and establish if the implicated worker has been injured in the fall.
- 7) Comfort and monitor the implicated worker throughout the emergency.
- 8) Follow all other general guidelines in the standard Emergency Response Plan.

GRID ALTERNATIVES REQUIRES THAT A WRITTEN FALL PROTECTION AND RESCUE PLAN BE INCLUDED IN THE SITE SAFETY PLAN. THIS INCLUDES A DETAILED LIST OF FALL PROTECTION EQUIPMENT AND A STRATEGIC PLAN THAT INDICATES WHERE FALL PROTECTION EQUIPMENT WILL BE INSTALLED.

Ladders

Ladder Placement

When erecting ladders, the GRID Alternatives Installation Supervisor is responsible for making sure the ladder is securely fastened with both feet placed on a level surface. An unsecure ladder should never be left unattended. During erection, exercise caution to ensure that the ladder does not come into contact with electrical lines or windows. Proper ladder angle is 4 to 1, meaning that for every 4 feet of elevation, the ladder's base should be set out 1 foot. The ladder must be placed with a 3 foot extension past the eve meaning that there is a 3 rung minimum that extends.³⁸



AN UNSECURE LADDER
SHOULD NEVER BE LEFT
UNATTENDED.

Extension Ladder Erection

The following steps serve as a best practices guide for safely erecting extension ladders:

- 1) The ladder should be closed. Position the ladder with the base section on top of the fly section. Block the bottom of the ladder against the base of the structure.
- 2) Make sure there is clearance and no electrical lines are overhead. Carefully “walk” the ladder up until it is vertical. Keep your knees bent slightly and your back straight.
- 3) Firmly grip the ladder, keep it vertical, and carefully move back from the structure about one quarter the distance of the ladder's working length. This allows you to place it at the correct angle against the structure.
- 4) Raise the fly section. After the bottom rung of the fly section clears the bottom rung of the base section, place one foot on the base rung for secure footing.
- 5) Lean the ladder against the structure. The distance from the base of the ladder to the structure should be one quarter the distance of the ladder's working length. Make sure the ladder extends three feet above the top support points for access to a roof or other work level. Both rails should rest firmly and securely against the structure.

Methods for Securing Extension Ladders

As compliant with GRID Alternatives ladder safety policy, extension ladders must always be tied down and secured to a structurally sound support. The following are examples of products available to securely fasten extension ladders at a residential job site. Manufacturer's instructions should be followed accordingly to comply with the product's intended purpose.

³⁸ 29 CFR 1926.1053 (b) (1)

Ladder Stability Anchor

Guardian Fall Protection's Ladder Stability Anchor Part # 10808 is specifically designed to comply with OSHA standards for securing ladders to roofs. This product can firmly attach to fascia board or rafters and is used in combination with either 2 or 3 foot long Velcro straps to secure extension ladders in place.

C Clamps

C clamps can be tightly fastened to fascia board or rafters and used in combination with tie-downs to secure the ladder to the roof and prevent side-to-side movement.

Example Reusable 2 x 4 Anchor

When working on houses with no exposed rafter or fascia boards, alternatively a 32" length 2 x 4 can be rigged as a reusable anchor:

- (1) Screw 2 3/8" x 2" eye screws into the 2 x 4 length.
- (2) Screw the 2 x 4 to the roof with 3" deck screws.
- (3) Tightly secure the ladder to the eye screws with appropriately rated rope or ratcheting straps.

Gutter Mounts

In order to minimize gutter wear and tear during extension ladder erection as well as ensure ladder stability, the following products are available to work in conjunction with standard ladder tie-off procedures:

Moheco Pro Ladder-Dok

Moheco Pro Ladder-Dok fits inside 5" or 6" gutters and distributes the weight of the ladder onto the fascia rather than the gutter. The guard serves as an excellent buffer and helps stabilize and support the ladder.

Ladder-Max Ladder Standoff Stabilizer

Ladder-Max Ladder Standoff Stabilizer provides a standoff extension between the ladder and the roof in order to protect gutters and shingle edges from typical damage caused when erecting an extension ladder against a house. This application is also helpful for increased comfort and stability when mounting and dismounting the roof from the ladder.

Ladder Mounting

All GRID Alternatives staff and volunteers are required to follow standard ladder safety practices when mounting and dismounting the equipment. Staff and volunteers must be trained to always face the ladder and maintain three points of contact with the ladder rungs

while ascending and descending. Ladder extensions like the Guardian Fall Protection 10800 Safe-T Ladder Extension System allow for workers to step through the top of the ladder rather than around and provide handrails for mounting and dismounting the ladder at the roof level. The rungs that fall at or above roof level should never be mounted. When transporting items to

IF PERFORMING WORK ON A LADDER, IT IS EXTREMELY IMPORTANT NOT TO OVERREACH. OVERREACHING CAN LEAD TO SERIOUS FALL-RELATED ACCIDENTS.

and from the roof, use a roped bucket or three workers (one ground, one ladder, one roof) to move the items safely. In order to prevent falling hazardous objects from coming into contact with a ground worker, no tools or other items should ever be

resting on or near the top of the ladder. Only one worker is permitted to be on the ladder at any one time. Be aware of ladder load weight capacity which is typically 300 pounds. If performing work on a ladder, it is extremely important not to overreach. Overreaching can lead to serious fall-related accidents.

Inspection

As with all construction-equipment, ladders must be inspected regularly to ensure that they do not pose a safety threat to staff and volunteers climbing or working around the equipment. If defects are identified, the ladder must be immediately replaced.

Electrical

Overview

Electrical safety is the foundation of GRID Alternatives' work. Proper electrical safety habits are critical in the installation of small-scale solar-electric systems as GRID Alternatives ties all systems into the electric utility grid. Residential service panels receive 120/240 VAC from the utility grid and it is essential that GRID Alternatives construction staff are properly trained in electrical safety as our systems are installed and tied into the utility via the main AC service panel. The following outlines GRID Alternatives electrical safety policies as compliant with OSHA and National Electrical Code (NEC).

Definition of "Qualified Person"

GRID Alternatives electrical work specifically conducted in the main AC service panel is strictly limited to a "Qualified Person." NEC defines a qualified person as "one who has skills and knowledge related to the

construction and operation of electrical equipment and installations and has received safety training to recognize and avoid the hazards involved."³⁹ During GRID Alternatives installations, the Installation Supervisor or an authorized licensed electrician are the only individuals permitted to work in the main service panel and for all intents and purposes are considered the designated "Qualified Person" for electrical work.

DURING GRID ALTERNATIVES INSTALLATIONS THE INSTALLATION SUPERVISOR OR AN AUTHORIZED LICENSED ELECTRICIAN ARE THE ONLY INDIVIDUALS PERMITTED TO WORK IN THE MAIN SERVICE PANEL.

Exposure and Energized Work

GRID Alternatives electrical policy encourages limited exposure to energized sources at all times during the installation process. Working with energized sources increases the risk of exposure to electrical hazards and can impose a fatal threat on staff and volunteer safety. As compliant with NEC, GRID Alternatives requires that if physically within 3 feet 6 inches of an open,

IF PHYSICALLY WITHIN 3 FEET 6 INCHES OF AN OPEN, ENERGIZED SERVICE PANEL OR INVERTER, WORKERS AND OBSERVERS MUST WEAR SAFETY GLASSES AND INSULATED GLOVES WITH LEATHER PROTECTORS AND USE INSULATED TOOLS.

energized service panel or inverter, workers and observers must wear safety glasses and insulated gloves with leather protectors and use insulated tools.

Testing and troubleshooting are the only electrical tasks that must be performed

³⁹ NFPA 70E Article 100

energized. For other tasks such as removing a dead front or installing a circuit breaker or conduit, either the main must be shut off or the installer must be wearing the required PPE.

Insulated gloves and tools must be rated to at least 500 volts. Gloves must be inspected regularly as per the manufacturer's specifications. Remember that insulated gloves and tools that are worn or damaged can potentially render the product ineffective, failing to protect the user in a case of shock. Insulated gloves should be sent to the manufacturer for testing every 6 months.

Lockout/Tagout Procedure

GRID Alternatives requires the implementation of lockout/tagout kits on all installations during any system wiring. It is the responsibility of the Installation Supervisor to lock off all hazardous energy sources in order to

ensure staff and volunteer safety during the installation process. All offices have been provided with lockout/tagout kits that are required in order to comply with OSHA and NEC lockout/tagout regulations.

A proper lockout/tagout kit must include the following:

- 4 homerun lockout containers – Electrical tape is not an acceptable method of “locking out” homerun connectors.
- 1 breaker lockout device
- 5 locks with unique keys
- 2 tagout labels

Micro Inverter System Lockout/Tagout Protocol

In systems with micro inverters, GRID Alternatives requires that AC sources/the main service panel be isolated during junction box and AC disconnect wiring and until the system is ready for testing. This can be executed by implementing one of the following systems:

- 1) Lockout and tag the entire main service panel when no one is working inside.
- 2) Do not install the solar breaker until after the junction box and AC disconnect have been wired and are closed. Lock the removed solar breaker until ready for installation.
- 3) If the solar breaker has already been installed, lockout and tag the breaker until the junction box and AC disconnect have been wired and are closed and the system is ready for testing.

ALL OFFICES HAVE BEEN PROVIDED WITH LOCKOUT/TAGOUT KITS THAT ARE REQUIRED IN ORDER TO COMPLY WITH OSHA AND NEC LOCKOUT/TAGOUT REGULATIONS.
ELECTRICAL TAPE IS NOT AN ACCEPTABLE METHOD OF “LOCKING OUT” HOMERUN CONNECTORS.

Central Inverter System Lockout/Tagout Protocol

In systems with central inverters, GRID Alternatives requires that AC sources/the main service panel and DC

sources/the homerun connectors be isolated during junction box, inverter, and disconnect wiring and until the system is ready for testing. AC sources can be isolated same as micro inverter protocol. DC sources can be isolated by implementing one of the following systems:

- 1) Lockout and tag all homerun connectors immediately after crimping.
- 2) Do not install homerun connectors until the junction box and inverter have been wired and are closed.

It is the responsibility of the Installation Supervisor to lockout and tag all necessary energized sources and maintain the key in a safe location.

Working Space

Sufficient working space is critical when working in electrical services. Before beginning work on any electrical service, the qualified person must ensure that satisfactory working space is available to comply with NEC. NEC working space regulations include the following when working on 120/240 volt single-phase systems⁴⁰:

- 1) A workspace depth of at least 36 inches must be available from the electrical service.
- 2) A workspace width of at least 30 inches must be available from the electrical service.

Crowding the electrical working space can cause potential safety hazards for both the qualified person working on the service as well as volunteers. It is the responsibility of the authorized qualified person to communicate to volunteers and staff an appropriate distance of at least 3 feet 6 inches at which to observe and learn.

Overhead power lines can carry high voltage and pose fatal electrocution risks in addition to burns and fall hazards. When possible, stay at least 10 feet away from overhead power lines or service mastheads and use fiberglass ladders when working nearby.

Safe Methods for Working in the Electrical Service

By following the above electrical safety guidelines, exposure to potential hazards can be significantly reduced and prevented. Here is a summary of best practices to adhere to while

⁴⁰ NEC 2011, Table 110.26 (A) (1)

IT IS THE RESPONSIBILITY OF THE INSTALLATION SUPERVISOR TO LOCKOUT AND TAG ALL DC AND AC ENERGY SOURCES AND MAINTAIN THE KEYS IN A SAFE LOCATION.

working in the main service panel:

- Turn off and lock/tag the circuit on which you are working.
- Test the voltage of the circuit before proceeding to verify that the circuit is off.
- When turning breakers on and off, always stand to the side of the main service panel and turn your head away to prevent exposure to a potential arc flash.
- Always wear insulated gloves with leather protectors to protect your hands from electrical shock as well as sharp edges from handling wires or other equipment.
- Always wear safety glasses to protect your eyes from various potential hazardous elements.
- Maintain clear communication with those working on the roof to ensure that all electrical sources are properly isolated to prevent shock exposure.

Safe Methods for Working in the Junction Box

As with working in the main service panel, junction box wiring can also pose an electrical safety threat if the guidelines listed within are not followed. Here is a summary of best practices to adhere to while working in the junction box:

- Verify that all implicated electrical conductors have been isolated by following the appropriate lockout/tagout protocol.
- Handle exposed wires cautiously during a wire pull. Wire pulls can subject the implicated worker to cuts and burns if appropriate PPE is not implemented.
- Maintain clear communication with those working on the ground and roof to ensure that all electrical sources are properly isolated to prevent shock exposure.

Safe Methods for Disconnecting Module Connectors

Use a DC amp clamp meter to confirm there is no current in the string before disconnecting any module connectors.

Equipment Inspection

All electrical-related equipment and PPE must be regularly inspected including: DC amp clamp meters, insulated gloves, and insulated tools. Please see manufacturer's instructions for equipment inspection guidelines.

Ground Disturbance

In the event of grounding electrode/ground rod installation, trenching, or ground mount racking installation, notify underground service alert to locate any gas, electric, water, or other service lines. Proceed with caution and only use hand tools within 24” of any flagged underground service lines. Call 811 at least 2 days before digging or for state specific information on digging, go to <http://www.call811.com/state-specific.aspx>.

Transportation

Motor Vehicle Safety

Motor vehicle safety is a critical component of ensuring the success of GRID Alternatives' safety program. The safe operation of GRID Alternatives vehicles must always be considered when driving for work purposes. All state traffic laws are firmly enforced under GRID Alternatives motor vehicle policy. The following highlights key practices to be observed when operating vehicles in order to ensure staff, volunteer, and public safety.

Safe Driving as Recommended by the Department of Transportation⁴¹

Cutting in Front

Cutting in front of other vehicles can put yourself and surrounding drivers at risk for an accident. Stay cognizant of all moving vehicles on the road so as to avoid braking situations for all drivers and pass other vehicles with care.

Watching Blind Spots

When passing large commercial vehicles, stay aware of the respective vehicle's blind spots. Drivers of large commercial vehicles are restricted from obtaining clear access to the front, back, and sides of their vehicle. In order to avoid an accident, stay clear of these areas of neighboring moving vehicles and be sure that the driver has clear visual access to your vehicle.

Inattentive Drivers

Inattentive drivers are those that are not fully engaged in vehicle safety.

Not paying attention while driving imposes a safety threat on the driver as well as the general public. Stay aware of the possibility of inattentive drivers on the road and maintain full

focus on your driving at all times. If you need to attend to another activity such as, but not limited to, talking on the phone, texting, or using a smart phone, pull over in an appropriate space to execute those tasks.

IF YOU NEED TO ATTEND TO ANOTHER ACTIVITY SUCH AS, BUT NOT LIMITED TO, TALKING ON THE PHONE, TEXTING, OR USING A SMART PHONE, PULL OVER IN AN APPROPRIATE SPACE TO EXECUTE THOSE TASKS.

⁴¹ U.S. Department of Transportation, Federal Motor Carrier Safety Administration, "Share the Road Safely," www.sharetheroadsafely.org

Aggressive Drivers

Stay aware of aggressive drivers not following safe driving practices on the road. They can put themselves and others at risk through reckless driving behavior. Likewise, always implement mindful driving practices in order to keep yourself and others safe on the road.

Buckling Belts

GRID Alternatives safety policy requires the use of seat belts by all passengers while operating organization vehicles. In the event of an accident, seat belts prevent passengers from striking the steering wheel or the windshield, being thrown around, and from being ejected from the car.

Securing Loads

Proper load securement is critical in order to keep yourself, passengers, drivers, and the general public safe. Not properly securing loads can result in a fatal accident. A load is secure when no loaded equipment can slide, shift, or fall onto the roadway, or become airborne. The following are practices that must be implemented in order to avoid load-related accidents:

- Secure all equipment and materials to prevent movement forward and backward, side to side, and up and down.
- Secure all equipment and materials against the wind and other forces that can cause the items to become airborne.
- Use appropriate tie-downs to secure your loads.
- Drivers should always check loads before driving off to ensure all items are securely fastened.

Here are some helpful tips for securely fastening loads to your vehicle:

- Place lighter items in the bottom of the load so that heavier items can help hold them down.
- As best practice, keep the load below the top edge of the truck.
- Block items against each other or bundle them together to minimize shifting and movement.
- Place tall items against the back of the cab.
- Lay tall items flat in the truck bed or trailer.
- Securely seal all boxes, bags, and garbage cans to keep contents from blowing away.

DRIVERS SHOULD ALWAYS CHECK LOADS BEFORE DRIVING OFF TO ENSURE ALL ITEMS ARE SECURELY FASTENED.

- Wrap straps through and around items such as ladders. Secure the straps to anchor points in the bed of the truck or on ladder racks.
- Strap similarly shaped items together, i.e. square (rails) or round (conduit). Best practice is to use a ladder rack container to secure rails and conduit.
- Strap small items together and/or cover them with a tarp. Place items such as hand tools in the cab of the truck or in a toolbox secured to the bed of the truck.

Be sure to have appropriate and ample tie-downs available to secure loads such as the following:

- Webbed straps with tightening ratchets
- Webbed lashing straps

It is important to note that bungee cords should never be used as a primary tie-down for loads.

Driving under the Influence

GRID Alternatives strictly prohibits the use of drugs or alcohol before or during the operation of any organization vehicles.

Hazard Communication

Overview

In the context of occupational safety in the U.S., hazard communication refers to the United Nations Globally Harmonized System of Classification and Labeling of Chemicals, Revision 3.⁴² As per OSHA laws and regulations which are consistent with the aforementioned legislation, GRID Alternatives mandates that all toxic substances used during the installation process be accompanied with the product's "Material Safety Data Sheet" (MSDS) which specifies information regarding the potential hazards of chemicals present in the product.⁴³ GRID Alternatives is responsible for communicating information on chemical hazards present on the jobsite and providing an effective means of protection for all staff and volunteer workers against harmful substances. The Installation Supervisor is responsible for ensuring that MSDSs are available on site for all toxic products being used or that may be used in the case of an emergency.

Material Safety Data Sheets (MSDSs)

GRID Alternatives specifically keeps on file MSDSs for products that are often used or have been used in the past during the installation process. MSDSs for all chemical products can be found at the following location on the server:

"O:\OSHA & Safety\Material Safety Data Sheets - Shortcut.Ink"

Installation Supervisors are required to read and understand the content within all MSDSs for any chemical product on the job site. MSDSs provide critical information such as the following:

- Product and company identification
- Emergency overview
- Potential health effects
- Signs and symptoms of overexposure
- Medical conditions aggravated
- Routes of entry
- Composition and information on ingredients
- First aid measures
- Fire-fighting measures
- Accidental release measures
- Handling and storage
- Exposure controls and personal protection
- Ecological information
- Disposal considerations
- Transport information

⁴² 29 CFR 1910.1200 (a) (1)

⁴³ 29 CFR 1910.1200 (b) (1)

Appendix

Appendix A: Safety Talk

Appendix B: Job Hazard Analysis

Appendix C: Emergency Response Plan

Appendix D: Sample Site Safety Plans

Appendix E: Incident Report Forms

Appendix F: PPE Compliance Inspection Log

Appendix G: Sample Equipment Price List

Appendix H: Safety Compliance Checklist

Revision History

PPE: Fire Extinguishers

Fall Protection: General Site Survey and Inspection Policy

Fall Protection: Site Survey and Inspection Policy Steep Roofs

Fall Protection: Flat Roofs with Parapets

Fall Protection: Personal Fall Arrest Systems

Fall Protection: Fall Restraint Systems (Removed)

Fall Protection: Skylights and Holes

Ladders: Gutter Mounts

Electrical: Exposure and Energized Work

Ground Disturbance