



Instructions for the following series products:

Detachable Roof Anchors

(See back page for specific model numbers.)

User Instruction Manual Detachable Roof Anchors

This manual is provided as the Manufacturer's Instructions, and should be used as part of an employee training program as required by OSHA.

DESCRIPTION

2104540: The detachable roof anchor consists of plated, forged alloy steel D-ring, galvanized sheet steel anchor clamp and shield, zinc plated carriage bolts, and flashing. The anchor clamp is designed to be bolted to a wood member (roof truss, rafter, cord, etc.) up to 2 x 4 in size. The D-ring top assembly includes a ring for connection of the fall arrest or restraint system, 10 in. long. See Figure 1.

2104541: Same as 2104540 except for 2 x 4 to 2 x 8 roof member, 14 in. long.

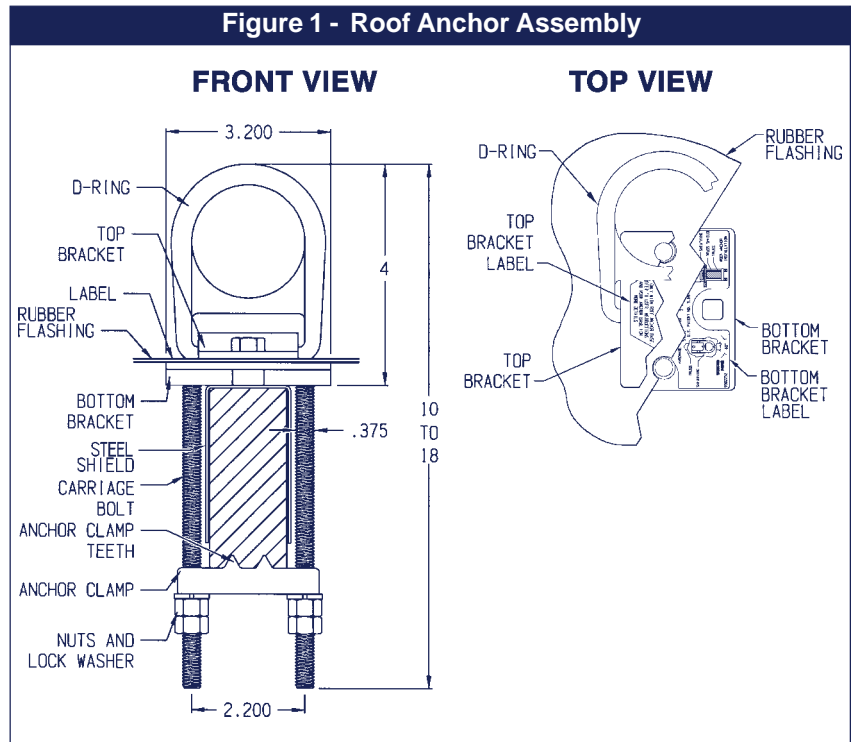
2104542: Same as 2104542 except for 2 x 10 to 2 x 12 roof member, 18 in. long.

2104534: Bottom clamp assembly, shield sized for 2 x 4's, flashing.

2104535: Bottom clamp assembly, shield sized for 2 x 6's and 2 x 8's, flashing.

2104536: Bottom clamp assembly, shield sized for 2 x 10's and 2 x 12's, flashing.

2104517: Top D-ring assembly, universal with all bottom clamp assemblies.



WARNING: This product is part of a personal fall arrest or restraint system. The users must read and understand the manufacturer's instructions for each component or part of the complete system. These instructions must be provided to the users of this equipment. The users must read and understand these instructions or have them explained to them before using this equipment. Manufacturer's instructions must be followed for proper use, care and maintenance of this product. Alterations or misuse of this product or failure to follow instructions, may result in serious injury or death.

IMPORTANT: If you have questions on the use, care, or suitability of this equipment for your application, contact DBI/SALA immediately.

1.0 APPLICATION

1.1 PURPOSE: DBI/SALA's roof anchors are designed to be used as detachable anchorage connectors on wood frame structures. These anchorage connectors may be used as part of a personal fall arrest or restraint system. Do not attach a lifeline between two or more roof anchors (i.e. horizontal lifeline systems). Do not hang, lift, or support tools or equipment from these roof anchors, or attach guylines for antennas, phone lines, etc..

A. FALL ARREST APPLICATION: In this application, the roof anchor is used as part of a complete fall arrest system. Such systems typically include a full body harness and some form of connecting subsystem, such as an energy absorbing lanyard. Maximum permissible free fall is six feet. This type of system is used where a free fall is possible before the fall is arrested.

B. RESTRAINT APPLICATION: In this application, the roof anchor is used as part of a complete restraint system. Such systems typically include a full body harness and a lanyard or restraint line used to restrain or tether the user from reaching a hazard (i.e. leading edge roof work). This type of system is used where no vertical free fall is possible.

- 1.2 LIMITATIONS:** The following application limitations must be recognized and considered before using this product:
- A. ROOF STRUCTURE:** These anchorage connectors are intended to be installed on 2 x 4 to 2 x 12 wood members (roof truss, rafter, cord, etc.). The roof structure must be capable of meeting the anchorage strength requirements as set forth in section 2.4. Consult DBI/SALA before using these roof anchors on any other roof materials (including steel).
 - B. CAPACITY:** These anchorage connectors are designed for use by persons with a combined weight (person, clothing, tools, etc.) of no more than 310 lbs. Only one personal protective system may be connected to the anchorage connector at any time.
 - C. PERSONAL FALL ARREST SYSTEM:** PFAS's selected for use with these roof anchors must meet the system performance and other criteria as stated in section 3.0.
 - D. FREE FALL:** Personal fall arrest systems used with these roof anchors must be rigged in such a way as to limit the free fall to a maximum of six feet (reference ANSI Z359.1). See associated connecting subsystem manufacturer's instructions for further information.
 - E. FALL CLEARANCE:** Make certain that enough clearance exists in your fall path to prevent striking an object. The amount of clearance needed is upon the type of connecting subsystem used (energy absorbing lanyard, self retracting lifeline, ect.), and the anchorage location. Refer to manufacturer's instructions of the connecting subsystem or component for more information on fall clearance.
 - F. RESTRAINT SYSTEMS:** Restraint systems selected for use with these roof anchors must meet the requirements given in section 3.0.
 - G. CORROSION:** Use near sea water or other corrosive environments may require more frequent inspections or servicing (replacement) to assure corrosion damage is not affecting the performance of the product.
 - H. CHEMICAL HAZARDS:** Solutions containing acids, alkali, or other caustic chemicals, especially at elevated temperatures, may cause damage to this equipment. Consult DBI/SALA if doubt exists concerning installing this equipment where chemical hazards are present.
 - I. ELECTRICAL HAZARDS:** Do not install roof anchors where they or the user may come into contact with electrical power lines.
 - J. TRAINING:** This equipment is intended to be installed and used by persons who have been properly trained on its correct application.

1.3 Refer to national consensus (including ANSI Z359.1), applicable local, state, and federal (OSHA) requirements governing this equipment for more information on anchorage connectors, and associated system components.

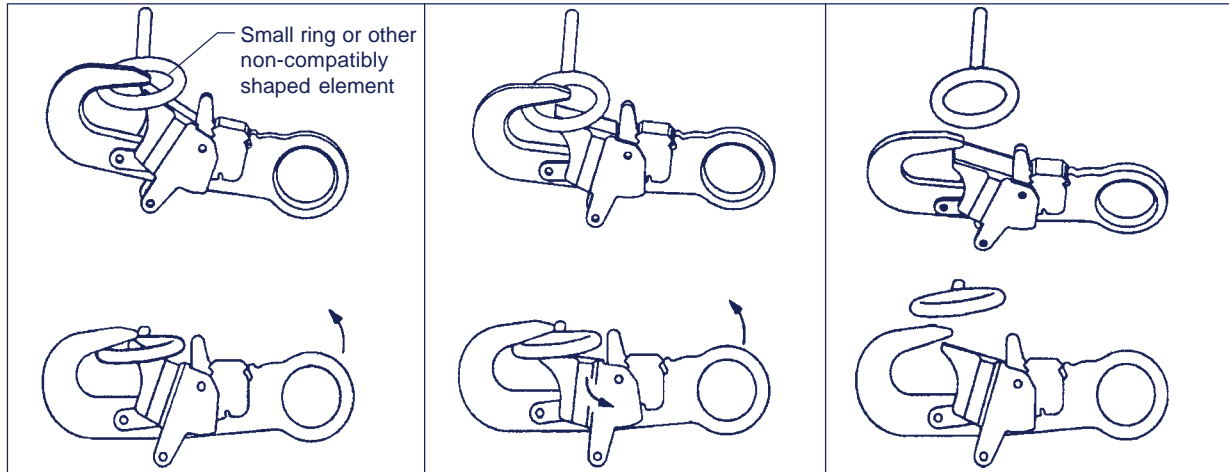
2.0 SYSTEM REQUIREMENTS

- 2.1 COMPATIBILITY OF COMPONENTS:** DBI/SALA equipment is designed for use with DBI/SALA approved components and subsystems only. Substitutions or replacements made with non-approved components or subsystems may jeopardize compatibility of equipment and may affect the safety and reliability of the complete system.
- 2.2 COMPATIBILITY OF CONNECTORS:** Connectors are considered to be compatible with connecting elements when they have been designed to work together in such a way that their sizes and shapes do not cause their gate mechanisms to inadvertently open regardless of how they become oriented. Contact DBI/SALA if you have any questions about compatibility.

Connectors (hooks, carabiners, and D-rings) must be capable of supporting at least 5,000 lbs. (22.2kN). Connectors must be compatible with the anchorage or other system components. Do not use equipment that is not compatible. Non-compatible connectors may unintentionally disengage. See Figure 2. Connectors must be compatible in size, shape, and strength. Self locking snap hooks and carabiners are required by ANSI Z359.1 and OSHA, and in Canada, by CSA Z259.12.

Figure 2 - Unintentional Disengagement (Roll-out)

If the connecting element that a snap hook (shown) or carabiner attaches to is undersized or irregular in shape, a situation could occur where the connecting element applies a force to the gate of the snap hook or carabiner. This force may cause the gate (of either a self-locking or a non-locking snap hook) to open, allowing the snap hook or carabiner to disengage from the connecting point.



1. Force is applied to the snap hook.

2. The gate presses against the connecting ring.

3. The gate opens allowing the snap hook to slip off.

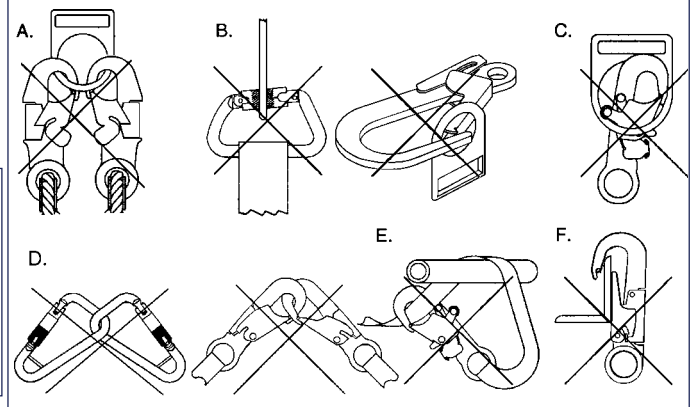
- 2.3 MAKING CONNECTIONS:** Only use self-locking snap hooks and carabiners with this equipment. Only use connectors that are suitable to each application. Ensure all connections are compatible in size, shape and strength. Do not use equipment that is not compatible. Ensure all connectors are fully closed and locked.

DBI/SALA connectors (snap hooks and carabiners) are designed to be used only as specified in each product's user's instructions. See Figure 3 for inappropriate connections. DBI/SALA snap hooks and carabiners should not be connected:

- A. To a D-ring to which another connector is attached.
- B. In a manner that would result in a load on the gate.

NOTE: Large throat opening snap hooks should not be connected to standard size D-rings or similar objects which will result in a load on the gate if the hook or D-ring twists or rotates. Large throat snap hooks are designed for use on fixed structural elements such as rebar or cross members that are not shaped in a way that can capture the gate of the hook.

Figure 3 - Inappropriate Connections



- C. In a false engagement, where features that protrude from the snap hook or carabiner catch on the anchor and without visual confirmation seems to be fully engaged to the anchor point.
- D. To each other.
- E. Directly to webbing or rope lanyard or tie-back (unless the manufacturer's instructions for both the lanyard and connector specifically allow such a connection).
- F. To any object which is shaped or dimensioned such that the snap hook or carabiner will not close and lock, or that roll-out could occur.

- 2.4 ANCHORAGE STRENGTH:** The anchorage to which the roof anchor is installed must meet minimum strengths as given below for the applications selected:

FALL ARREST: per ANSI Z359.1 - Anchorages selected for personal fall arrest systems (PFAS) shall have a strength capable of sustaining static loads in the direction(s) permitted by the PFAS when in use of at least (A) 3,600 lbs. (16 kN) when certification exists (reference ANSI Z359.1 for certification definition); or (B) 5,000 lbs. (22.2 kN) in absence of certification. When more than one PFAS is attached to an anchorage, the anchorage strength set forth in (A) or (B) above shall be multiplied by the number of PFAS attached to the anchorage.

Per OSHA 1926.500 and 1910.66 - Anchorages used for attachment of personal fall arrest systems (PFAS) shall be independent of any anchorage being used to support or suspend platforms and capable of supporting at least 5,000 lbs. (22.2 kN) per use attached, or be designed, installed, and used as part of a complete PFAS which maintains a safety factor of at least two and is in the supervision of a qualified person.

RESTRAINT: Roof anchors installed for restraint applications must be attached to a roof member capable of sustaining a static load of at least 3,000 lbs. applied in any direction permitted by the restraint system when in use. Each roof anchor installation must independently be capable of sustaining this load.

3.0 OPERATION AND USE

WARNING: Do not alter or intentionally misuse this equipment. Consult with DBI/SALA if using this equipment with components or subsystems other than those described in this manual. Some subsystem and component combinations may interfere with the operation of this equipment.

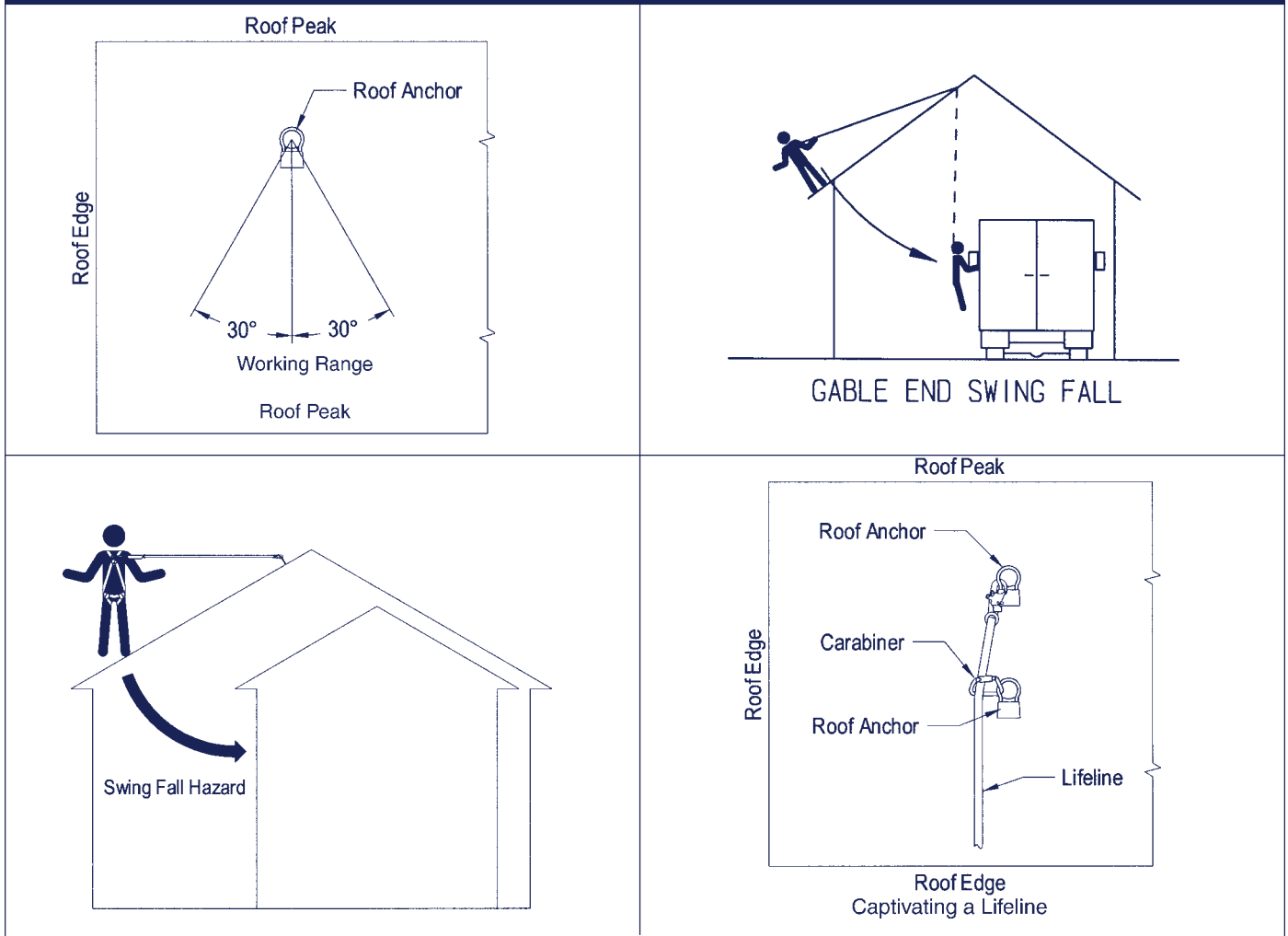
WARNING: Do not use this system if you are unable to tolerate the impact of a fall arrest. Age and fitness can seriously affect your ability to withstand a fall. Pregnant women and minors must not use this equipment.

3.1 BEFORE EACH USE of this equipment, carefully inspect it to assure it is in serviceable condition. Check for worn or damaged parts. Ensure the roof anchor is secure and not distorted. Inspect for sharp edges, burrs, cracks, or corrosion. Inspect other fall arrest or restraint equipment in accordance with manufacturer's instructions. Refer to section 5.0 for further inspection details. Do not use if inspection reveals an unsafe condition.

3.2 PLAN your fall protection system before starting your work. Take into consider all factors affecting your safety at any time during use. The following list gives some important points to consider when planning your system:

- A. ANCHORAGE:** Select an anchorage point that is rigid and capable of supporting the required loads. See section 2.4. Locate roof anchor in accordance with section 3.3.
- B. FREE FALL:** Personal fall arrest systems must be rigged to limit any free fall to a maximum of 6 feet (OSHA and ANSI Z359.1). Restraint systems must be rigged such that no vertical free fall is possible. Avoid working above your anchorage level since an increased free fall distance will result.
- C. PERSONAL FALL ARREST SYSTEM REQUIREMENT:** PFAS's used with these roof anchors must meet applicable OSHA, state, federal, and ANSI requirements. PFAS's incorporating a full body harness must be capable of arresting a workers fall with maximum arresting force of no greater than 1,800 lbs. and limit the free fall distance to 6 feet or less. The deceleration distance for a PFAS must be 42 inches (1.1 m) or less. Reference ANSI Z359.1, and OSHA requirements.
- D. RESTRAINT SYSTEMS:** Restraint systems must meet applicable state and federal requirements.
- E. FALL CLEARANCE:** Should a fall occur, there must be sufficient clearance in the fall area to arrest the fall before striking the ground or other objects. The actual clearance required is dependent upon the type of fall arrester connecting subsystem used (energy absorbing lanyard, self retracting lifeline, ect.). Refer to manufacturer's instructions for fall clearance information.
- F. SWING FALLS:** Swing falls occur when the anchor is not directly above the point where a fall occurs. The force if striking an object while swinging can be great and cause serious injury. Minimize swing falls by working as directly below the anchorage as possible. It is acceptable to captivate a lifeline to an anchorage close to the work area with a carabiner, see Figure 4. Do not captivate the lifeline of a self retracting lifeline, it may affect the performance of its internal braking.
- G. SHARP EDGES:** Avoid working where the connecting subsystem (i.e. shock absorbing lanyard, self retracting lifeline, full body harness, ect.) or other components will be in contact with, or abrade against, unprotected

Figure 4 - Swing Fall



sharp edges. Do not loop lanyard around small diameter structural members. If working with equipment near sharp edges is unavoidable, protection against cutting must be provided by using a heavy pad or other means over the exposed sharp edge.

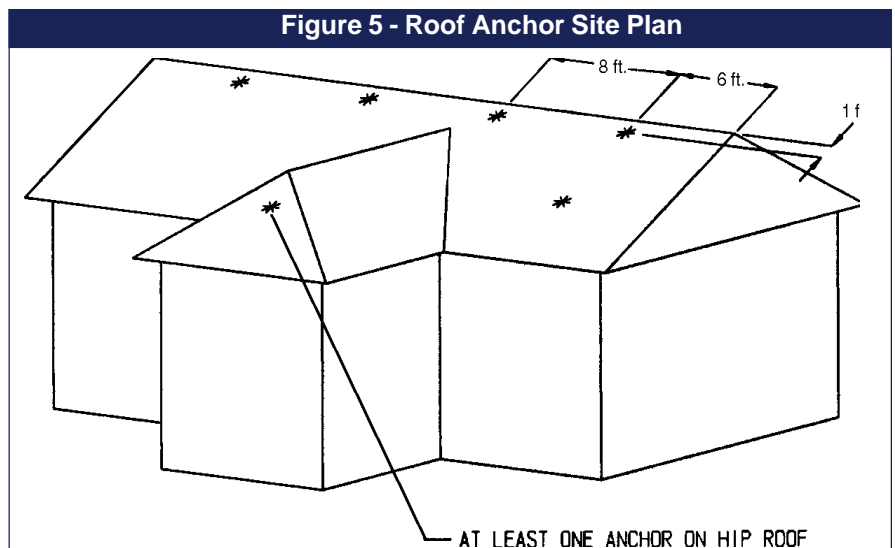
- H. **RESCUE:** Should a fall occur, the user (employer) must have a rescue plan and the means at hand to implement it.
- I. **AFTER A FALL** Any equipment which has been subjected to the force of arresting a fall must be removed from service immediately and destroyed, or contact a factory authorized service center for repair.

3.3 INSTALLATION REQUIREMENTS

- A. **ROOF ANCHOR SITE PLAN:** Before starting the roof construction, a plan should be established as to where the roof anchors will be installed, and when during the construction process they may be used. See Figure 5. The following are guidelines on locating roof anchors:

- Roof anchors must be located at least 12 inches below the roof peak (measure along the roof surface) and at

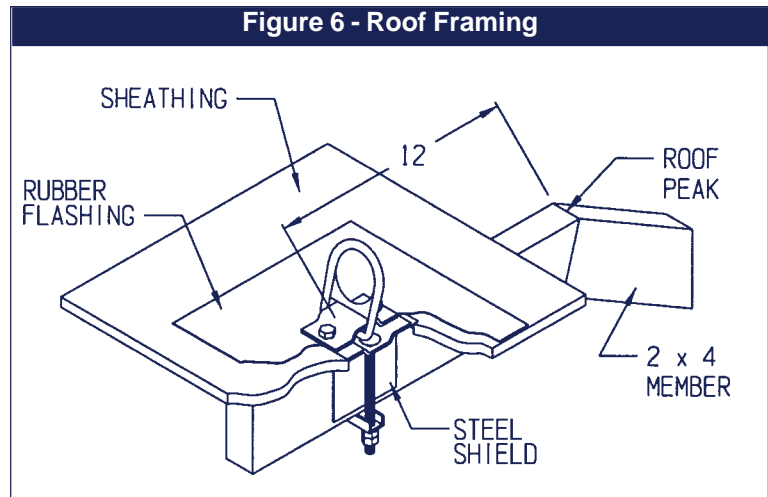
Figure 5 - Roof Anchor Site Plan



least 6 feet from any exposed roof edge. On very small roof areas, locate the roof anchor as far from the roof edge as possible.

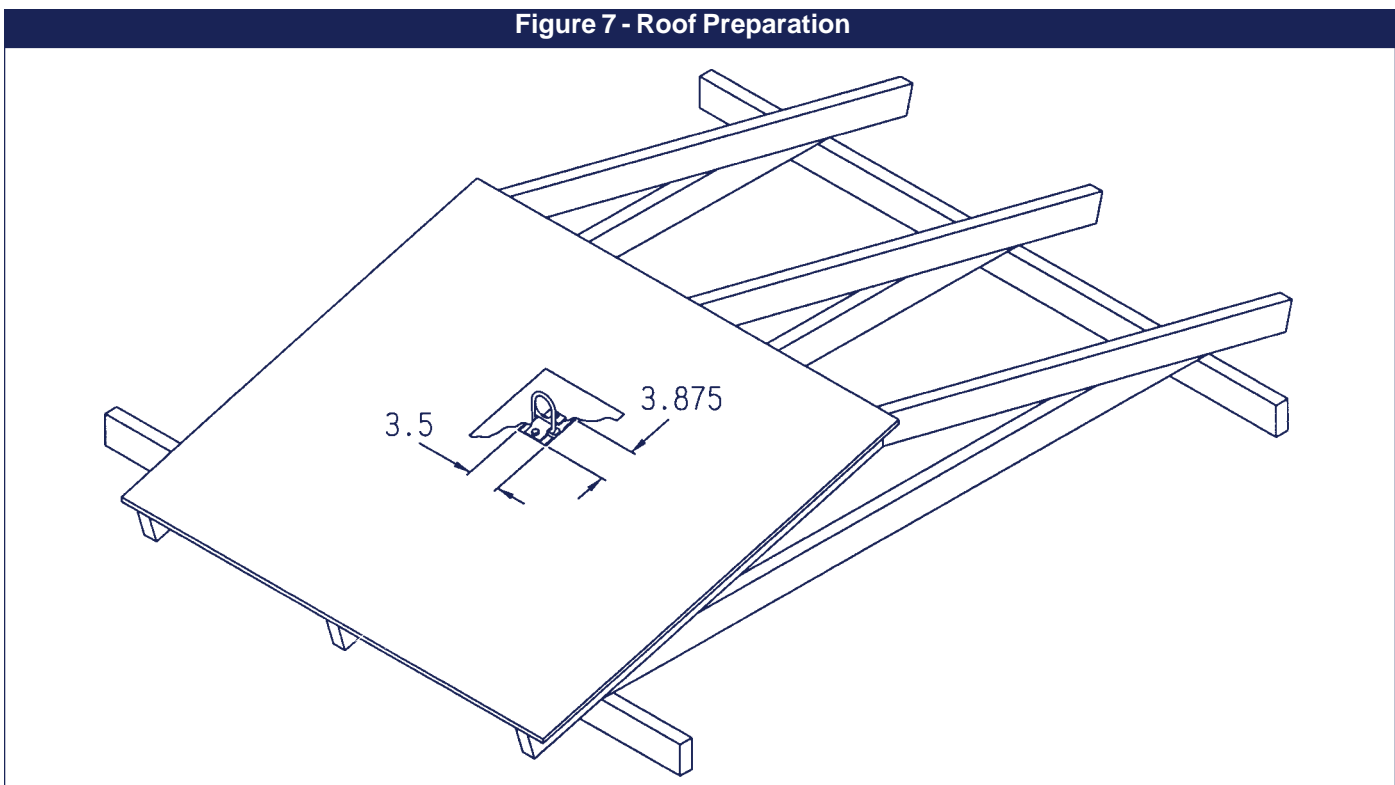
- Do not install roof anchors on unsupported roof structures, such as eaves or gable overhangs. Do not install roof anchors on fascia boards.
- Roof anchors should be installed at 8 foot spacings along roof ridge. Hip roof anchor on each hip face.
- On long, low pitched roofs, multiple roof anchors should be installed along gable ends (6 feet from edge) to reduce swing fall hazards.

B. ROOF FRAMING: Roof framing members to which the roof anchors are attached must be in good condition. Members must be free of splits, cracks, large knots, or defects that may weaken the member. Roof anchors must be located at least 6 in. away from any knots that exceed 1 inch in diameter. Figure 6 shows what the entire anchor would look like installed. The roof framing structure must be capable of withstanding the loads given in section 2.4.



C. ROOF ANCHOR INSTALLATION: Roof anchors must be installed in accordance with the previously discussed site plan. Site work rules must be followed regarding when an installed roof anchor is ready for use (i.e. after sheathing is in place). Do not use the detachable roof anchor until the sheathing is in place.

- Roof preparation: If sheathing has not been nailed down to the roof rafters, cut a 3-7/8 in. x 3-1/2 in. hole in the sheathing (centered over a rafter or truss) in the desired roof anchor locations. It will be necessary to have access to the underside of the sheathing to install anchor. If roof is already shingled, remove the roof covering (shingles) in area where the roof anchor is to be installed. Cut an opening 3-7/8 in. x 3-1/2 in. to allow the steel shield and roof anchor to be installed. See Figure 7. Use caution when cutting near roof members so its not damaged.



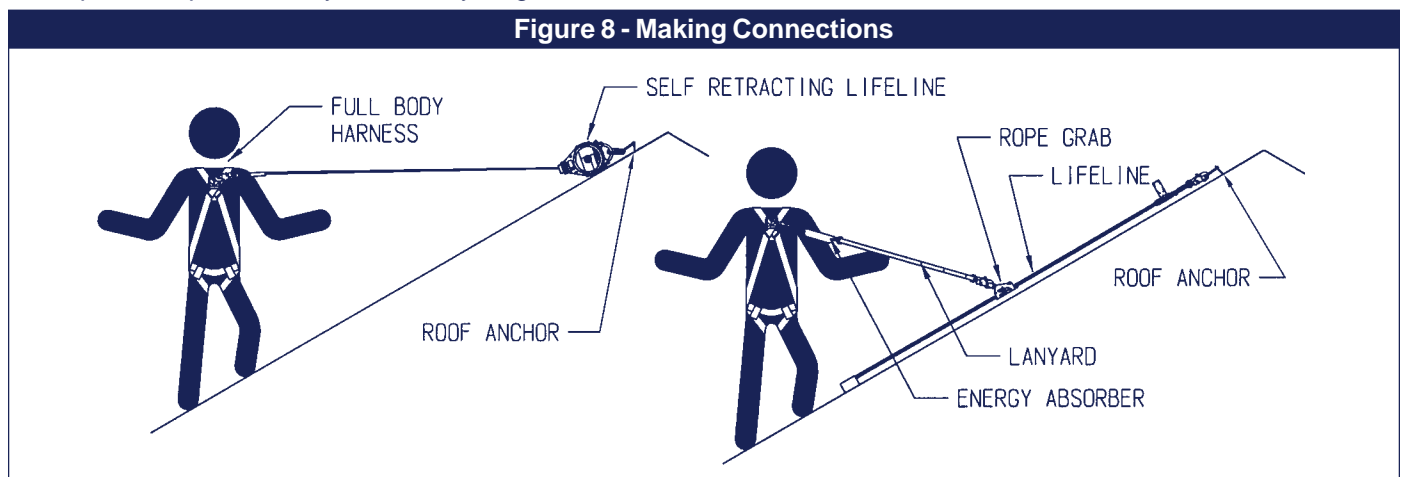
- To attach the roof anchor to the member: Install the steel shield onto the roof member. Slide the carriage bolts (legs) over the roof member so that the upper portion of the bottom bracket contacts the steel shield. From the underside of the sheathing, install the anchor clamp, nuts, and lock washers (two nuts and one lock washer on each carriage bolt leg, see Figure 1). Position the anchor perpendicular to the top face of the roof member and tighten the nuts. Continue tightening until the teeth in the anchor clamp are fully embedded into the member. When work at the site is finished, the top D-ring assembly of the roof anchor may be detached from the bottom clamp assembly. The bottom clamp assembly may remain installed so the top D-ring assembly can be temporarily reattached at a later date. The top D-ring assembly is not designed to remain installed onto the bottom clamp assembly as a permanent roof anchor because the top D-ring assembly may prevent the finish roofing materials from creating a proper seal.
- To install flashing: Caulk the area of the sheathing in which the flashing will be applied. Place the rubber flashing over the bottom bracket making sure to line up the holes in the flashing with those on the bottom bracket. Caulk around hole openings in flashing and continue with installation of top D-ring assembly. To prevent water leakage through the roof during construction, install flashing appropriate for the finish roofing material (i.e. shingles).
- To install top D-ring assembly to bottom clamp assembly: Place the top bracket and D-ring on top of the rubber flashing and match up with the holes in the bottom bracket. Screw the top bracket to the bottom bracket using the two supplied bolts. **Use only bolts supplied with the roof anchor, do not use replacement bolts that are not supplied either with the roof anchor or by DBI/SALA for the anchor, it may weaken the strength of the roof anchor.** There are two self clinching nuts underneath the bottom clamp plate that will draw the top D-ring assembly and the bottom clamp assembly tightly together.

WARNING: Read and follow manufacturer's instructions for associated equipment (i.e. full body harness, shock absorbing lanyard, self retracting lifeline, ect.) used in your personal fall arrest system.

IMPORTANT: For special (Custom) versions of this product, follow the instruction herein. If enclosed, see attached supplement for additional instructions to be followed when using a customized product.

3.4 MAKING CONNECTIONS: When using a hook to make a connection, be certain accidental disengagement (roll-out) cannot occur. Roll-out occurs when interference between a hook and the mating connector causes the hook's gate keeper to accidentally open and release. Self locking snap hooks or self locking and self closing gate carabiners must be used to reduce the possibility of roll-out when making connections. Do not use hooks or connectors that will not completely close over the attachment object. Do not use non-locking snap hooks. Always follow the manufacturer's instructions supplied with each system component. See Figure 8.

3.5 CONNECTING TO ROOF ANCHOR: Connection to the installed roof anchor may be made using a self locking snap hook or self locking and self closing carabiner only. Do not use a knot to connect a lifeline to the roof anchor. Do not pass a lanyard or lifeline through the roof anchor D-ring and hook back into lanyard or lifeline. When connecting, make sure connections are fully closed and locked. Figure 8 illustrates proper connection of typical fall arrest or restraint equipment to the roof anchor. When using an energy absorbing lanyard, connect the absorber "pack" end to the harness. When using a self retracting lifeline, make sure device is properly positioned so that retraction is not hindered. Always protect lifeline / lanyard from abrading against sharp or abrasive surfaces on the roof. Make sure all connections are compatible in size, shape, and strength. Never connect more than one personal protective system to any single roof anchor at a time.



4.0 TRAINING

- 4.1 TRAINING:** The user and the user's employer, must be trained in the correct use and care of this equipment. Both parties must be aware of the operating characteristics, application limits, and consequences of improper use of this equipment.

IMPORTANT: Training must be conducted without exposing the trainee to a fall hazard. Training should be repeated on a periodic basis.

5.0 INSPECTION

- 5.1 FREQUENCY:** Before each use, visually inspect per steps listed in section 5.2 and 5.3.

IMPORTANT: If this equipment has been subjected to forces resulting from the arrest of a fall, it must be immediately removed from service and destroyed or returned to DBI/SALA for possible repair. See section 5.2.

5.2 INSPECTION STEPS:

- STEP 1.** Inspect the Roof Anchor for physical damage. Look carefully for any signs of cracks, dents, or deformities in the metal. Check for bending, the roof anchor should be perpendicular to the roof surface.
- STEP 2.** Inspect the Roof Anchor for signs of excessive corrosion.
- STEP 3.** Ensure the condition of the roof anchor will support the Roof Anchor loads, see section 2.3. An anchor connected to rotten or deteriorated wood should not be used.
- STEP 4:** Ensure the Roof Anchor is still securely attached. If loose, tighten anchor clamp as described in section 3.3.
- STEP 5:** Inspect each system component or subsystem per associated manufacturer's instructions.
- STEP 6:** Record the inspection date and results on the inspection log. See section 9.0.
- 5.3** If inspection reveals a defective condition, remove unit from service immediately and destroy, or contact a factory authorized service center for repair.

NOTE: Only DBI/SALA or parties authorized in writing may make repairs to this equipment.

6.0 MAINTENANCE, SERVICE, AND STORAGE

- 6.1** No scheduled maintenance is required. If you have any questions concerning the condition of your Roof Anchor, or have any doubt about putting it into service, contact DBI/SALA immediately.
- 6.2** Additional maintenance and servicing procedures (i.e. replacement parts) must be completed by a factory authorized service center. Authorization must be in writing.

7.0 SPECIFICATIONS

MATERIALS: D-ring: Cadmium plated forged alloy steel; Shield and clamp: galvanized sheet steel; carriage bolts: zinc plated steel; Flashing - 10 in. x 10 in. EPDM rubber.

STATIC LOAD CAPACITY: 5,000 lbs. along rafter, 3,600 lbs. within 30° of rafter's centerline.

WEIGHT: 2104540 = 2.0 lbs.; 2104541 = 2.25 lbs.; 2104542 = 2.5 lbs.; 2104517 = .60 lbs.; 2104534 = 1.4 lbs.; 2104535 = 1.65 lbs.; 2104536 = 1.9 lbs.

SIZE: 2104540 = 3.625 in. x 3.2 in. x 9.75 in.; 2104541 = 3.625 in. x 3.2 in. x 13.75 in.; 2104542 = 3.265 in. x 3.2 in. x 17.75 in.

CAPACITY: 310 lbs. (one person)

8.0 LABELING

8.1 These labels should be securely attached to the roof anchor and fully legible.

⚠ WARNING

MAXIMUM CAPACITY: 1 PERSON, 310 LBS. USE ONLY WITH ANSI/OSHA APPROVED PERSONAL FALL ARREST/RESTRAINT SYSTEMS. USE ONLY WITH COMPATIBLE CONNECTING HARDWARE. REFER TO USER INSTRUCTIONS SUPPLIED WITH PRODUCT FOR COMPATIBILITY REQUIREMENTS, INSTALLATION INSTRUCTIONS AND INSPECTION CRITERIA. FAILURE TO FOLLOW INSTRUCTIONS MAY RESULT IN SERIOUS INJURY OR DEATH.

ROOF ANCHOR BASE MEETS OSHA REQUIREMENTS.

DBI SALA

DBI/SALA; RED WING, MN 55066
(800) 328-6146

BASE WITH ANCHORAGE ASSEMBLY

TRUSS SIZE	BASE	BASE WITH ANCHORAGE ASSEMBLY
2 x 4	2104534	2104540
2 x 6	2104535	2104541
2 x 8	2104535	2104541
2 x 10	2104536	2104542
2 x 12	2104536	2104542

DBI SALA 9502253

DBI/SALA
3965 PEP IN AVE.
RED WING, MN
55066-1837
(800) 328-6146

2104517 ANCHORAGE ASSEMBLY

USE ONLY WITH ROOF ANCHOR BASE. REFER TO USER INSTRUCTIONS AND ROOF ANCHOR BASE FOR MORE DETAILS.

⚠ WARNING

THIS SIDE DOWN. DO NOT ATTACH D-RING TO THIS SIDE. 9507811

MATERIALS:
 D-RING - ALLOY STEEL
 PLATES - GALVANIZED STEEL
 HARDWARE - ZINC PLATED STEEL

U.S. PATENT NO. 5,687,535

WORKING RANGE 60°

2104517 ANCHORAGE ASSEMBLY
 SHEATHING
 TRUSS SHIELD
 TRUSS
 ROOF ANCHOR INSTALLATION

9.0 INSPECTION AND MAINTENANCE LOG

DATE OF MANUFACTURE: _____

MODEL NUMBER: _____

DATE PURCHASED: _____

INSPECTION DATE	INSPECTION ITEMS NOTED	CORRECTIVE ACTION	MAINTENANCE PERFORMED
Approved By: _____			
Approved By: _____			
Approved By: _____			
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MODEL NUMBER: _____

DATE PURCHASED: _____

INSPECTION DATE	INSPECTION ITEMS NOTED	CORRECTIVE ACTION	MAINTENANCE PERFORMED
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This instruction applies to the following models:

2104173
2104174
2104175
2104517
2104534
2104535
2104536
2104540
2104541
2104542

Additional model numbers may appear on the next printing of these instructions



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Rev: D