



The Ultimate in Fall Protection

# INSTRUCTION MANUAL

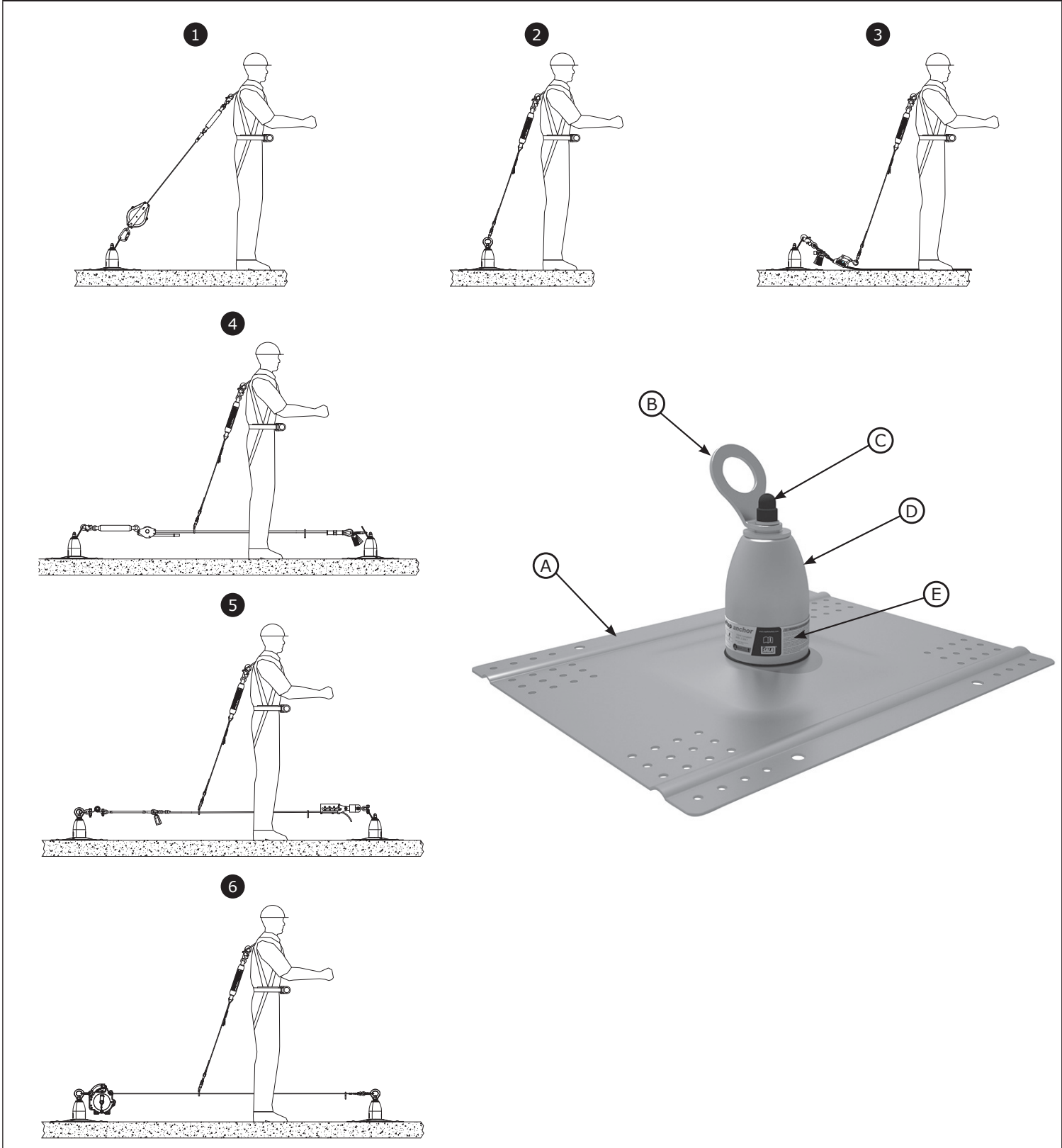
ANSI Z359.1	OSHA
<i>This manual is intended to meet the Manufacturer's Instructions as required by ANSI Z359.1 and should be used as part of an employee training program as required by OSHA.</i>	

## rooftop anchor

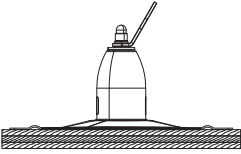
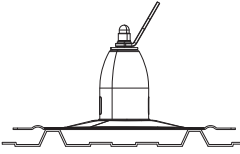




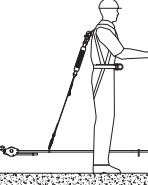
### Metal, Concrete, and Wood Roofs

Model Number: 2100133

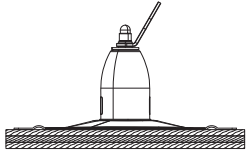
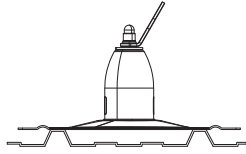
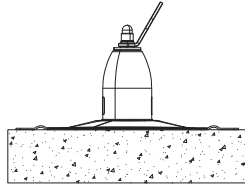
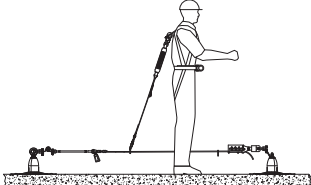
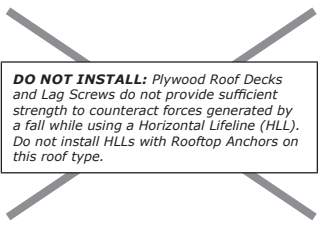
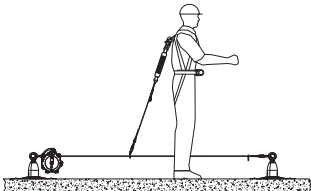
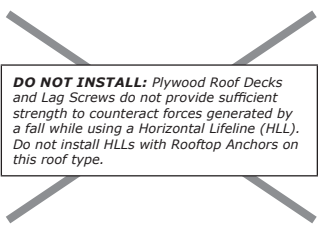
### Figure 1 – Rooftop Anchor - Metal, Concrete, and Wood Roofs



**Table 1 – 2100133 Rooftop Anchor Applications and Required Fasteners**

<p style="transform: rotate(-45deg);"><b>Required Fasteners</b></p>	 <p><b>CDX Plywood Roof Deck:</b> 5/8 in. (16 mm) or Thicker CDX Plywood</p>	 <p><b>Ribbed Metal Roof Decks:</b> 24 Gauge or Thicker with 10 in. (254 mm) to 20 in. (508 mm) Rib Spacing</p>	 <p><b>Concrete Roof Decks:</b> Minimum Concrete Compressive Strength of 3,000 PSI (21 MPa). Minimum Thickness of 6 1/2 in. (16.5 cm) for Adhesive Anchors. Minimum Thickness of 5 in. (13 cm) for Mechanical Anchors.</p>
 <p><b>EZ-Stop™ and Force2™ Energy Absorbing Lanyard</b></p>	<p><b>Lag Screws:</b> 16 total (4 in each corner), 1/4 in. SAE Grade 2 with at least 5 full threads extending through the deck and fully engaged in the plywood.</p> <p><b>Mechanical Anchors:</b> 4 total (1 in each corner). DBI/Sala 7241182/7241183 – Toggle Bolt Kit. For built-up roofs, minimum thickness 4 in (10 cm).</p>	<p><b>Aluminum Blind Rivets:</b> 16 total (4 in each corner). 5/16 x 1 in. (7.7 x 27 mm).</p> <p><b>Fab-lok Fasteners:</b> 16 total (4 in each corner), Elco Construction Products' Fab-Lok® FAC-10-4 (PN EZJ210) for decking to 24 gauge. Contact your vendor regarding Fab-lok fasteners for decking thicker than 1/8 in. (.3175 mm)</p> <p><b>Teks Screws:</b> 16 total (4 in each corner). 1/4 - 14 self-drilling screws. Must be 1/4 in. diameter with at least 5 full threads extending through decking.</p> <p><b>Mechanical Anchors:</b> 4 total (1 in each corner). DBI/Sala 7241182/7241183 – Toggle Bolt Kit. For built-up roofs, minimum thickness 4 in (10 cm).</p>	<p><b>Adhesive Anchors:</b> 4 total (1 in each corner), Hilti® HAS-HIT HY 200 Adhesive Anchor with Hilti® HAS-E Galvanized Steel Threaded Rod (Minimum Size = M12).</p> <p><b>Mechanical Anchors:</b> 4 total (1 in each corner) DBI/Sala 7241182/7241183 – Toggle Bolt Kit (through-bolt application). Hilti® HSL-3 Heavy Duty Sleeve Anchor (Minimum Size = M8).</p>
 <p><b>Ultra-Lok™ Leading Edge Self-Retracting Lifeline</b></p>	<p><b>Lag Screws:</b> 16 total (4 in each corner), 1/4 in. SAE Grade 2 with at least 5 full threads extending through the deck and fully engaged in the plywood.</p> <p><b>Mechanical Anchors:</b> 4 total (1 in each corner). DBI/Sala 7241182/7241183 – Toggle Bolt Kit. For built-up roofs, minimum thickness 4 in (10 cm).</p>	<p><b>Aluminum Blind Rivets:</b> 16 total (4 in each corner). 5/16 x 1 in. (7.7 x 27 mm).</p> <p><b>Fab-lok Fasteners:</b> 16 total (4 in each corner), Elco Construction Products' Fab-Lok® FAC-10-4 (PN EZJ210) for decking to 24 gauge. Contact your vendor regarding Fab-lok fasteners for decking thicker than 1/8 in. (.3175 mm)</p> <p><b>Teks Screws:</b> 16 total (4 in each corner). 1/4 - 14 self-drilling screws. Must be 1/4 in. diameter with at least 5 full threads extending through decking.</p> <p><b>Mechanical Anchors:</b> 4 total (1 in each corner). DBI/Sala 7241182/7241183 – Toggle Bolt Kit. For built-up roofs, minimum thickness 4 in (10 cm).</p>	<p><b>Adhesive Anchors:</b> 4 total (1 in each corner), Hilti® HAS-HIT HY 200 Adhesive Anchor with Hilti® HAS-E Galvanized Steel Threaded Rod (Minimum Size = M12).</p> <p><b>Mechanical Anchors:</b> 4 total (1 in each corner) DBI/Sala 7241182/7241183 – Toggle Bolt Kit (through-bolt application). Hilti® HSL-3 Heavy Duty Sleeve Anchor (Minimum Size = M8).</p>
 <p><b>DBI-SALA or Protecta Rope Grabs or Rope Adjusters and Vertical Lifelines</b></p>	<p><b>Lag Screws:</b> 16 total (4 in each corner), 1/4 in. SAE Grade 2 with at least 5 full threads extending through the deck and fully engaged in the plywood.</p> <p><b>Mechanical Anchors:</b> 4 total (1 in each corner). DBI/Sala 7241182/7241183 – Toggle Bolt Kit. For built-up roofs, minimum thickness 4 in (10 cm).</p>	<p><b>Aluminum Blind Rivets:</b> 16 total (4 in each corner). 5/16 x 1 in. (7.7 x 27 mm).</p> <p><b>Fab-lok Fasteners:</b> 16 total (4 in each corner), Elco Construction Products' Fab-Lok® FAC-10-4 (PN EZJ210) for decking to 24 gauge. Contact your vendor regarding Fab-lok fasteners for decking thicker than 1/8 in. (.3175 mm)</p> <p><b>Teks Screws:</b> 16 total (4 in each corner). 1/4 - 14 self-drilling screws. Must be 1/4 in. diameter with at least 5 full threads extending through decking.</p> <p><b>Mechanical Anchors:</b> 4 total (1 in each corner). DBI/Sala 7241182/7241183 – Toggle Bolt Kit. For built-up roofs, minimum thickness 4 in (10 cm).</p>	<p><b>Adhesive Anchors:</b> 4 total (1 in each corner), Hilti® HAS-HIT HY 200 Adhesive Anchor with Hilti® HAS-E Galvanized Steel Threaded Rod (Minimum Size = M12).</p> <p><b>Mechanical Anchors:</b> 4 total (1 in each corner) DBI/Sala 7241182/7241183 – Toggle Bolt Kit (through-bolt application). Hilti® HSL-3 Heavy Duty Sleeve Anchor (Minimum Size = M8).</p>
 <p><b>Sayflite™ Synthetic Rope Horizontal Lifeline</b></p>	<p><b>Lag Screws:</b> 16 total (4 in each corner), 1/4 in. SAE Grade 2 with at least 5 full threads extending through the deck and fully engaged in the plywood.</p> <p><b>Mechanical Anchors:</b> 4 total (1 in each corner). DBI/Sala 7241182/7241183 – Toggle Bolt Kit. For built-up roofs, minimum thickness 4 in (10 cm).</p>	<p><b>Aluminum Blind Rivets:</b> 16 total (4 in each corner). 5/16 x 1 in. (7.7 x 27 mm).</p> <p><b>Fab-lok Fasteners:</b> 16 total (4 in each corner), Elco Construction Products' Fab-Lok® FAC-10-4 (PN EZJ210) for decking to 24 gauge. Contact your vendor regarding Fab-lok fasteners for decking thicker than 1/8 in. (.3175 mm)</p> <p><b>Teks Screws:</b> 16 total (4 in each corner). 1/4 - 14 self-drilling screws. Must be 1/4 in. diameter with at least 5 full threads extending through decking.</p> <p><b>Mechanical Anchors:</b> 4 total (1 in each corner). DBI/Sala 7241182/7241183 – Toggle Bolt Kit. For built-up roofs, minimum thickness 4 in (10 cm).</p>	<p><b>Adhesive Anchors:</b> 4 total (1 in each corner), Hilti® HAS-HIT HY 200 Adhesive Anchor with Hilti® HAS-E Galvanized Steel Threaded Rod (Minimum Size = M12).</p> <p><b>Mechanical Anchors:</b> 4 total (1 in each corner) DBI/Sala 7241182/7241183 – Toggle Bolt Kit (through-bolt application). Hilti® HSL-3 Heavy Duty Sleeve Anchor (Minimum Size = M8).</p>

**Table 1 – 2100133 Rooftop Anchor Applications and Required Fasteners**

<p style="transform: rotate(-45deg);">Required Fasteners</p>	 <p><b>CDX Plywood Roof Deck:</b> 5/8 in. (16 mm) or Thicker CDX Plywood</p>	 <p><b>Ribbed Metal Roof Decks:</b> 24 Gauge or Thicker with 10 in. (254 mm) to 20 in. (508 mm) Rib Spacing</p>	 <p><b>Concrete Roof Decks:</b> Minimum Concrete Compressive Strength of 3,000 PSI (21 MPa). Minimum Thickness of 6 1/2 in. (16.5 cm) for Adhesive Anchors. Minimum Thickness of 5 in. (13 cm) for Mechanical Anchors.</p>
 <p><b>Sayflin™ Wire Rope Horizontal Lifeline</b></p>	 <p><b>DO NOT INSTALL:</b> Plywood Roof Decks and Lag Screws do not provide sufficient strength to counteract forces generated by a fall while using a Horizontal Lifeline (HLL). Do not install HLLs with Rooftop Anchors on this roof type.</p>	<p><b>Aluminum Blind Rivets with Sealing Washers:</b> 16 total (4 in each corner). 5/16 x 1 in. (7.7 x 27 mm).</p> <p><b>Fab-lok Fasteners:</b> 16 total (4 in each corner), Elco Construction Products' Fab-Lok® FAC-10-4 (PN EZJ210) for decking to 24 gauge. Contact your vendor regarding Fab-lok fasteners for decking thicker than 1/8 in. (.3175 mm)</p> <p><b>DO NOT USE TEKS SCREWS:</b> TekS Screws are not strong enough to counteract the fall forces of a Wire Rope HLL.</p>	<p><b>Adhesive Anchors:</b> 4 total (1 in each corner), Hilti® HAS-HIT HY 200 Adhesive Anchor with Hilti® HAS-E Galvanized Steel Threaded Rod (Minimum Size = M8).</p> <p><b>Mechanical Anchors:</b> 4 total (1 in each corner)</p> <p>DBI/Sala 7241182/7241183 – Toggle Bolt Kit (through-bolt application).</p> <p>Hilti® HSL-3 Heavy Duty Sleeve Anchor (Minimum Size = M8).</p>
 <p><b>EZ-Line™ Retractable Horizontal Lifeline</b></p>	 <p><b>DO NOT INSTALL:</b> Plywood Roof Decks and Lag Screws do not provide sufficient strength to counteract forces generated by a fall while using a Horizontal Lifeline (HLL). Do not install HLLs with Rooftop Anchors on this roof type.</p>	<p><b>Aluminum Blind Rivets with Sealing Washers:</b> 16 total (4 in each corner). 5/16 x 1 in. (7.7 x 27 mm).</p> <p><b>Fab-lok Fasteners:</b> 16 total (4 in each corner), Elco Construction Products' Fab-Lok® FAC-10-4 (PN EZJ210) for decking to 24 gauge. Contact your vendor regarding Fab-lok fasteners for decking thicker than 1/8 in. (.3175 mm)</p> <p><b>DO NOT USE:</b> TekS Screws are not strong enough to counteract the fall forces of a Wire Rope HLL.</p>	<p><b>Adhesive Anchors:</b> 4 total (1 in each corner), Hilti® HAS-HIT HY 150 MAX Adhesive Anchor with Hilti® HAS-E Galvanized Steel Threaded Rod (Minimum Size = M8).</p> <p><b>Mechanical Anchors:</b> 4 total (1 in each corner)</p> <p>DBI/Sala 7241182/7241183 – Toggle Bolt Kit (through-bolt application).</p> <p>Hilti® HSL-3 Heavy Duty Sleeve Anchor (Minimum Size = M8).</p>

## DESCRIPTION:

Figure 1 illustrates the rooftop anchor for Metal, Concrete, and Wood Roofs. The rooftop anchor is comprised of:

- (A) Baseplate for mounting the anchor on roof decks.
- (B) Single Point Top Connector attached to the top of the anchor for connection of a Self-Retracting Lifeline (SRL), Lanyard, or Lifeline subsystem. Includes an Eye that rotates 360 degrees allowing user to walk completely around the anchor without reorienting the lanyard, lifeline, or connectors.
- (C) Protective Nut Cap.
- (D) Protective Weather Cap.
- (E) Product ID/Warning Label.

**WARNING:** This product is part of a personal fall arrest or fall restraint system. These instructions must be provided to the user of this equipment. The user must read and understand these instructions before using this equipment. The user must follow the manufacturer's instructions for each component of the system. Manufacturer's instructions must be followed for proper use and maintenance of this equipment. 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 Capital Safety.

**IMPORTANT:** Before using this equipment, record the product identification information from the ID label in the Inspection and Maintenance Log (Table 2) at the back of this manual.

## 1.0 APPLICATIONS

**1.1 PURPOSE:** The rooftop anchor described in this instruction manual is designed for use on flat roof decks (or sloped roof decks up to 3:12 pitch) constructed from the following materials:

- CDX Plywood
- Corrugated Metal
- Concrete

See Table 1 for specific roof deck requirements.

The rooftop anchor serves as an anchorage connector for Personal Fall Arrest Systems (PFAS) and is intended for use with the following products (see Figure 1):

- DBI-SALA Ultra-Lok™ Leading Edge Self-Retracting Lifelines (Figure 1-1)
- DBI-SALA EZ-Stop™ and Force2™ Energy Absorbing Lanyards (Figure 1-2)
- DBI-SALA or Protecta Rope Grabs or Rope Adjusters and Vertical Lifelines (Figure 1-3)
- DBI-SALA Sayflin™ Synthetic Rope Horizontal Lifeline (HLL) Systems (Figure 1-4)
- DBI-SALA Sayflin™ Wire Rope Horizontal Lifeline (HLL) Systems<sup>1</sup> (Figure 1-5)
- DBI-SALA EZ-Line™ Retractable Horizontal Lifeline (HLL) Systems<sup>1</sup> (Figure 1-6)

See Table 1 for a list of the recommended fasteners for each PFAS and roof deck type.

**WARNING:** Unless otherwise noted, Capital Safety equipment is designed for use with Capital Safety approved components and subsystems only. Substitution or replacement with non-approved components or subsystems may jeopardize compatibility of equipment and may affect safety and reliability of the complete system. Do not hang, lift, or support tool or equipment from the rooftop anchor, or attach guy lines for antennas, phone lines, etc.

**1.2 STANDARDS:** Your rooftop anchor conforms to the national standard(s) identified on the front cover of this instruction manual. Refer to local, state, and federal (OSHA) requirements governing occupational safety for additional information regarding Personal Fall Arrest Systems (PFAS).

**1.3 TRAINING:** It is the responsibility of the users and purchasers of this equipment to assure they are familiar with these instructions, trained in the correct care and use of, and are aware of the operating characteristics, application limitations, and consequences of improper use of this equipment.

**CAUTION:** Training must be conducted without exposing the user to a fall hazard. Training should be repeated on a periodic basis.

**1.4 RESCUE PLAN:** When using this equipment and connecting subsystem(s), the employer must have a rescue plan and the means at hand to implement and communicate that plan to users, authorized persons<sup>2</sup>, and rescuers<sup>3</sup>.

**1.5 INSPECTION FREQUENCY:** The rooftop anchor shall be inspected by the user before each use and, additionally, by a competent person<sup>4</sup> other than the user at intervals of no more than one year<sup>5</sup>. Inspection procedures are described in the "Inspection and Maintenance Log" (Table 2). Results of each Competent Person inspection should be recorded on copies of the "Inspection and Maintenance Log".

**1.6 AFTER A FALL:** rooftop anchors subjected to the forces of arresting a fall must be removed from service immediately and destroyed.

**1 Wire Rope HLL Systems:** Sayflin and EZ-Line Wire Rope HLLs may only be used with rooftop anchors that are attached to the structure with the fasteners specified in the "Roof Type Fastener Reference Chart" (Table 1). Lag Bolts and Tek screws do not provide sufficient strength to counteract forces generated by a fall while using the Wire Rope HLL. The Tension Indicator supplied with Sayflin Wire Rope HLL systems should not be used with rooftop anchors. Instead, visually tension the Horizontal Lifeline to allow 6 to 12 inches (15 to 30 cm) at mid-point of the HLL span.

**2 Authorized Person:** For purposes of the Z359 standards, a person assigned by the employer to perform duties at a location where the person will be exposed to a fall hazard.

**3 Rescuer:** Person or persons other than the rescue subject acting to perform an assisted rescue by operation of a rescue system.

**4 Competent Person:** 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.

**5 Inspection Frequency:** Extreme working conditions (harsh environments, prolonged use, etc.) may require increasing the frequency of competent person inspections.

## 2.0 REQUIREMENTS

Observe the following requirements when planning and installing the rooftop anchor(s) and Personal Fall Arrest System (PFAS):

**2.1 ANCHORAGE STRENGTH:** Anchorage selected for the rooftop anchor shall have a strength capable of sustaining static loads applied in the directions permitted by the system of a least:

- **Energy Absorbing Lanyards, Self-Retracting Lifelines, or Verticle Lifelines:** 5,000 lb (22.2 kN) for non-certified anchorage or two times the maximum arrest force permitted on the system for certified anchorage<sup>6</sup>.
- **Sayflie Wire Rope or EZ-Line Horizontal Lifelines:** 5,000 lbs. (22.2 kN) along the axis of the horizontal lifeline and 3,600 lbs. (16.0 kN) applied in all potential directions of fall arrest that are perpendicular to the axis of the HLL.
- **Sayflie Synthetic Horizontal Lifeline:** 3,600 lbs. (16.0 kN) along the axis of the horizontal lifeline and 3,600 lbs. (16.0 kN) applied in all potential directions of fall arrest that are perpendicular to the axis of the HLL.

**FROM OSHA 1926.500 AND 1910.66:** Anchorages used for attachment of Personal Fall Arrest Systems shall be independent of any anchorage being used to support or suspend platforms, and capable of supporting at least 5,000 lbs (22 kN) per user attached, or be designed, installed, and used as part of a complete Personal Fall Arrest System which maintains a safety factor of a least 2, and is under the supervision of a qualified person.

**2.2 CAPACITY:** The rooftop anchor is designed for use by one person with a combined weight (clothing, tools, etc.) of no more than 310 lbs (141 kg). Only one person (or one PFAS) shall be attached to the top connector on the rooftop anchor at any time. For horizontal lifeline applications, observe the HLL system capacity restrictions.

**2.3 PERSONAL FALL ARREST SYSTEM:** Personal fall arrest systems (PFAS) incorporating a full body harness must be used with the rooftop anchor. The PFAS must meet applicable OSHA, ANSI, state, and federal requirements and should be selected by a Competent Person. See the PFAS equipment manufacturer's product instructions for specifics regarding capabilities and requirements.

**2.4 SRL LOCKING SPEED:** Situations which restrict the speed of the fall should be avoided. Working in confined or cramped spaces may not allow the body to reach sufficient speed to cause the SRL to lock if a fall occurs. Working on slowly shifting material, such as sand or grain, may not allow enough speed buildup to cause the SRL to lock. A clear path is required to assure positive locking of the SRL.

**2.5 FALL CLEARANCE:** There must be sufficient clearance below the user to arrest a fall before the user strikes the ground or other obstruction. Fall clearance is dependent on the following factors:

- Deceleration Distance
- Worker Height
- Elevation of Anchorage Connector
- Free Fall Distance
- Movement of Harness Attachment Element
- Connecting Subsystem Length

See the person fall arrest system manufacturer's instructions for specifics regarding fall clearance calculation.

**2.6 SWING FALLS:** Swing falls occur when the anchorage point is not directly above the point where the fall occurs (see Figure 2). The force of striking an object while swinging from the pendulum effects of a swing fall can cause serious injury. Swing falls can be minimized by limiting the horizontal distance between the user and the anchorage point. In a swing fall, the total vertical fall distance will be greater than if the user had fallen directly below the anchorage point, thus increasing fall clearance required to safely arrest the user's fall. See the PFAS manufacturer's instructions for details regarding swing falls and fall clearance calculation. If a swing fall hazard exists in your application, contact Capital Safety before proceeding.

**SRL SWING FALLS:** In the event of a fall, and SRL will activate (lock up) regardless of the SRL's orientation and location relative to the user's position; however, a common guideline is not to extend the work zone beyond 30° from the anchorage point. (The rooftop anchor swivels allowing a 30° work area on all sides of the rooftop anchor.)

Figure 2 – Swing Falls

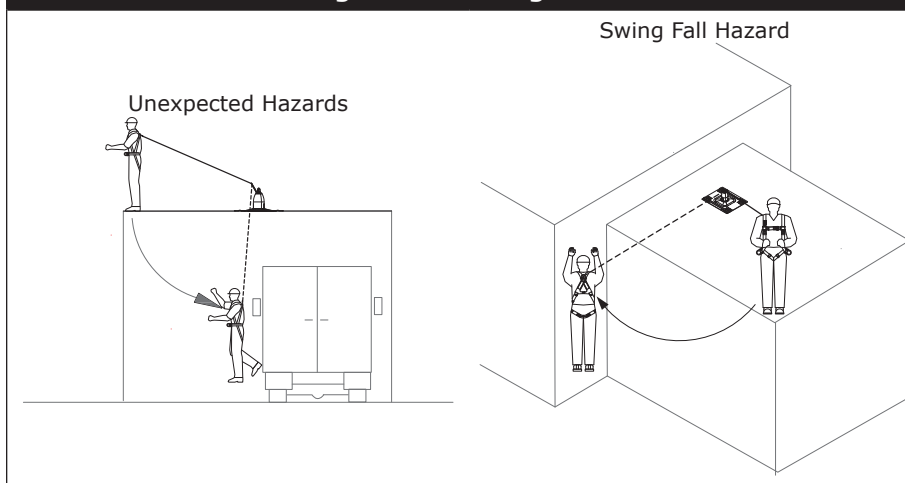
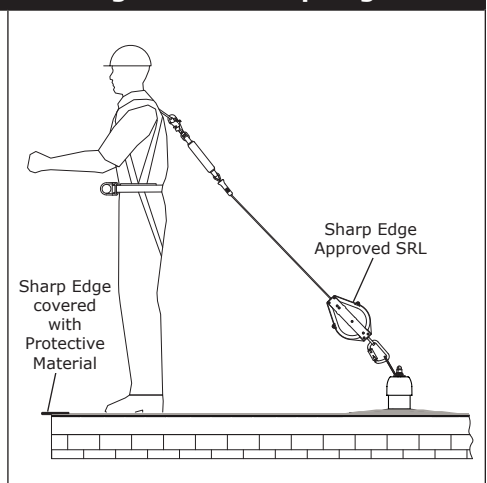


Figure 3 – Sharp Edges



**6 Certified Anchorage:** An anchorage for Fall Arrest, Positioning, Restraint, or Rescue systems that a Qualified Person certifies to be capable of supporting the potential fall forces that could be encountered during a fall or that meet the criteria for a certified anchorage prescribed in the ANSI Z359 standards.

- 2.7 SHARP EDGES:** Avoid working where lifeline or lanyard components of the Personal Fall Arrest System (PFAS) can contact or abrade against unprotected sharp edges (see Figure 3). Where contact with a sharp edge is unavoidable, use fall arrest equipment that is approved for sharp edge applications or cover the edge with protective material.
- 2.8 ENVIRONMENTAL HAZARDS:** Use of this equipment in areas with environmental hazards may require additional precautions to prevent injury to the user or damage to the equipment. Hazards may include, but are not limited to; heat, chemicals, corrosive environments, high voltage power lines, explosive or toxic gases, moving machinery, and sharp edges.
- 2.9 COMPONENT COMPATIBILITY:** Capital Safety equipment is designed for use with Capital Safety approved components and subsystems only. Substitutions or replacements made with non-approved components or subsystems may jeopardize compatibility of equipment and may effect the safety and reliability of the complete system.

**IMPORTANT:** Equipment substitutions require written consent from Capital Safety.

**2.10 CONNECTOR COMPATIBILITY:** 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 Capital Safety if you have any questions about compatibility.

Connectors (hooks, carabiners, and D-rings) must be capable of supporting at least 5,000 lbs. (22.2 kN). 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 4). Connectors must be compatible in size, shape, and strength. Self-locking snap hooks and carabiners are required by ANSI Z359 and OSHA.

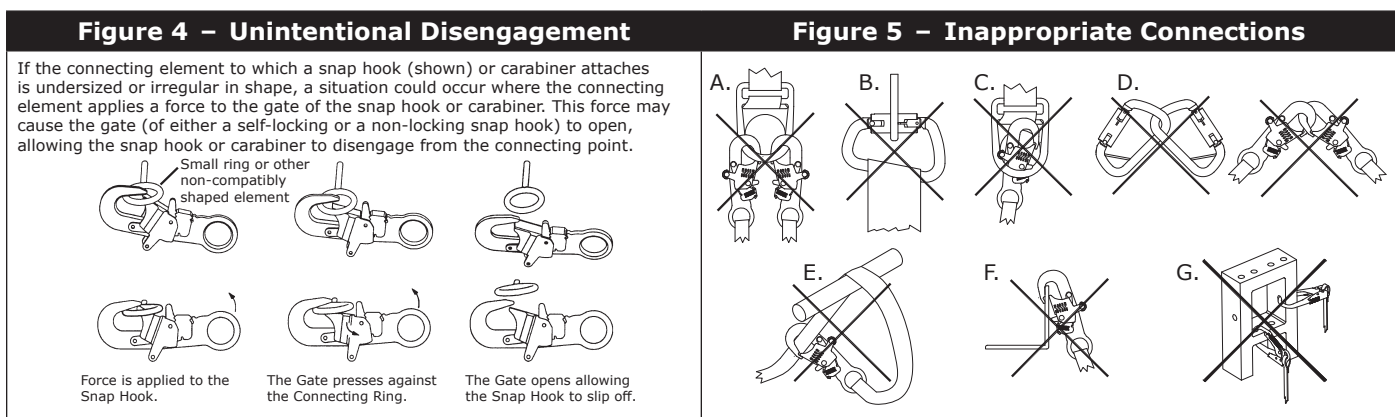
**2.11 MAKING CONNECTIONS:** Snap hooks and carabiners used with this equipment must be self-locking. Ensure all connections are compatible in size, shape and strength. Do not use equipment that is not compatible. Ensure all connectors are fully closed and locked.

Capital Safety connectors (snap hooks and carabiners) are designed to be used only as specified in each product’s user’s instructions. See Figure 5 for examples of inappropriate connections. Do not connect snap hooks and carabiners:

- 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 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, unless the snap hook complies is equipped with a 3,600 lb (16 kN) gate. Check the marking on your snap hook to verify that it is appropriate for your application.

- 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 allows 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.
- G. In a manner that does not allow the connector to align properly while under load.



### 3.0 INSTALLATION

**IMPORTANT:** Do not alter or intentionally misuse this equipment. Consult Capital Safety when installing or using this equipment in combination with components or subsystems other than those described in this manual. Some subsystems and component combinations may interfere with the operation of this equipment.

**3.1 SITE PLAN:** Prior to roof construction, a site plan should be established which defines where the roof top anchors will be installed (see Figure 6) and when, during construction, they may be used. In addition to the requirements defined in Section 2, the site plan should take into account the following considerations:

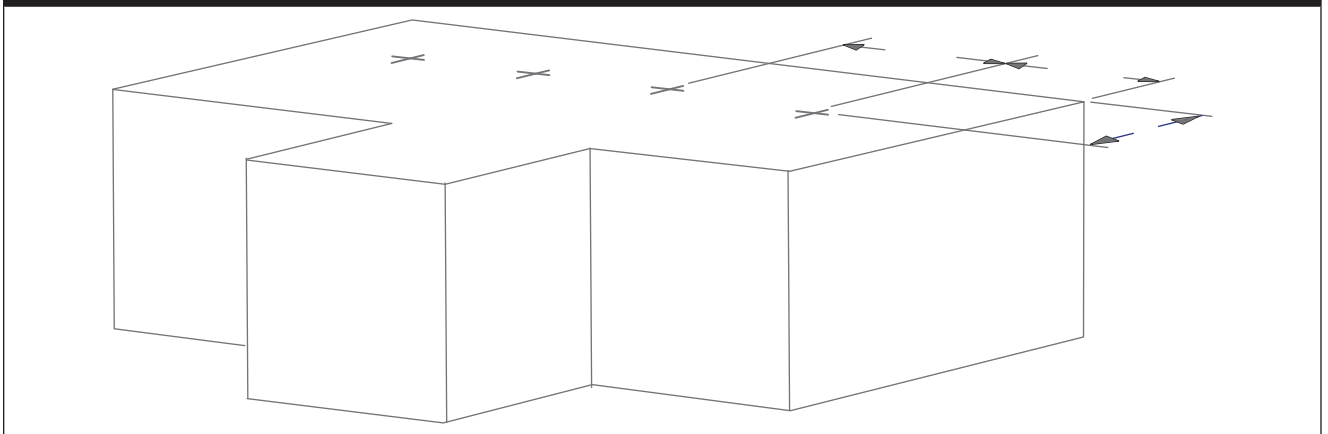
- **Structure:** Structure on which the roof top anchor is installed must meet or exceed the 'Anchorage Strength' requirement stated in Section 2.
- **Fall Protection System:** The Metal, Concrete, and Wood Roof roof top anchor has been tested for use in the fall protection systems illustrated in Table 1. Depending on location of the roof top anchor(s) on the roof deck, the fall protection system is used in a Restraint<sup>7</sup> or Fall Arrest<sup>8</sup> application. For restraint applications, the roof top anchor(s) must be located on the roof deck where they prevent the user from reaching any fall hazard (roof edge, access doorway, etc.).

**RECOMMENDATION:** While all of the systems tested with the roof top anchor are designed for fall arrest, it is recommended that the roof top anchor(s) be located on the roof deck for restraint to enable users to access their work area without exposure to a fall hazard.

- **Roof Type:** The roof top anchor shall only be mounted on flat roofs or sloped roofs not exceeding 3:12 pitch. Roof decks must meet the criteria listed in Table 1.
- **Fasteners:** roof top anchors shall only be attached to the roof deck with the fasteners defined in Table 1 for your fall protection system and roof type.
- **Anchor Position:** The roof top anchor must only be used in an upright position.
- **Roof Support:** Do not install the roof top anchor on unsupported roof structures such as overhangs.
- **Waterproofing:** Follow roofing manufacturer's recommendations for waterproofing of fasteners and attachments used in the installation of this roof top anchor system.

**IMPORTANT:** Use of the roof top anchor with fall protection systems, roof types, or fasteners other than defined in Table 1 must be approved by Capital Safety.

**Figure 6 – Roof Anchor Site plan - Anchor Locations**



**3.2 INSTALLATION ON PLYWOOD ROOF DECKS:** The roof top anchor is designed for use on flat plywood roof decks meeting the requirements defined in Table 1. Supported Personal Fall Arrest Systems (PFAS) and recommended fasteners are also defined in Table 1.

**IMPORTANT:** Use of PFAS or fasteners other than recommended in Table 1 must be approved by Capital Safety.

Figure 7 illustrates installation of the roof top anchor on a plywood roof deck. Roof top anchors shall be inspected prior to installation (see Table 2) and installed in accordance with an approved site plan (see Section 3.1). To install the roof top anchor on a plywood roof deck:

1. With the roof top anchor positioned per the site plan and the anchor's mounting plate as a template, drill four 3/16 in. pilot holes through the decking in each corner of the mounting plate. Wherever possible, use the outermost set of mounting plate holes.
2. On each corner of the mounting plate, install four 1/4 in. SAE Grade 2 Lag Screws through the selected set of mounting holes and into the plywood decking. At least 5 full threads must extend through the deck and be fully engaged in the plywood. (A total of 16 total lag screws per anchor plate.) Tighten the Lag Screws securely.
3. Follow roofing manufacturer's recommendations for waterproofing of fasteners and attachments used in the installation of this roof top anchor system.

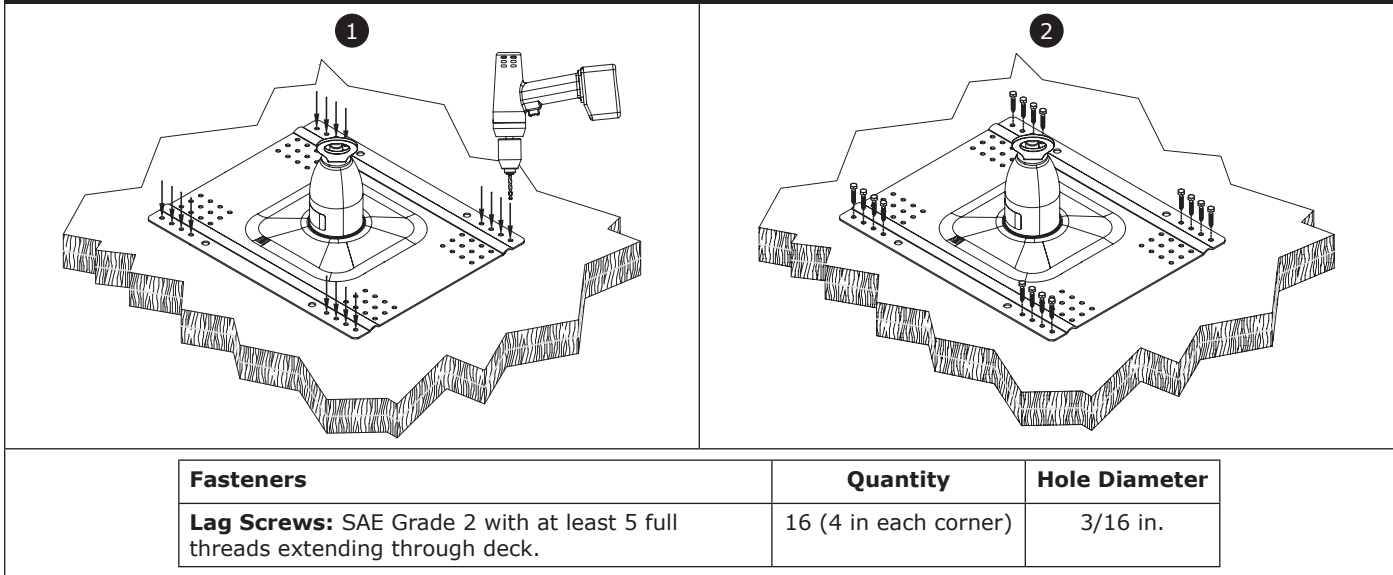
**CAUTION:** Exercise care when tightening the Lag Screws. If screws are over-torqued, the holes in the plywood decking will strip out and will not provide sufficient strength to resist fall arrest forces.

**7 Restraint:** The technique of securing an authorized person to an anchorage using a lanyard/lifeline short enough to prevent the person's center of gravity from reaching the fall hazard.

**8 Fall Arrest:** The action or event of stopping a free fall or the instant where the downward free fall has been stopped.

**WARNING:** Sixteen screws (four in each corner of the mounting plate) must be used to mount the anchor. If not installed correctly, the anchor could pull away from the plywood roof deck during fall arrest, causing serious injury or death.

**Figure 7 – Installation on Plywood Roof Decks**



**3.3 INSTALLATION ON CONCRETE ROOF DECKS:** The Metal, Concrete, and Wood Roof roof top anchor is designed for use on flat concrete roof decks meeting the requirements defined in Table 1. Supported Personal Fall Arrest Systems (PFAS) and recommended fasteners are also defined in Table 1.

**IMPORTANT:** Use of PFAS or fasteners other than recommended in Table 1 must be approved by Capital Safety.

Figure 8 illustrates installation of the roof top anchor on a concrete roof deck. Roof top anchors shall be inspected prior to installation (see Table 2) and installed in accordance with an approved site plan (see Section 3.1). To install the roof top anchor on a concrete roof deck:

1. With the roof top anchor positioned per the site plan and using the anchor’s mounting plate as a template, mark the locations of the four large holes in the mounting plate on the roof deck (Figure 8-1).
2. Remove the roof top anchor and drill four holes at the locations marked in the previous step. See Figure 8 for the hole diameter and hole depth required for your anchor type (adhesive or mechanical).
3. Insert an air nozzle in each mounting hole and blow out any debris with an air pump or low-pressure compressed air.

**CAUTION:** Wear face protection to ensure debris doesn’t blow into your eyes or face.

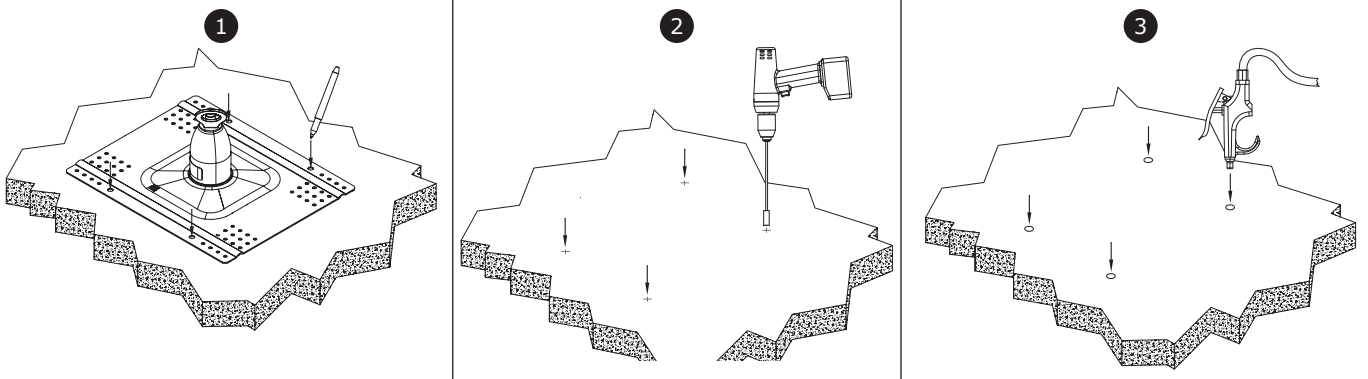
4. Perform the steps specified for your anchor type to secure the roof top anchor to the concrete roof deck:

A	B
<p><b>Adhesive Anchors:</b> Hilti HIT-HY 200 with HAS-E Rod:</p> <ol style="list-style-type: none"> <li>a. Insert the nozzle on the adhesive dispenser to the bottom of each mounting hole and fill each hole 1/2 to 2/3 full of adhesive.</li> </ol> <p><b>NOTE:</b> For a new adhesive cartridge, discard the first three trigger pulls of adhesive before filling the first hole.</p> <ol style="list-style-type: none"> <li>b. Twist a threaded rod into each hole. The rod can be adjusted up, down, or sideways while the adhesive is gelling, but <b>MUST NOT</b> be moved while the adhesive is curing. Consult the manufacturer’s instructions to determine the specific gel time and cure time for your current temperature.</li> <li>c. Position the roof top anchor mounting plate on the threaded rods. Install a flat washer and hex nut on each threaded rod.</li> <li>d. After the adhesive fully cures tighten each hex nut to 30 ft-lbs (40 Nm).</li> <li>e. Cut off excess rod extending beyond top of hex nut.</li> </ol>	<p><b>Mechanical Anchors:</b> Hilti HSL-3 (M8) Sleeve Anchor or equivalent. Follow manufacturer’s instructions:</p> <ol style="list-style-type: none"> <li>a. Position the four large holes in the roof top anchor mounting plate over the four holes that were drilled in the roof deck.</li> <li>b. Install a 38 mm (1-1/2 in) or larger washer on each of four mechanical anchors. Washer must rest below the hex head of the mechanical anchor. The hole in the washer must be small enough to prevent the anchor head from passing through the washer.</li> <li>c. Tap mechanical anchors through the mounting plate and into each of the four drilled holes in the roof deck until the washer under the hex head of the anchors contacts the top of the mounting plate.</li> <li>d. Tighten the hex head on each mechanical anchor to 18 ft-lbs (25 Nm).</li> </ol>

5. Follow roofing manufacturer’s recommendations for waterproofing of fasteners and attachments used in the installation of this roof top anchor system.

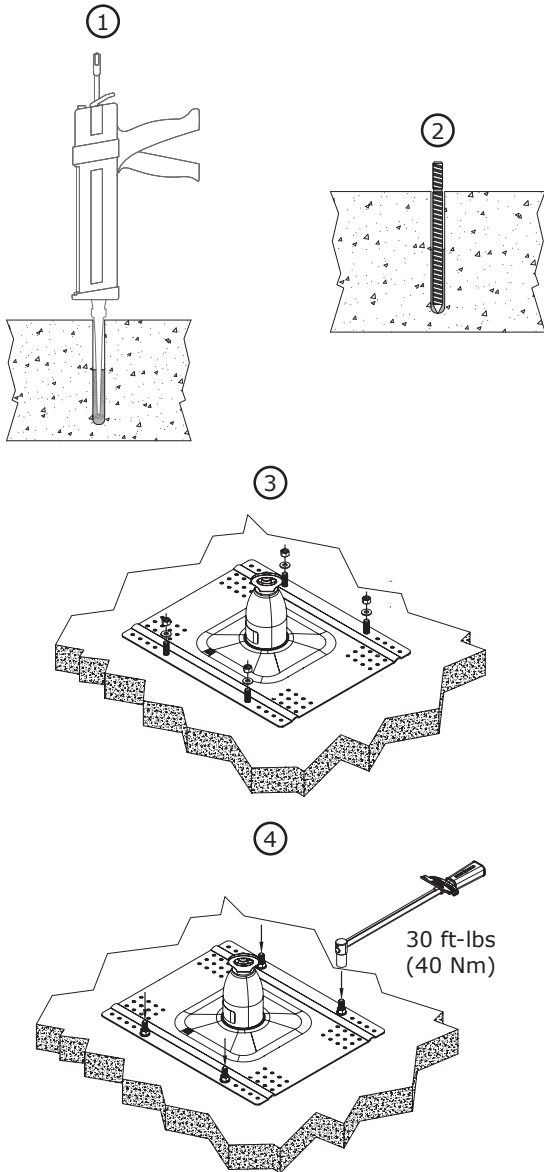


**Figure 8 – Installation on Concrete Roof Decks**



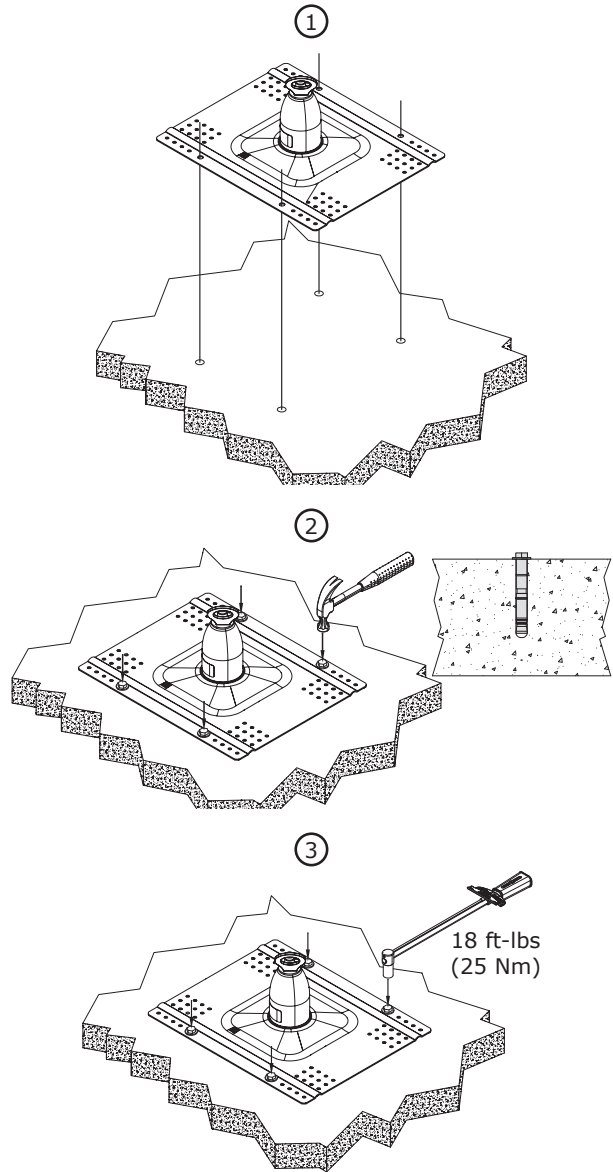
**4A**

Adhesive Anchor	Hole Diameter	Hole Depth
Hilti HAS-E 1/2 in (M12) Threaded Rod	9/16 in (14 mm)	5 in (12.7 cm)



**4B**

Mechanical Anchor	Hole Diameter	Hole Depth
Hilti HSL-3 (M8) Sleeve Anchor	12 mm	4 in (10 cm)



**3.4 INSTALLATION ON RIBBED METAL ROOF DECKS:** The Metal, Concrete, and Wood Roof roof top anchor is designed for use on flat ribbed metal roof decks meeting the requirements defined in Table 1. Supported personal fall arrest systems (PFAS) and recommended fasteners are also defined in Table 1.

**IMPORTANT:** Use of PFAS or fasteners other than recommended in Table 1 must be approved by Capital Safety.

Figure 9 illustrates installation of the roof top anchor on a ribbed metal roof deck. Roof top anchors shall be inspected prior to installation (see Table 2) and installed in accordance with an approved site plan (see Section 3.1).

To install the roof top anchor on a ribbed metal roof deck:

**Using Fablok Fasteners:** The roof top anchor may be secured using sixteen (16) Fablok fasteners of appropriate length for the decking thickness (FAC-10-4 manufactured by Textron Fastening Systems to 24 gauge or thicker steel decking). Decking thicker than 1/8 in. requires longer fasteners. Contact your vendor for information on longer Fablok fasteners.

1. Place the roof top anchor in position on the steel decking ribs. Drill (4) 5/16 in. diameter pilot holes through the ribs in each set of four mounting holes being used. Locate each hole as closely as possible to the center of a decking rib (see Figure 9-1). Apply sealing tape or silicone caulking over the drilled holes.
2. Align the pilot holes drilled in the decking ribs with the holes in the roof top anchor base plate. Press the base plate in position to ensure full contact with the sealing tape or caulking. Install four (4) Fablok fasteners in each set of anchor plate mounting holes (see Figure 9-2A).
3. Tighten the Fablok fastener using a 5/8 in. 12 point box end wrench to hold the fastener base and a drill with a 5/16 in. 6 point nut driver on the fastener head.

**IMPORTANT:** Sixteen (16) Fablok fasteners (four in each set of anchor plate mounting holes) must be used to fasten the anchor. If the anchor is not installed correctly the anchor could pull away from the roof structure during a fall arrest, causing a serious injury or death.

**Using Screws:** The roof anchor may be secured using sixteen (16) 1/4 - 14 self drilling sheet metal screws (Tek screws). The screws must be 1/4 inch in diameter and a length that leaves at least five full threads protruding through the decking.

1. Sealing tape or silicone caulking should be applied to the metal roof deck before securing the roof top anchor. Place the roof top anchor in position on the steel decking ribs to determine appropriate sealing tape or silicone caulking locations. Remove the anchor and apply tape or caulking.
2. Press the base plate in position to ensure full contact with the sealing tape or caulking. Secure the base plate to the decking using four (4) screws in each set of anchor plate mounting holes (see Figure 9-2B).

**CAUTION:** Use care when tightening self-drilling screws. If screws are over torqued the holes in the metal decking will strip out, and will not provide sufficient strength to resist fall arrest forces.

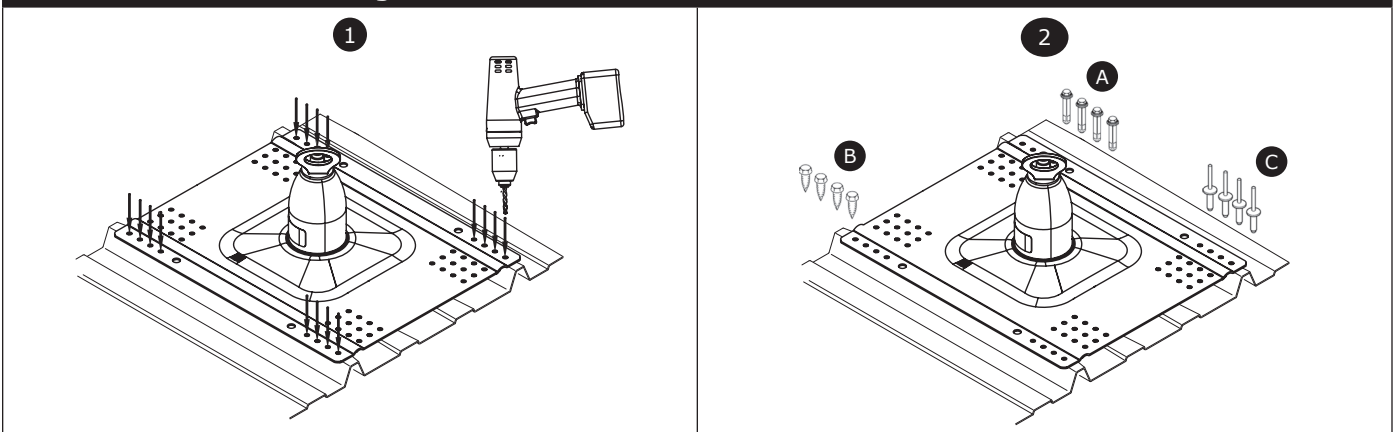
**WARNING:** Sixteen (16) screws (four in each set of anchor plate mounting holes) must be used to fasten the anchor. If the anchor is not installed correctly the anchor could pull away from the roof structure during a fall arrest, causing a serious injury or death.

**Using Rivets:** The roof anchor may be secured using sixteen (16) aluminum blind rivets, 5/16 x 1 in. (7.7 x 27 mm).

1. Place the roof top anchor into position and drill four (4) 5/16 in. diameter pilot holes through the steel decking in each set of anchor plate mounting holes (See Figure 9-2C). Remove the roof top anchor and apply a strip of sealing tape or silicone caulking over the drilled holes.
2. Align the pilot holes drilled in the decking ribs with the holes in the roof top anchor base plate. Press the base plate in position to ensure full contact with the sealing tape or caulking. Install four (4) rivets in each set of anchor plate mounting holes using an appropriate riveting tool.

**WARNING:** Sixteen (16) rivets (four in each set of anchor plate mounting holes) must be used to fasten the anchor. If the anchor is not installed correctly the anchor could pull away from the roof structure during a fall arrest, causing a serious injury or death.

**Figure 9 – Installation on Ribbed Metal Roof Decks**



Fasteners	Quantity	Hole Diameter
<b>Fablok Fasteners (C):</b> Appropriate length	16 (4 in each corner)	5/16 in.
<b>Teks Screws (D):</b> 1/4 - 4	16 (4 in each corner)	Self drilling
<b>Aluminum Blind Rivets (E):</b> 5/16 x 1 in. (7.7 x 27 mm)	16 (4 in each corner)	5/16 in.

**3.5 INSTALLATION USING DBI/SALA TOGGLE BOLTS:** If the roof structure is “built-up,” the preferred method of installation of the roof top anchor is with the use of DBI/SALA toggle bolts. The toggle bolts are designed to accommodate the maximum total roofing material thicknesses (including insulation and decking) listed below.

Toggle Bolt Kit (Set of 4)	Max. Material Thickness (Membrane & Decking)
7241182	6 in (15.2 cm)
7241183	12 in (30.5 cm)

Roof decks must meet the requirements defined in Table 1. Supported Personal Fall Arrest Systems (PFAS) and recommended fasteners are also defined in Table 1.

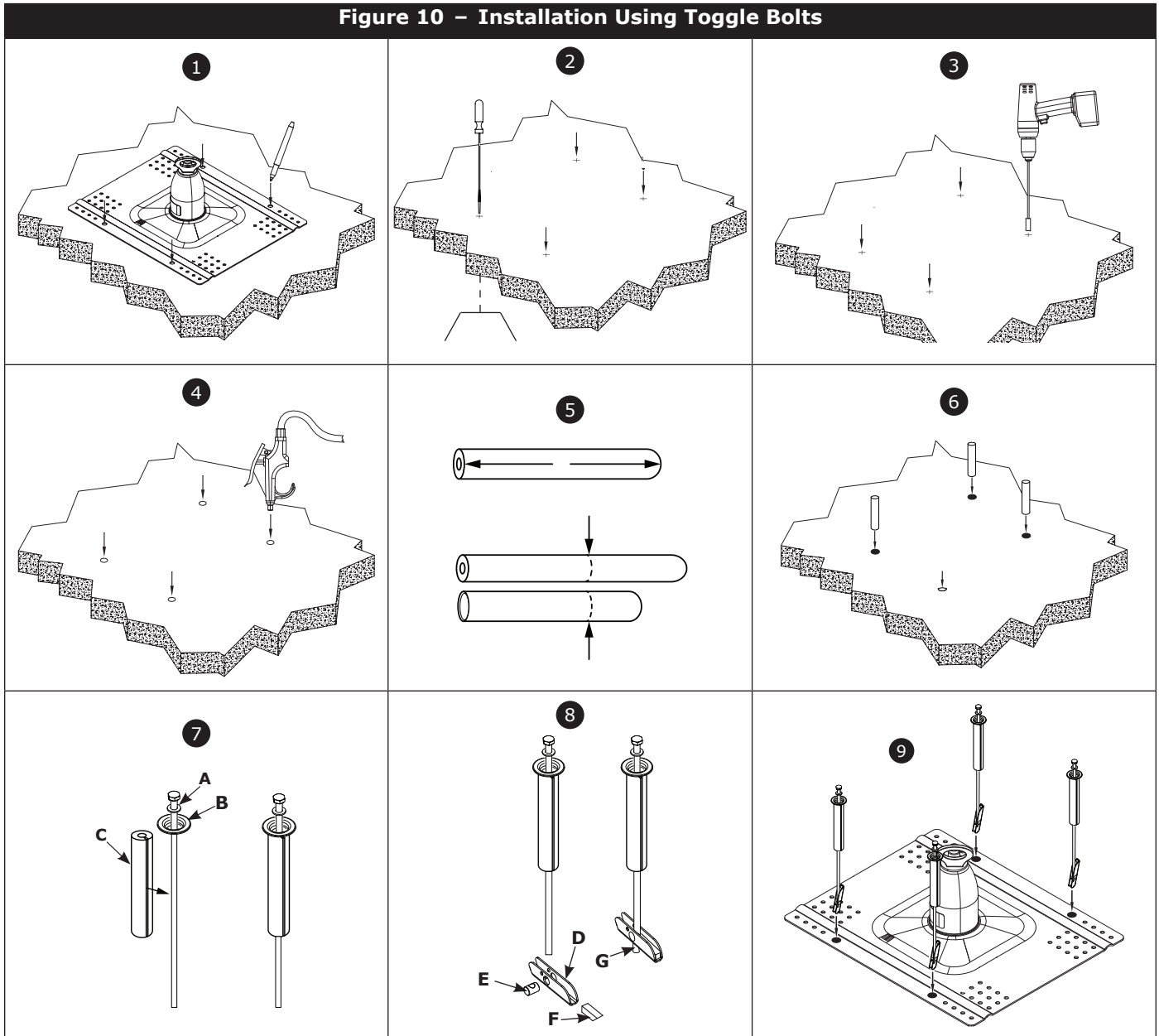
**IMPORTANT:** Use of PFAS or fasteners other than recommended in Table 1 must be approved by Capital Safety.

Figure 10 illustrates installation of the roof top anchor using DBI/SALA Toggle Bolts. Roof top anchors shall be inspected prior to installation (see Table 2) and installed in accordance with an approved site plan (see Section 3.1). To install the roof top anchor using toggle bolts:

1. With the roof top anchor positioned per the site plan and using the anchor’s mounting plate as a template, mark the locations of four mounting holes on the roof. (Figure 10-1).
2. On roofs which have an underlying metal roof deck: Using a thin probe, penetrate the membrane and insulation at each of the four hole locations until the probe contacts the metal roof deck. Each hole location must be centered on the top surface of a metal roof rib. (Figure 10-2) Drill test holes using a long 1/4 in (6.35 mm) drill bit. If you feel the drill deflect on the sloped side of a roof rib, reposition the roof top anchor and retest hole locations as necessary until all four holes are properly centered on roof ribs.

Remove the roof top anchor and, at the four mounting hole locations, drill holes through the entire membrane, insulation and metal roof deck structure using a bi-metal 1-1/8 in (29 mm) hole saw. (Figure 10-3)

**Figure 10 – Installation Using Toggle Bolts**



On roofs which have an underlying wood roof deck: Remove the roof top anchor and, at the four mounting hole locations, drill holes through the entire membrane, insulation and wood roof deck structure using a 1-1/8 in (29 mm) hole saw. (Figure 10-3)

On roofs which have an underlying concrete roof deck: Remove the roof top anchor and, at the four mounting hole locations, drill holes through the entire membrane, insulation and into the concrete deck structure using a 1-1/8 in. (29 mm) concrete hole saw or drill. The saw or drill must find a cast-in void in the concrete or fully penetrate the concrete structure. Each toggle bolt toggle must be able to fully open in or beneath the concrete to serve as a reliable anchor.

3. Insert an air nozzle in each mounting hole and blow out any debris with an air pump or low-pressure compressed air (Figure 10-4). Remove debris from the roof top anchor installation area.

**CAUTION:** Wear face protection to ensure debris doesn't blow into your eyes or face.

4. Measure the depth of the drilled mounting holes (top of the roof surface to the top of the surface of the roof structure that supports the insulation and membrane). Stretch each piece of toggle bolt foam insulation lengthwise (Figure 10-5). Mark and cut the toggle bolt foam insulation pieces and alignment tubes to the hole depth measurement.
5. Insert an alignment tube into each hole. (Figure 10-6) The top of each alignment tube should be even with or below the top of the membrane surface. The alignment tube must not extend above the top of the membrane surface.
6. Install a washer (A) and toggle insert (B) on each toggle bolt. (Figure 10-7) Install foam insulation (C) on each toggle bolt by opening the slot in the foam and inserting the toggle bolt lengthwise into the foam.
7. Assemble toggle (D), toggle nut (E), and foam insert (F) on each toggle bolt. (See Figure 10-8) Thread the toggle onto the toggle bolts to a depth of three threads (G).

**IMPORTANT:** Four toggle bolts (one in each anchor plate mounting hole) MUST be used to fasten the roof top anchor. If the anchor is not installed correctly the roof top anchor could pull away from the roof structure during a fall arrest and cause a serious injury or death.

8. Place the roof top anchor on the membrane surface. Align anchor mounting plate holes with the holes drilled in the roof deck. With the assembled toggle bolts in position (toggle extended to full length and the longest part of the toggle pointing upward) fully insert toggle bolts through the roof top anchor mounting plate and through the holes in the roof structure. Each toggle must open below the roof deck (or in a cast-in void in a concrete roof deck) to properly anchor the toggle bolt. (See Figure 10-9)
9. Pull up on each toggle bolt to lock the toggle in place under the roof deck. Tighten each toggle bolt to 11 ft-lbs. (15 Nm).
10. Follow roofing manufacturer's recommendations for waterproofing of fasteners and attachments used in the installation of this roof top anchor system. The manufacturer may also recommend that a large area of roofing material be used to form a seal over the entire roof top anchor base.

## 4.0 INSPECTION

- 4.1 **INSPECTION FREQUENCY:** The roof top anchor must be inspected at the intervals defined in Section 1. Inspection procedures are described in the "Inspection and Maintenance Log" (Table 1). Inspect all other components of the fall protection system per the frequencies and procedures defined in the manufacturer's instructions.
- 4.2 **DEFECTS:** If inspection reveals an unsafe or defective condition, remove the roof top anchor from service immediately and replace. Do not attempt to repair the roof top anchor.
- 4.3 **PRODUCT LIFE:** The functional life of the roof top anchor is determined by work conditions and maintenance. As long as the product passes inspection criteria, it may remain in service.

## 5.0 MAINTENANCE, SERVICING, STORAGE

- 5.1 **CLEANING:** Periodically clean The roof top anchor with a soft brush, warm water, and a mild soap solution. Ensure parts are thoroughly rinsed with clean water.

**IMPORTANT:** Although highly resistant to chemicals and environmental conditions, avoid contaminating the roof top anchor with acids, bitumen, cement, paint, cleaning fluids, etc. If the roof top anchor contacts acids or other caustic chemicals, remove from service and wash with water and a mild soap solution. Inspect per Table 2 before returning to service.

- 5.2 **SERVICE:** The roof top anchor is not repairable. If the anchor has been subject to fall force or inspection reveals an unsafe or defective condition, remove the anchor from service/

**IMPORTANT:** Only Capital Safety or parties authorized in writing may make repairs to this equipment.

- 5.3 **STORAGE:** When not in use, store roof top anchors in a cool, dry, clean environment out of direct sunlight. Avoid areas where chemical vapors may exist. Thoroughly inspect components after extended storage.

## 6.0 LABELS

- 6.1 The Product ID/Warning label must be attached to the roof top anchor and completely legible. Label location is shown in Figure 1 as item E. See manufacturer's instructions for subsystem component labels.









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