



# TRUSS ANCHORING

A guide on the use of Howe and Fink truss anchors



# TABLE OF CONTENTS

# 04

## INTRODUCTION

# 06

## REQUIREMENTS TO USE THIS METHOD

- 7** Worker requirements
- 8** Building and roof specifications

# 10

## CONSTRUCTION OF TRUSS TRIPLET ANCHORAGE

- 11** Categories of bracing
- 12** Strapping
- 13** Strongback
- 14** Diagonal bracing
- 15** Installation of anchor strap

# 16

## TRAVEL RESTRAINT

- 19** Lanyard travel restraint
- 20** Life safety rope travel restraint
- 21** Double travel restraint along an edge
- 24** Double travel restraint to reach a corner

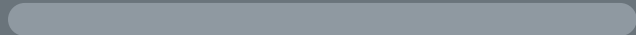
# 27

## FALL ARREST

- 30** Standing on the roof
- 32** Standing on the bottom chord of truss
- 34** Potential to fall off the gable or edge (eave)
- 36** Working below the gable or edge (eave)



# 1. INTRODUCTION



Building Industry and Land Development Alberta Association (BILD Alberta) along with partner companies and organizations developed this method for creating fall protection anchors, rated for one worker, on partially sheeted wooden roofs.

An engineering firm, specializing in the field of fall protection, was retained to do an engineering review of the proposed anchor system during the fall of 2015. Investigation and testing proved that the system described in this document provides adequate strength (minimum factor of safety of 2) to meet the requirements of Alberta's Occupational Health and Safety (OHS) Code, Part 9.

The engineering review also included examination of the total fall distances and clearances required for using the system as a fall arrest anchorage, and concluded that in some cases (on lower roofs), use of this fall protection system may not prevent a worker from impacting a lower level.

This best practice guideline is only applicable to roofs constructed using conventional wooden Howe and Fink trusses in accordance with specifications outlined in this document.

## COPYRIGHT AND TERMS OF USE

This material, including copyright and marks under the **Trade Marks Act** (Canada) is owned by the BILD Alberta and protected by law.

This material may be used, reproduced, stored or transmitted for non-commercial purpose. However, BILD Alberta copyright is to be acknowledged. If it is to be used, reproduced, stored or transmitted for commercial purposes, written consent of BILD Alberta is necessary.

## DISCLAIMER

This resource does not replace the **OHS Act**, Regulation and Code and does not exempt readers from their responsibilities under the legislation.

The information provided in this guidance document is solely for the user's information and convenience and, while thought to be accurate and useable, is provided without warranty of any kind. If in doubt, please refer to the current edition of the **OHS Act**, Regulation and Code. BILD Alberta, High Engineering Corp., The Crown, its agents, employees or contractors will not be liable for any damages, direct or indirect, arising out

of your use of information contained in this document.

## PURPOSE

This guide may assist employers with creation of appropriate fall protection anchorages on the most common types of wooden roofs.

These anchorages may be used during completion of the sheeting, subsequent installation of vents, stacks, antennae, shingles and other roofing materials, and (where walls are high enough to make clearances adequate), work on walls below the roof, including installation of siding, stucco, windows, etc.

Evaluate your circumstances to confirm whether this document may be used in whole or in part to establish an appropriate program for your worksite. Consult relevant professionals (e.g. health and safety professionals, engineers), when this plan does not properly match the work that is being undertaken, to help develop policies, plans and procedures matching specific needs of any particular worksite.

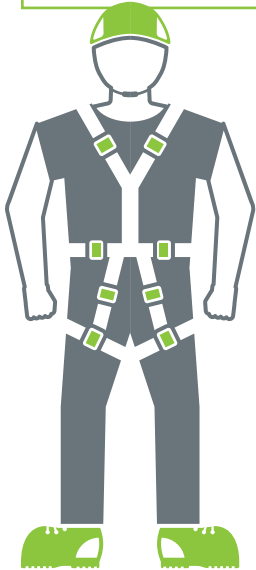


## 2. REQUIREMENTS TO USE THIS METHOD



To use this tie-off method the following requirements must be met:

- Worker Requirements (this page)
- Building and Roof Requirements (pages 8-16)
- Fall Protection Requirements (pages 17-37)
  - Travel Restraint
  - Fall Arrest



## Worker Requirements



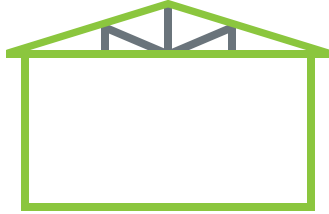
Workers must be competent in the following:

- Roof construction: framing, sheeting, or application of shingles or other roofing
- The use of the appropriate fall protection equipment such as fall arrest and travel restraint.
- The construction of the truss triplet in accordance with these procedures. This requirement is not mandatory for workers who only use anchors properly installed by others who have met this requirement.



The maximum worker weight, including all tools and equipment, is **250 lb (113 KG)**.

## Building and Roof Requirements



These procedures only apply to conventional wood-frame structures meeting Alberta Building Code requirements



Howe



Fink

Roof Trusses must be **HOWE OR FINK** - No other truss types may be used for this method



Building walls must be fully clad



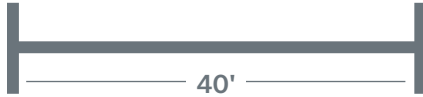
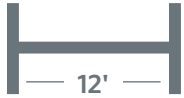
The peak of the truss must be located in the middle of the truss length



Slopes from the truss ends to the peak must be between 3:12 and 12:12



## Building and Roof Requirements



The truss span must be between  
12 and 40 feet

# 21 PSF

Trusses will be designed and built of 2x4 or 2x6 lumber to support a minimum 21 pounds per square foot live load. Truss construction must be conventional using Canadian Construction Materials Centre approved steel plates meeting current Truss Plate Institute of Canada design requirements.

# 16" – 24"

Trusses must be installed 16 to 24 inches centre to centre, secured to the top plates of walls and all temporary bracing installed per the "Western Wood Truss Association Handling, Erection, and Bracing of Wood Trusses" guidelines. As applicable, all hangers and connection hardware must be completely installed.

# 2x4 or 2x6

The lumber used for bracing is #2 or better. 2x4 lumber, or when called for in this plan, 2x6.



The bottom row of roof sheathing must be installed prior to using the anchors.

**While creating this structure you must find other means of fall protection such as Mobile Elevated Work Platforms (MEWPs). This applies both during the construction of the house and the creation of the truss triplet anchorage (TTA).**



# 3. CONSTRUCTION

OF TRUSS TRIPLET ANCHORAGE (TTA)



The following section shows how to install the bracing on both Howe and Fink trusses to create the Truss Triplet Anchorage (TTA). The TTA is key to ensuring that the trusses are able to withstand the forces involved in a fall arrest situation. Both types of trusses require all 3 categories of bracing, however its placement varies between them.

## Categories of Bracing

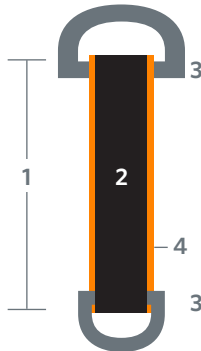
- 1 **Strapping** - The purpose of the strapping is to brace the trusses from pulling over when a lanyard or line deflects over a truss. It also distributes fall arrest loadings, reduces the opening at the peak so a worker is less likely to fall through, and provides a platform for the anchor strap to drape over to hold the connection ring of the anchor sling as high as possible.
- 2 **Strongback** - The purpose of the strongback is to distribute the loading across the TTA.
- 3 **Diagonal Bracing** - The diagonal bracing serves as the main mechanism to distribute loading across the truss.



Nails must be used to fasten all three types of bracing. The bracing will be secured to the roof trusses (Howe or Fink) at all contact points using **16 penny (3 1/4") nails**.



A minimum of 2 nails are required for 2x4 members (strapping and diagonal bracing) and 3 nails for the 2x6 strongbacks. Screws are not to be used due to their brittle nature and potential to fail if overloaded.

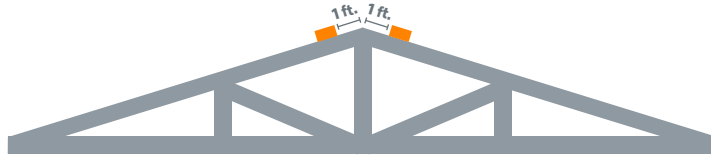


The anchor straps installed on the truss triplets anchorage must be approved to CSA Z259.15 or ANSI Z359.1 and must meet the following criteria:

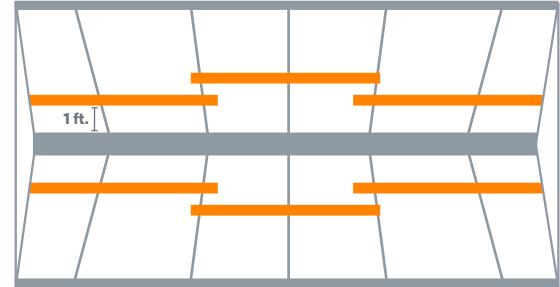
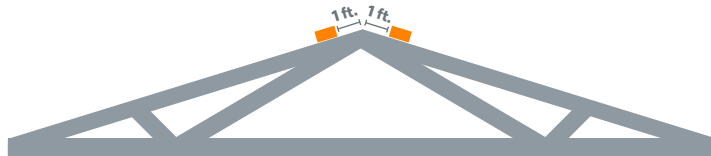
1. 3 feet long (+/- 3 inches)
2. Made from webbing
3. Choking style (small D-ring on one end to pass through the large D-ring on the opposite end)
4. Include a wear pad

## 1) Strapping

### Howe Truss



### Fink Truss

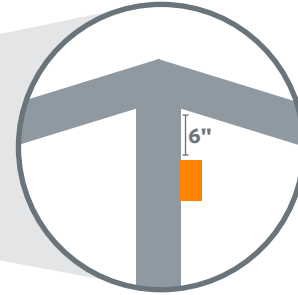


The strapping must be completed with 2x4 members and have 2 nails at each contact point. This strapping should span the full length of the roof, but not less than the distance from the middle truss of the TTA to the furthest point a worker is permitted or intending to travel while connected to the TTA. The strapping must be nailed to each truss it crosses. Splices in strapping must be accomplished by nailing both segments to the same truss.

## 2) Strongback

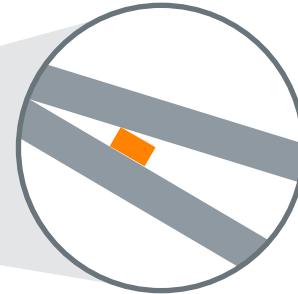
The strongback must be completed using 2x6 members and have 3 nails at each contact point. It must connect to a minimum of 3 trusses and extend at least one truss past the location where the anchor strap will be installed.

### Howe Truss



**Howe:** The strongback must be installed with up to a 6 inch gap between it and the top chord

### Fink Truss



**Fink:** The strongback must be installed so it touches both the truss diagonal and the top chord

### 3) Diagonal Bracing

The diagonal bracing must be completed using 2x4 members and have 2 nails at each contact point. Diagonal bracing should be one piece (no splices allowed). It must connect to a minimum of 3 trusses and extend at least one truss past the location where the anchor strap will be installed.

#### Howe Truss



The brace should be long enough to span diagonally corner to corner the whole height of the King post.

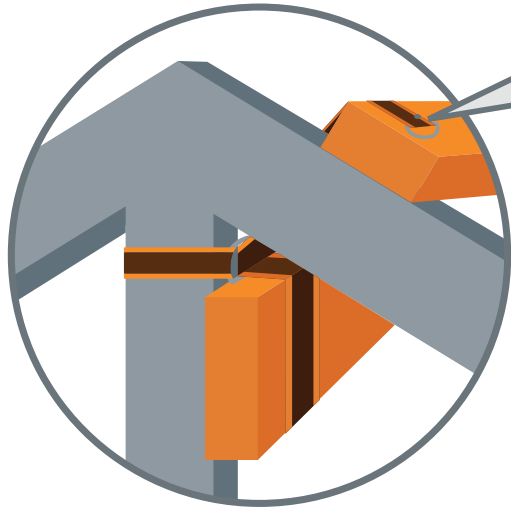
#### Fink Truss



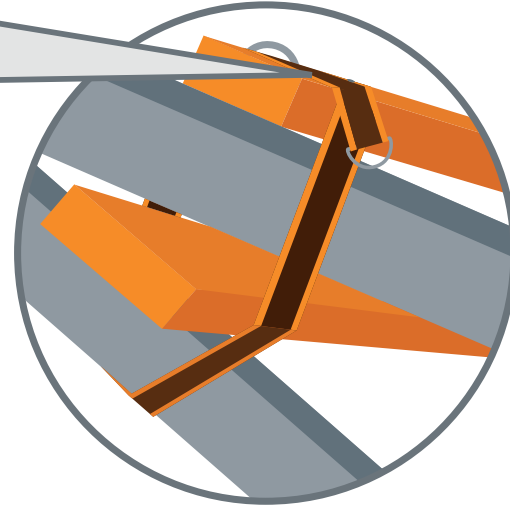
The brace should be long enough to span diagonally corner to corner from the peak to the bottom chord along the diagonal.

## Installation of the Anchor Strap

### Howe Truss



### Fink Truss



A finishing nail will be put through the ABRASION PAD to secure the anchor strap in place.

**Once the Truss Triplet Anchorage (TTA) has been properly assembled there are two options for how you will use the anchor: Travel Restraint OR Fall Arrest**



## 4. TRAVEL RESTRAINT





## Travel Restraint

Travel restraint does not allow a worker to enter a zone where a fall is possible. Since there is no risk of a fall this option must always be explored before moving to fall arrest. Travel restraint requires workers to have a lanyard (or life safety rope with the rope grab parked) that's length does not allow a worker to reach the edge of the roof, or an opening in the roof.

Travel restraint is only possible once sufficient sheeting is secured to the roof to cover any holes a worker may fall through that are within the range allowed by their lanyard or life safety rope.

### When using travel restraint:

- The length of the line between the anchor and the worker must be the proper length so that a worker is **NOT** able to reach an edge and therefore cannot fall off of the edge.
- Travel restraint with only a single line will **NOT** allow you to work in a corner. If you can reach a corner, the rope is too long and could allow a fall off an edge.

### Legend



Roof - Top View



Anchor point



Worker



Safe working zone



Correct lanyard length



Incorrect lanyard length

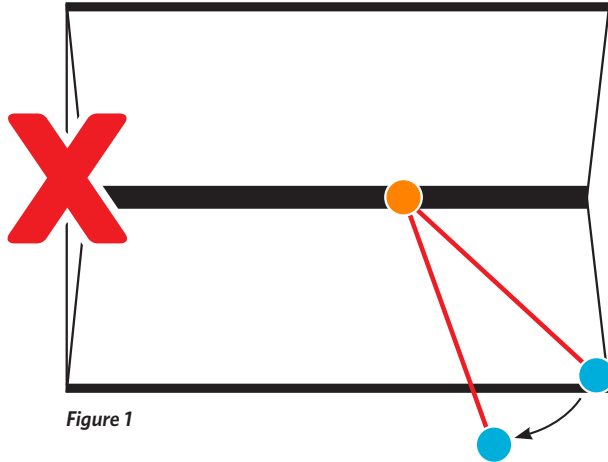


Figure 1

Figure 1 shows how the length of line between the anchor and the worker **will not** prevent the worker from falling off the roof. Figure 2 shows that once the line is shortened to make it impossible to fall off, there is a substantial circular working area that is protected by travel restraint but also areas along the edge that the worker cannot reach. Workers must be aware that there will be areas along the edges that can only be reached using double travel restraint. (see page 21 - 26)

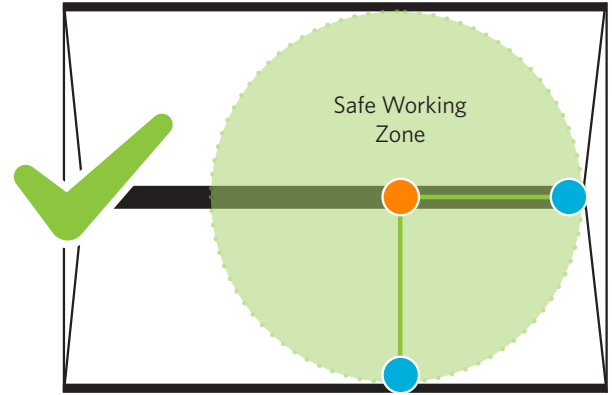


Figure 2

In all of the following fall restraint procedures, “Safe Access” and “Safely Access” mean that you must be protected from falling as you access the stipulated point(s) to set up your travel restraint system. This can be accomplished through the use of manlifts, ladders, or where footing is secure, crawling or continuous 3-point contact with the structure. This may involve connection to a fall arrest system.

**WARNING:** Self-retracting devices (SRD) are not approved for use with the Truss Triplet Anchorage because they generally cannot keep their user in travel restraint, are usually not rated for large free falls that may occur if a worker falls, and may often require greater clearance than lanyard and lifeline systems. Consult with a health and safety professional or engineer specializing in fall protection before using an SRD.

## Option #1 Lanyard Travel Restraint

Applicable when the worker does not need to work near any unprotected edges and the lanyard length ensures that they cannot reach an unprotected edge.

### Required Equipment

- Workers must wear full body harnesses approved to CSA Z259.10 Class A, AS, AD or ADP or ANSI Z359.1. Stretch-web harnesses that have webbing that is easily stretched to make them more comfortable must not be used.
- Maximum 6 foot lanyard approved to CSA Z259.11 Class E6.

### Procedure

- At a safe location, inspect and don a full body harness in accordance with your training.
- Inspect the lanyard in accordance with your training.
- Connect the snaphook closest to the personal energy absorber to the dorsal D-ring of the harness.
- Safely access the Truss Triplet Anchorage (TTA) and connect the other snaphook to the small ring on the anchor strap.
- Proceed with the work.
- After the work is complete, safely access the TTA, disconnect from it and use safe egress techniques to move off the roof.

## Option #2 Life Safety Rope Travel Restraint

Applicable when the worker does not need to work near any unprotected edges and the position of the rope grab on the life safety rope ensures that they cannot reach an unprotected edge.

### Required Equipment

- Workers must wear full body harnesses approved to CSA Z259.10 Class A, AS, AD or ADP or ANSI Z359.1. Stretch-web harnesses that have webbing that is easily stretched to make them more comfortable must not be used.
- Life safety rope with a fall arrester (rope grab) approved to CSA Z259.2.1 Class MDP, or CSA Z259.2.5, or ANSI Z359.1 or EN 353-2. **The rope grab must have a manual function so that it can be locked in position on the rope and will not move along the rope unless the worker manually repositions it.**
- A maximum 3 foot lanyard approved to CSA Z259.11 Class E6.

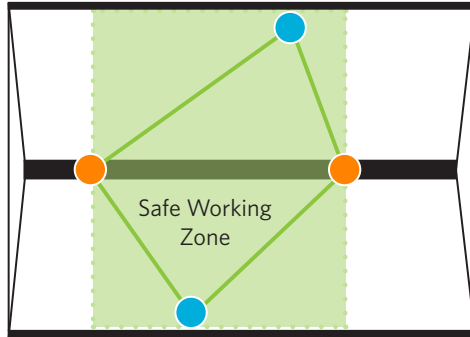
### Procedure

- 1 At a safe location, inspect and don a full body harness in accordance with your training.
- 2 Inspect the life safety rope and fall arrester (rope grab) with the short lanyard in accordance with your training.
- 3 Connect the snaphook closest to the personal energy absorber on the lanyard to the dorsal D-ring of the harness.
- 4 Safely access the TTA and connect the life safety rope to the small D-ring on the anchor strap.
- 5 Adjust the position of the fall arrester on the life safety rope and park it, so that the length of line between you and the anchor is short enough to prevent reaching any unprotected edges and openings.
- 6 Proceed with the work.
- 7 After the work is complete, safely access the TTA, disconnect from it and use safe egress techniques to move off the roof.

## Option #3 Double Travel Restraint Along an Edge

Applicable when the worker needs to work along an unprotected edge, and at least 2 TTAs are installed at locations that will permit double travel restraint techniques to be used at the desired working location.

Illustrated below is the required location of anchors that enable double travel restraint while working along an edge of a roof that is downslope from the TTA.



*Double travel restraint along an edge*

Note that a pair of TTAs at the peak of the roof can provide travel restraint protection at both edges of the roof. The safe working zone is defined by lines to the anchor that are perpendicular to the edge. If workers move beyond this zone, they are no longer in travel restraint.

### Required Equipment

- Workers must wear full body harnesses approved to CSA Z259.10 Class A, AS, AD or ADP or ANSI Z359.1. Stretch-web harnesses that have webbing that is easily stretched to make them more comfortable must not be used.
- 2 life safety ropes with 2 fall arresters (rope grabs) approved to CSA Z259.2.1 Class MDP, or CSA Z259.2.5, or ANSI Z359.1 or EN 353-2. **The rope grab must have a manual function so that it can be locked in position on the rope and will not move along the rope unless the worker manually repositions it.**
- Maximum 3 foot long Y-lanyard meeting CSA Z259.11 Class E6.

### Procedure

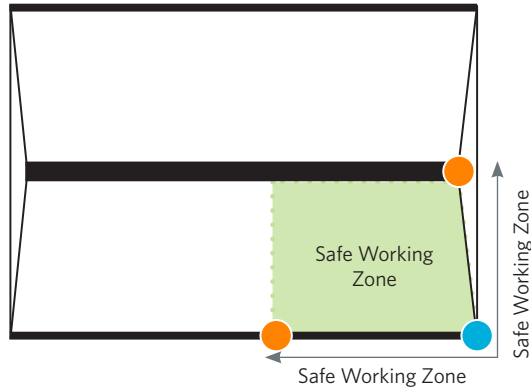
- 1 At a safe location, inspect and don a full body harness in accordance with your training.
- 2 Inspect life safety ropes, fall arresters (rope grabs) and the 3 foot Y-lanyard in accordance with your training.
- 3 Connect the snaphook closest to the personal energy absorber on the lanyard to the dorsal D-ring of the harness.
- 4 Select the 2 TTAs that you will use for the procedure. TTAs must not be spaced further apart along the peak of the roof, than the distance from the TTA to the downslope edge(s) of the roof.
- 5 Safely access the TTA that is furthest from the gable end of the roof and connect the first life safety rope to the small ring on the anchor strap.

Connect one leg of the Y-lanyard to the fall arrester and adjust it so that there is enough rope to reach the second TTA.
- 6 Safely access the other TTA and connect the second life safety rope to the small ring on its anchor strap. Connect the other leg of the Y-lanyard to the fall arrester on the second rope.
- 7 Adjust the location of the fall arresters on both life safety ropes so that it is impossible to reach the roof edge.
- 8 Carefully move towards the working point, slowly letting rope through one or both fall arresters as needed. It is key that you stay at least 6.5 feet (2m) from the roof edge or other fall hazards. Move as close as possible to the working point without violating the 6.5 foot rule and stop.
- 9 Adjust the rope grabs on both life safety ropes to eliminate ALL slack in both restraint lines.
- 10 Attempt to move ONLY 1 foot towards unprotected edges adjacent to the working point and verify that the double restraint system absolutely prevents being able to move this distance. Only light tension in the life safety rope is permitted when verifying that a restraint system prevents movement towards the edge. The worker must not lean into the restraint lines with more than 10 lbs. of force and must be balanced so that if a restraint line were to fail, the worker would be able to stop further movement towards the edge.

- 11 If the double restraint system does NOT prevent 1 foot of movement towards the applicable edge or edges, then the work must not proceed until the worker determines why they have not been restrained from moving. If they cannot solve this issue the worker must safely dismantle the system and return to a safe location. Upon reaching the safe location, the worker must contact a competent person to report that the system cannot be safely used to prevent falls and that an alternative fall protection system needs to be developed.
- 12 When a worker faces the edge of the roof in a standing or kneeling position, the closest safe approach distance to the edge allowed by the restraint system will permit the worker's hands to just reach the edge and the torso of the worker is restrained from getting any closer than 2 feet from any edge.
- 13 Once it's verified that the rigging prevents movement towards the applicable unprotected edges, the worker must alternate adjustment of the position of the rope grab on each life safety rope in 1 foot increments. The worker may step towards the working point after each adjustment, exercising caution to ensure none of the adjustments allow the worker enough slack to fall off the roof, complying with the limitations imposed in step 11.
- 14 Once reaching the working point and verifying that the system will not allow the torso to leave the roof, proceed with the work.
- 15 To move along the edge, adjust both rope grabs on their respective ropes starting with shortening the life safety rope that is towards the direction of movement and then lengthening the life safety rope that is away from the direction of movement, always ensuring that the rope lengths will absolutely prevent a fall.
- 16 After the work is complete, move upslope and away from the edge, periodically adjusting the fall arrester on the life safety ropes to minimize slack. Safely access the anchors to dismantle the system, first disconnecting from the TTA that is closest to an edge and then disconnecting from the other one.

## Option #4 Double Travel Restraint to Reach a Corner

Applicable when the worker needs to work near a corner and at least 1 TTA is near the end of the roof and another anchorage is installed near the downslope roof edge, adjacent to the corner. The other anchorage cannot be a TTA since they are always installed at the peak of the roof. The required location of anchorage connectors to enable double travel restraint while working at the corner of a roof is illustrated in the figure below.



**Double travel restraint to reach a corner**

The safe working zone is defined by lines to the anchor that are perpendicular to the edge. If workers move beyond this zone, they are no longer in travel restraint.

### Required Equipment

- Workers must wear full body harnesses approved to CSA Z259.10 Class A, AS, AD or ADP or ANSI Z359.1. Stretch-web harnesses that have webbing that is easily stretched to make them more comfortable must not be used.
- 2 life safety ropes with 2 fall arresters (rope grab) approved to CSA Z259.2.1 Class MDP, or CSA Z259.2.5, or ANSI Z359.1 or EN 353-2. **The rope grabs must have a manual function so that it can be locked in position on the rope and will not move along the rope unless the worker manually repositions it.**
- Maximum 3 foot long Y-lanyard meeting CSA Z259.11 Class E6.
- Anchor that meets ANSI Z359.1 installed according to manufacturer's instructions and capable of loading in the direction of pull, along the roof edge towards the corner.



### Procedure for Double Travel Restraint at a Corner

- 1 At a safe location, inspect and don a full body harness in accordance with your training.
- 2 Inspect life safety ropes, fall arresters (rope grabs), and the 3 foot Y-lanyard in accordance with your training.
- 3 Connect the snaphook closest to the personal energy absorber on the lanyard to the dorsal D-ring of the harness.
- 4 Safely access the TTA at the peak of the roof and connect the first life safety rope to the small ring on the anchor strap. Connect one leg of the Y-lanyard to the fall arrester and adjust it so that there is enough rope to reach the second anchor.
- 5 Safely access the other anchorage near the bottom edge of the roof and connect the second life safety rope to the small ring on its anchor strap. Connect the other leg of the Y-lanyard to the fall arrester on the second rope.
- 6 Adjust the location of the fall arresters on both life safety ropes so that it is impossible to reach either roof edge.
- 7 Carefully move towards the working point, slowly letting rope through 1 or both fall arresters as needed. Initially it is key that you stay at least 6.5 feet from the roof edge or other fall hazards. Move as close as possible to the working point without violating the 6.5 foot rule and stop.
- 8 Adjust the rope grabs on both life safety ropes to eliminate ALL slack in both restraint lines.
- 9 Attempt to move ONLY 1 foot towards all unprotected edges adjacent to the working point, and verify that the double restraint system absolutely prevents being able to move this distance. Only light tension in the life safety rope is permitted when verifying that a restraint system prevents movement towards the edge. The worker must not lean into the restraint lines with more than 10 lbs. of force and must be balanced so that if a restraint line were to fail, the worker would be able to stop further movement towards the edge.

- 10 If the double restraint system does NOT prevent 1 foot of movement towards the applicable edge or edges, then the work must not proceed until the worker determines why they have not been restrained from moving. If they cannot solve this issue the worker must safely dismantle the system and return to a safe location. Upon reaching the safe location, the worker must contact a competent person to report that the system cannot be safely used to prevent falls and that an alternative fall protection system needs to be developed.
- 11 When a worker faces the edge of the roof in a standing or kneeling position, the closest safe approach distance to the edge allowed by the restraint system will permit the worker's hands to just reach the edge and the torso of the worker is restrained from getting any closer than 2 feet from any edge.
- 12 Once it's verified that the rigging prevents movement towards the applicable unprotected edges, the worker may alternate adjustment of the position of the rope grab on each life safety rope in 1 foot increments. The worker must step towards the working point after each adjustment, exercising caution to ensure none of the adjustments create enough slack to allow the worker to fall off the roof, complying with the limitations imposed in step 10.
- 13 Once reaching the working point and verifying that the system will not allow the torso to leave the roof, proceed with the work.
- 14 To move along the edge, adjust both rope grabs on their respective ropes, starting with shortening the life safety rope that is towards the direction of movement and then lengthening the life safety rope that is away from the direction of movement, always ensuring that the rope lengths will absolutely prevent a fall.
- 15 After the work is complete, safely access the lower anchorage and disconnect from it safely access the TTA and disconnect from it and use safe egress techniques to move off the roof.



## 5. FALL ARREST

---

## Fall Arrest Systems - Important Considerations

### Clearance

In order for a fall arrest system to properly function it is key to consider the amount of clearance available.

When the required clearance for the fall arrest systems in this section cannot be met, other means of fall protection, such as travel restraint or the use of mobile elevating work platforms should be used.

### Free Falls

The clearance required for all fall arrest systems is tied to the amount of free fall that a worker may experience. Free fall is the vertical distance travelled by the worker before the system engages and begins to apply forces to slow the worker down. Larger free falls mean

the worker falls further due to both the free fall AND the increased deployment of energy absorber. **For a 250 lb worker who is using a CSA Z259.11 Class E6 personal energy absorber, for every foot of free fall, there will be approximately 1.4 feet of increased fall distance.**

It is very important to minimize any slack between the worker and the anchorage. Since the authors of this document cannot predict how much slack a worker may create, clearances discussed in this document presume the worker has diligently minimized the slack in his system. **If workers allow extra slack, 140% of this slack must be added to the clearances that are stated in this document.**

### Energy Absorber Deployment

Because there is so little clearance available on single story roofs, this document has determined the actual deployment of personal energy absorbers according to the anticipated free fall and the worker weight. Light-weight workers will require less clearance than heavy-weight workers because they will require less energy absorber deployment to dissipate their fall energy.

Clearance and Impact Force in this document have only been calculated for CSA Z259.11 Class E6 personal energy absorbers and therefore Class E6 Personal Energy Absorbers must ONLY be used.

A 250 lb worker standing and falling adjacent to the anchor will experience a free fall of

**NOTE:** If a CSA Z259.11 Class E4 personal energy absorber were used, it would fully deploy, requiring more clearance, AND the worker would see a much higher impact than for the **✓ E6 lanyard**. The **✗ E4 lanyard** would only be capable of absorbing about half the fall energy from a 12 foot free fall.

11 - 12 feet when using a 6 foot long lanyard. If using a CSA Z259.11 Class E6 personal energy absorber it would deploy approximately 3 feet to absorb the fall energy. Adding harness stretch and a mandatory 2 foot clearance margin, the minimum required clearance below the anchor would be 16 feet.

Therefore, **ONLY** an E6 should be used according to this document as it will decrease both the required clearance AND the peak impact force seen by the worker.

### Swing Falls

Swing Falls are caused when the location that a worker falls is not directly below an overhead anchorage, or if falling off a roof, when a line drawn between the worker at the roof edge and the anchorage is not perpendicular to the roof edge. Gravity will always pull the worker to the lowest possible elevation, which is below the anchorage, or on a roof, to where the worker's life safety rope or lanyard is

approximately perpendicular to the roof edge.

Swing falls are very dangerous for 3 main reasons:

- Horizontal impacts can be severe since there is no energy absorption from the fall arrest system. The impact energy can only go into the worker's body and the blows are always transverse to the body.
- Swings off the edge of a roof can cut the Life Safety Rope if the edge of the roof is sharp.
- The swinging motion lowers the worker and this extra distance must be added to the required clearance.

Because swing falls are dangerous, the maximum Swing Drop Distance allowed in the province of Alberta, under section 147 of Part 9 of the Alberta OHS Code, is 1.2m (4 feet).

Swing fall can be estimated using a tape measure by comparing the perpendicular distance the edge is from the anchorage to the distance from the working point along the edge to the anchorage. The difference between these 2 measurements is the swing fall distance and must be added to the required clearances specified in this document and must always be less than 4 feet, even when there is sufficient clearance to allow it.

In all of the following fall restraint procedures, "Safe Access" and "Safely Access" mean that you must be protected from falling as you access the stipulated point(s) to set up your fall arrest system. This could be accomplished through the use of manlifts, ladders, where footing is secure, crawling or continuous 3-point contact with the structure. This may involve connection to a fall arrest system.

## Option #1 Lanyard Fall Arrest – Standing on the Roof

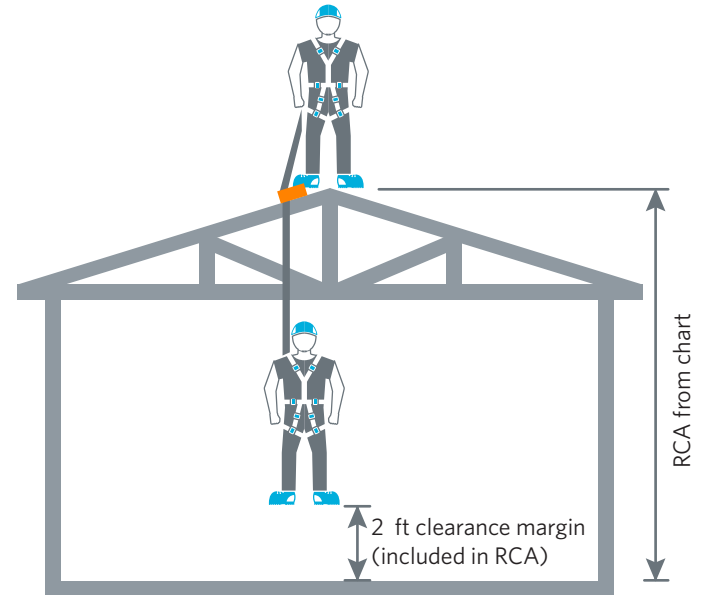
Applicable when a worker is standing on the roof, next to the hole that is adjacent to the location of the TTA.

### Required Equipment

- Workers must wear full body harnesses approved to CSA Z259.10 Class A, AS, AD or ADP or ANSI Z359.1. Stretch-web harnesses that have webbing that is easily stretched to make them more comfortable must not be used.
- Maximum 6 foot lanyard approved to CSA Z259.11 Class E6

<b>Worker Weight</b> (including tools & equipment)	100 lb	150 lb	200 lb	250 lb
<b>Required Clearance below Anchor (RCA) is:</b>	15' 4"	16' 1"	17' 0"	18' 0"

**DO NOT** use this procedure if the anchorage is less than the "RCA" above the floor or ground.



*Required clearance if standing on the roof*

**Procedure for Fall Arrest while standing on the roof.**

\* A rescue plan to promptly retrieve a fallen worker must be in-place prior to using this fall arrest system \*

- ① At a safe location, inspect and don a full body harness in accordance with your training.
- ② Inspect the lanyard in accordance with your training.
- ③ Connect the snaphook closest to the personal energy absorber on the lanyard to the dorsal D-ring of the harness.
- ④ Safely access the TTA and connect the other snaphook to the small ring on the anchor strap.
- ⑤ Proceed with the work.
- ⑥ After the work is complete, safely access the TTA, disconnect from it and use safe egress techniques to move off the roof.

## Option #2 Lanyard Fall Arrest – Standing on the Bottom Chord of a Truss

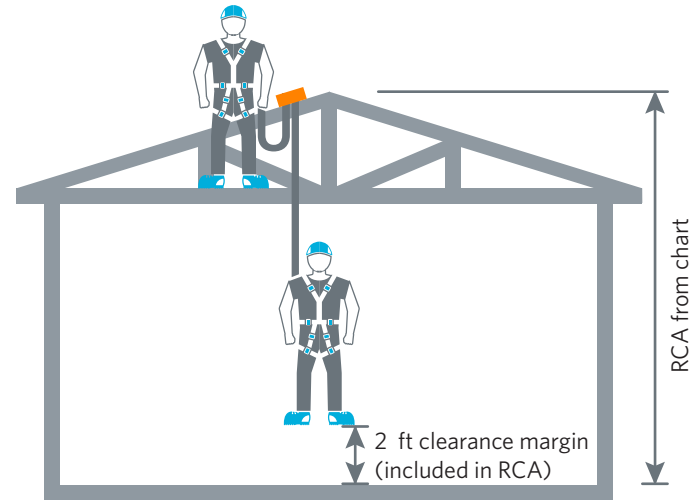
Applicable when a worker is standing on the bottom chord of a truss, adjacent to a TTA they are connected to. The lanyard must NOT be between the two lines of strapping.

### Required Equipment

- Workers must wear full body harnesses approved to CSA Z259.10 Class A, AS, AD or ADP or ANSI Z359.1. Stretch-web harnesses that have webbing that is easily stretched to make them more comfortable must not be used.
- Maximum 6 foot lanyard approved to CSA Z259.11 Class E6

<b>Worker Weight</b> (including tools & equipment)	100 lb	150 lb	200 lb	250 lb
<b>Required Clearance below Anchor (RCA) is:</b>	14' 11"	15' 5"	16' 0"	16' 8"

**DO NOT** use this procedure if the anchorage is less than the 'RCA' above the floor or ground.



*Required clearance if standing on the bottom chord of truss*



**Procedure**

\* A rescue plan to promptly retrieve a fallen worker must be in-place prior to using this fall arrest system \*

- ① At a safe location, inspect and don a full body harness in accordance with your training.
- ② Inspect the lanyard in accordance with your training.
- ③ Connect the snaphook closest to the personal energy absorber on the lanyard to the dorsal D-ring of the harness.
- ④ Safely access the TTA and connect the life safety rope to the small ring on the anchor strap.
- ⑤ Proceed with the work.
- ⑥ After the work is complete, safely access the TTA, disconnect from it and use safe egress techniques to move off the roof.

## Option #3 Using a Life Safety Rope – Potential to fall off the Gable or the Eave (edge)

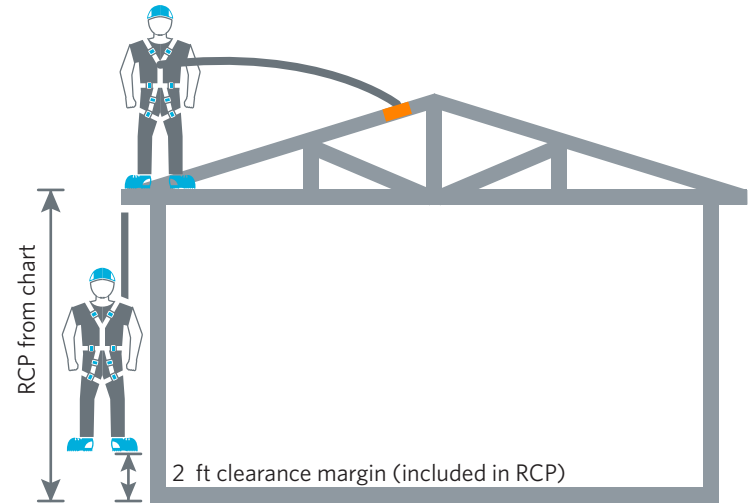
Applicable when a worker is standing near a roof edge (gable or eave), connected to a TTA that is at least 10 feet from the roof edge (gable or eave).

### Required Equipment

- Workers must wear full body harnesses approved to CSA Z259.10 Class A, AS, AD or ADP or ANSI Z359.1. Stretch-web harnesses that have webbing that is easily stretched to make them more comfortable must not be used.
- 1 life safety rope with a fall arrester (rope grab) approved to CSA Z259.2.1 Class MDP, or CSA Z259.2.5, or ANSI Z359.1 or EN 353-2. **The rope grab must have a manual function so that it can be locked in position on the rope and will not move along the rope unless the worker manually repositions it.**
- Maximum 3 foot long lanyard meeting CSA Z259.11 Class E6.

<b>Worker Weight</b> (including tools & equipment)	100 lb	150 lb	200 lb	250 lb
<b>Required Clearance below Platform (RCP) is:</b>	10' 9"	11' 3"	11' 9"	12' 4"

**DO NOT** use this procedure if the anchorage is less than the 'RCP' above the floor or ground.



*Required clearance if falling off the gable or eave*

**Procedure**

\* A rescue plan to promptly retrieve a fallen worker must be in-place prior to using this fall arrest system \*

- ① At a safe location, inspect and don a full body harness in accordance with your training.
- ② Inspect the life safety rope, fall arrester and short lanyard in accordance with your training.
- ③ Safely access the TTA and connect the life safety rope to the small ring on the anchor strap.
- ④ Connect the snaphook closest to the personal energy absorber on the lanyard to the dorsal D-ring of the harness. Connect the other snaphook on the lanyard to the fall arrester.
- ⑤ Proceed with the work.
- ⑥ After the work is complete, safely access the TTA, disconnect from it and use safe egress techniques to move off the roof.

## Option #4 Using a Life Safety Rope - Working below the Gable or Eave (edge)

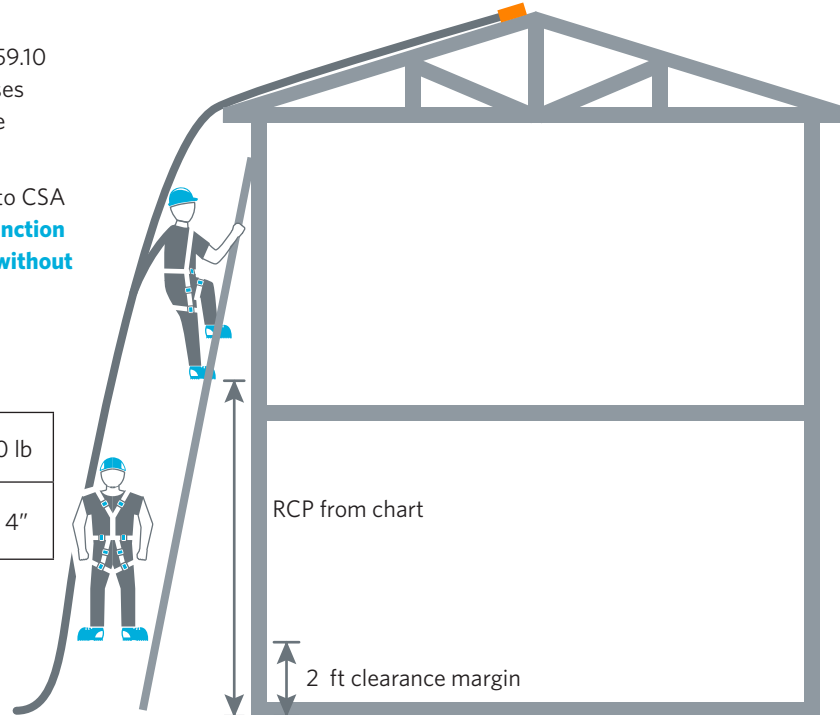
Applicable when a worker is working on a ladder or scaffolding, connected to a TTA on the roof above them using a life safety rope and automatic fall arrester.

### Required Equipment

- Workers must wear full body harnesses approved to CSA Z259.10 Class A, AS, AD or ADP or ANSI Z359.1. Stretch-web harnesses that have webbing that is easily stretched to make them more comfortable must not be used.
- One life safety rope with a fall arrester (rope grab) approved to CSA Z259.2.1 Class ADP. **The rope grab will have an automatic function that will smoothly follow the worker up and down the rope without a need for the worker to manually adjust its position.**
- Maximum 3 foot long lanyard meeting CSA Z259.11 Class E6.

<b>Worker Weight</b> (including tools & equipment)	100 lb	150 lb	200 lb	250 lb
<b>Required Clearance below Platform (RCP) is:</b>	10' 9"	11' 3"	11' 9"	12' 4"

**DO NOT** use this procedure if the anchorage is less than the 'RCP' above the floor or ground.



## Procedure

\* A rescue plan to promptly retrieve a fallen worker must be in-place prior to using this fall arrest system \*

- 1 At a safe location, inspect and don a full body harness in accordance with your training.
- 2 Inspect the life safety rope, fall arrester and short lanyard in accordance with your training.
- 3 Remove the fall arrester and short lanyard from the life safety rope.
- 4 Safely access the TTA and connect the life safety rope to the small ring on the anchor strap. Throw the tail of the life safety rope over the edge of the roof adjacent to the working point.
- 5 Return to the ground using safe access techniques.
- 6 Install the fall arrester and short lanyard on the tail of the life safety rope.
- 7 Connect the snaphook closest to the personal energy absorber on the lanyard to the dorsal D-ring of the harness. Verify that the fall arrester is working (automatically trailing up and down the rope).
- 8 Climb to the working level, verifying that the fall arrester is properly trailing up and down the rope. Position the fall arrester as high on the rope as possible.
- 9 Proceed with the work.
- 10 After the work is complete, safely access the TTA, disconnect from it and use safe egress techniques to move off the roof.





THANK YOU TO THE FOLLOWING  
COMPANIES FOR THEIR GENEROUS SUPPORT  
IN THE CREATION OF THIS DOCUMENT

**Brookfield**  
Residential

The logo for Jayman BUILT features a stylized sunburst icon above the word "Jayman" in a serif font, with "BUILT" in a smaller, all-caps sans-serif font below it.

Jayman  
BUILT

The logo for ZyTech building systems L.P. features the word "ZyTech" in a large, blue, sans-serif font with a red roofline icon above the "y". Below it, "building systems L.P." is written in a smaller, blue, sans-serif font.

ZyTech  
building systems L.P.

The logo for STEPPER HOMES features the word "STEPPER" in a large, red, sans-serif font above the word "HOMES" in a white, sans-serif font inside a black, curved banner.

STEPPER  
•HOMES•