Appendix B – Framing Component Installation

Last updated 6/2/2010

Apex Brace Installation

Refer to apex connection detail on the engineering plans for the location of the apex brace. Refer to the member and material schedule on the engineering plans for size, gauge and type of apex brace and number of bolts or screws necessary to install the apex brace.

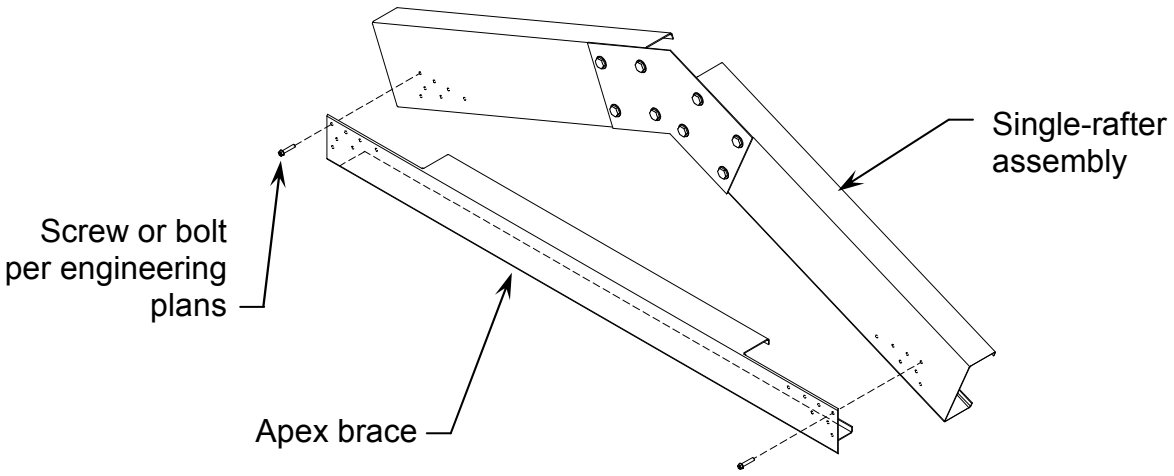
To install apex brace you must first cope the flanges of the apex brace CEE section. Using the information found on the engineering plans, you will have to calculate the exact locations to cope the flanges. Also, if you are installing the apex braces using framing bolts, holes will need to be pre-drilled before installation per engineering plans.

Once the CEE section is coped, you will attach it to the rafters with bolts or screws, which are specified on the member and material schedule on the engineering plans.

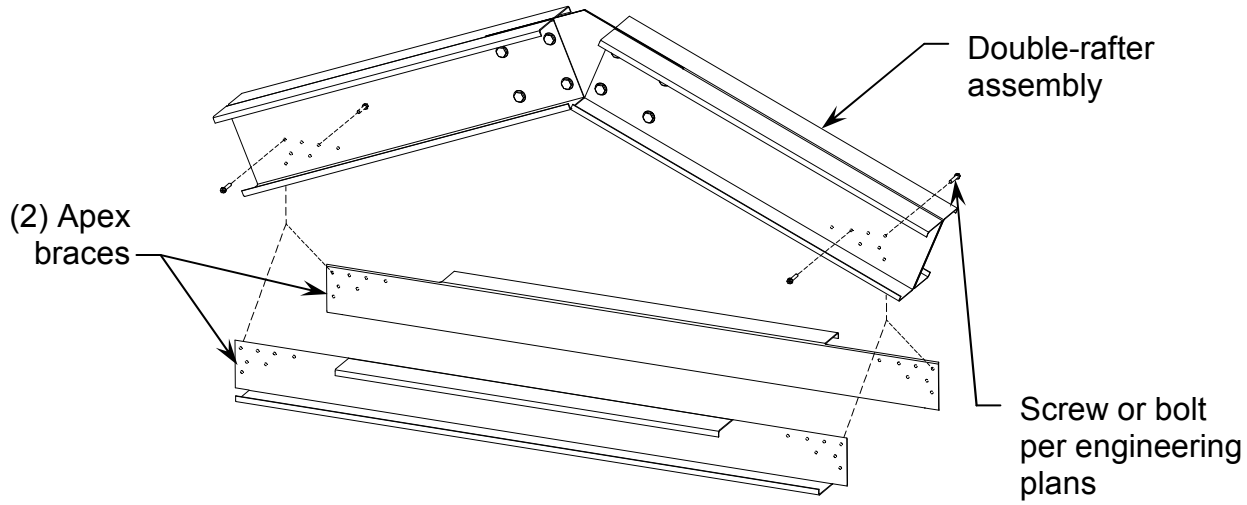
Note that if your building has a gambrel-style roof pitch, each portal frame will have three separate apex brace assemblies. See apex connection detail on the engineering plans for further instructions.

Please see the illustrations below and on the next page as a reference for attaching the apex brace to the rafters. Note that the exact location, number and type of the bolts or screws are specified on the engineering plans but are not represented on the illustrations.

Single-rafter apex brace assembly



Double-rafter apex brace assembly

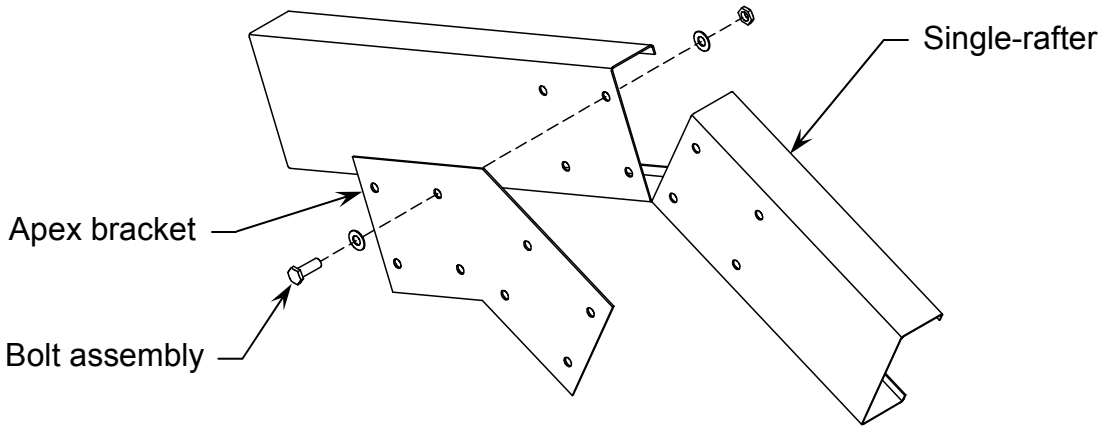


Apex Bracket Installation

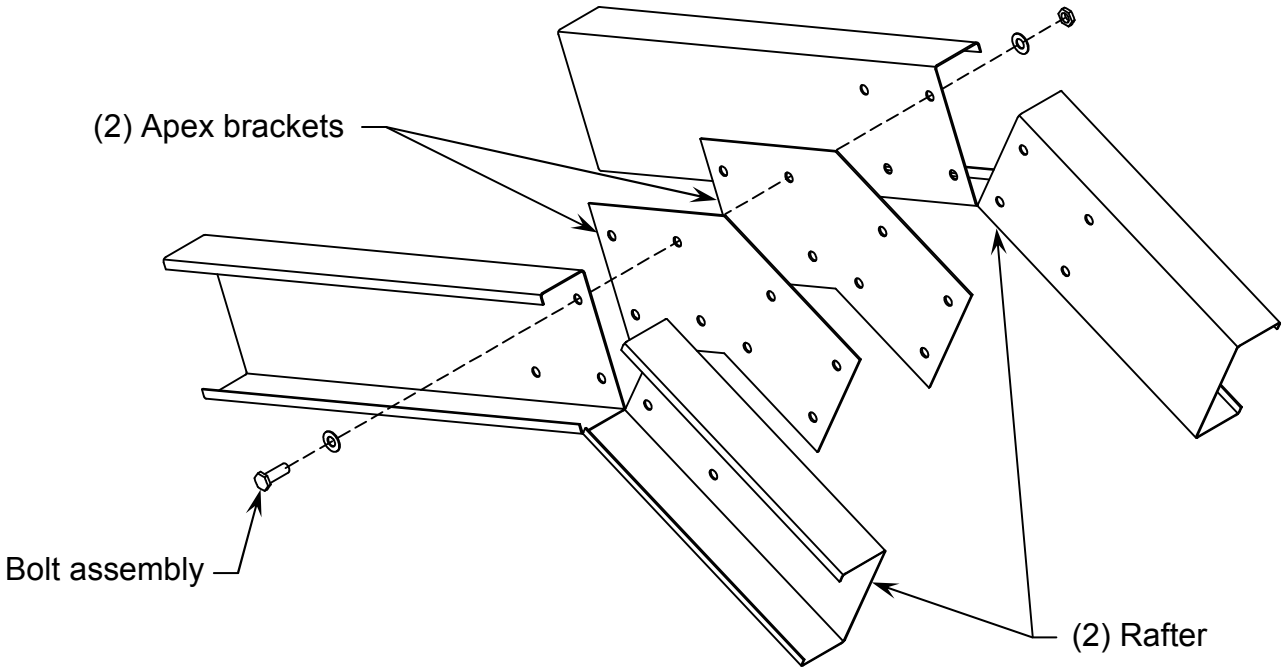
Connect rafters to apex bracket with bolts. Please see engineering plans for number and type of apex brackets and see the member and material schedule on the engineering plans for number and type of rafters.

Note that if your building has a gambrel-style roof pitch, each portal frame will have three rafter-to-apex bracket connections, one at the roof apex and two connecting the rafters to the lower rafters. See apex connection detail on the engineering plans for further instructions. Please see the illustrations below for reference.

Single-rafter to apex bracket assembly



Double-rafter to apex bracket assembly



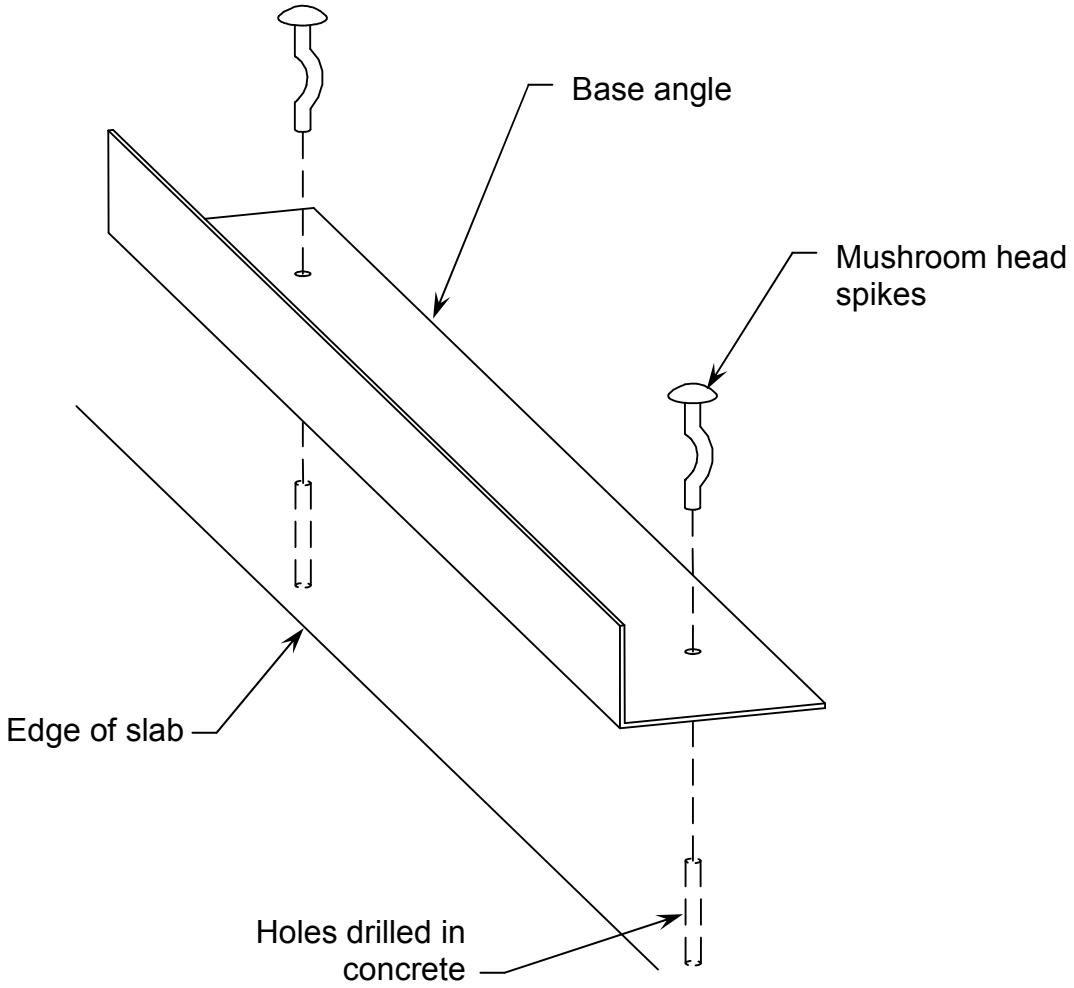
Base Angle Installation

If you have base angle on your building, it will be on your bill of materials and will be indicated on the foundation plan of the engineering plans.

Connect base angle to slab using mushroom head spikes. First, determine the location of mushroom head spikes according to the engineering plans. Then drill holes in the base angle in these locations. Line up edge of base angle to edge of slab. Drill a hole in the concrete ¼" in size and at least 1" deep through the already-created holes in the base angle. Clear the hole of any concrete dust. Then use a sledge hammer to install the mushroom head spikes, forcing them into the drilled hole.

Note that the base angle will be installed around the entire slab, except when a column or door jamb impedes the installation of the base angle. Please see the foundation plan on the engineering plans for mushroom head spike spacing and locations.

Please see the illustration below as a reference on the installation of the base angle. Also refer to the foundation plan on the engineering plans for exact requirements on base angle installation.



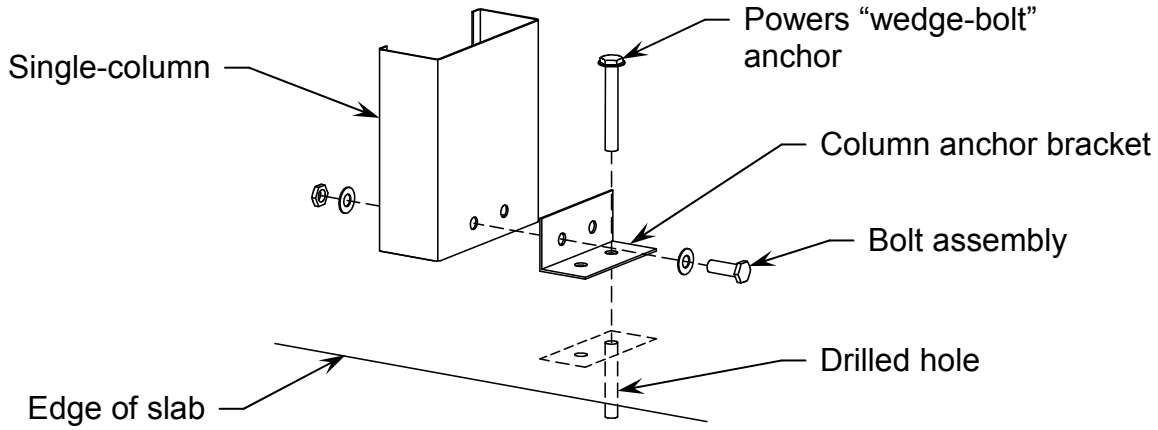
Column Base Installation

First, after ascertaining the exact location of the anchor bolts, drill the anchor bolt holes, using a rotary drill to drill holes in the concrete slab. Note that you will be using a Powers “wedge-bolt” anchor to connect column anchor bracket to concrete slab. You must drill a hole in the concrete using a Powers “wedge-bit” of the same size as the “wedge-bolt.” The size of the “wedge-bolt” anchor can be found on the member and material schedule found on the engineering plans. Make sure that drilled hole is deep enough for “wedge-bolt” anchor to fit in the hole snugly. Once the hole is drilled, you must clear it of any remaining concrete dust by using compressed air. If no water is present in the hole, using an air puffer to clean the hole of dust will suffice.

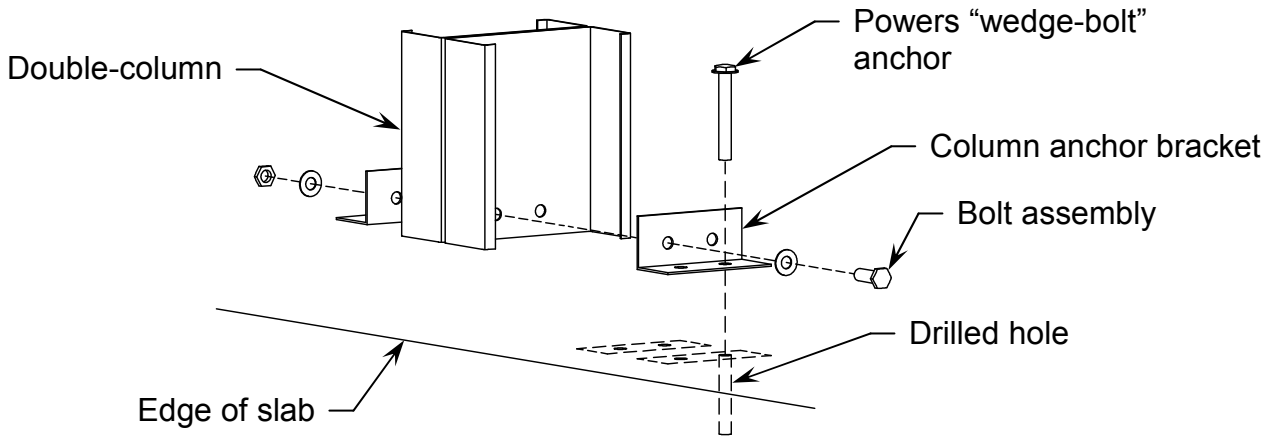
Next, attach column anchor brackets to the bottom of the column using bolt assembly, tightening the bolt assemblies by hand. For exact information on the column anchor bracket and bolt type, see engineering plans.

Lastly, stand up column and use an impact wrench to secure “wedge-bolt” anchor bolts through column anchor bracket to concrete slab. When complete tighten bolt assemblies with impact wrench. Please see the illustrations below as a reference for attaching the columns to the foundation.

Single-column base connection



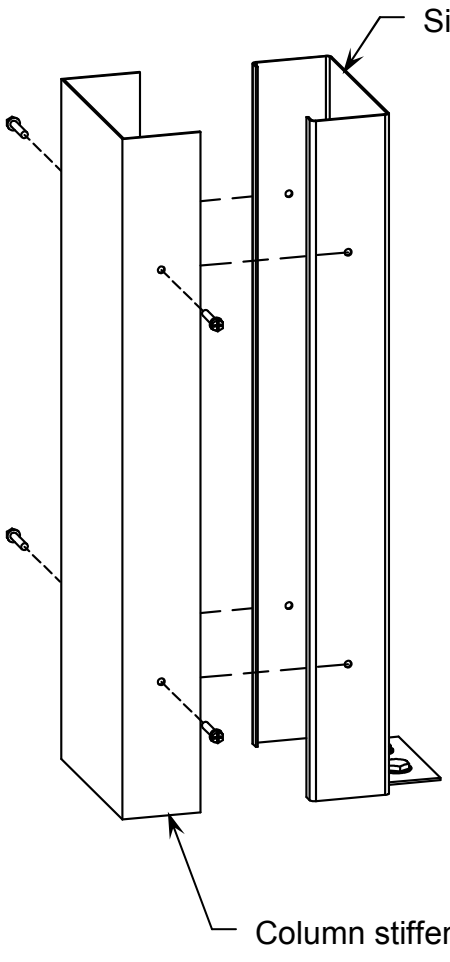
Double-column base connection



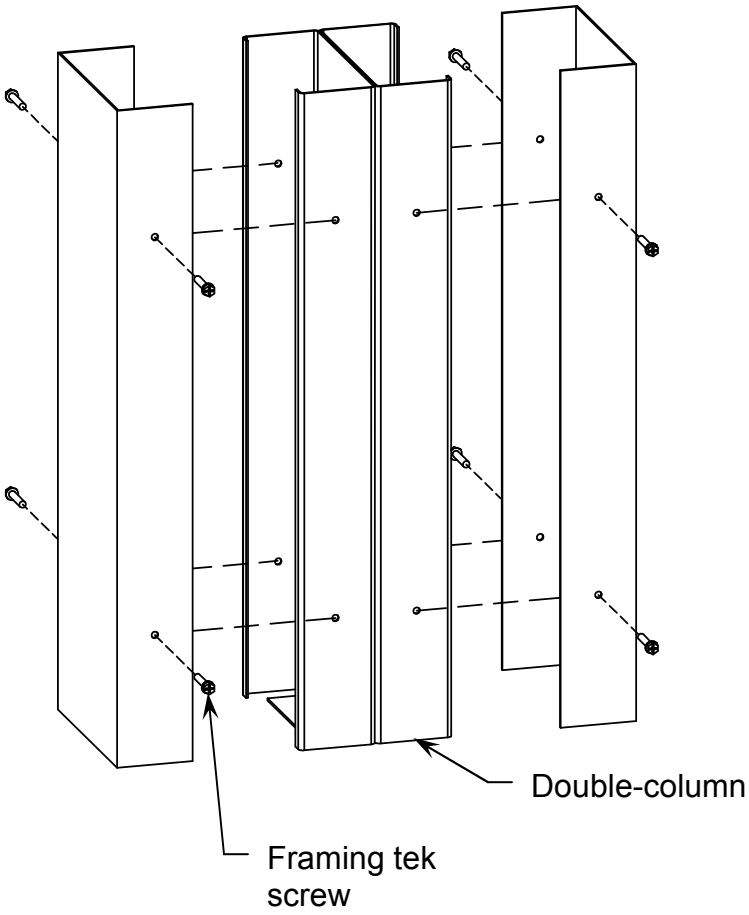
Column Stiffener Installation

In some cases, you will need to install a column stiffener (which is comprised of channel material) at specific column locations. This will be indicated on your engineering plans. After standing up column and attaching the base of the column, you will attach the stiffener to the column using framing tek screws. Please see the illustrations below as an example of how to install the column stiffeners.

Column stiffener to single-column assembly

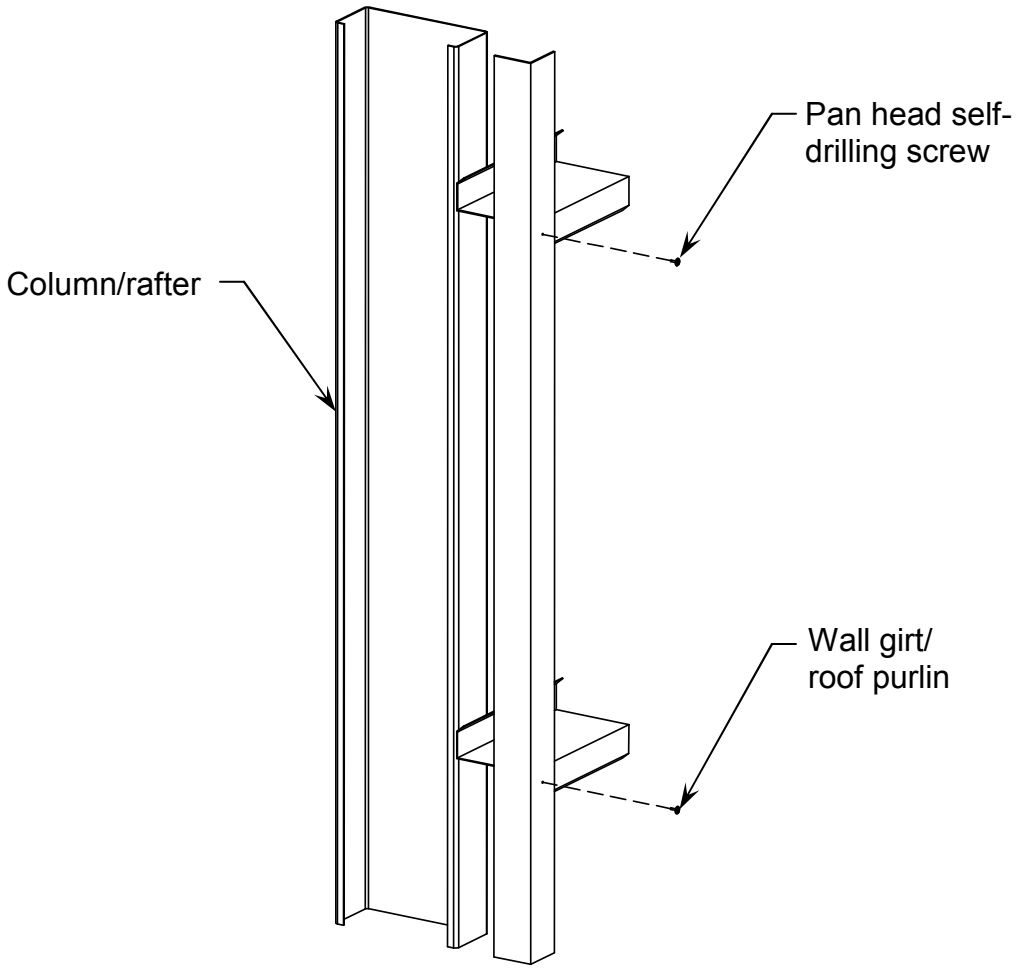


Column stiffener to double-column assembly



Corner and Rake Angle Installation

If corner and rake angle is provided in your building kit, it will be installed on the ends of all girts and purlins and will be attached using pan head self-drilling screws. When installing at the ends of wall girts, corner angle should run from the edge of the slab to the eave of the building. When installing at the ends of purlins, rake angle should run from the eave to the apex of the building. Please see the illustration below as a reference for installing corner and rake angle.



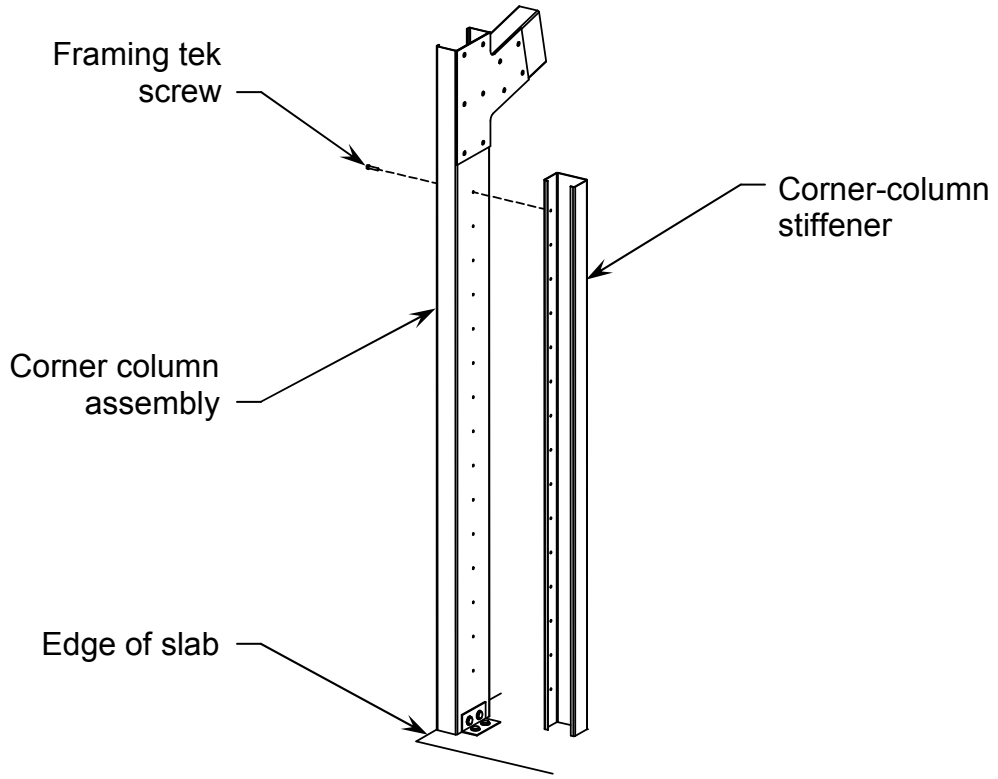
Corner Column Stiffener Installation

In some cases, you will need to install a corner column stiffener (which is comprised of a CEE section) at specific corner columns. This will be indicated on your engineering plans. You will attach the stiffener to the corner column using framing tek screws. Note that corner column stiffener will run from top of column anchor bracket to bottom of the haunch bracket.

In some cases, other components, such as a mezzanine floor bracket, will need to be installed to a column that requires a corner column stiffener. In this case, both components will need to be installed, first installing the mezzanine bracket, and then installing the corner column stiffener to the column, over the mezzanine floor bracket. Note that corner column stiffeners will always need to run continuously from the column anchor bracket to the haunch bracket, regardless of other components to be installed.

The *only* case where corner column stiffeners should be coped or cut in any way is when the bolts at a mezzanine bracket on the corner column are 4" apart horizontally, and the corner column stiffener must fit between them. In this case, move the stiffener slightly off the center of the column so that the web of the stiffener is between the mezzanine bracket bolts. Then cope off the flange and stiffener lip of the corner column stiffener in two locations, where the bracket bolts would interfere with the corner column stiffener.

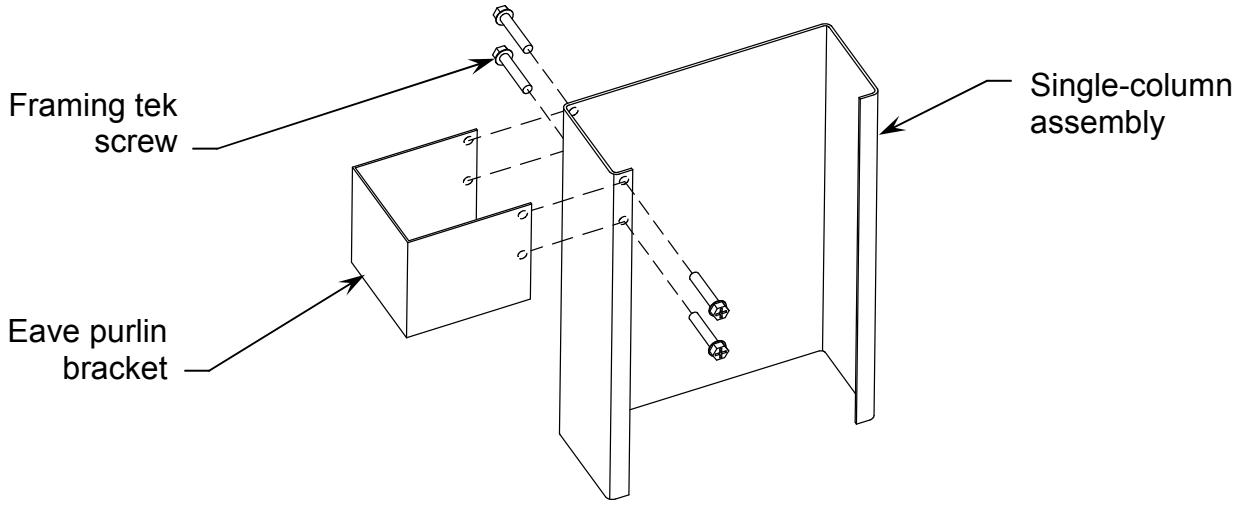
Please see the engineering plans for exact information on size, location and installation of corner column stiffener. See the illustrations below as an example of how to install the corner column stiffeners.



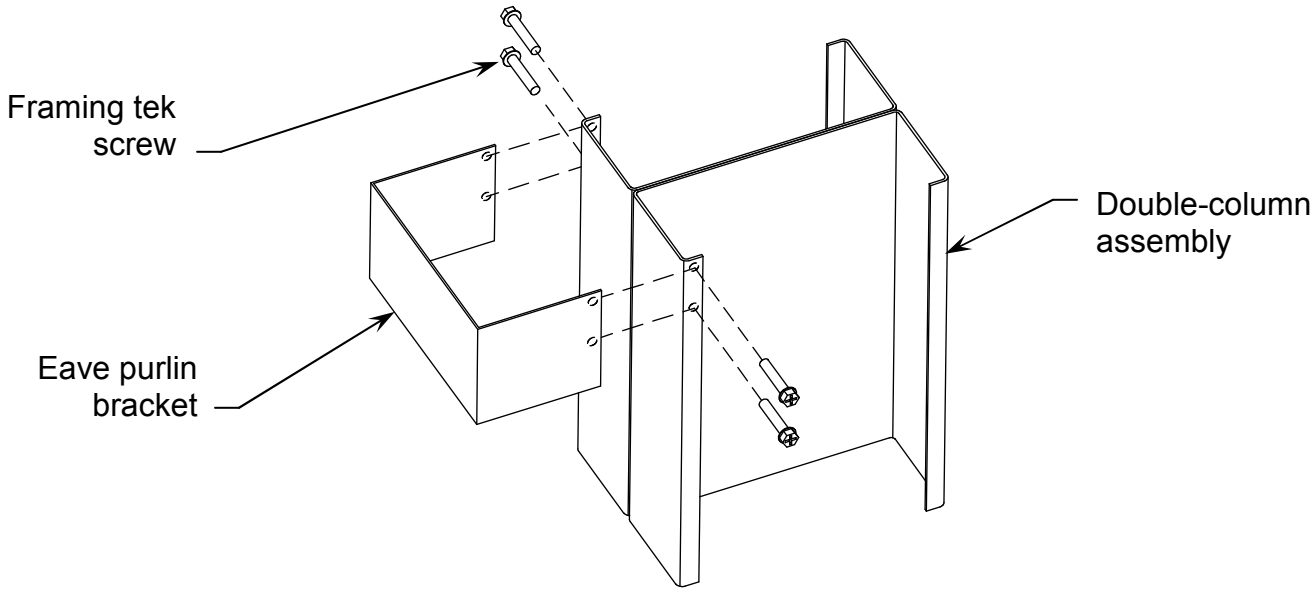
Eave Purlin Bracket Installation

Connect eave purlin bracket to top of column using framing tek screws. Please see the illustrations below as a reference for attaching the eave purlin bracket to the columns. Note that framing tek screws should be as far away from each other as possible.

Eave purlin bracket to single-column assembly



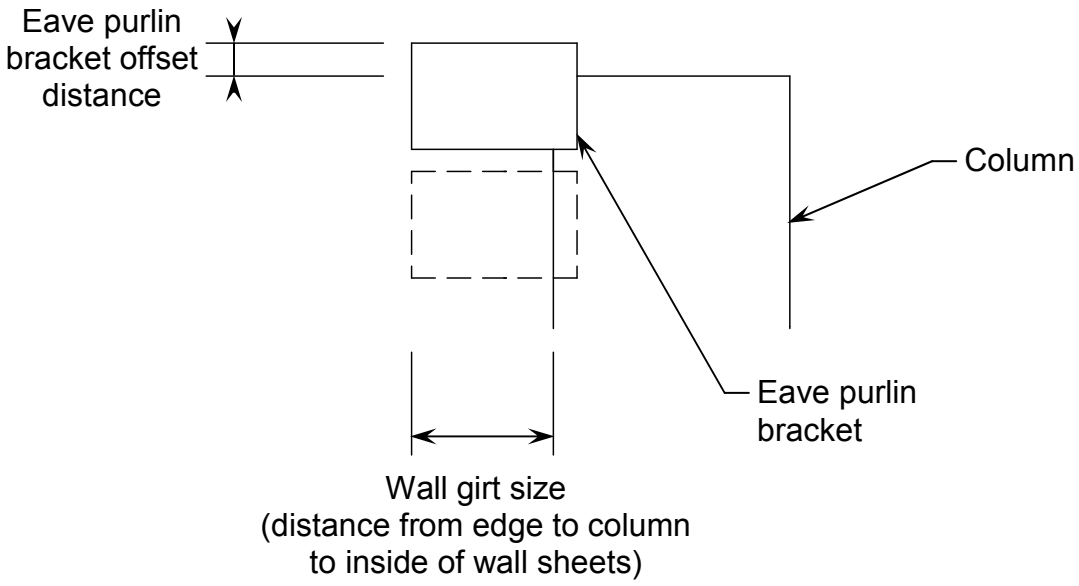
Eave purlin bracket to double-column assembly



However, exact location of bracket will vary per building. The eave purlin bracket should be installed so that when the eave purlin is attached to the eave purlin bracket, the top of the eave purlin will align with the eave of the building. Thus, the distance between the top of the eave purlin bracket and the top of column varies per building.

This distance is illustrated below and can be found in the table below. Also note that the eave purlin bracket will need to be installed so that the bracket will line up with the slab edge. Thus, the edge of the eave purlin will not always line up with the edge of the stiffener lip of the column CEE. This distance will need to be determined at time of construction.

Please see below for an illustration of how the location of the eave purlin bracket can vary. Please use the table below to ascertain the eave purlin bracket offset distance for your building. Note that when the offset distance is positive, the top edge eave purlin bracket will be above the top end of the column. If the offset distance is negative it will be below the top edge of the column.



Eave Purlin Bracket Offset Table (continued on next page)

Column size	Purlin size	Girt size	2.55:12 roof pitch Offset dist	4.85:12 roof pitch Offset dist
6”	4”	4”	- 3/4”	- 3/4”
6”	6”	4”	1 5/16”	1 7/16”
6”	6”	6”	7/8”	5/8”
6”	4”	6”	- 1 3/16”	- 1 9/16”
8”	4”	4”	- 3/4”	- 3/4”
8”	6”	4”	1 5/16”	1 7/16”
8”	6”	6”	7/8”	5/8”
8”	4”	6”	- 1 3/16”	- 1 9/16”
10”	4”	4”	N/A	- 2 1/8”
10”	4”	6”	N/A	- 2 15/16”
10”	6”	4”	- 1/4”	1/16”

10”	6”	6”	- 3/4”	- 3/4”
12”	4”	4”	N/A	- 2 1/8”
12”	4”	6”	N/A	- 2 15/16”
12”	6”	4”	- 1/4”	1/16”
12”	6”	6”	- 3/4”	- 3/4”
14”	4”	4”	N/A	- 2 1/8”
14”	4”	6”	N/A	- 2 15/16”
14”	6”	4”	- 1/4”	1/16”
14”	6”	6”	- 3/4”	- 3/4”

Eave Purlin Installation

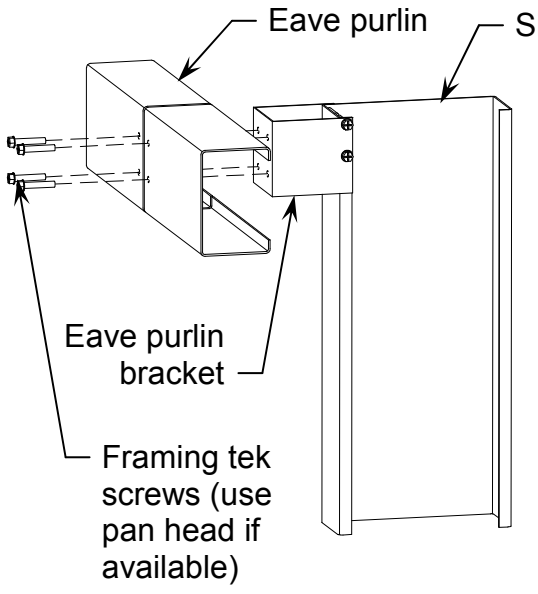
Connect eave purlin to eave purlin bracket using framing tek screws (use pan head screws if available). Note that the exact location of the eave purlin bracket varies. For specifications on how eave purlin bracket must be placed, see "Eave Purlin Bracket Installation" section above. Do not install eave purlin until all conditions are met.

To install the eave purlin bracket, place the eave purlin so that the top stiffener lip rests on the eave purlin bracket, the top of the eave purlin is level, and the front of the eave purlin is flush with the front of the eave purlin bracket. Then, install two framing tek screws from each eave purlin into the eave purlin bracket.

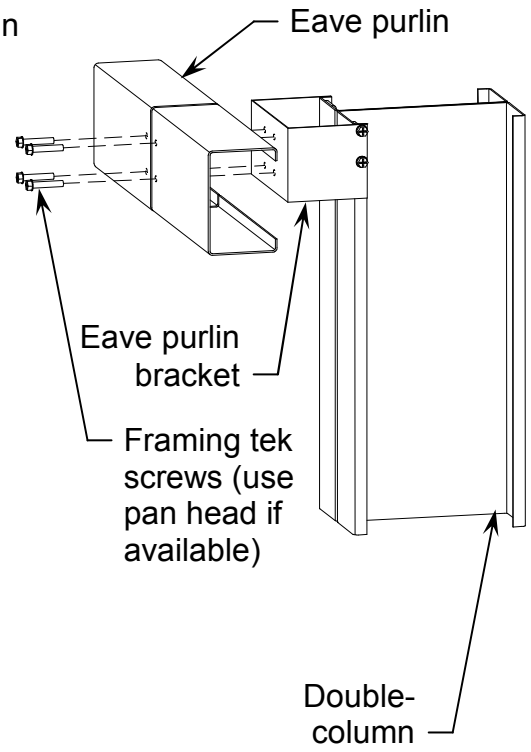
Note that when you install the eave purlin, when it connects to the eave purlin bracket on the corner column, the edge of the eave purlin must line up with the edge of the eave purlin bracket. When installing eave purlin on an interior sidewall column, eave purlin will fall in center of eave purlin bracket. Also, once the eave purlin is installed, the top of the eave purlin should align with the eave of the building.

Please see the illustrations below and on the following page as a reference for attaching the eave purlin to the eave purlin bracket.

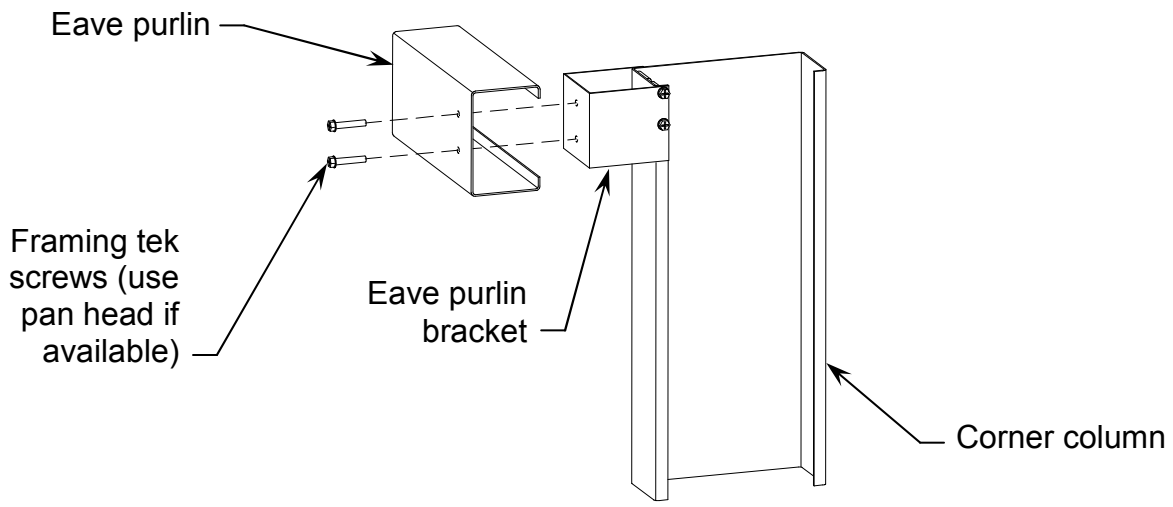
Eave purlin to single-column assembly



Eave purlin to double-column assembly



Eave purlin to corner-column assembly



Endwall Column Installation

For installation of base of endwall columns, see “Column Base Installation” section earlier in appendix

After installing base of endwall column, top of endwall column will need to be attached to the rafter. Before securing top of endwall column, ensure that column is plumb.

When installing endwall columns, there are many variations that can occur. Before proceeding, ascertain whether your building has 4” or 6” endwall girts and whether endwall columns are single or double. This information can be found in the member and material schedule on the engineering plans.

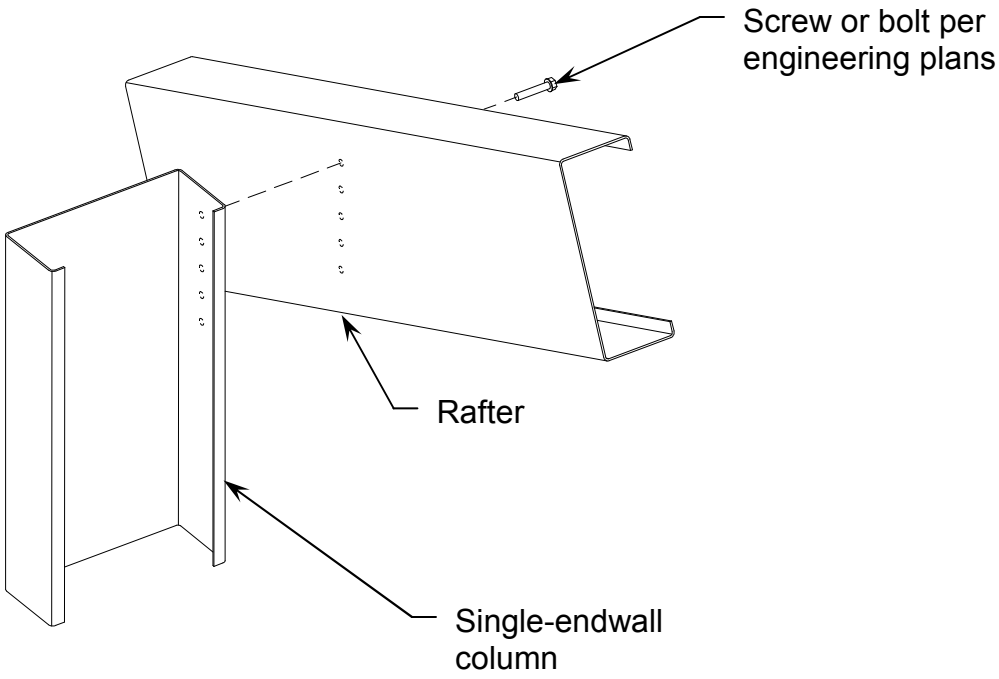
If your building has 4” endwall girts, the endwall column will attach directly to the rafter and will be installed using framing tek screws or bolts, as specified on engineering plans. If your building has 6” endwall girts, the endwall column will be attached to the rafter using an endwall column bracket and framing tek screws. When installing an endwall column when you have 6” endwall girts, there will be a 2” gap between the top of the endwall column, and the endwall rafter.

Also note that if you need to use an endwall column bracket to attach your endwall column, you may need to cope a section of the endwall column. Please see the illustrations on the following pages as a reference for the difference between these two methods. See the engineering plans for further information and the type and number of screws to use.

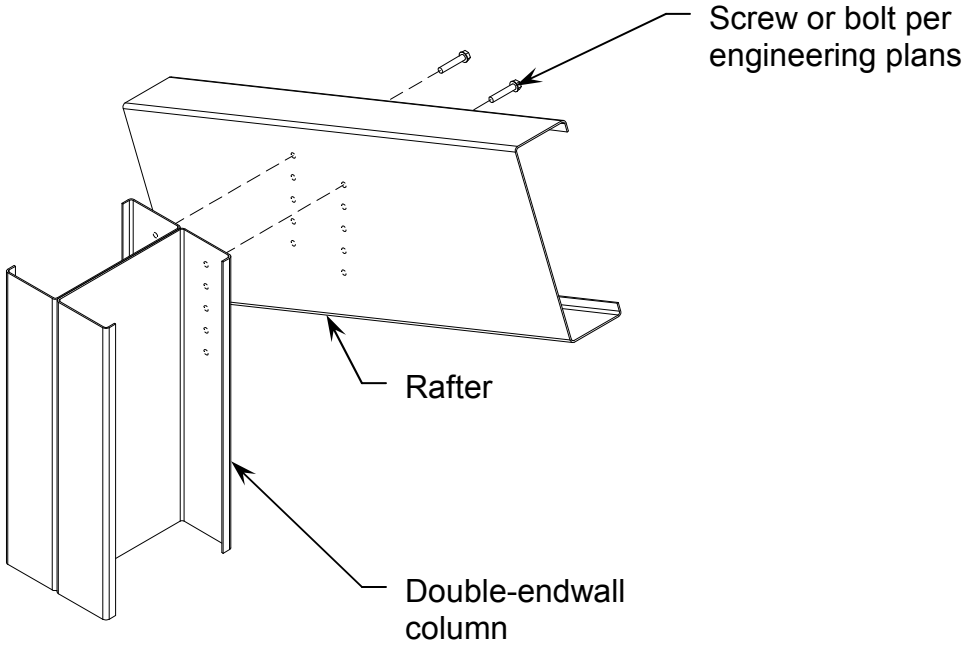
If an endwall column is being installed in the middle of the endwall, it will need to attach to the apex of the rafters. In this case, some of the bolts that connect the rafters and apex bracket together could impede the installation of the endwall column. If this is the case, it is permissible to remove two of the bolts of this connection, but only the bolts that are to the inside and toward the bottom of the rafter. This is shown in the illustrations on the following pages.

Please see the illustrations on the following pages as a reference for attaching the endwall columns to the rafters. For exact information on attaching the top of endwall columns to the rafter, please see the engineering plans.

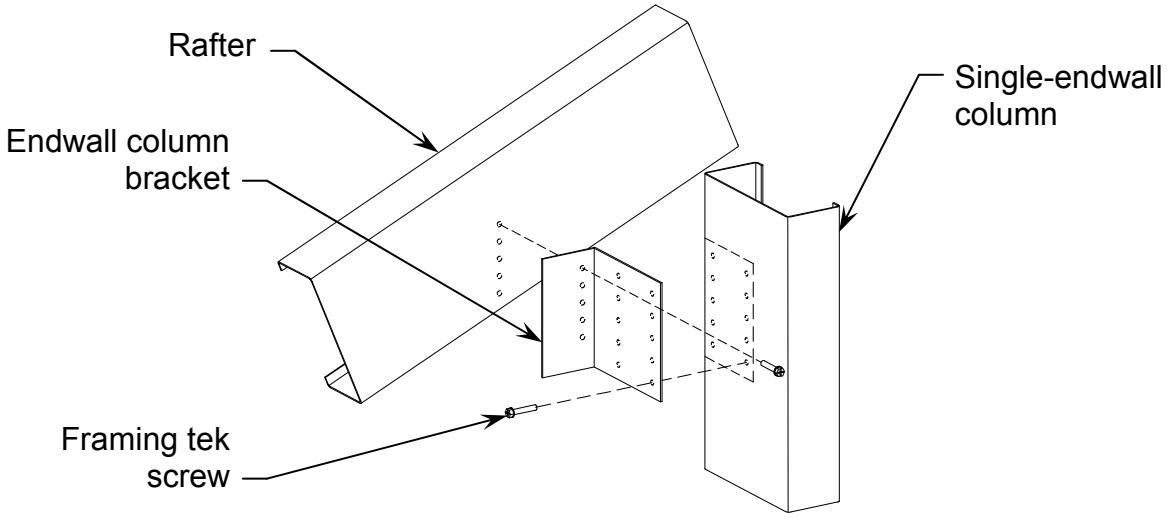
Single-endwall column to rafter assembly w/ 4-inch endwall girts



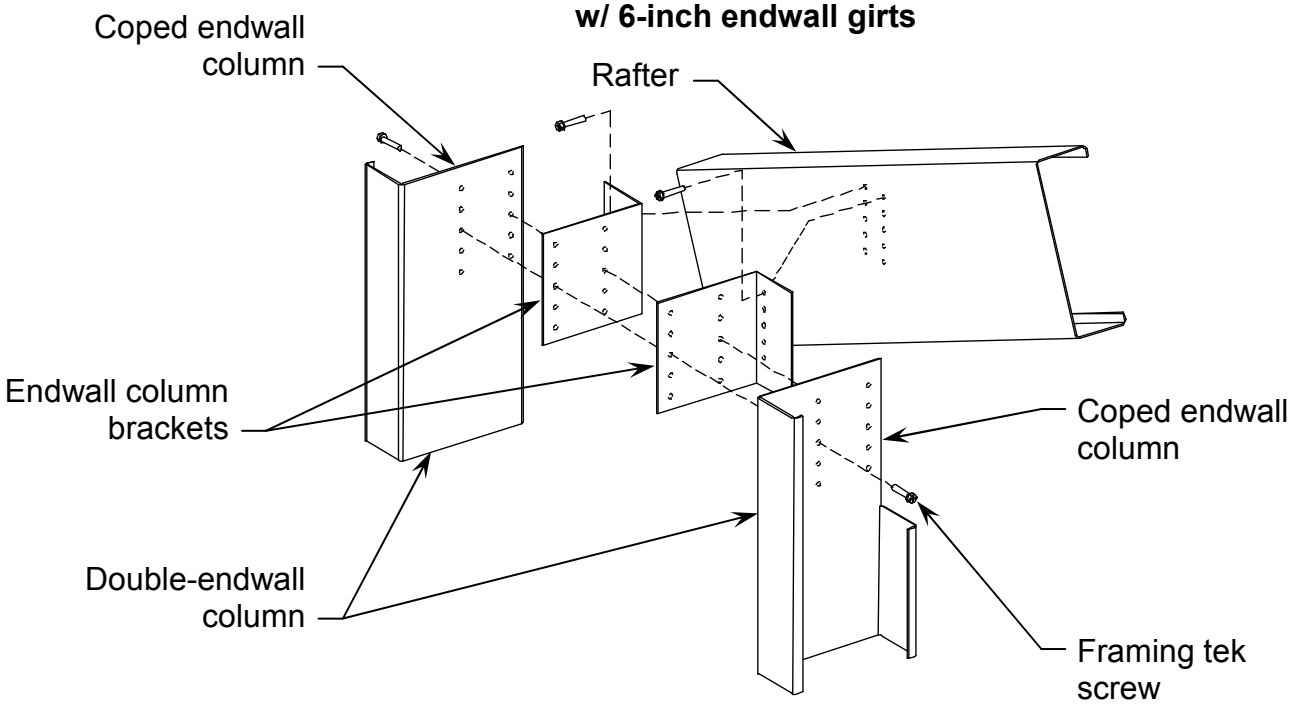
Double-endwall column to rafter assembly w/ 4-inch endwall girts



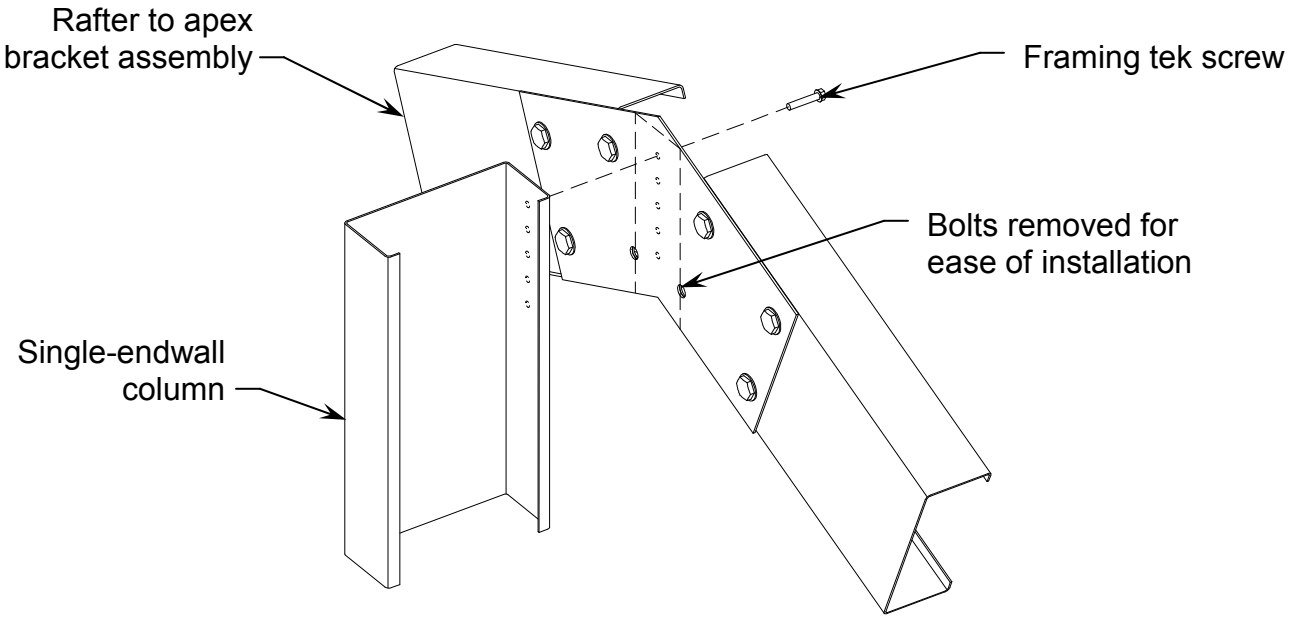
Single-endwall column to rafter assembly w/ 6-inch endwall girts



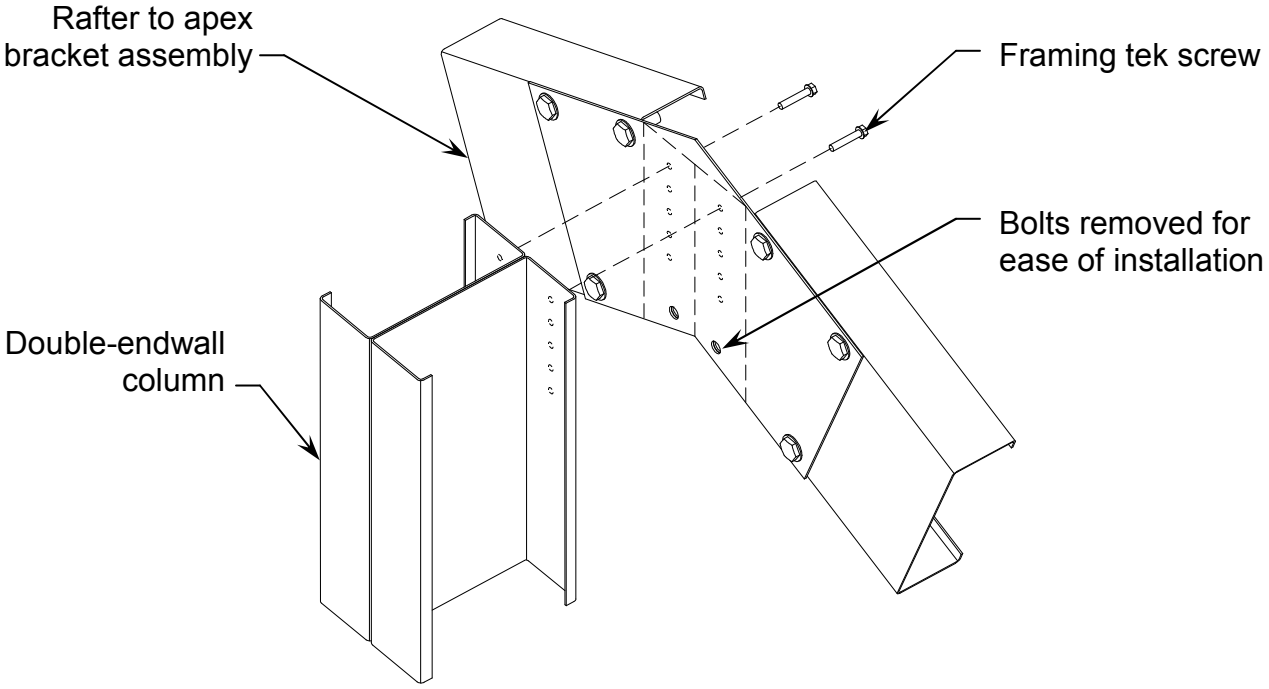
Double-endwall column to rafter assembly w/ 6-inch endwall girts



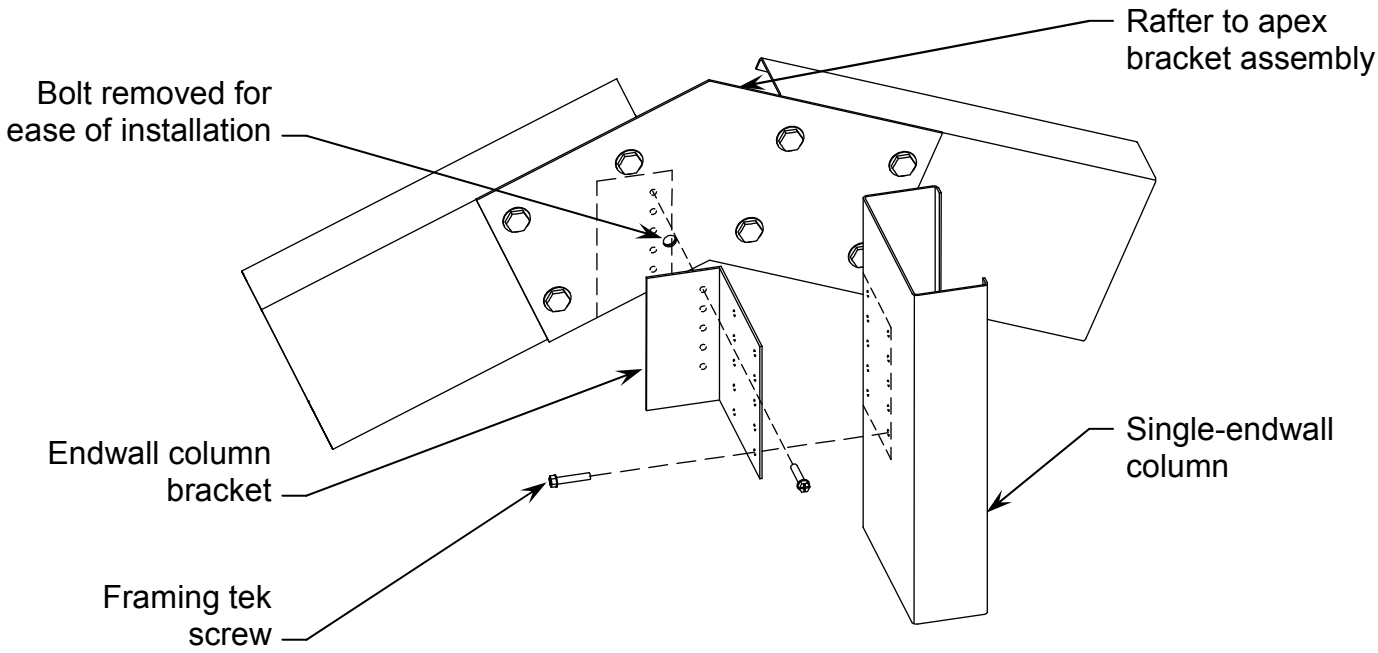
Single-endwall column to rafter assembly
w/ 4-inch endwall girts and installed at apex



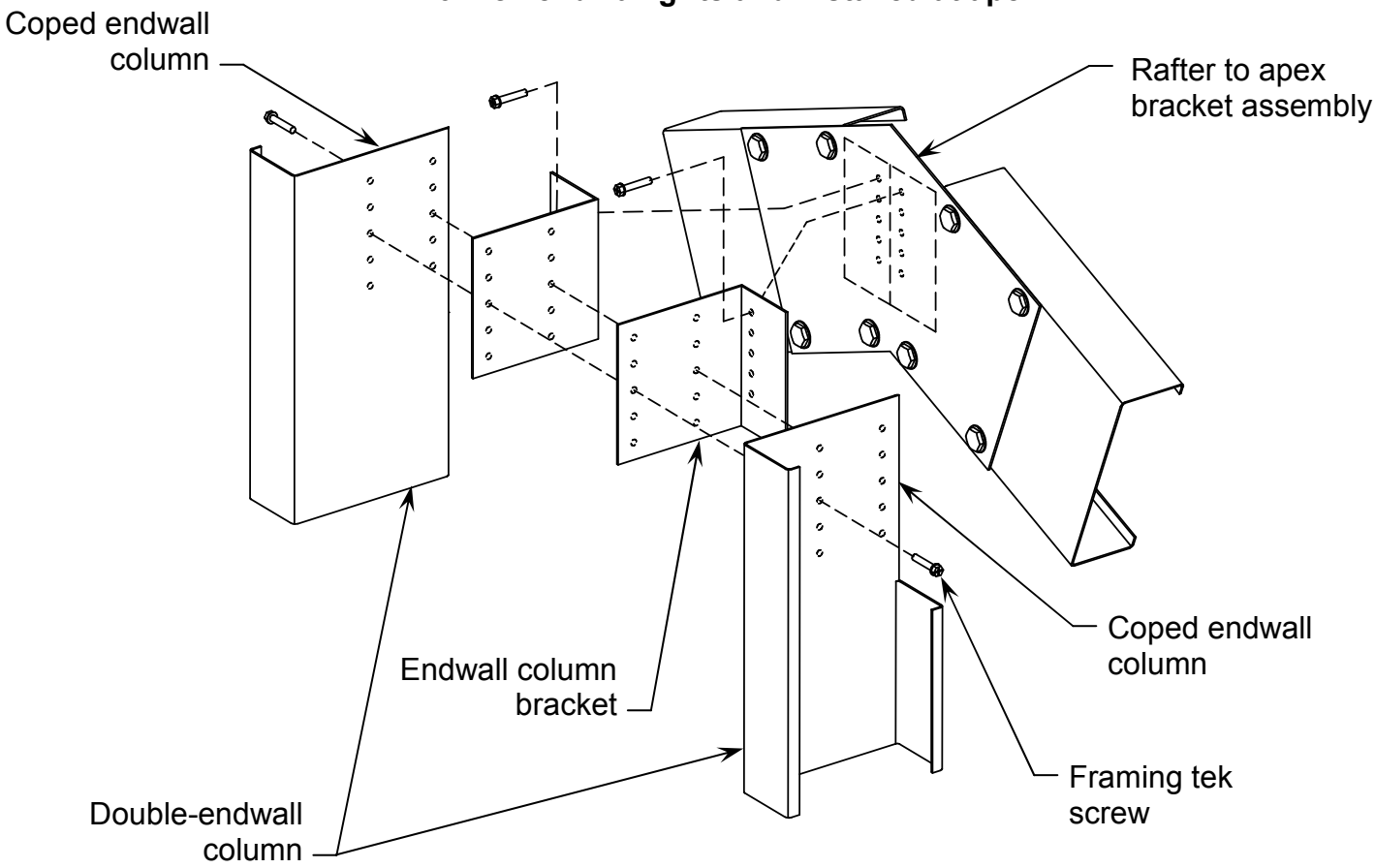
Double-endwall column to rafter assembly
w/ 4-inch endwall girts and installed at apex



Single-endwall column to rafter assembly
w/ 6-inch endwall girts and installed at apex



Double-endwall column to rafter assembly
w/ 6-inch endwall girts and installed at apex



Flybracing Installation

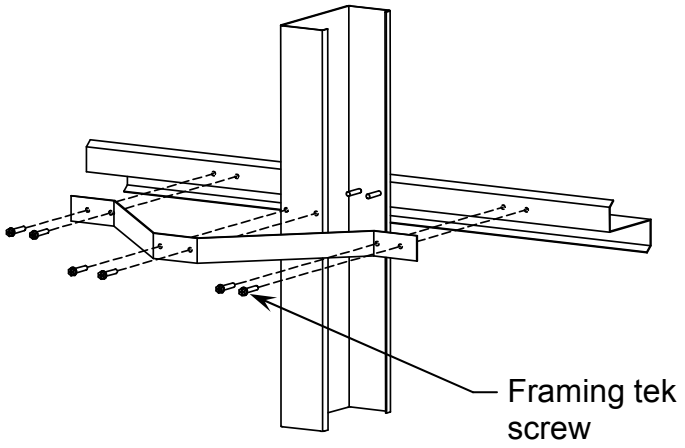
After installing endwall columns, you may have to install flybracing. This is specified on the engineering plans. See the endwall elevations and the flybracing detail, both found on the engineering plans, for exact information on installing flybracing.

Flybracing is installed by attaching strapping (the exact type as used for x-bracing) to both the endwall column and the endwall girt using framing tek screws.

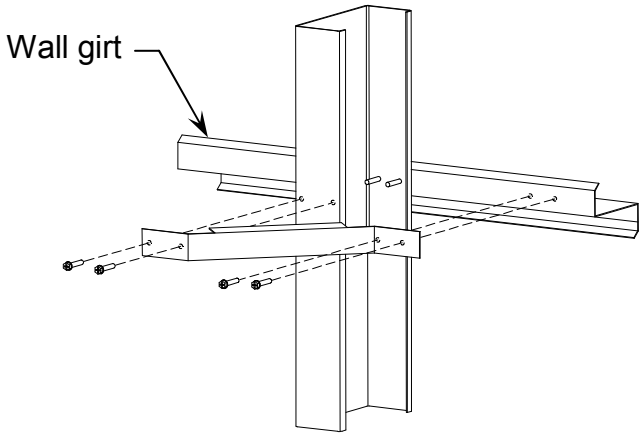
In some instances, flybracing can only be installed on one side of the girt. When this is the case, attach from the endwall column to the endwall girt using a two legged member with a minimum of 1.5" legs. It is best to fashion this out of excess material since this item will not be found in your bill of materials. Please see the details on the engineering plans for exact information on installing flybracing using this alternate method.

Please see the illustrations below as a reference for installing flybracing.

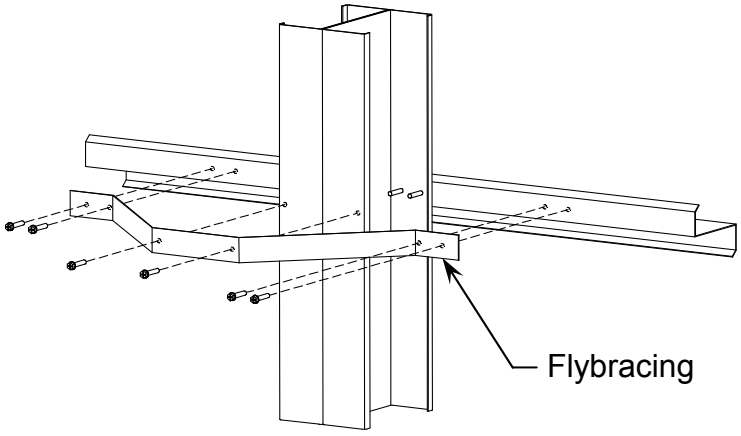
Flybrace installation at single-column



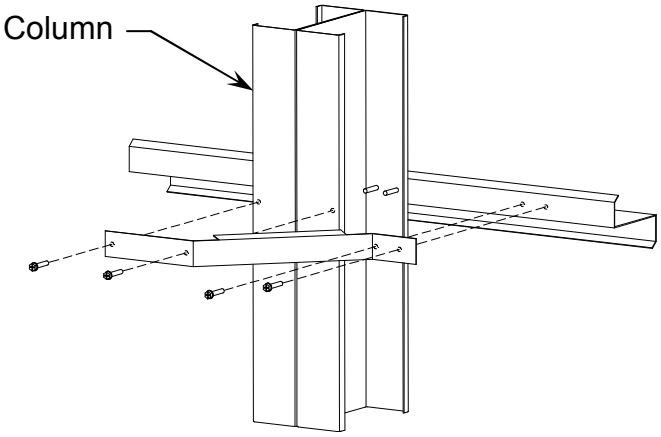
Alternate flybrace installation at single-column



Flybrace installation at double-column



Alternate flybrace installation at double-column



Girt (Sidewall and Endwall) Installation

Girts are installed on the sidewall and endwalls of your building and are connected to the sidewall and endwall columns. Each wall girt is connected from one column to the adjacent column using framing tek screws. When overlapping girts, they *must* overlap at a sidewall or endwall column.

Installation of girts is different for those bays that have doors and windows. Please see Appendix A (Door and Window Installation section) for more information on this aspect of girt installation.

Also note that the ZEE sections that make up the wall girts are made to interlock. When you unpack then you will notice this. Thus, when installing the wall girt, install them in such a manner that the first girt attached should have its longer flange (note that there will be a small triangle-shaped hole in the web of the ZEE, which points toward the longer flange) connected to the column. This will easily allow the next girt to be installed so that, if its shorter flange is attached, it will easily interlock with the other girt. When installing all wall girts, please keep this fact in mind.

Also, when installing girts, make sure the flange that is connected to the column points upward.

In some cases, endwall girts will need to attach directly to the rafter. When this occurs, bend out the upper stiffener lip of the endwall girt, so that it lays flush against the edge of the endwall rafter. Please see the instructions and illustrations below and on the following page (specifically Detail D) as a reference on how to install girts which connect directly to the rafter.

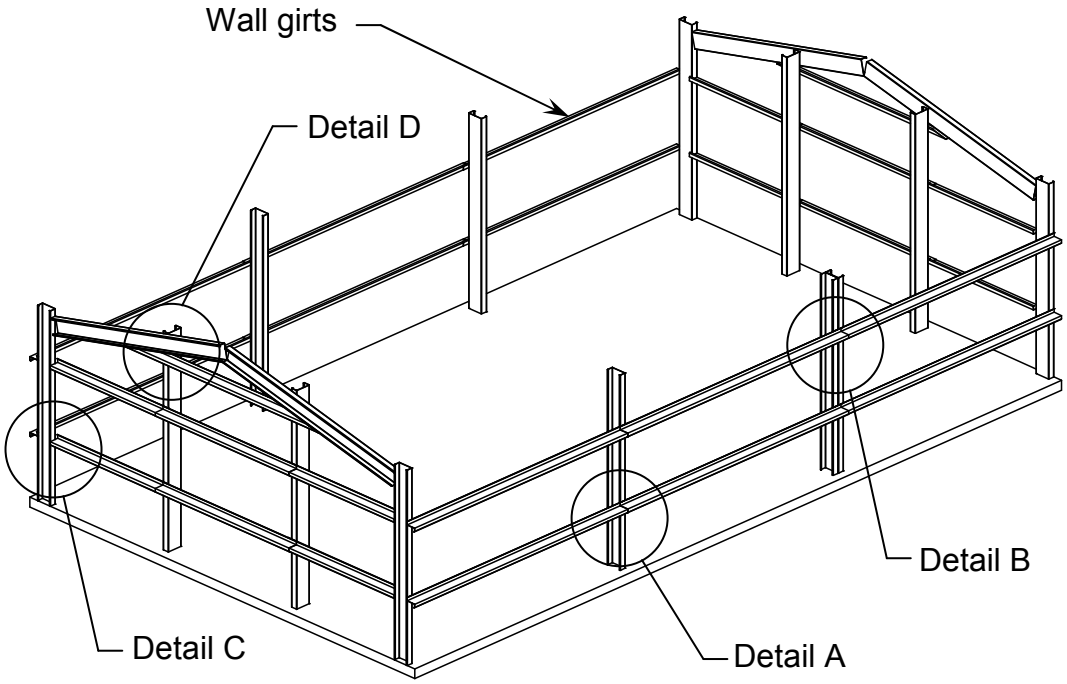
Please see the details on the engineering plans for more information on installing wall girts and please see illustrations on the next two pages as a reference for installing wall girts. Note that in the illustrations, not all components are shown for clarity. Double and single-columns are shown, but your building will not have both double and single interior sidewall columns. Instead it will be one or the other.

Note that though girts are graphically shown on the engineering plans, locations shown are not exact.

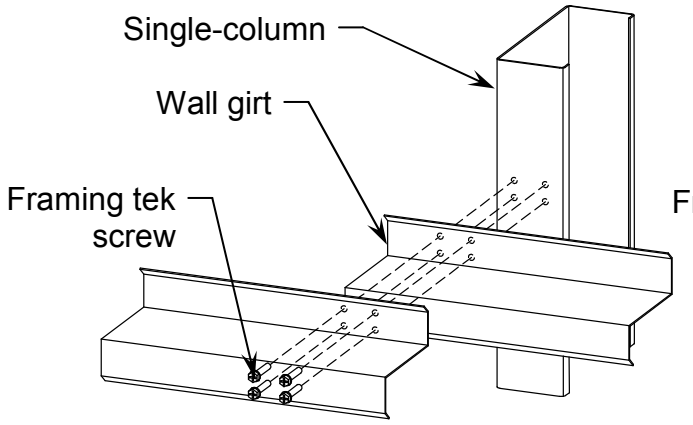
If you are installing base angle, install this first. If you are not installing base angle, you will need to install a bottom girt, which should be located as close to the slab as possible without touching the slab.

Locate the next girt with its web being the up the column the maximum girt spacing. Remember to that the girt flange connected to the column should be pointed upward. The subsequent girts should be located up the column from the initial girt at maximum girt spacing. Note that the final girt installed should be within the maximum girt spacing of the eave purlin. For the maximum girt spacing, please see the member and material

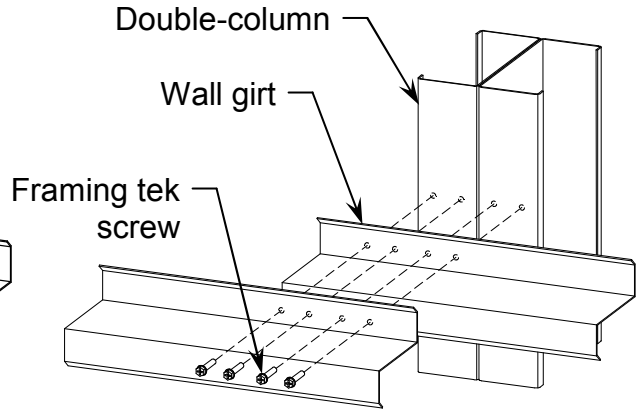
schedule of the engineering plans. Note that there is both a sidewall girt spacing and an endwall girt spacing listed. Ensure that you use correct spacing for each wall.



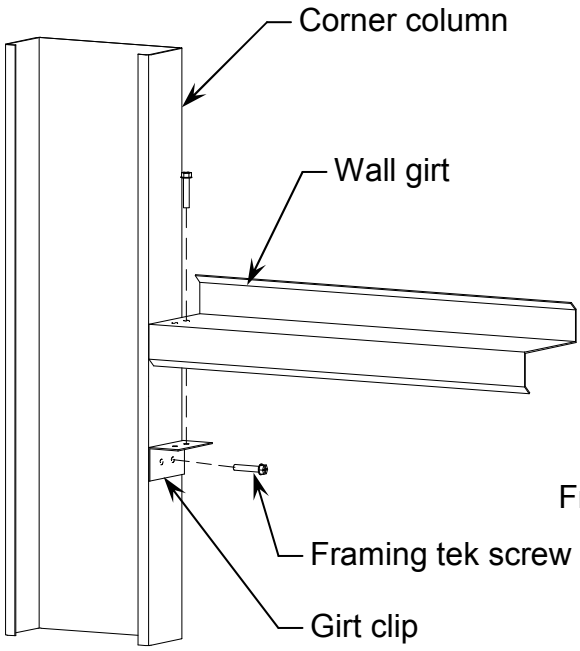
Detail A
Girt to single-column assembly



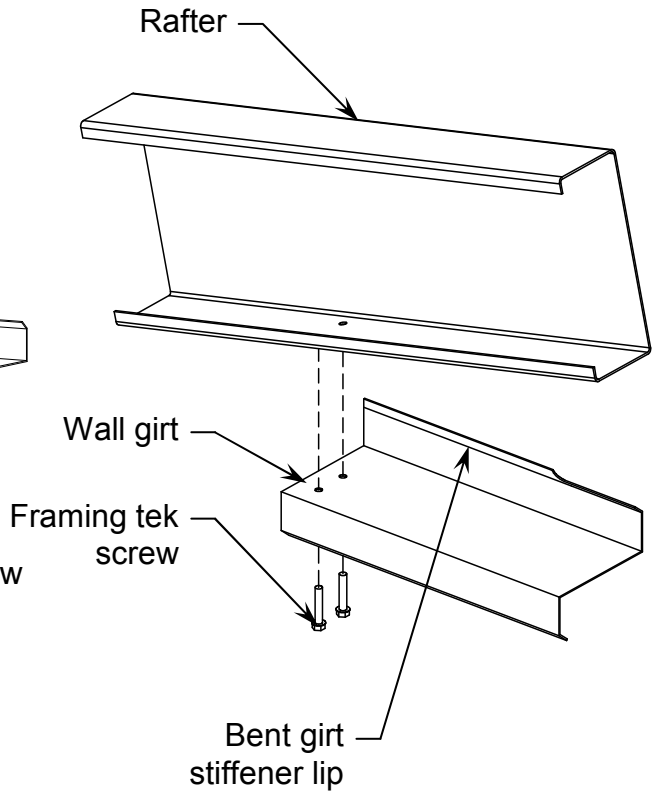
Detail B
Girt to double-column assembly



Detail C
Endwall girt to column assembly



Detail D
Endwall girt to rafter assembly



Girt and Purlin Flange Bracing Installation

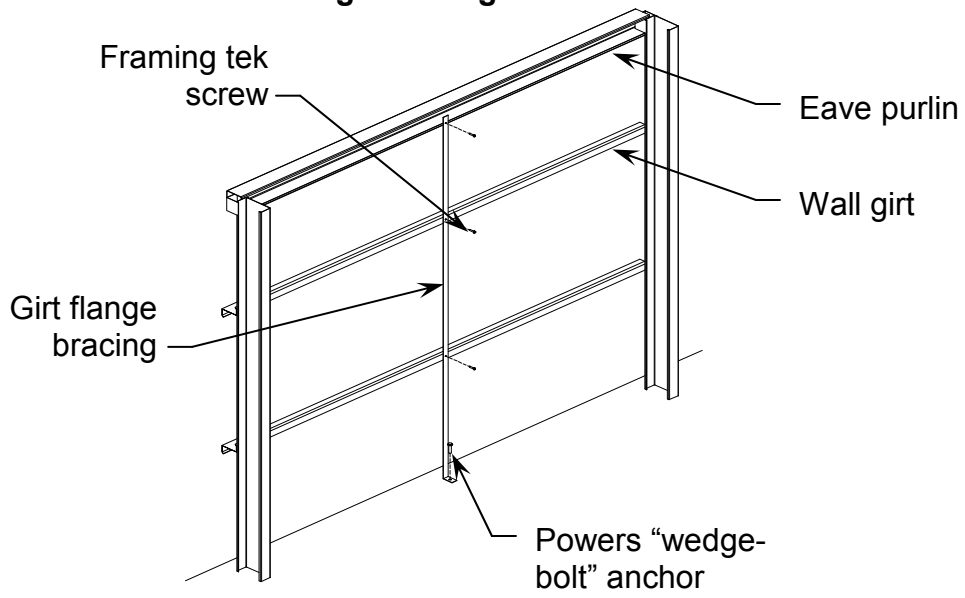
After installing all wall girts and roof purlins, you may have to install girt and purlin flange bracing. This is specified on the engineering plans. Please see number and location on the sidewall elevations.

If necessary for your building, you will need to use the strapping provided and install this using framing tek screws to attach to the wall girts, roof purlins and eave purlins and a Powers “wedge-bolt” anchor to attach to the foundation. Please see the column base installation section for more information on installing these anchor bolts.

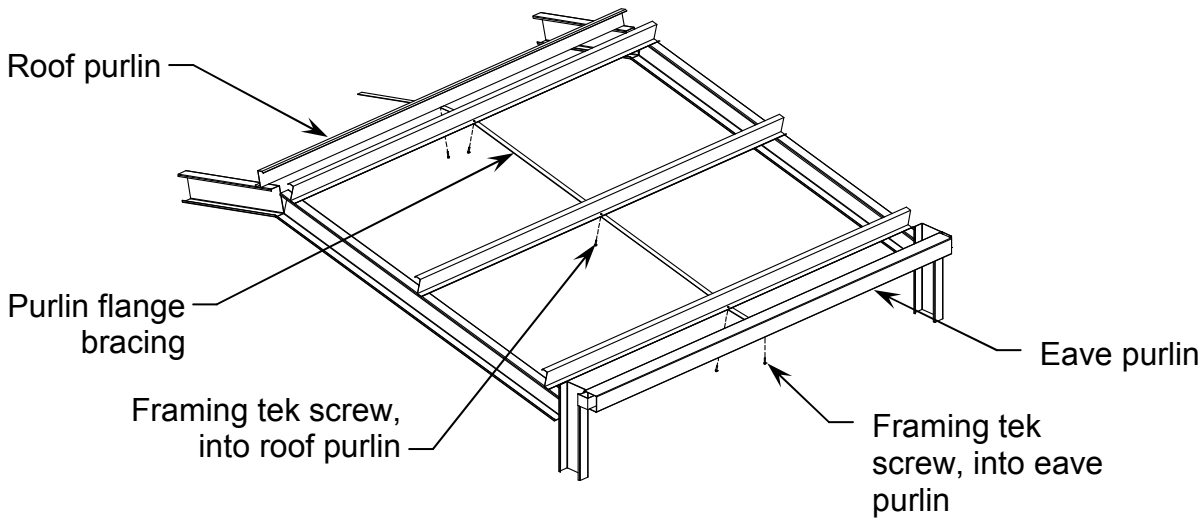
Please see the details on the engineering plans for information on strapping, screw and bolt types required as well as for specific installation instructions.

Please see the illustrations below and on the next page as a reference on how to install girt and purlin flange bracing.

Girt flange bracing installation



Purlin flange bracing installation

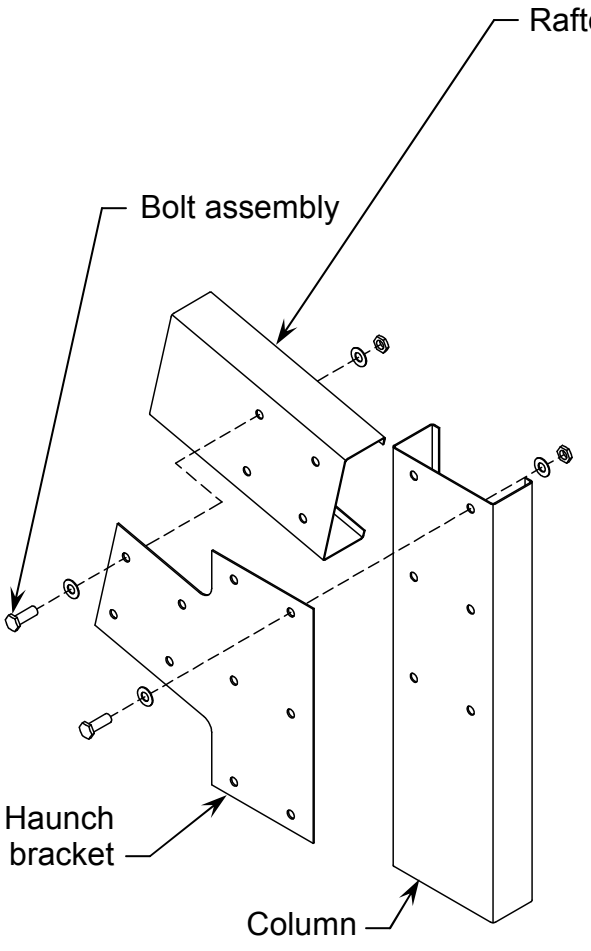


Haunch Bracket Installation

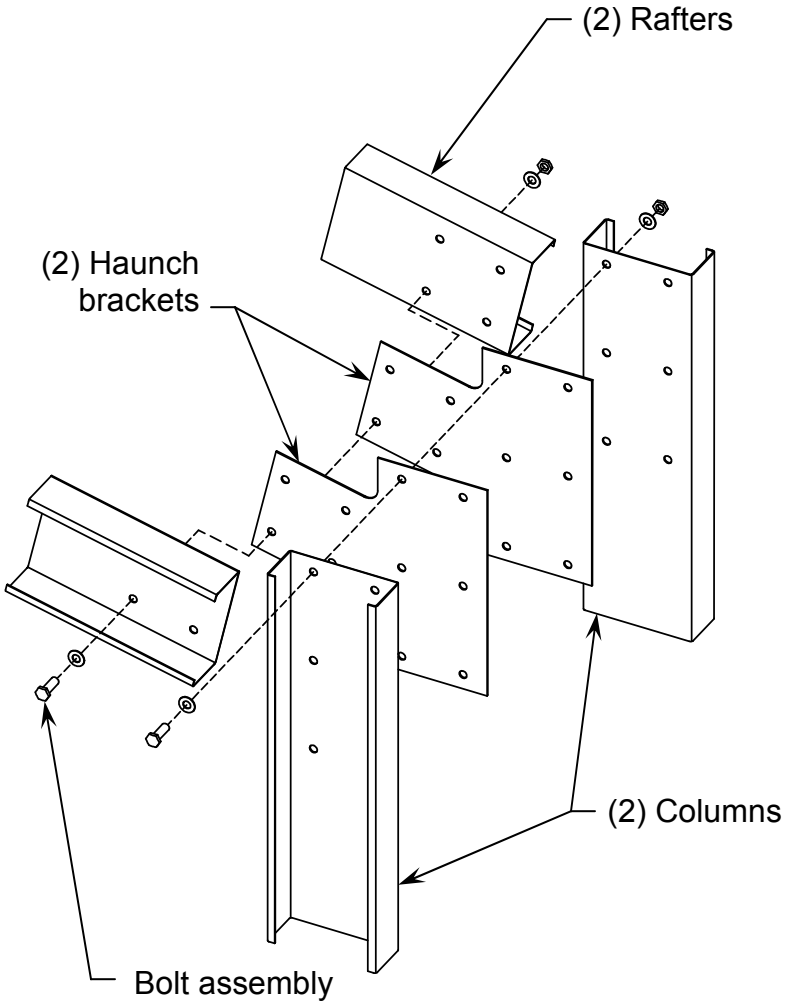
Connect columns to rafters using the haunch bracket with bolts. Please see the details on the engineering plans for number, type and shape of haunch brackets and see the member and material schedule for number and type of rafters. Please see the illustrations below as a reference for attaching the columns to the rafters using haunch brackets.

Note that the precise shape of the haunch bracket varies by roof pitch and column size. See the haunch connection detail on the engineering plans for approximate shape.

Single-column to rafter assembly



Double-column to rafter assembly



Knee Brace Installation

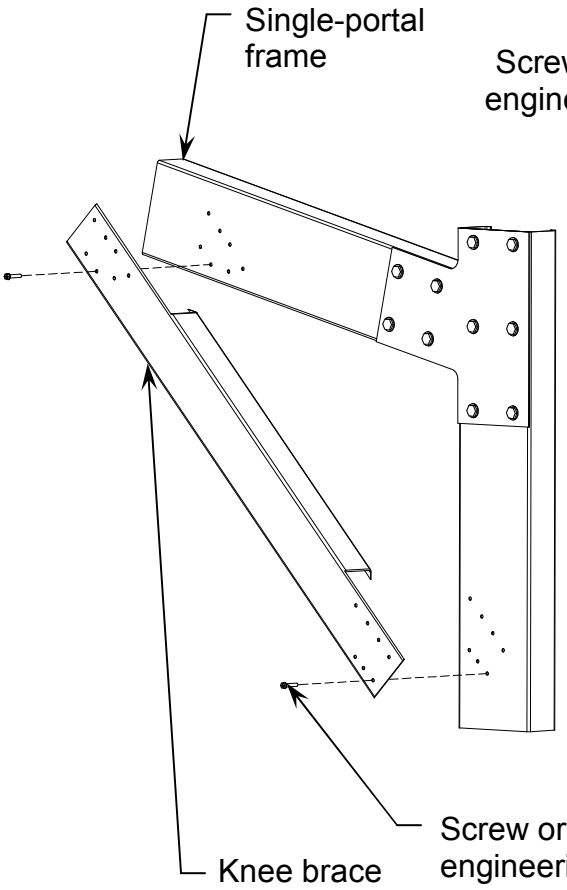
To install a knee brace you must first cope the flanges of the knee brace CEE section. Using the information found on the engineering plans, you will have to calculate the exact locations to cope the flanges. Also, if you are installing the knee braces using framing bolts, holes will need to be pre-drilled before installation per engineering plans.

Once the CEE section is coped, you will attach it to the columns and rafters with bolts or screws, which are specified on the member and material schedule on the engineering plans.

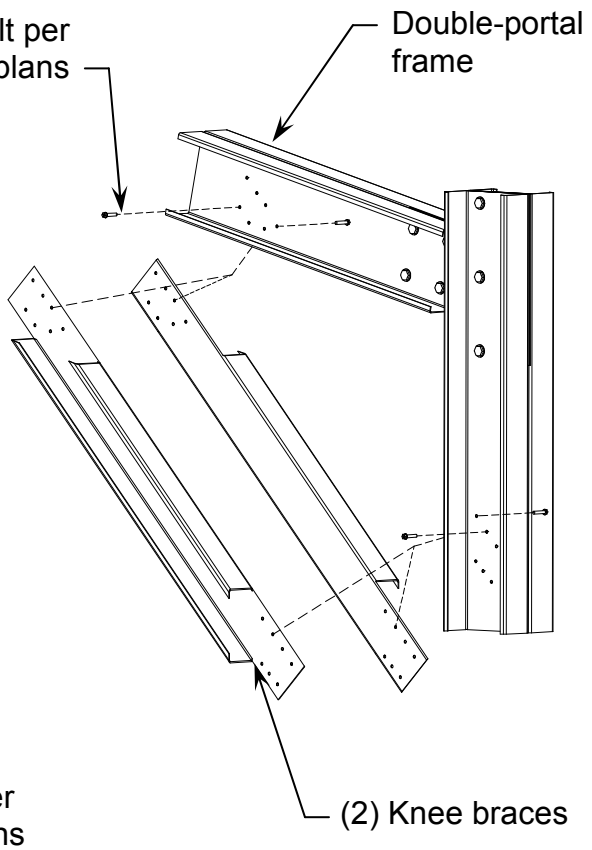
Refer to haunch connection detail on the engineering plans for the height of the bottom end of the knee brace relative to the foundation. Refer to the member and material schedule on the engineering plans for size, gauge and type of knee brace and number of bolts or screws necessary to install the knee brace.

Please see the illustrations below as a reference for attaching the knee brace to the columns and rafters. Note that the exact location, number and type of the bolts or screws are specified on the engineering plans, but are not represented on the illustrations below.

Single-column knee brace assembly



Double-column knee brace assembly



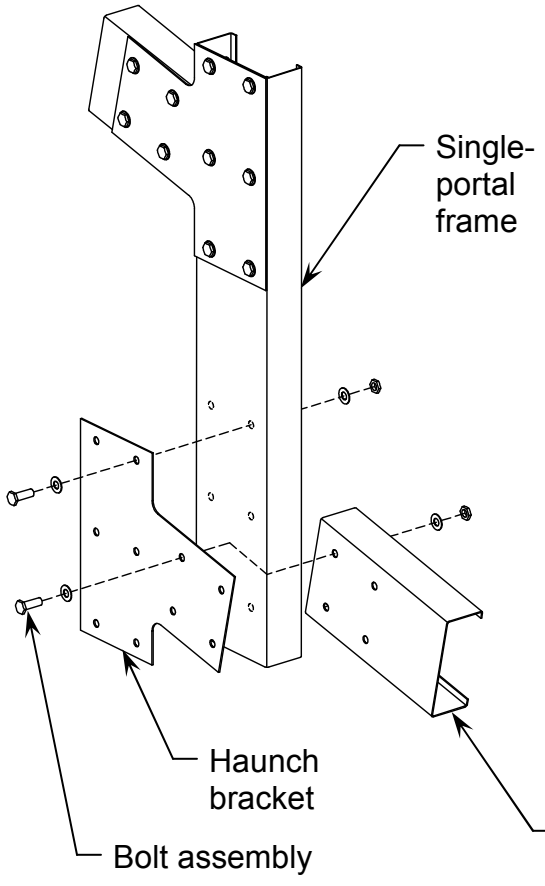
Leanto Rafter Installation

To install a leanto rafter, it must first be attached to the column on the main building. This is done with either a haunch bracket turned upside down, if the leanto has a drop and it is either a 2.55:12 or 4.85:12 pitch. If this is not the case, rafter will be attached using framing tek screws to a bent and coped endwall column bracket. Your method of installation will be indicated on the engineering plans.

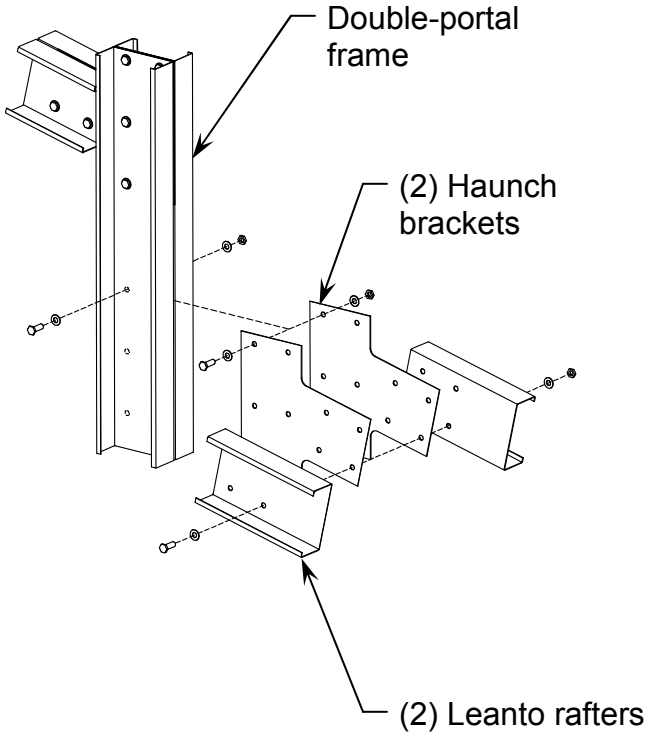
Leanto rafter can be installed after main building is installed and leanto column is stood up and attached at slab. First install upside down haunch bracket or coped and bent endwall column bracket as required on the main building column. Also, install haunch bracket on top of leanto column. Next, raise leanto rafter into position and attach to main building column as required and attach to leanto column as required.

Please see the illustrations below as a reference for attaching a leanto rafter to a main building column. Note that the exact location, number and type of the bolts or screws are specified on the engineering plans, but are not represented on the illustrations below.

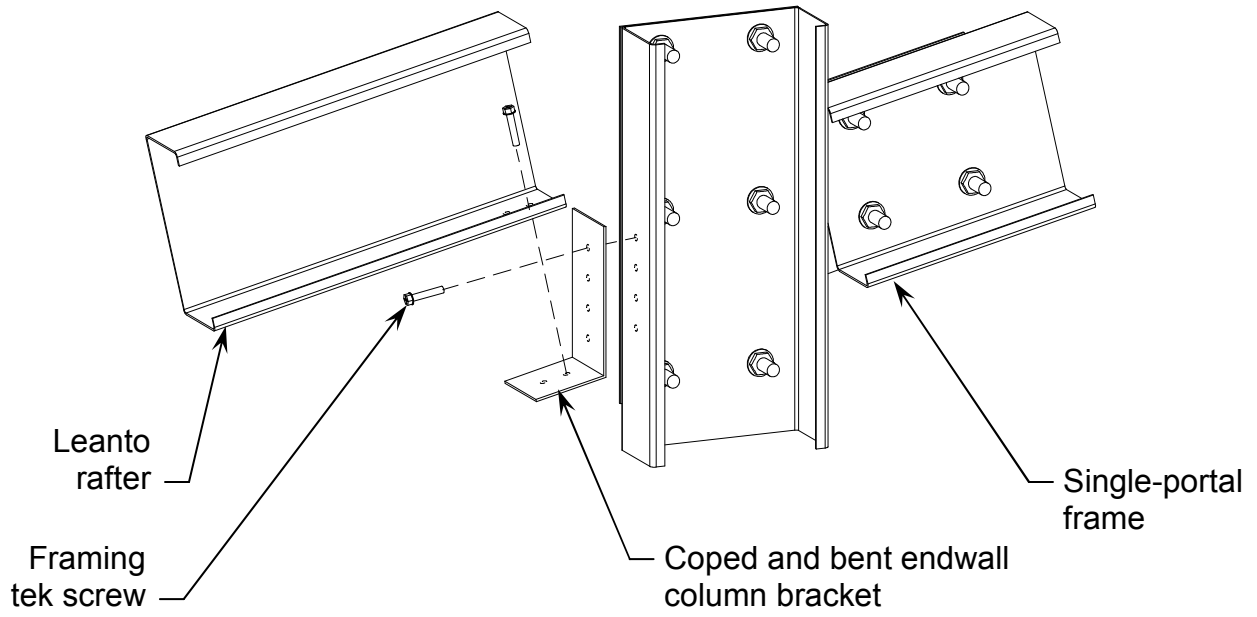
Leanto rafter to single-column assembly with drop



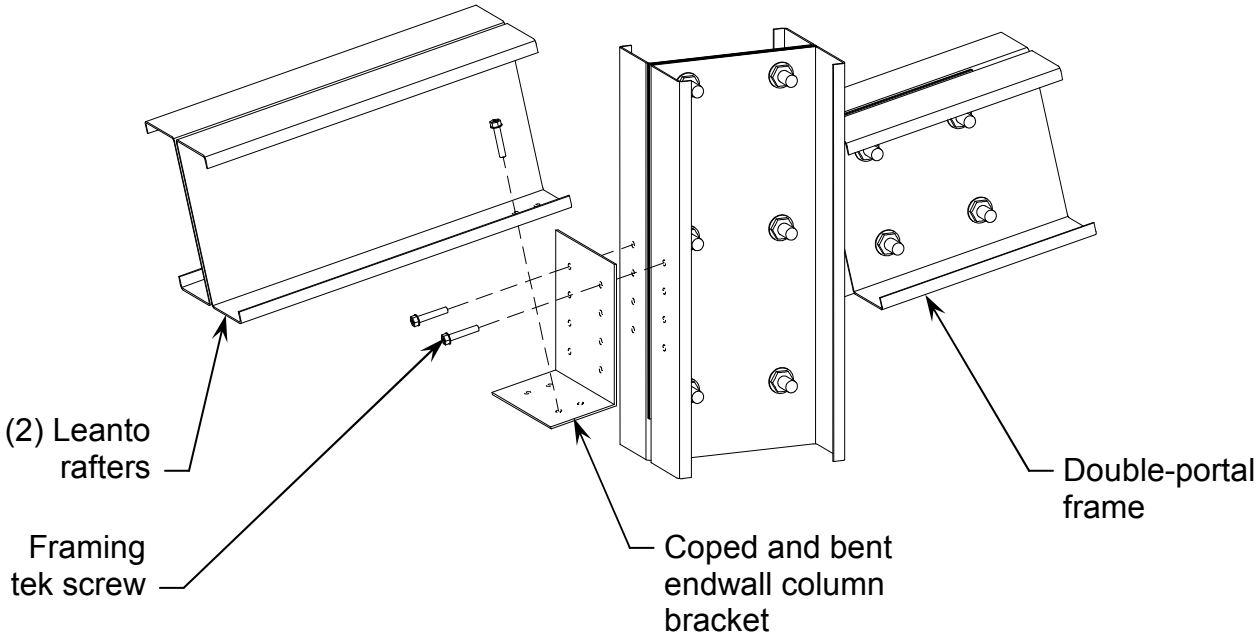
Leanto rafter to double-column assembly with drop



Leanto rafter to single-column assembly without drop



Leanto rafter to double-column assembly without drop



Mezzanine Installation

When beginning mezzanine installation, mezzanine floor brackets must be installed at the same time as the haunch brackets. If this is not done, it will impede the installation of the mezzanine and slow building installation. Please see engineering plans for location of single- and double-mezzanine girders. When installing floor brackets, ensure that a single bracket is installed at locations requiring a single girder, and two brackets are installed at locations where a double girder will be installed.

After installing mezzanine floor brackets, install the mezzanine girders. These and the floor brackets will be installed using bolts. Please see engineering plans for location of single- and double-mezzanine girders. Note that when installing double-mezzanine girders, you must install extra bolts to fasten the two girders together. Please see the engineering plans for location of these bolts.

After installing the mezzanine girder, install any necessary mezzanine knee braces which are indicated on the engineering plans. For instructions on installation, please see the knee brace installation section above. Installation procedures for knee braces and mezzanine knee braces are nearly identical. The only difference for installing mezzanine knee braces will be that the top end of the brace will attach to the mezzanine girder as opposed to the rafter.

Next, install any necessary mezzanine interior columns. The location of these is indicated on the engineering plans. Note that mezzanine interior columns consist of two 4” CEEs placed with their fronts together, and held together by framing tek screws and 2” by 4” sections of strapping. Please see the engineering plans for exact requirements for location and installation of this strap. The bottom and top of the interior column will be attached to the slab below and the mezzanine girder above using framing tek screws and Powers “wedge-bolt” anchors. For instructions on installing the anchor bolts, please see the column base installation section above. Please see the engineering plans for specific information on installation requirements for mezzanine interior columns.

After that, install mezzanine floor joists. Note that these are installed in a similar fashion as the wall girts and roof purlins, interlocking and connecting to the mezzanine girders with framing tek screws. For information on installing these, please see the wall girt or roof purlin section. For information on joist size and location, please see engineering plans.

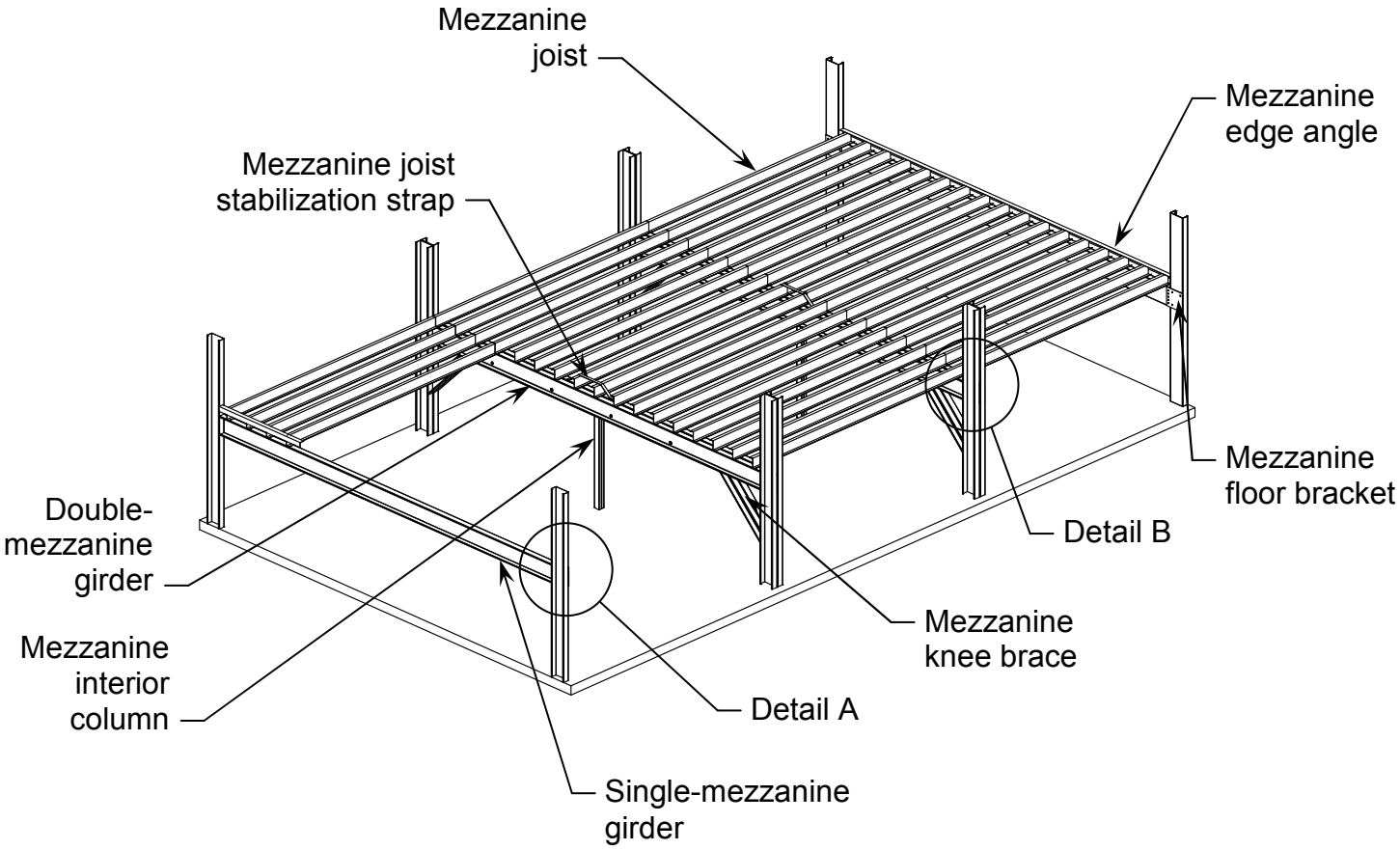
Once the joists are installed, you will need to install the edge angle along the outside edges of the mezzanine joists. To do this, place angle on edge of joist, and install pan-head screws at each intersection of edge angle and joists. For exact angle and fastener requirements, see the engineering plans.

Also, you will need to stabilize the mezzanine joists, installing mezzanine joist stabilization strap in the center of all mezzanine girders not at the outer edges of the

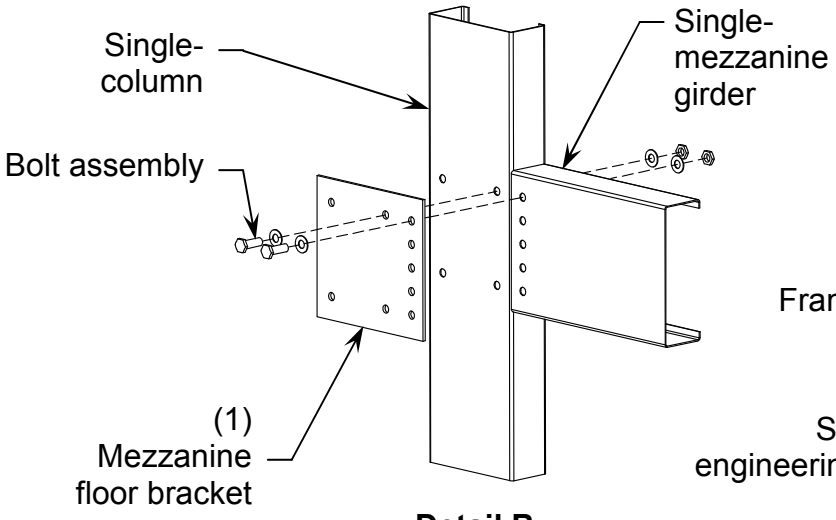
mezzanine joists. This strap will need to span at least two mezzanine joists, and will be installed using pan head screws where the strap overlaps the mezzanine joists. For exact strap placement and requirements, as well as fastener requirements, please see the engineering plans.

If installing stairs in your building that would require an opening to be cut in your mezzanine, you will need to cut and reinforce the mezzanine joists. For more information on this, please see the engineering plans. Note that because of the custom engineering required for stairs, instructions for installation of stair opening and the stairs themselves are not provided in the manual. Please contact your distributor for information on installation of stairs.

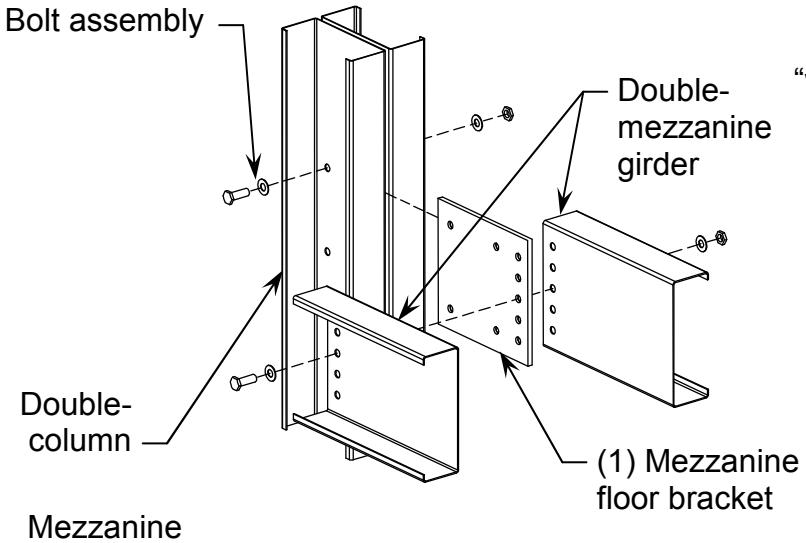
Please see the illustrations below and on the following pages as a reference for installing a mezzanine in your building. For reasons of clarity, not all components are shown.



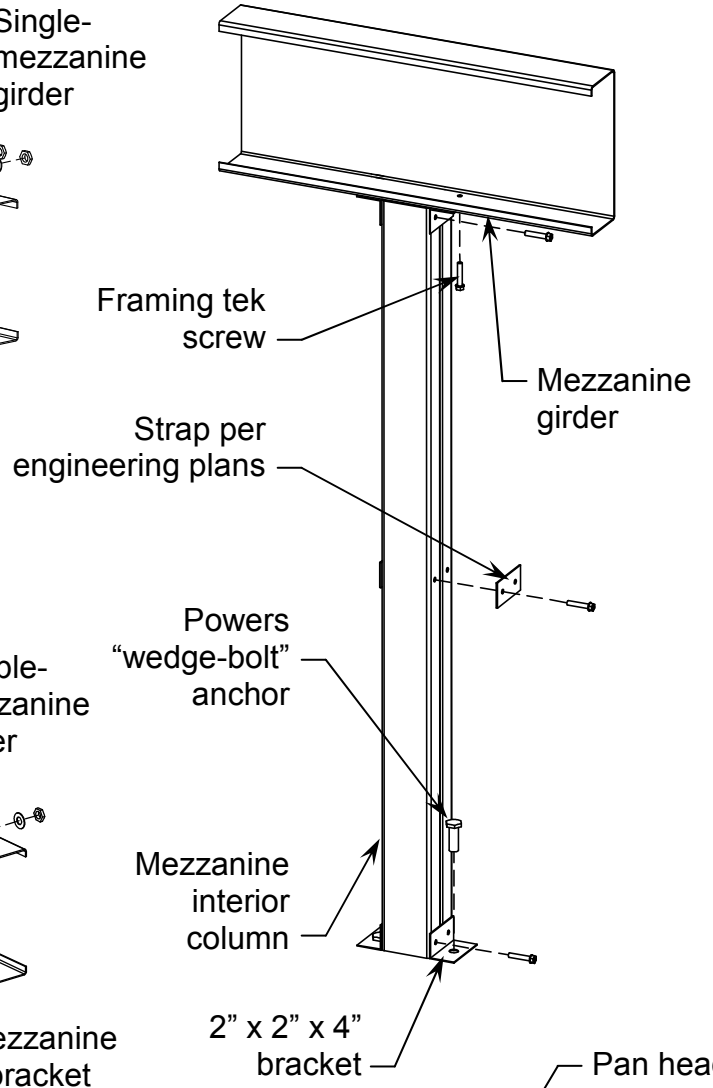
Detail A



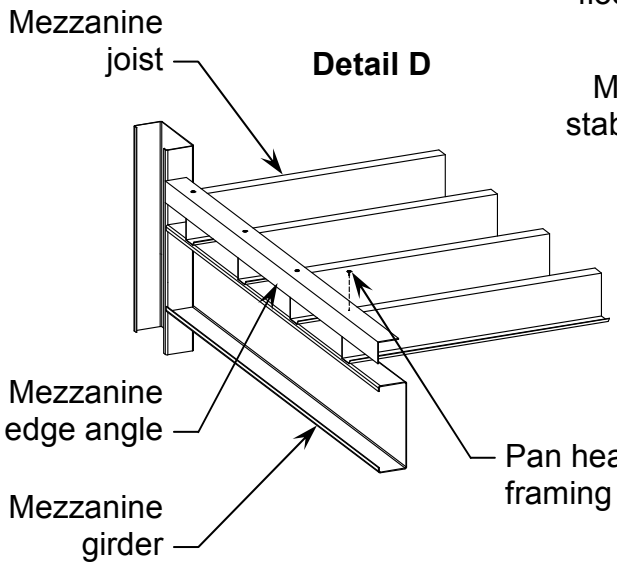
Detail B



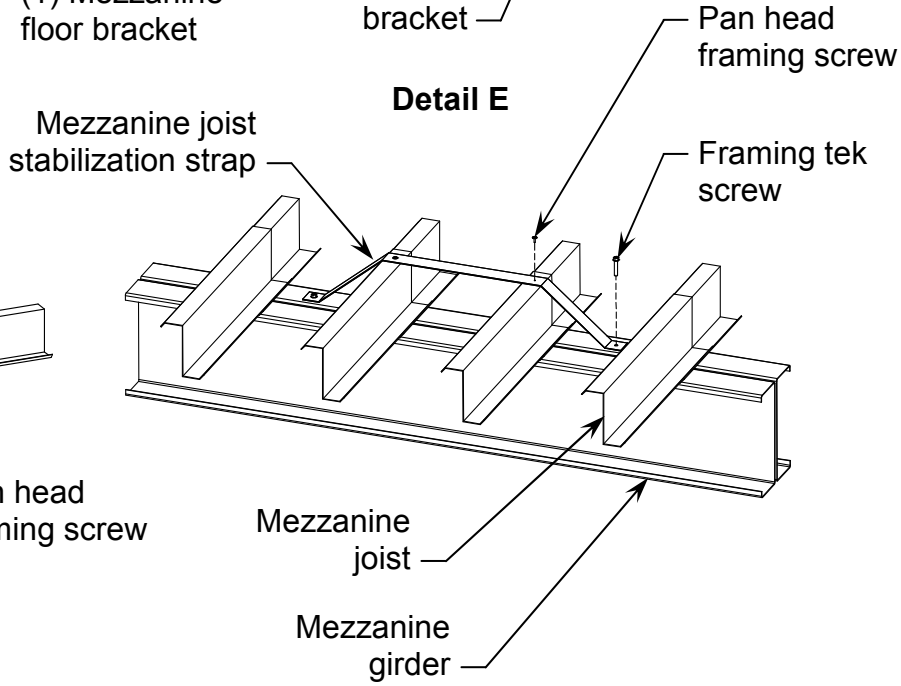
Detail C



Detail D



Detail E



Open Bay Installation

If you have open bays in your building, those bays that are open will not typically contain any wall girts, with girts and sheeting from adjacent bays stopping at the edge of the columns for the open bay. However, if your open bays have an open bay header, you will need to install open bay header girts to support your open bay header sheeting. If this is the case, an open bay header girt will be installed at the bottom edge of the open bay header, and, if the open bay header sheet is longer than the minimum required girt spacing for that specific wall, girts will need to be installed to support the open bay header sheet.

If an entire wall will consists of open bays, you will simply not install any of the wall girts for that entire wall unless directed otherwise on the engineering plans. Also note that if this is the case, you may be required to install moment frames. As this is a custom aspect of OutBack buildings, it is not covered in this manual. For location and installation instructions, please refer to the engineering plans.

Purlin Installation

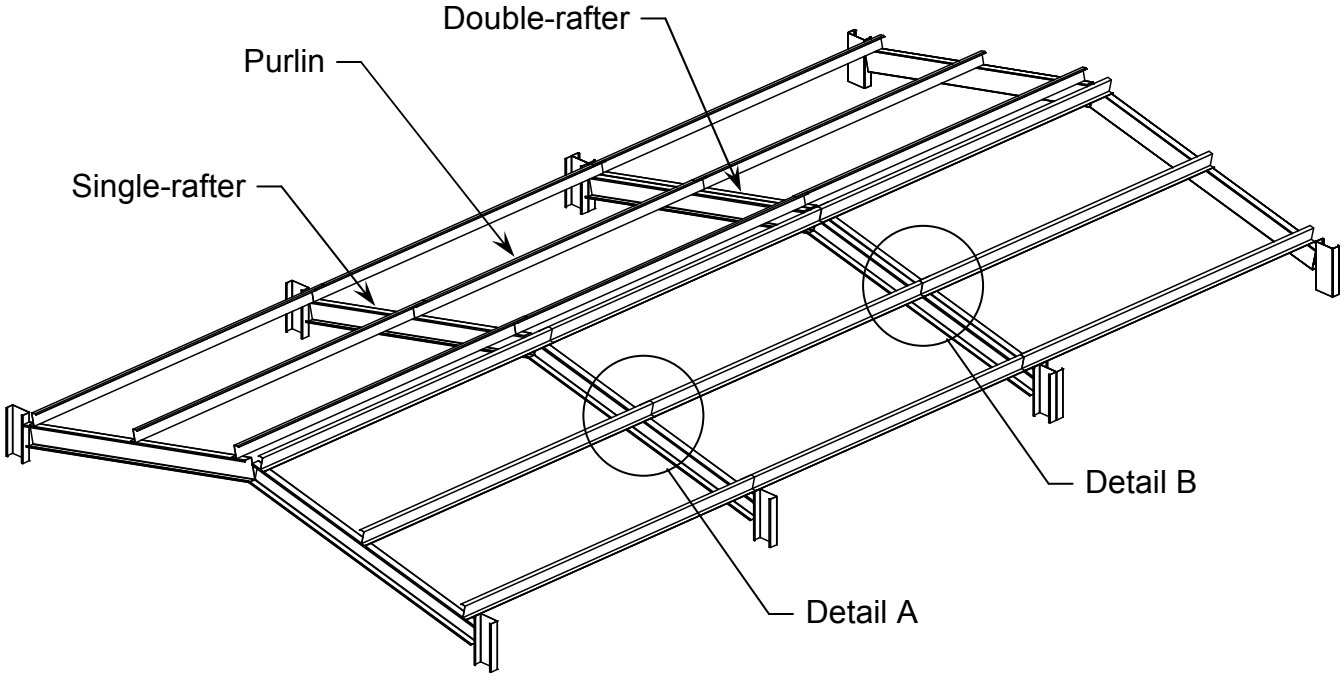
Purlins are installed on the top of rafters of your building. Each purlin is connected from one rafter to the adjacent rafter using framing tek screws. When overlapping purlins, they *must* overlap at a rafter.

Also note that the ZEE sections that make up the purlins are made to interlock. When you unpack them you will notice this. Thus, when installing the purlins, they should be installed in such a manner that the first purlin attached should have its longer flange connected to the column (note that there will be a small triangle-shaped hole in the web of the ZEE, which points toward the longer flange). This will easily allow the next purlin to be installed so that, if its shorter flange is attached, it will easily interlock with the next purlin. When installing all purlins, please keep this fact in mind.

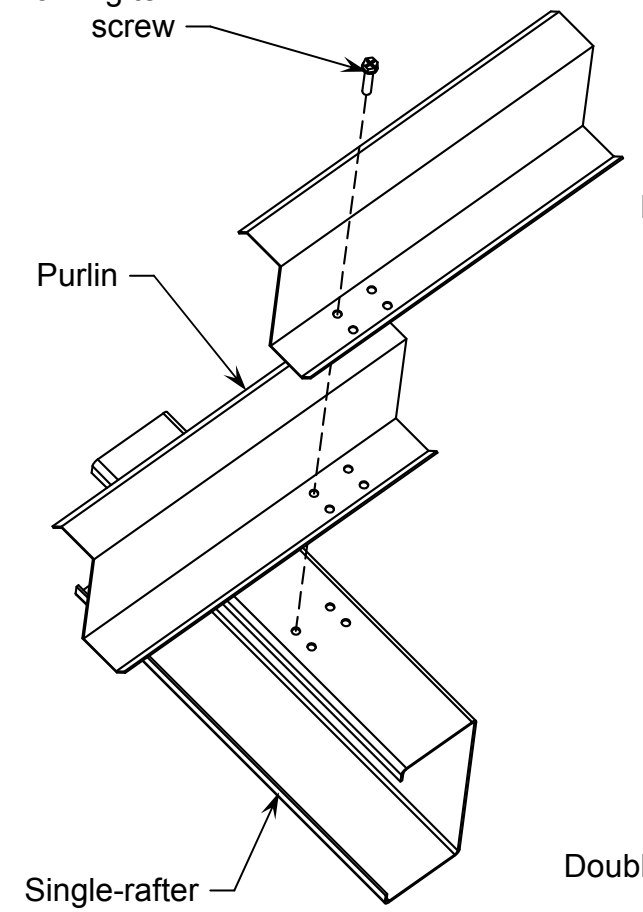
Also, when installing a purlin, make sure the flange that is connected to the rafter points downhill.

Please see the details on the engineering plans for more information on installing purlins and please see illustrations below and on the following page as a reference for installing purlins. Note that in the illustrations, not all components are shown for clarity and that double and single-rafters are shown, but your building may not have both double and single-rafters. Instead it will be one or the other.

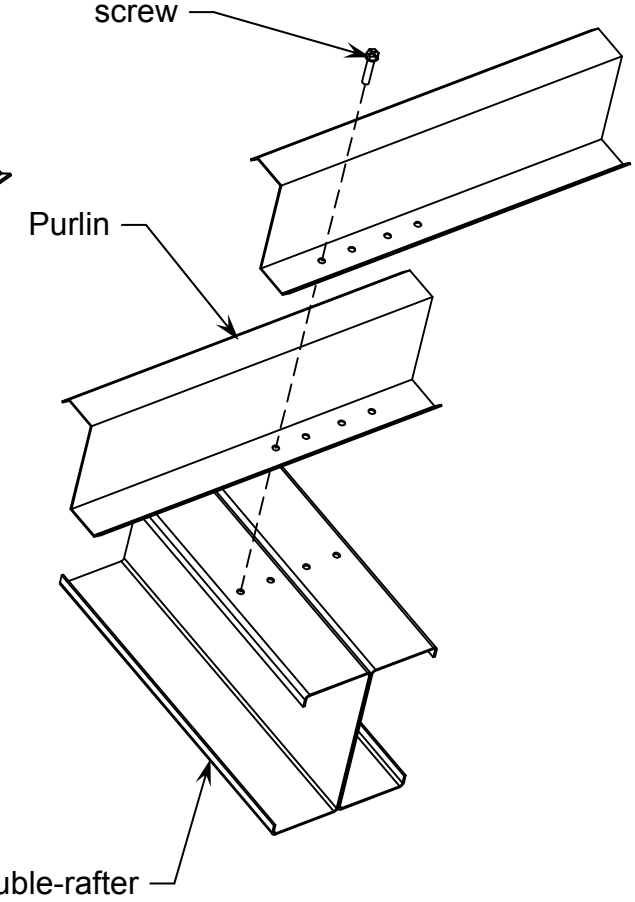
Note that though purlins are graphically shown on the engineering plans, locations shown are not exact. Locate the top purlin with its web being at the top end of the rafter (with the flange connected to the rafter pointed downhill). The subsequent purlins should be located downhill from the initial purlin at the maximum purlin spacing. Note that the final purlin installed should be within the maximum purlin spacing of the eave purlin. For the maximum purlin spacing, please see the member and material schedule of the engineering plans.



Detail A



Detail B

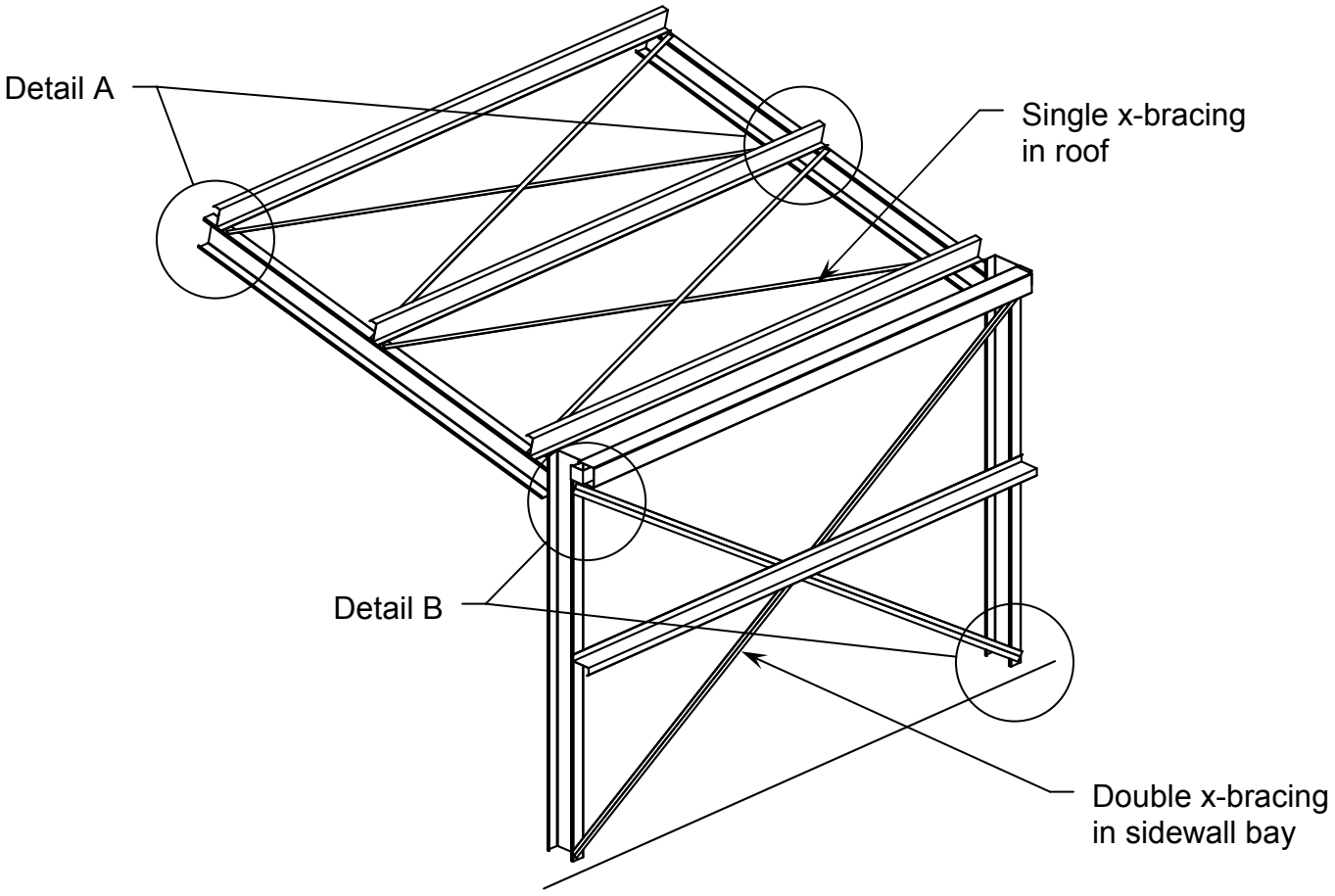


X-Bracing Installation

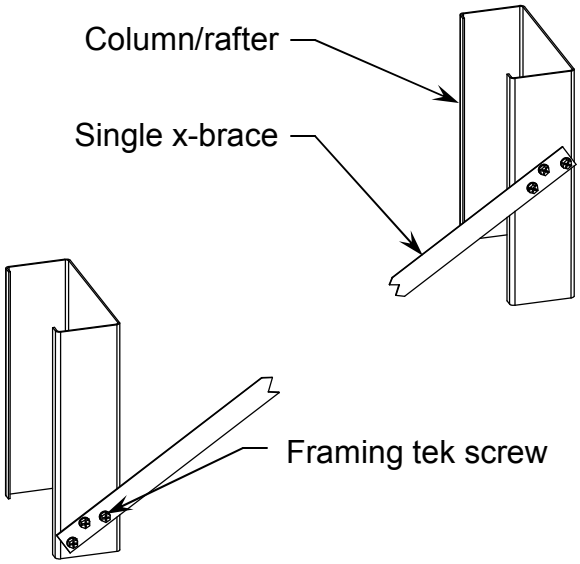
After installing wall girts and roof purlins, you will need to install x-bracing on the walls and on the roof, respectively. For exact location and layout of the x-bracing, please see the engineering plans, specifically the foundation plan and all elevations. Note that the specific strapping type is specified in the member and material schedule on the engineering plans. Further installation instructions and requirements specific for your building are found in the details section of the engineering plans.

Note that when installing x-bracing, strapping needs to be within 2” from the top and bottom of column or rafter, per the engineering plans.

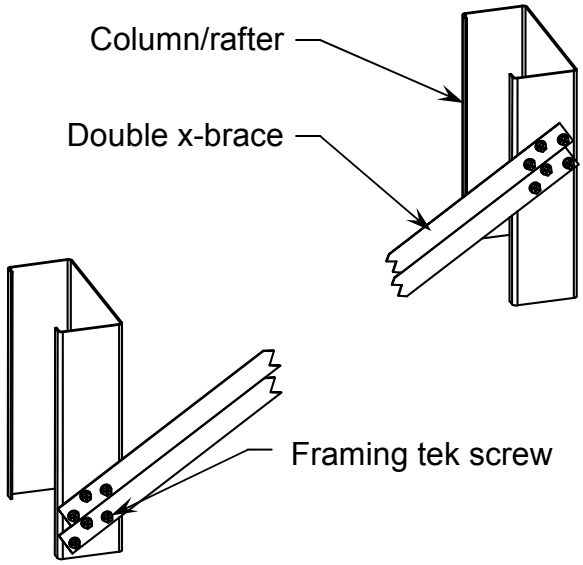
Please see the illustrations below and on the following page as a reference on installation of x-bracing. Note that the illustrations do not show endwall x-bracing. However, installation is similar to the installation of x-bracing on the sidewall. Also note that double x-bracing is shown on the sidewall, while single x-bracing is shown on the roof. This is for reference only. Please refer to the member schedule on sheet 2 of your engineering plans for x-bracing requirements.



Detail A



Detail B



When installing x-brace, it is imperative that it be snug. However, you must not overtighten it. Overtightening will pull your columns out of plumb. Please keep this in mind while installing.

To get your x-bracing tight, first attach one end of the strap (in most cases the higher end) using a single screw, so the strap is attached to one column or rafter but is still able to pivot. Then pull the strap manually as tight as you can and clamp into place. Drill a hole through the strap ONLY using a framing tek screw. Do not drill into the column or rafter. Instead, using the hole you have just drilled, trace the hole on the column. Then, unclamp and reposition strap so you can drill a hole in the column. Drill this hole about ¼" past where your previous mark was. Then, after both holes are drilled, angle a framing tek screw through both holes, as illustrated below. This process should tighten your x-brace, but not overtighten it. If it is not snug enough, or is overtightened and pulls columns or rafters out of plumb, remove and re-install the x-brace.