Dutch Hip End

Scope of section

The following technical sheets are limited to 5 segment fan hip ends in accordance with Multinail Software.

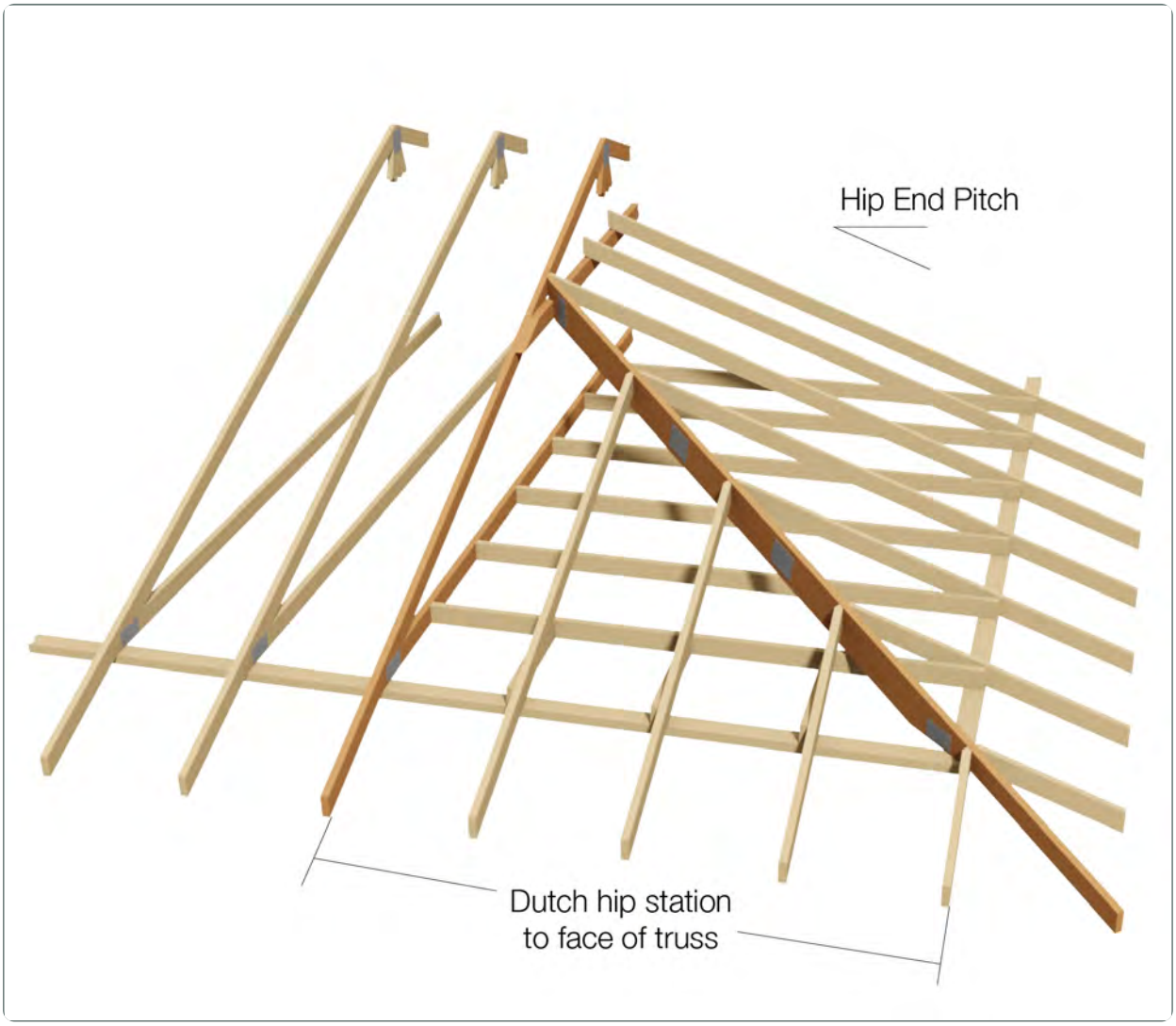


Figure C2-08-04-01

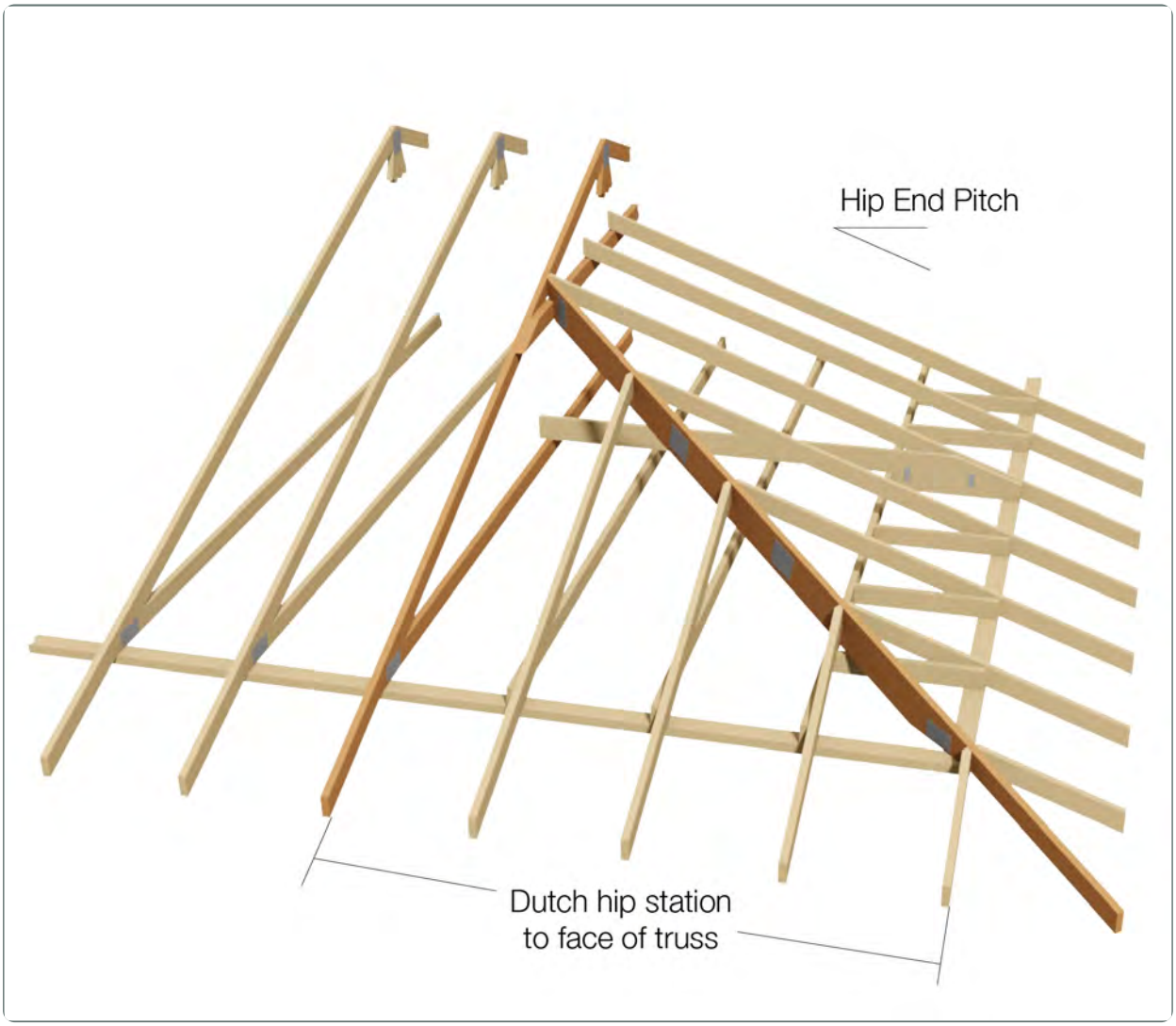


Figure C2-08-04-02

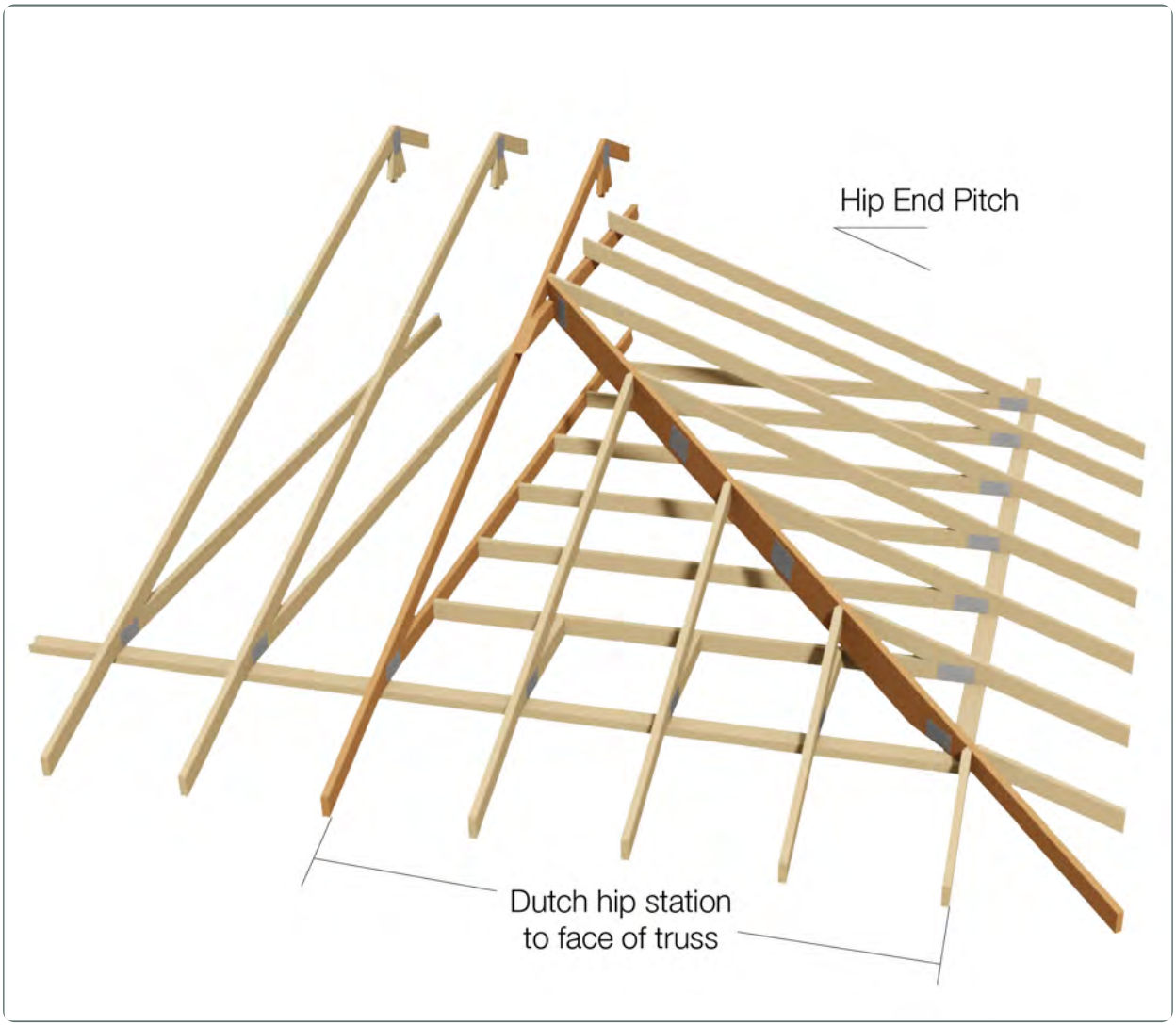


Figure C2-08-04-03

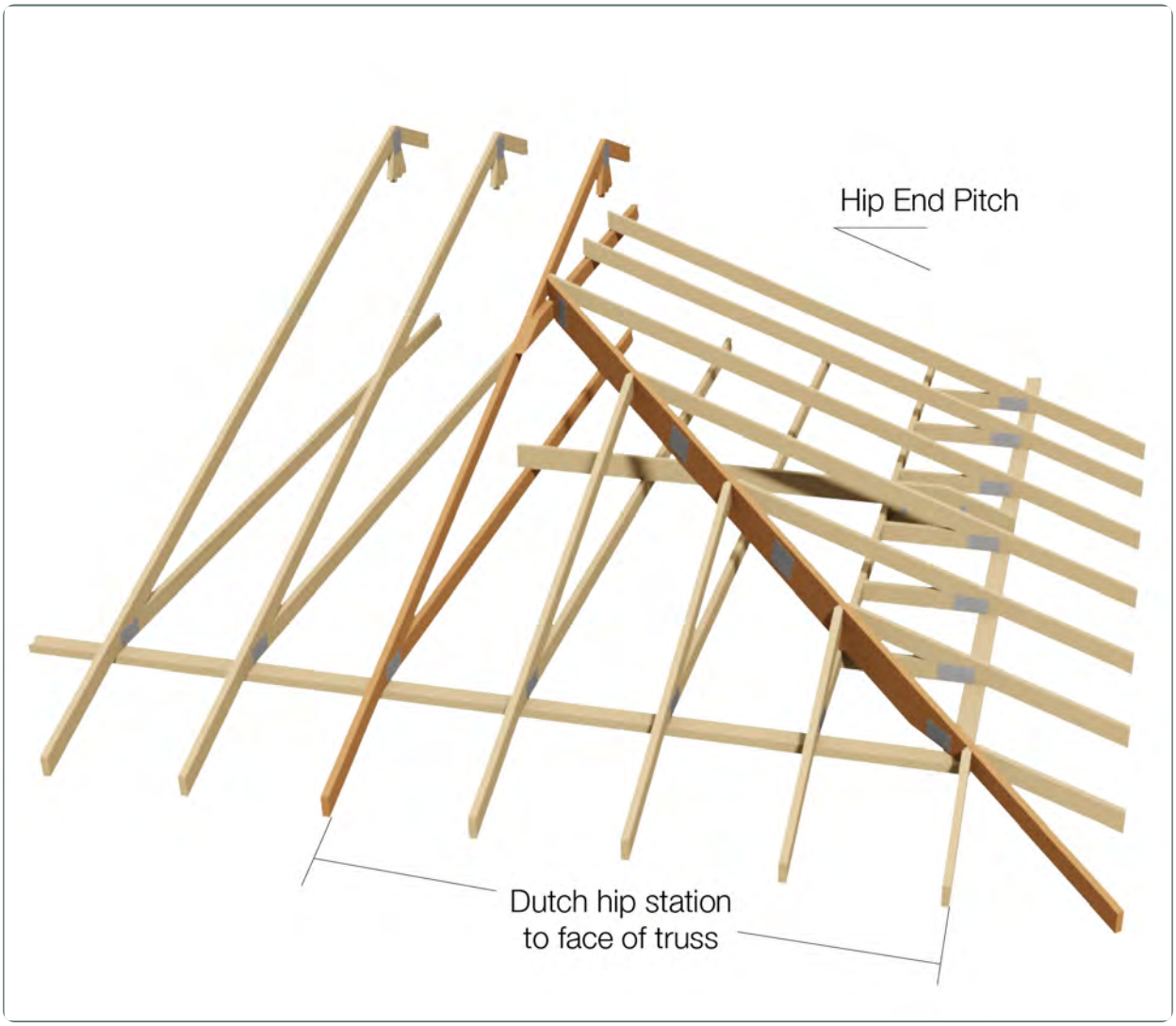


Figure C2-08-04-04

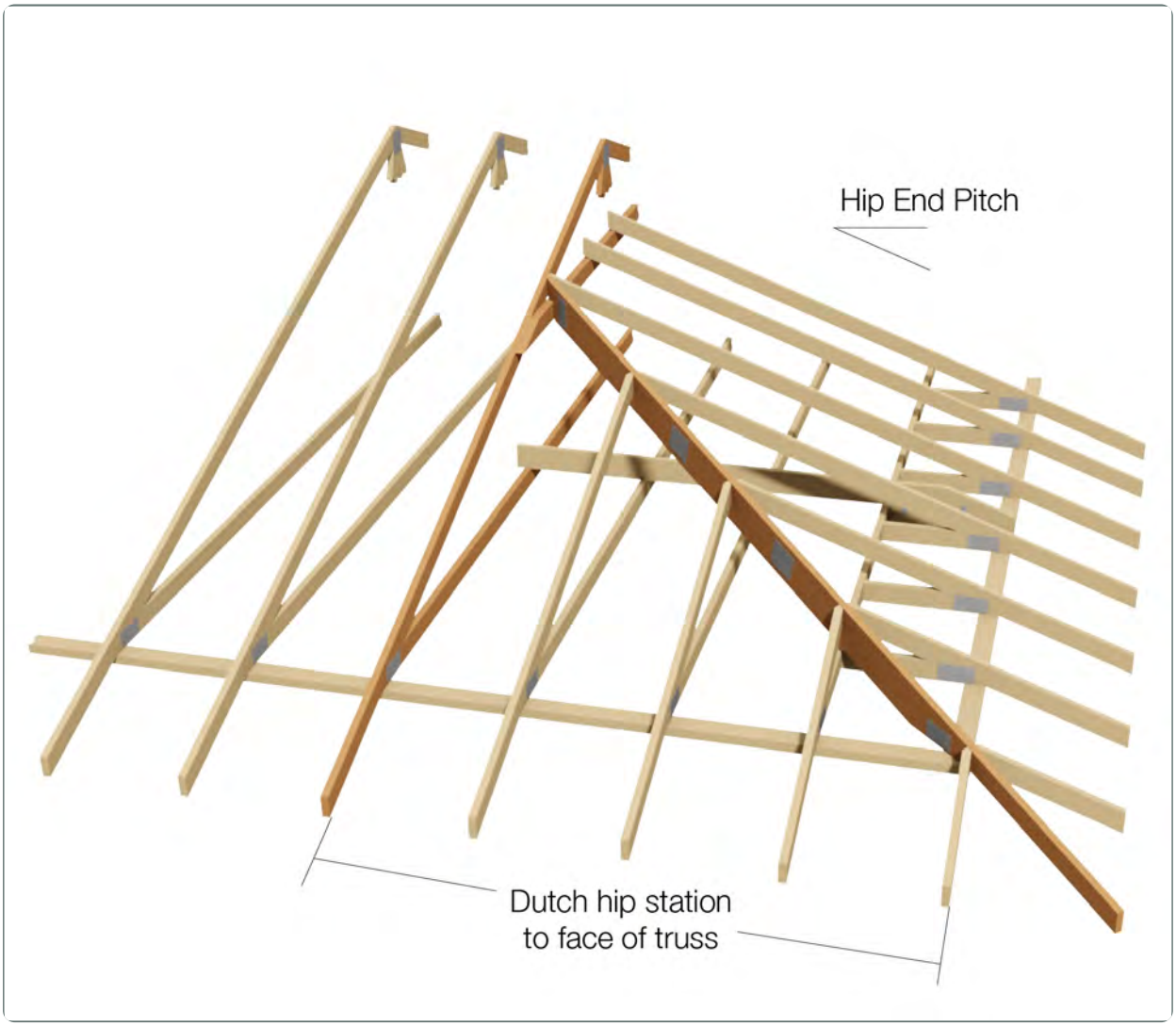


Figure C2-08-04-04

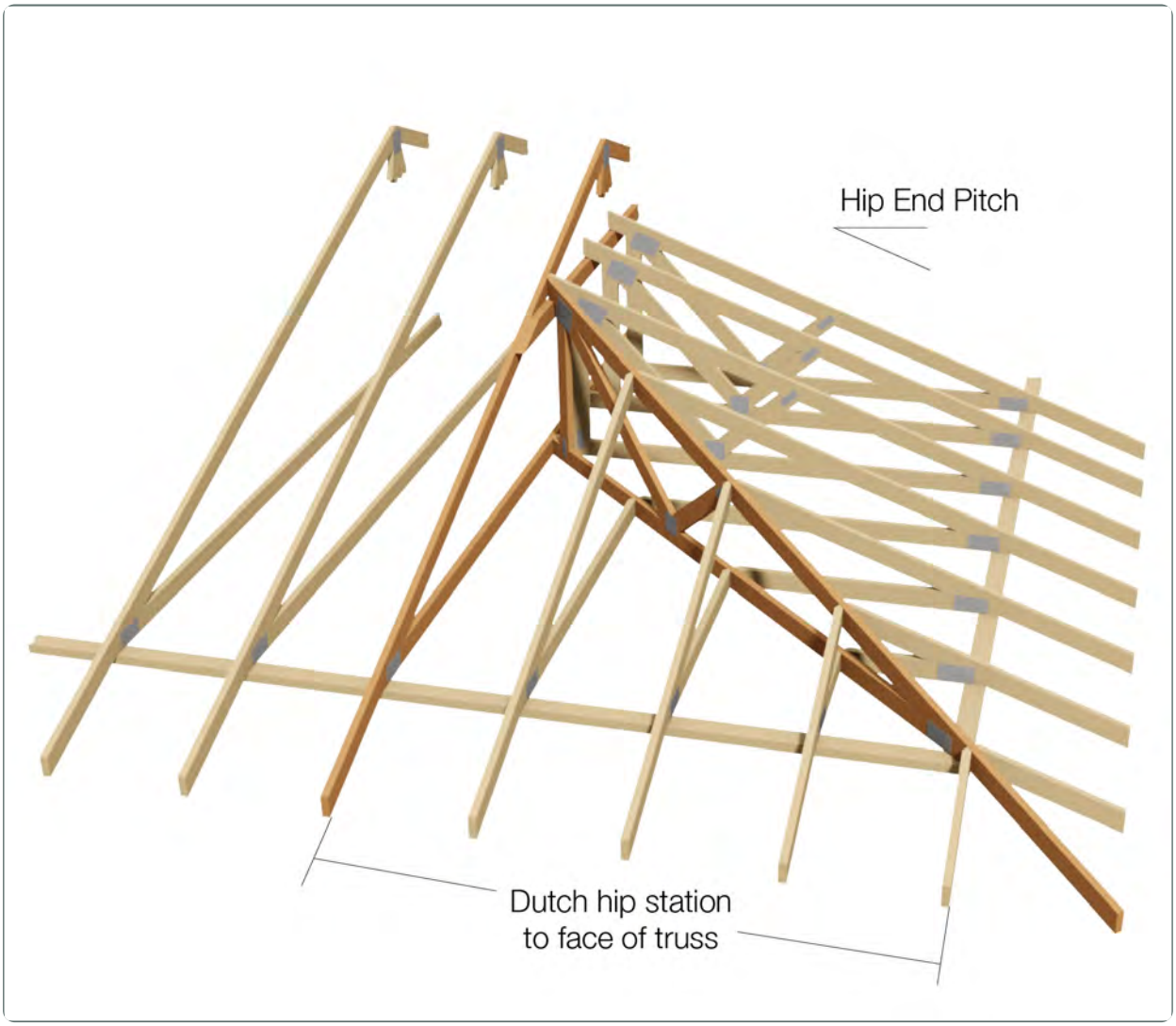


Figure C2-08-04-05

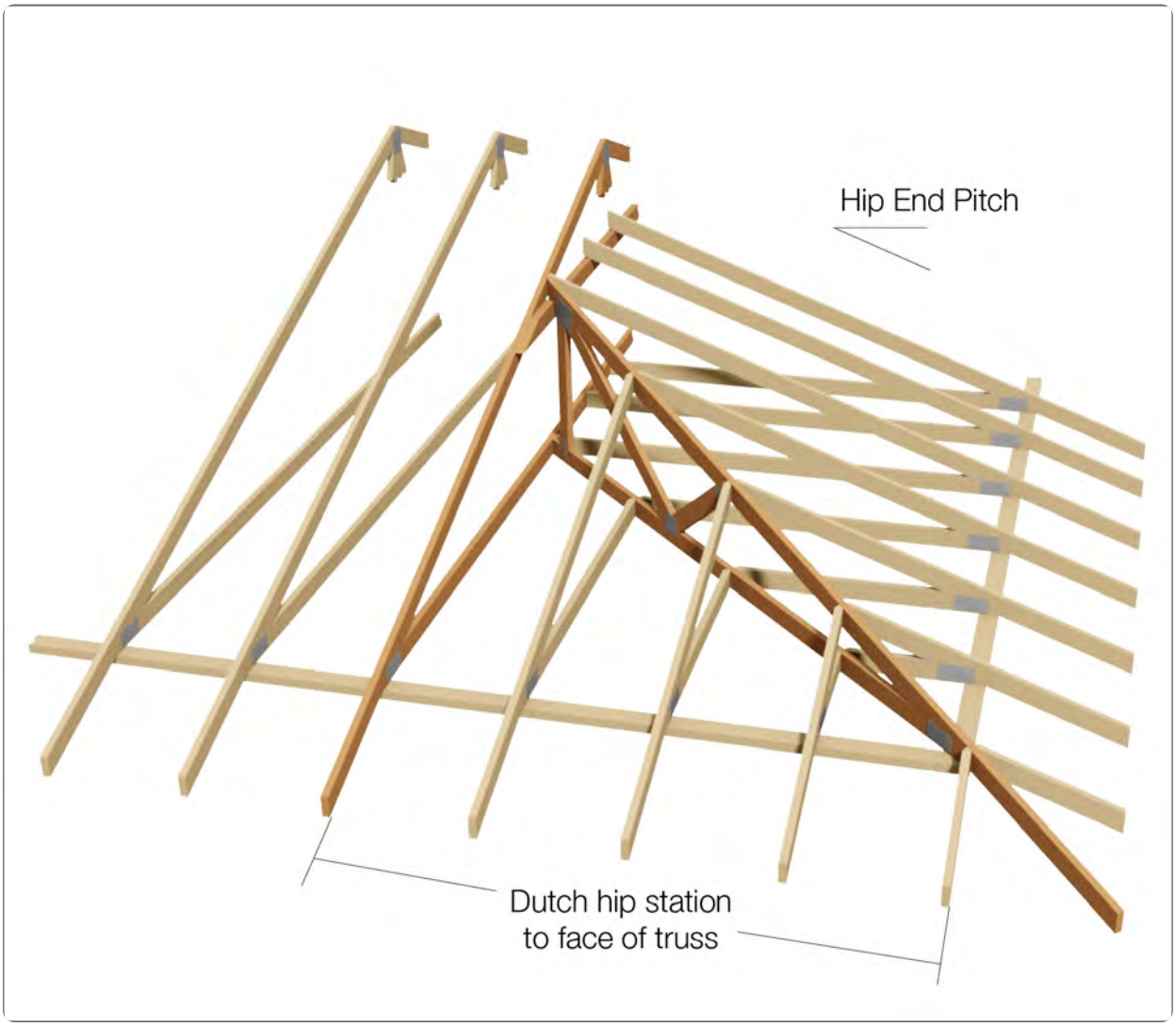


Figure C2-08-04-06

Fan Hip Connection

Standard apex girder connection detail

Bracket to Apex Girder Bottom Chord.

Hip trusses must have vertical webO to transfer load to Bottom Chord support.

Number Screws	Capacity (kN)					
	Joint Group	Dead Load	Dead Load + Floor LL	Dead Load + Roof LL	Dead Load + Wind Load	DL + WL for 1 screw from underneath
5	JD3	9.1	11.0	12.3	18.2	2.2
	JD4	6.4	7.7	8.7	12.8	1.6
	JD5	4.5	5.5	6.1	9.0	1.2
6	JD3	10.9	13.2	14.7	21.8	2.2
	JD4	7.6	9.2	10.4	15.2	1.6
	JD5	5.4	6.6	7.3	10.8	1.2

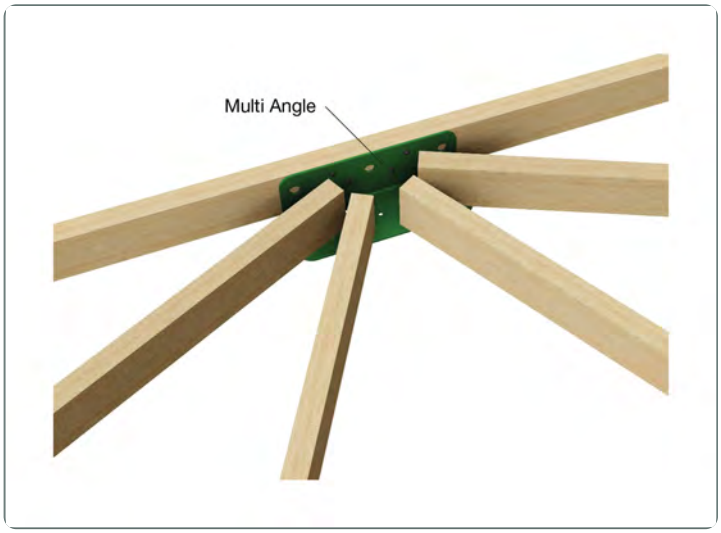


Figure C2-08-01-02

Supplementary Anti-rotation Bracing

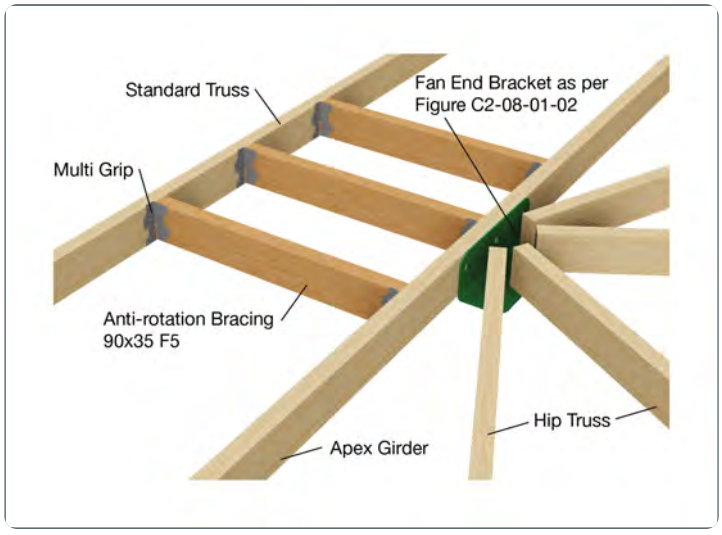


Figure C2-08-01-03

1. Anti-rotation bracing as shown is required when Multi Angle bracket are used
2. Bracing is located opposite the girder bracket and extends back to standard truss
3. Bracing is fixed using 2-Multi Grips each end with 3/2.8Ø nails to each leg of each Multi Grip

Typical truss boot support detail.

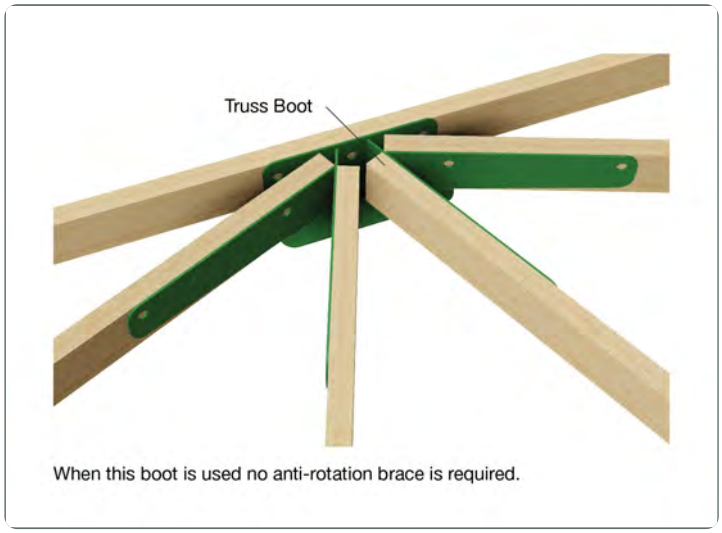


Figure C2-08-01-04

Timber Joint Group	Girder or Std Truss Thickness	Load Combination Values (KN)		
		3 x M16 Bolts		2 x M12 Bolts
		Dead Load	Dead Load + Live Load	Dead Load + Wind Load
JD2	35	16.1	21.8	16.1
	45	20.7	28.0	19.2
	2/35	22.1	29.9	23.0
JD3	35	12.2	16.4	12.2
	45	15.6	21.2	15.7
	2/35	20.9	28.2	21.7
JD4	35	8.9	12.1	9.0
	45	11.5	15.5	11.5
	2/35	17.4	23.5	18.1

Fan hip to waling plate

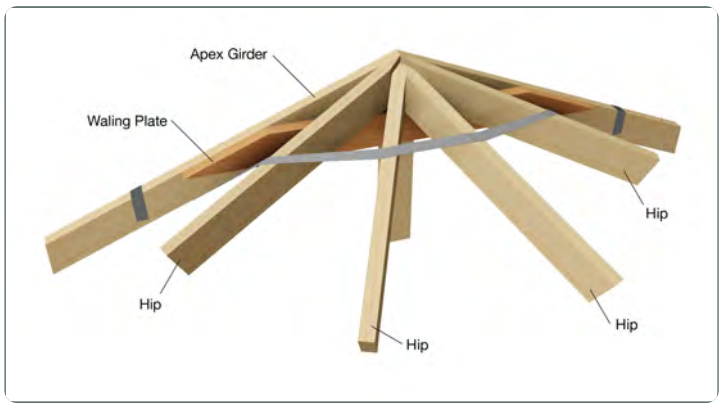


Figure C2-08-01-05

Joint Group	Tie Down Capacity (kN) 6/nails per loop strap leg
JD3	11.4
JD4	11.4
JD6	8.9

Wrap 30 x 0.8 strap over hip top chord and under waling plate

Figure C2-08-01-06

Bolt Fixing

Joint Group	Waling Plate to Girder Connection Capacity (kN)					
	1/M12 per joint			1/M16 per joint		
	DL	DL + LL	DL + WL	DL	DL + LL	DL + WL
JD3	5.2	7.0	10.4	6.9	9.3	13.8
JD4	3.8	5.2	7.6	5.1	6.9	10.2
JD6	1.9	2.5	3.7	2.5	3.4	5.0

1. For M12 bolts Waling plate to be at least 90mm
2. For M16 bolts Waling plate to be at least 140mm for dry timber.
3. Fix one bolt to each joint

Screws or Nails

Joint Group	Waling Plate to Girder Connection Capacity (kN)					
	1/M12 per joint			1/M16 per joint		
	DL	DL + LL	DL + WL	DL	DL + LL	DL + WL
JD3	10.4	14.0	20.8	4.7	6.3	9.4
JD4	7.4	9.9	14.7	3.4	4.5	6.7
JD6	3.8	5.1	7.6	2.1	2.8	4.1

Fix 2/Green Tip Screews or 3/75mm x 3.05Ø Multinail nails to each joint

Fan Hip End

Scope of section

The following technical sheets are limited to 5 segment fan hip ends in accordance with Multinail Software.

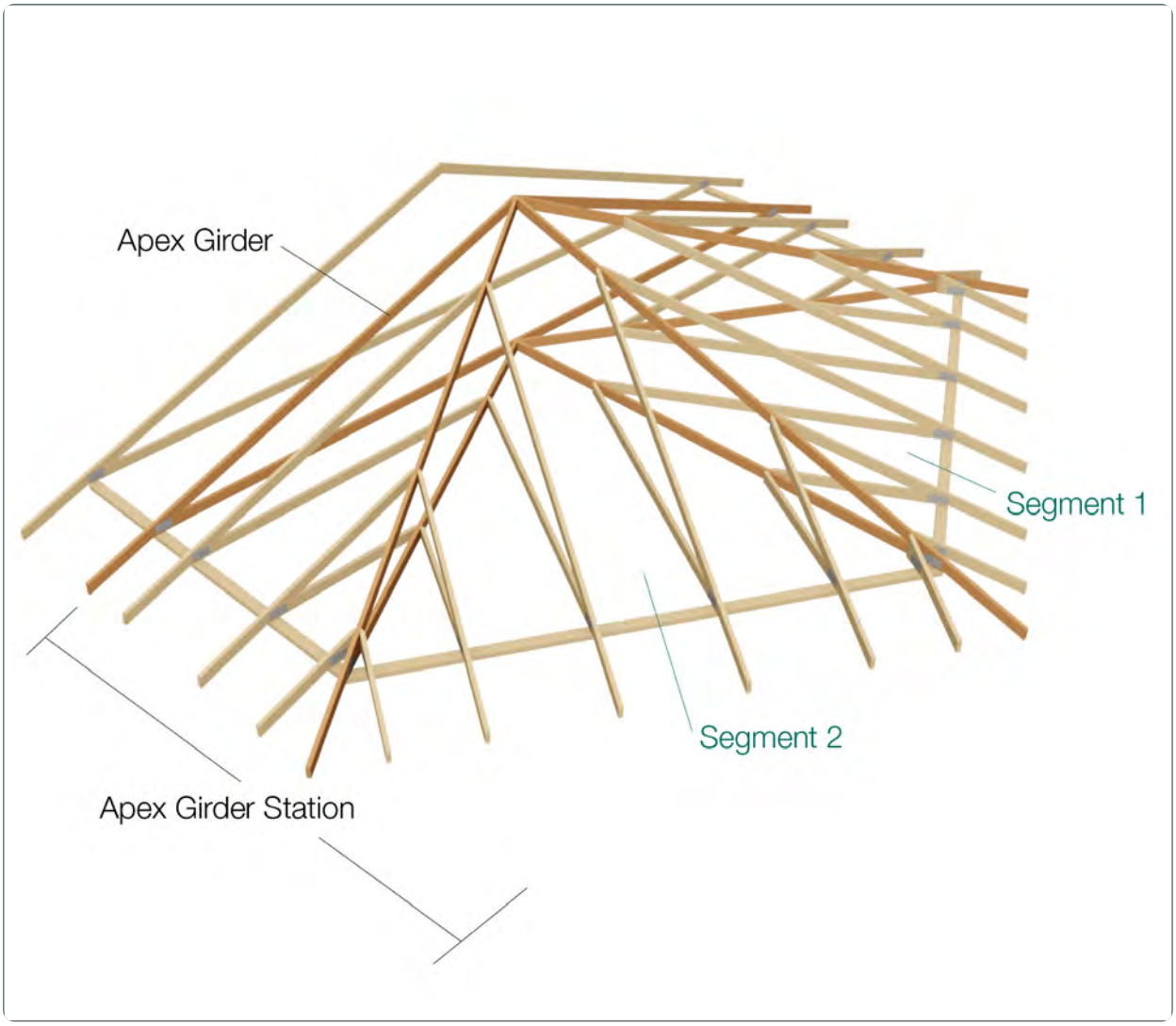


Figure C2-08-02-01

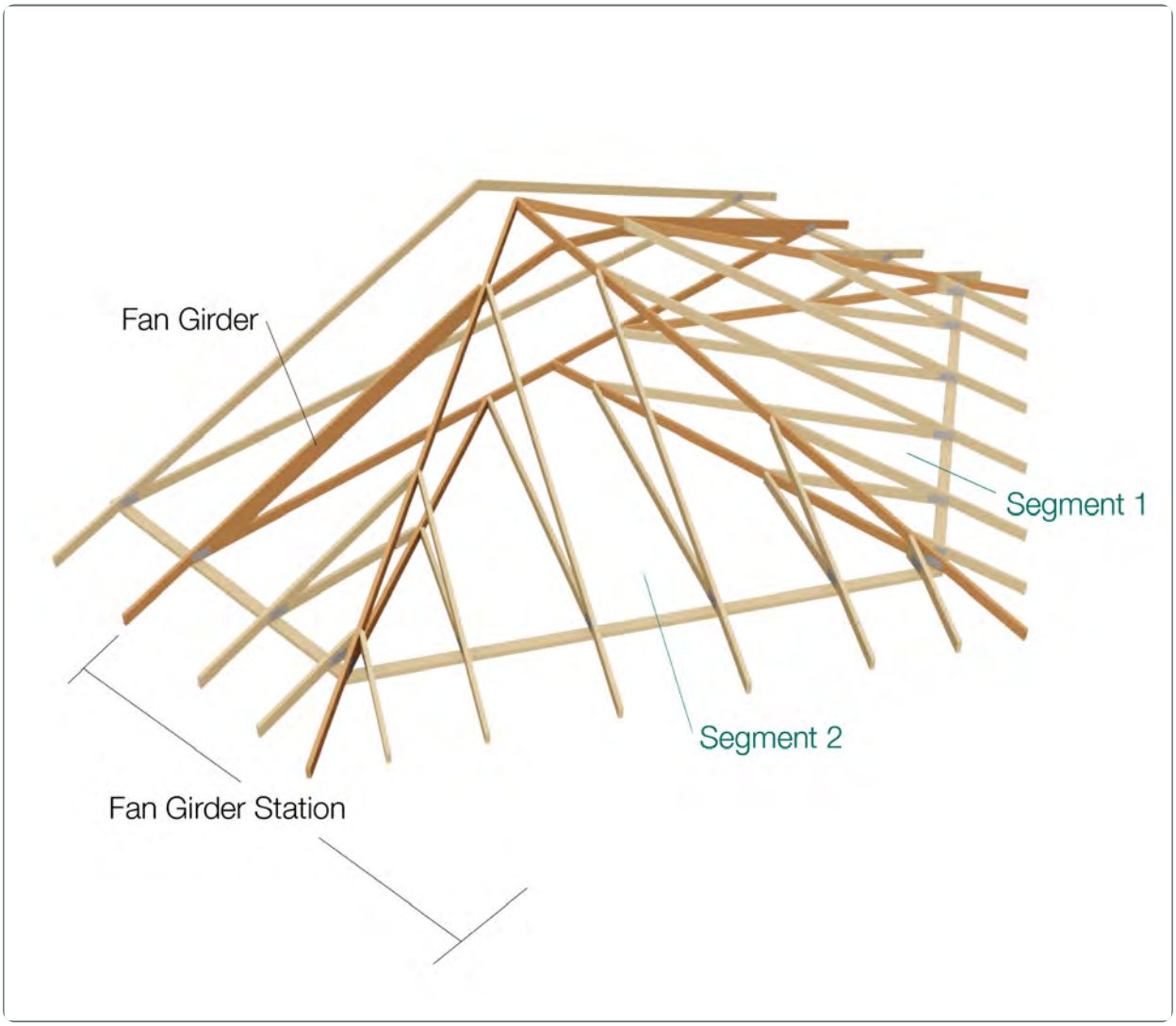


Figure C2-08-02-02

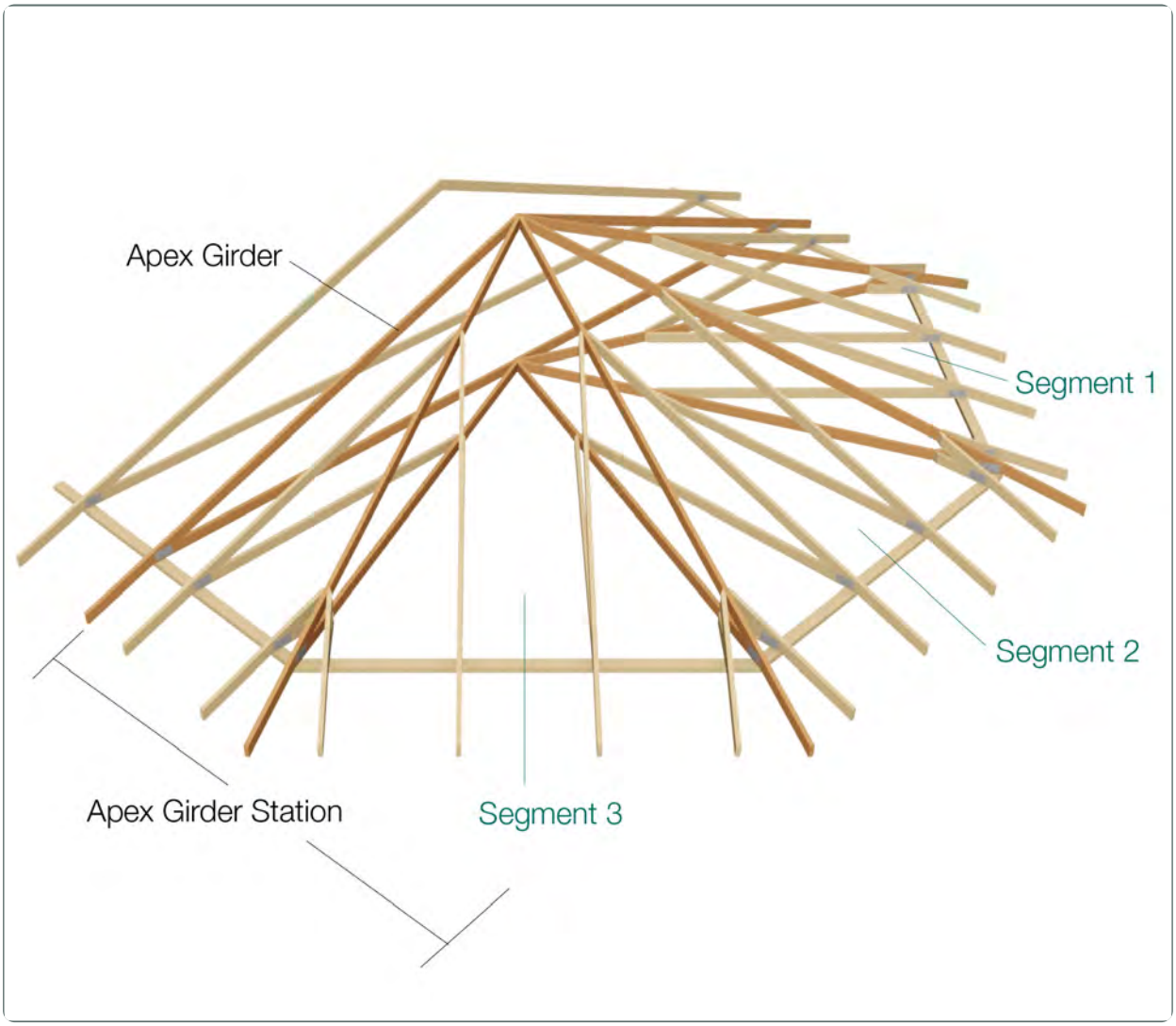


Figure C2-08-02-03

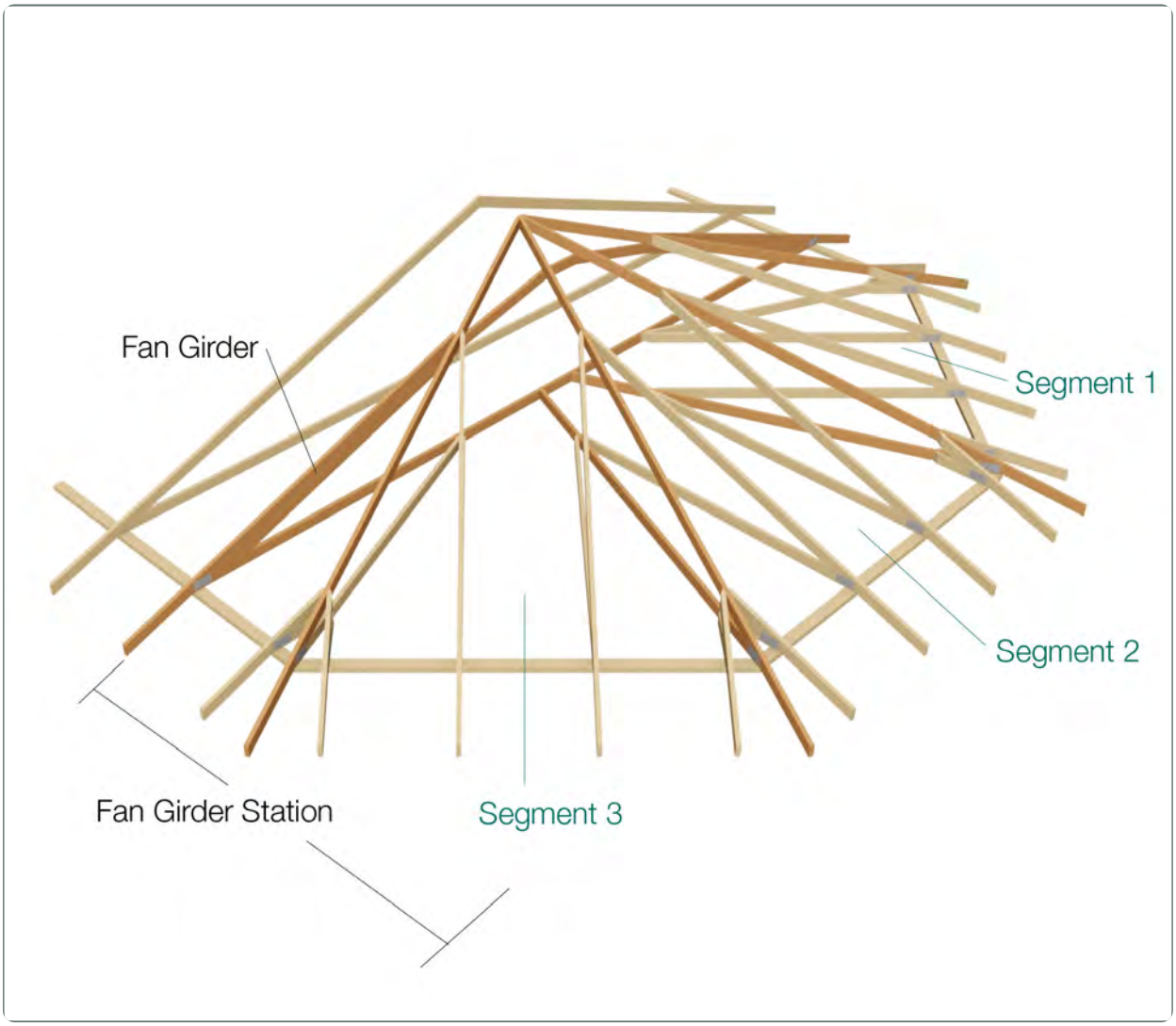


Figure C2-08-02-04

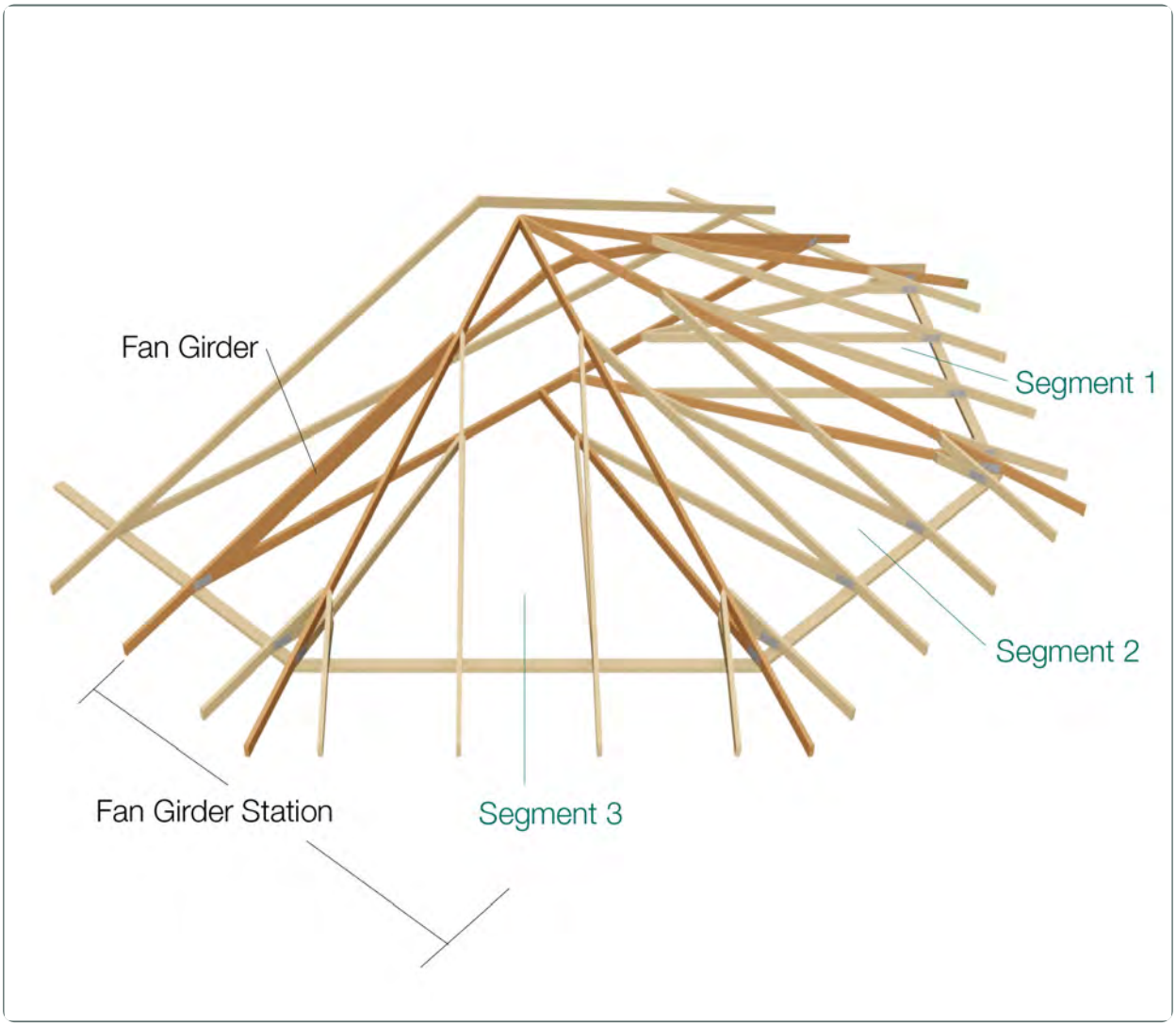


Figure C2-08-02-04

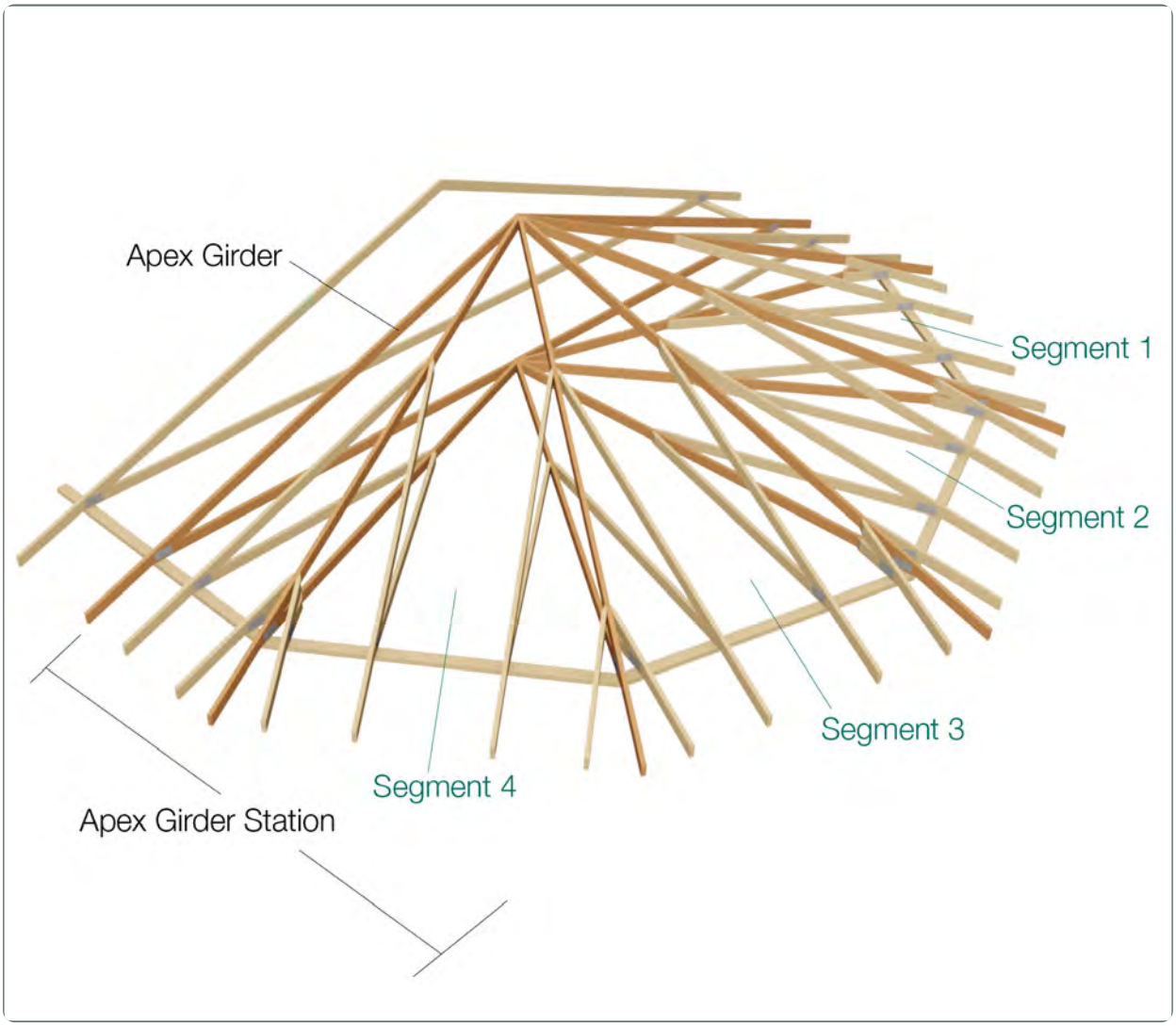


Figure C2-08-02-05

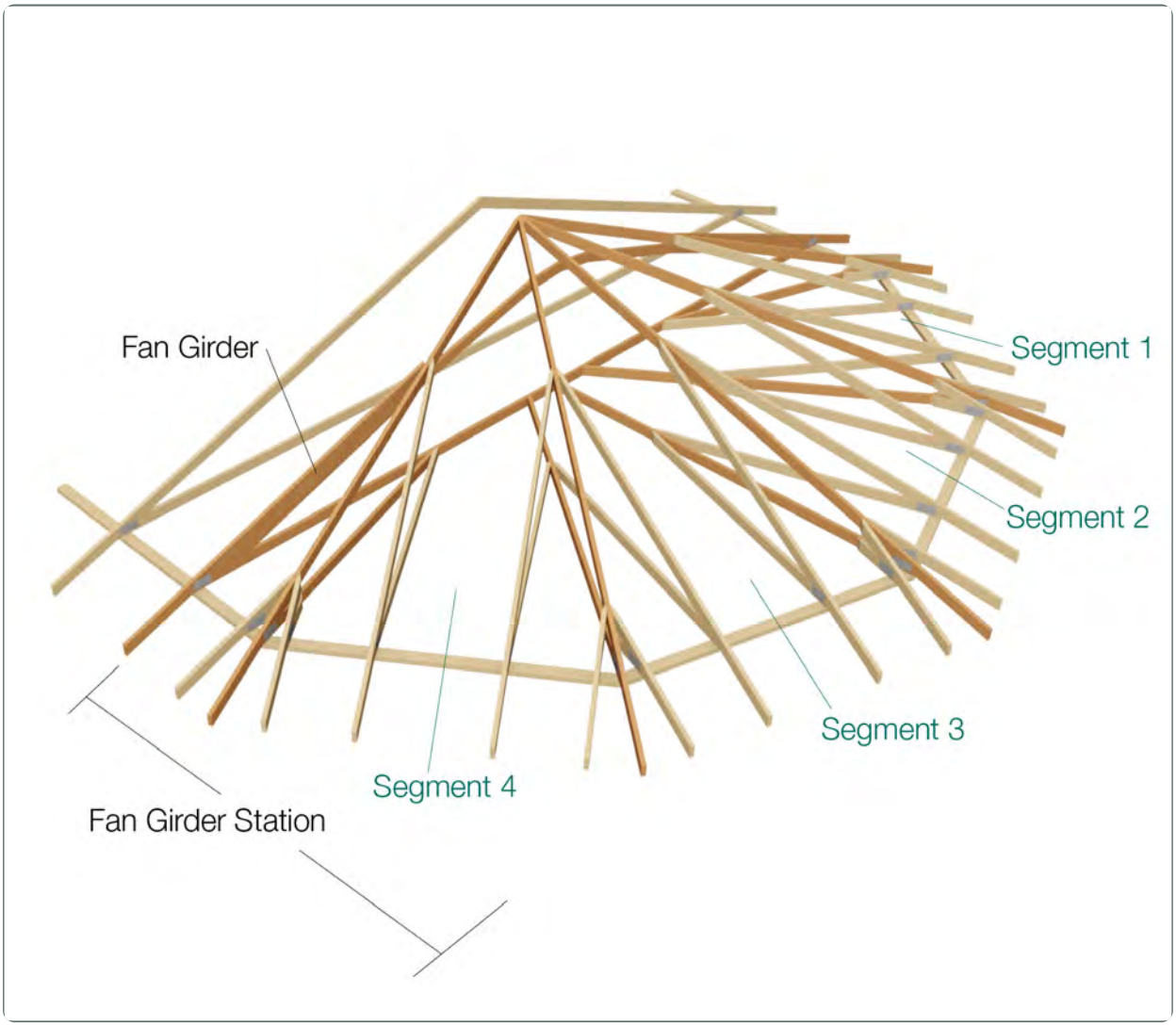


Figure C2-08-02-06

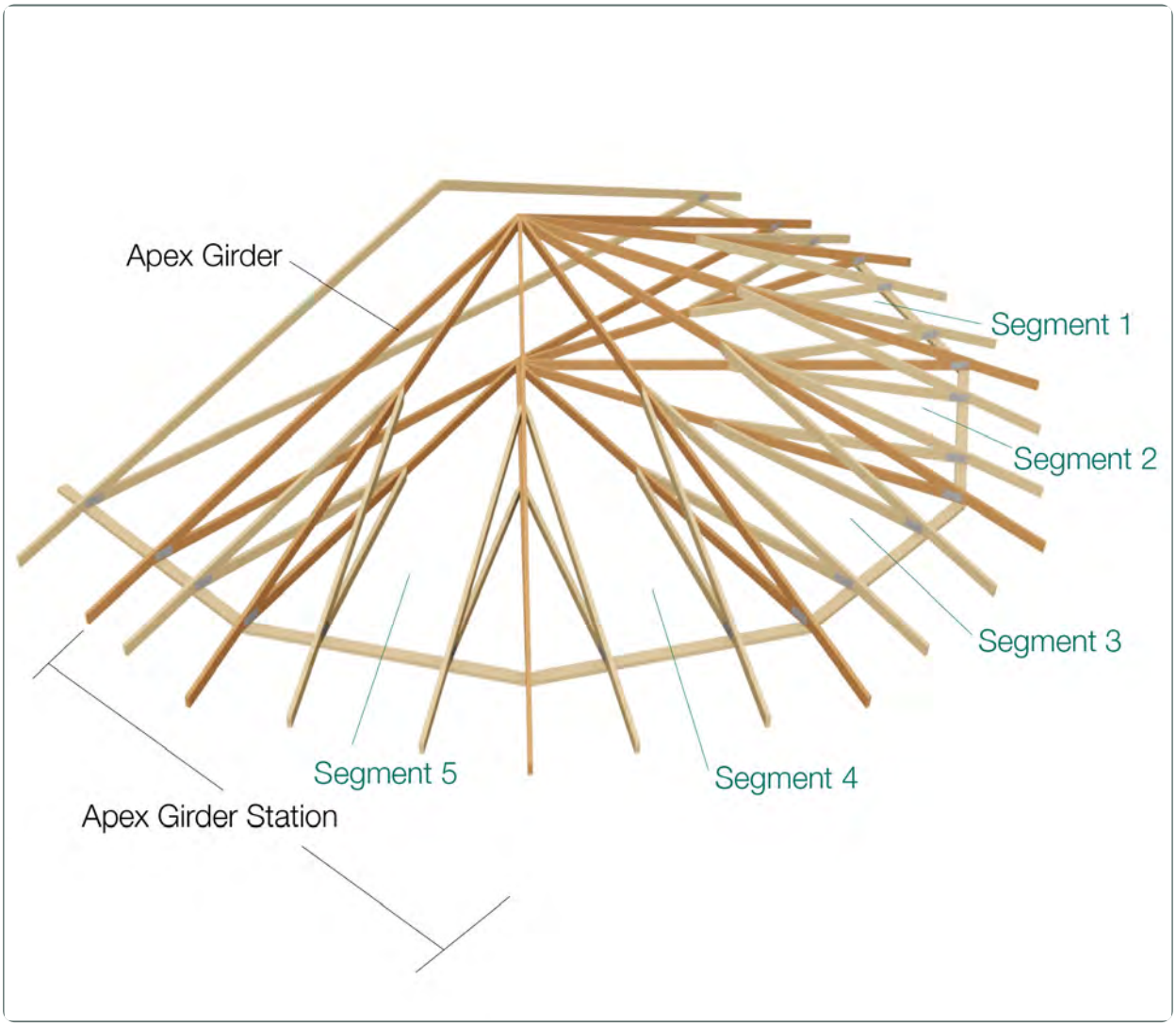


Figure C2-08-02-07

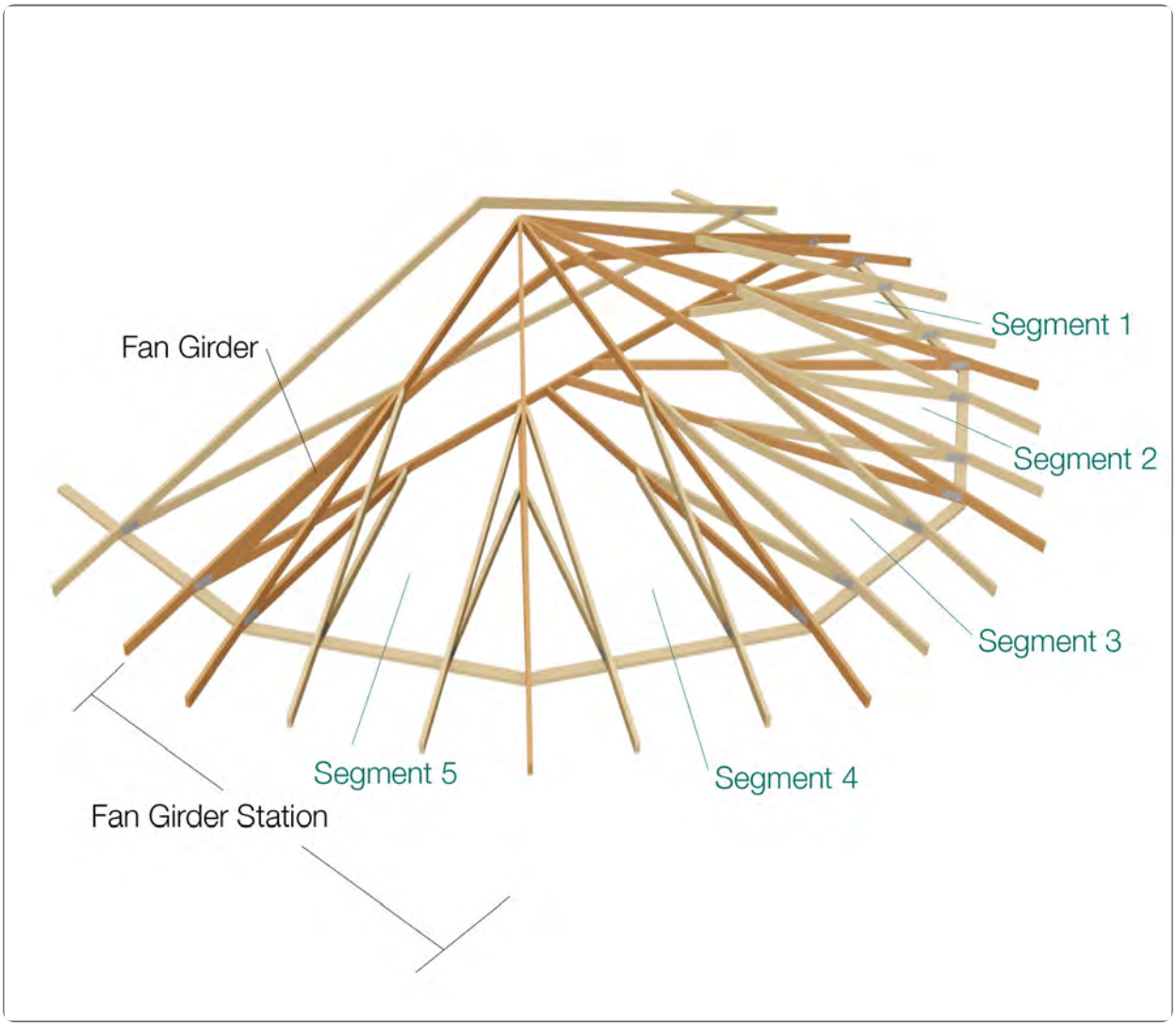


Figure C2-08-02-08

Multinail Hub - Hip End – Fully Trussed Hip End with a Truncated Girder

27 May 2020

Multinail Australia

Hip End – Fully Trussed Hip End with a Truncated Girder

Consists of:

One Truncated Girder
– to support the hip trusses and jack truss all supported from the TC.

Two Hip Trusses
– to support the jacks supported of the TC.

Multiple Jack Trusses
– to infill between the hips and the hips and the Truncated Girder.

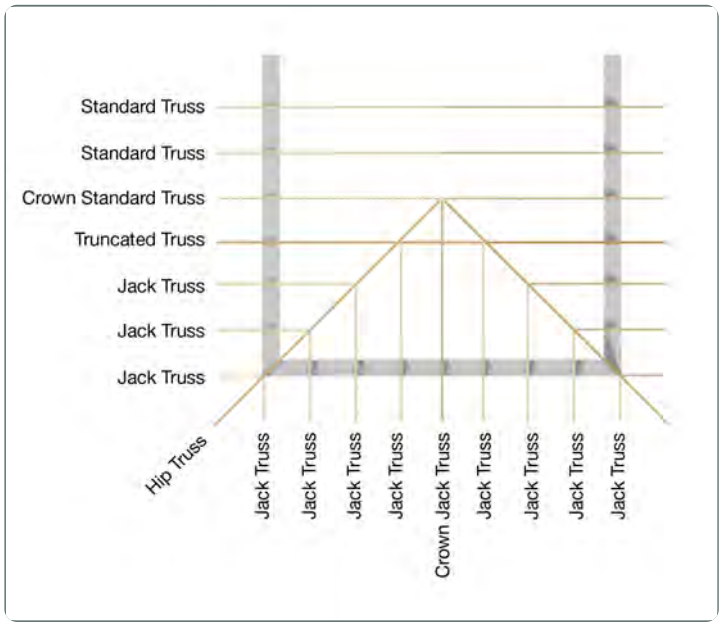


Figure C2-09-03-11

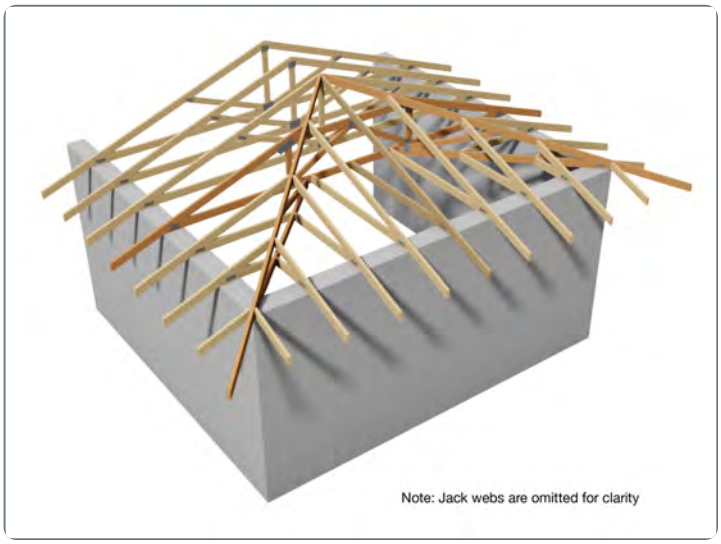


Figure C2-09-03-01

Step One

The Truncated Girder (TG) is stood into position and temp braced / fixed to the wall plate (see details above).

The TG is positioned according to the dimensions marked on the fabricators truss layout – this position will vary depending on the span of the trusses.

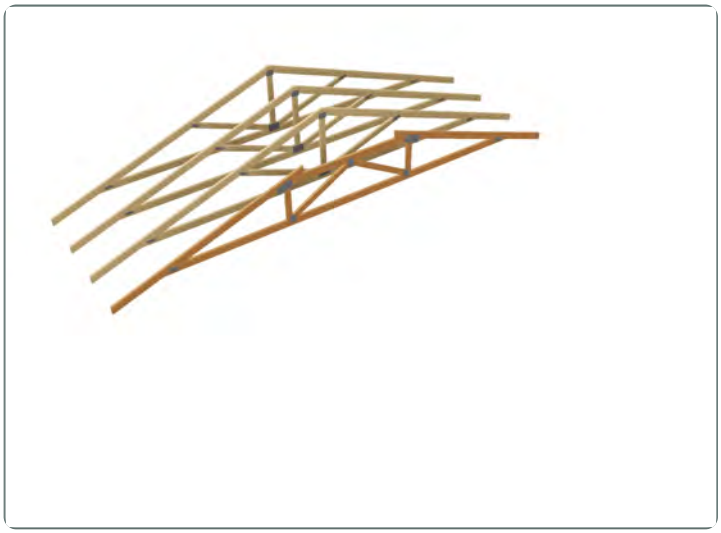


Figure C2-09-03-03

Step Two

The “Hip Trusses” are positioned from the corner of the span / area and to the centre of the Crown Standard – also they butt against either the sloping TC of the TG or a timber block fixed to the HTC.

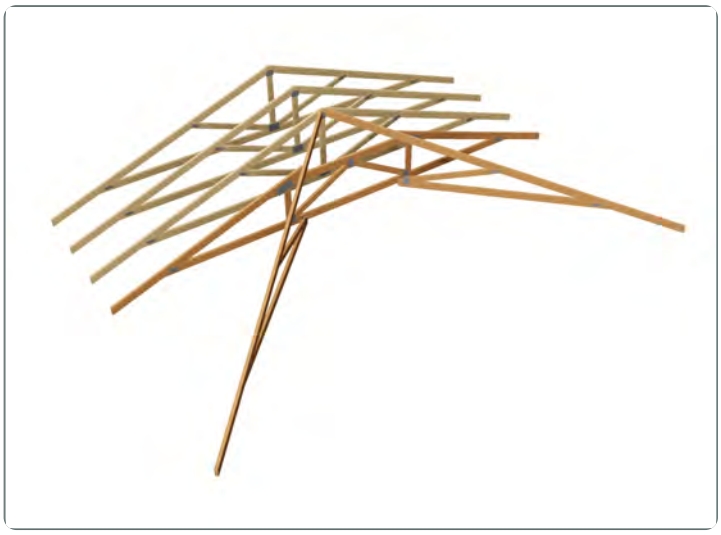


Figure C2-09-03-04

Step Three

The “Crown Jack” is positioned in the centre of the hip end and fixed to the end wall and the centre of the Truncated Girder to meet the hip trusses.

The Crown YJack is supported from the TC of the TG.

Figure C2-09-03-05

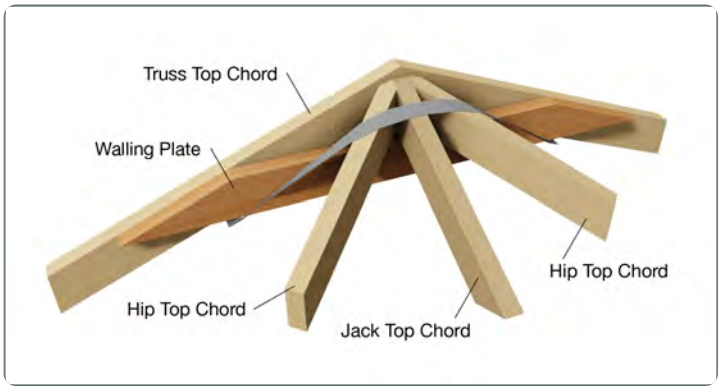


Figure C2-09-01-10

Step Four

The “Jack Trusses ” are positioned from the centre of the span / area towards the spans corners.

Figure C2-09-03-06

The “Jack Trusses ” are positioned from the centre of the span / area towards the spans corners.

Figure C2-09-03-07

Hip End – Fully Trussed with an Apex Girder

Consists of:

One Dutch Hip Girder or Apex Girder
– to support the hip trusses.

Two Hip Trusses
– to support all Jack Trusses.

Multiple Jack Trusses
– to infill between the hip and trusses and the Dutch Hip Girder.

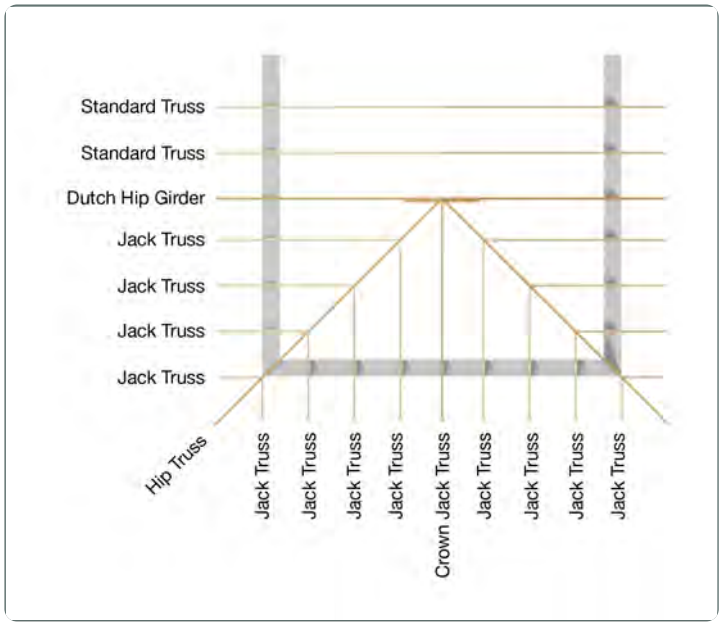


Figure C2-09-01-13

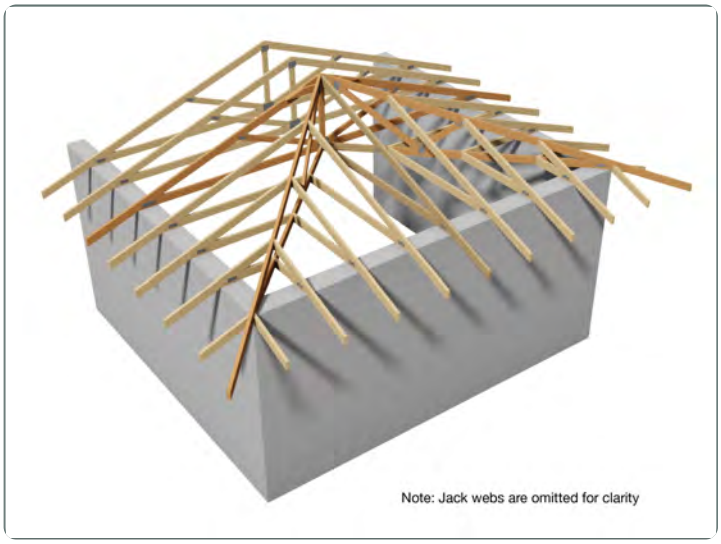


Figure C2-09-01-01

Step One

The DHG is positioned according to the dimensions marked on the fabricators truss layout – but it is usually a distance equaling half of the truss span.

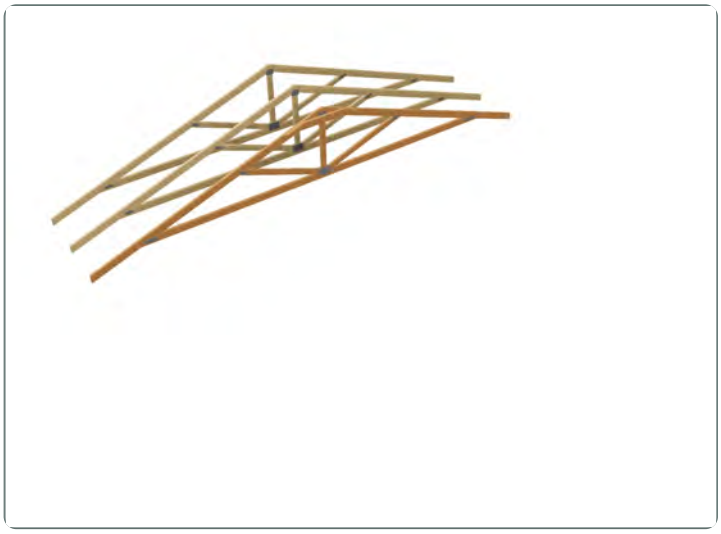


Figure C2-09-01-02

Step Two

The “Crown Jack” is positioned in the centre of the hip end and fixed to the end wall and the centre of the Dutch Hip Girder with a triple grip

The Crown Jack is supported from the “Waling Plate” which is fixed to the face of the DHG.

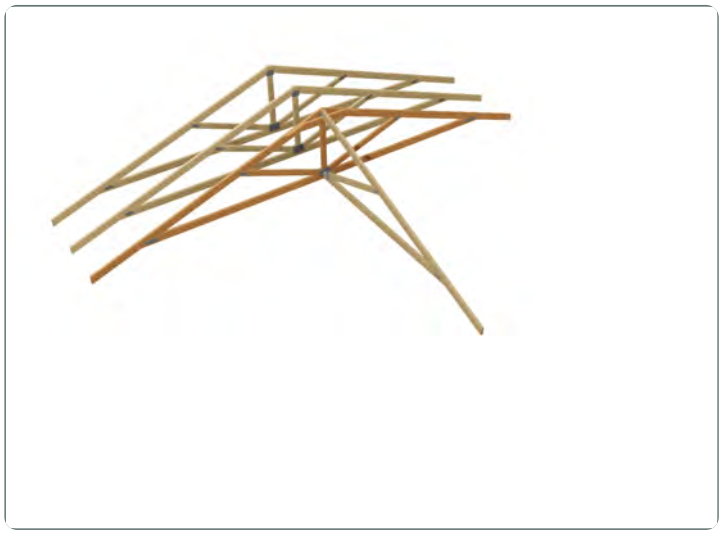


Figure C2-09-01-03

Step Three

The “Hip Truss” are positioned from the corner of the span / area and to the centre of the Dutch Hip Girder.

Jack Top Chord to Hip Top Chord: Use ‘effective’ flat-head 3/75mm x 3.05Ø nails. Hip Top Chord to be mitre cut.

Jack and Hip Top Chord to Waling Plate: Use 30 x 0.8mm looped flat strap fixed with 5/30mm x2.8Ø nails to each leg.

Figure C2-09-01-04

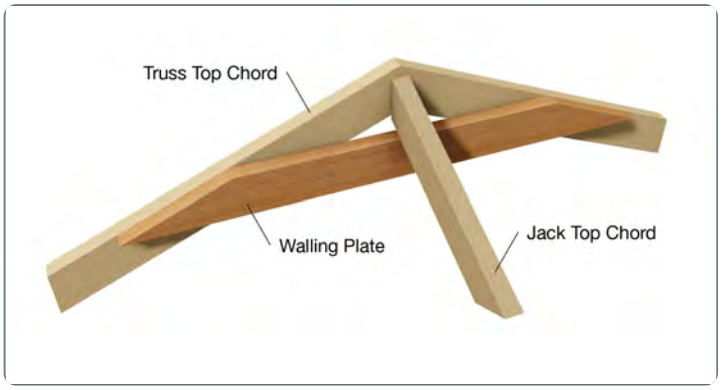


Figure C2-09-01-09

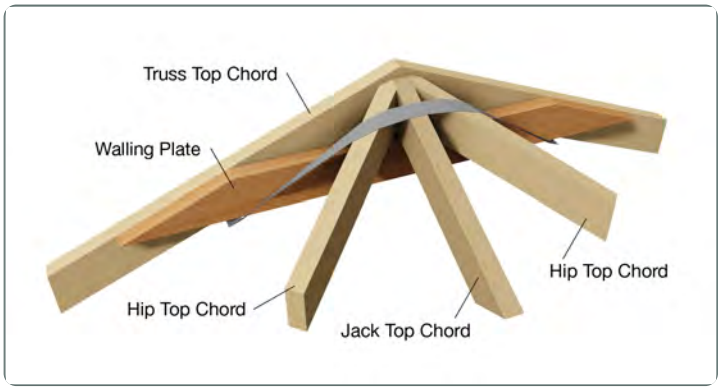


Figure C2-09-01-10

Step Four

Fill in remaining jacks.

Top Chord: Fix Mitre-plate for jack over 1800mm using 6/30mm x 2.8Ø nails into each chord.

Bottom Chord: Use ‘effective’ flat-head 3/75mm x 3.05Ø nails through Jack Truss BC into Hip Truss BC.

Figure C2-09-01-05

Figure C2-09-01-06

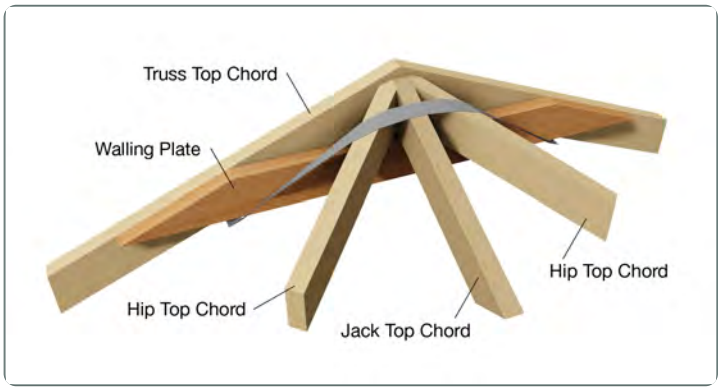


Figure C2-09-01-10

Figure C2-09-01-08

The “Jack Truss” are positioned from the centre of the span / area towards the spans corners – until jacks are filling the areas between the hips and the hips to the DHG.

Multinail Hub - Hip End – Hip Rafter and YJacks with an Apex Girder

27 May 2020

Multinail Australia

Hip End – Hip Rafter and YJacks with an Apex Girder

Consists of:

One Dutch Hip Girder or Apex Girder
– to support the hip rafters and YJack BC's.

Two Hip Rafters
– to support the YJacks

Multiple YJacks
– to infill between the hips and the hips and the Dutch Hip Girder.

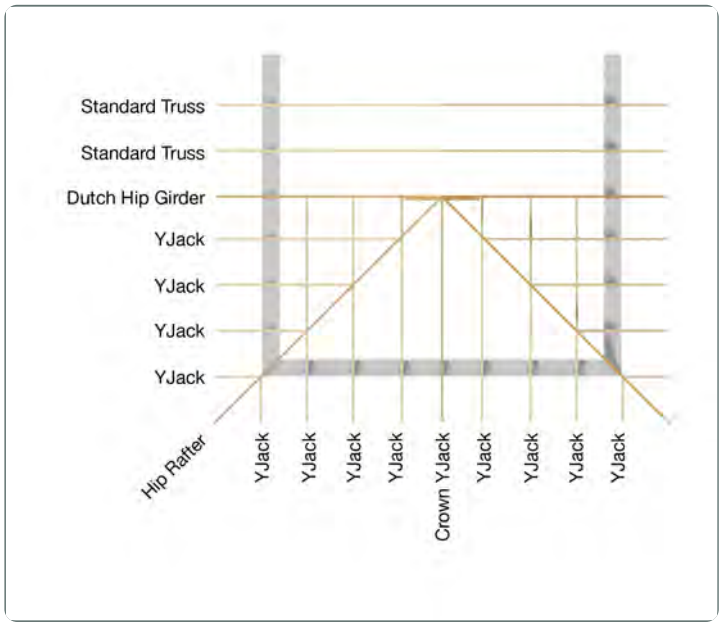


Figure C2-09-02-15

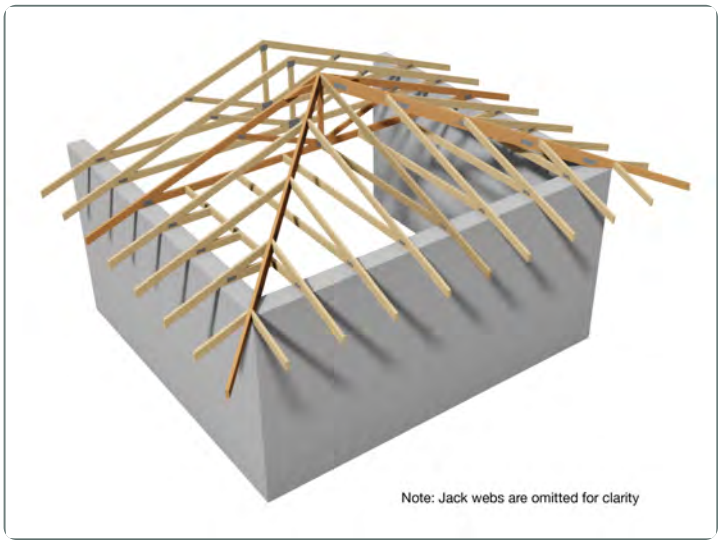


Figure C2-09-02-01

Step One

The DHG is positioned according to the dimensions marked on the fabricators truss layout – but it is usually a distance equaling half of the truss span.

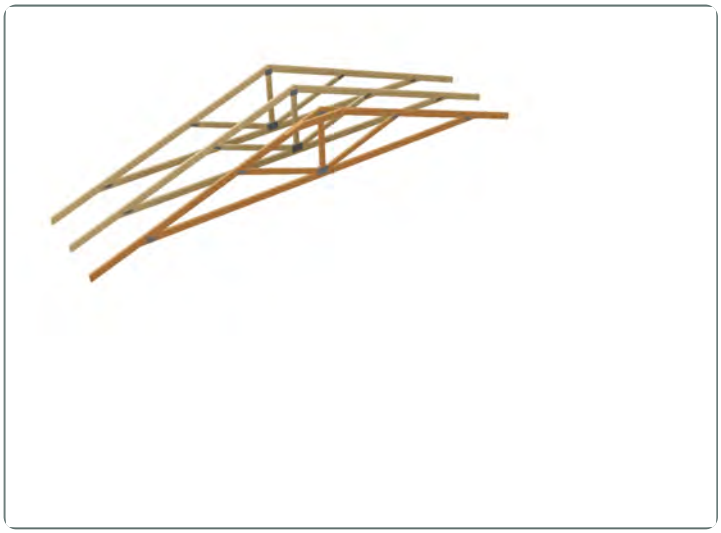


Figure C2-09-02-02

Step Two

The “Crown YJack” is positioned in the centre of the hip end and fixed to the end wall and the centre of the Dutch Hip Girder.

The Crown YJack is supported from the “Waling Plate” which is fixed to the face of the DHG.

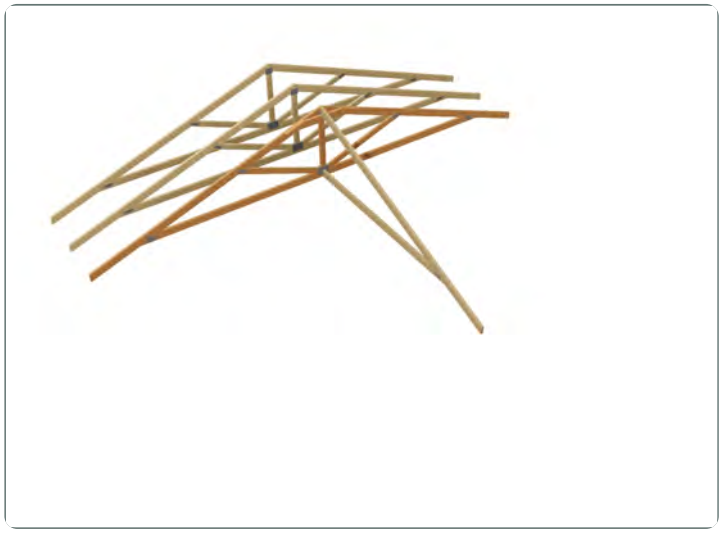


Figure C2-09-02-03

Figure C2-09-02-09

Step Three

The “Hip Rafters” are positioned from the corner of the span / area and to the centre of the Dutch Hip Girder.

Jack Top Chord to Hip Top Chord: Use ‘effective’ flat-head 3/75mm x 3.05Ø nails. Hip Top Chord to be mitre cut.

Jack and Hip Top Chord to Waling Plate: Use 30 x 0.8mm looped flat strap fixed with 5 nails to each leg.

Figure C2-09-02-04

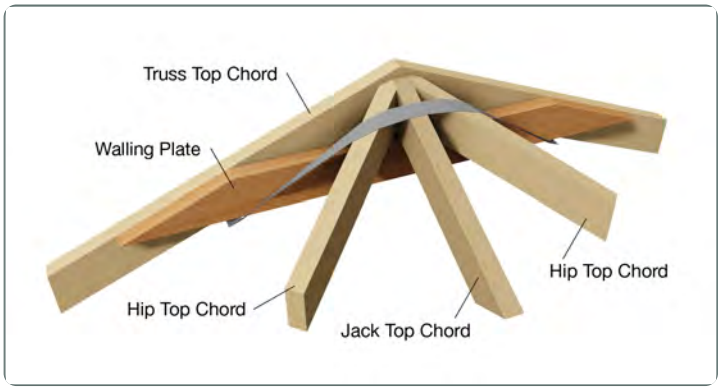


Figure C2-09-01-10

Step Four

Fill in remaining jacks.

Top Chord: Fix Mitre-plate using 6/30mm x 2.8Ø nails into each chord.

Bottom Chord: Use ‘effective’ flat-head 3/75mm x 3.05Ø nails. into each incoming bottom chord.

Figure C2-09-02-05

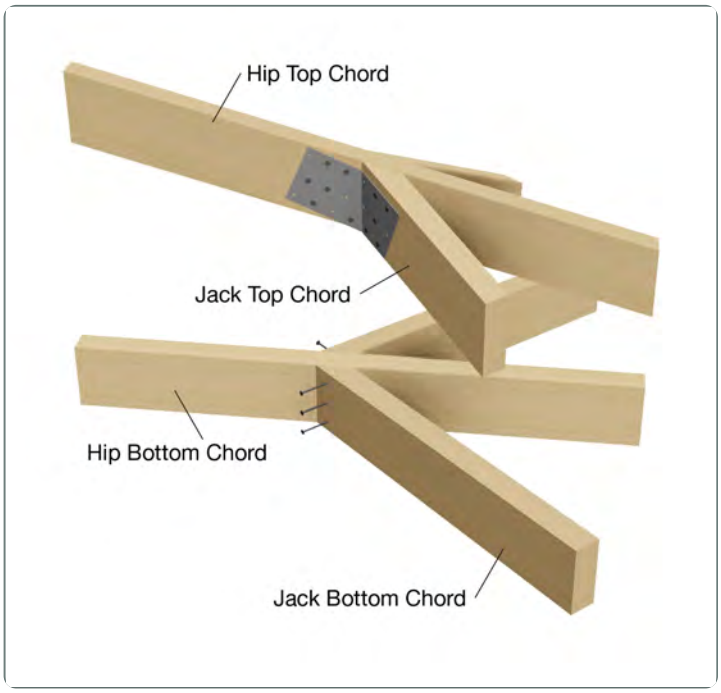


Figure C2-01-01-10

The “YJacks ” are positioned from the centre of the span / area towards the spans corners but only the YJacks that are perpendicular to the DHG.

Figure C2-09-02-06

The last YJack along the end of the span / area is placed at a truss spacing away from the corner. It will be used to support the YJacks that run parallel to the DHG.

Figure C2-09-02-07

Multinail Hub - Hip End – Hip Rafters and YJacks with a Truncated Girder

27 May 2020

Multinail Australia

Hip End – Hip Rafters and YJacks with a Truncated Girder

Consists of:

One Truncated Girder
– to support the hip trusses and jack truss all supported from the TC.

Two Hip Rafters
– to support the YJacks supported of the TC.

Multiple YJacks
– to infill between the hips and the hips and the Truncated Girder.

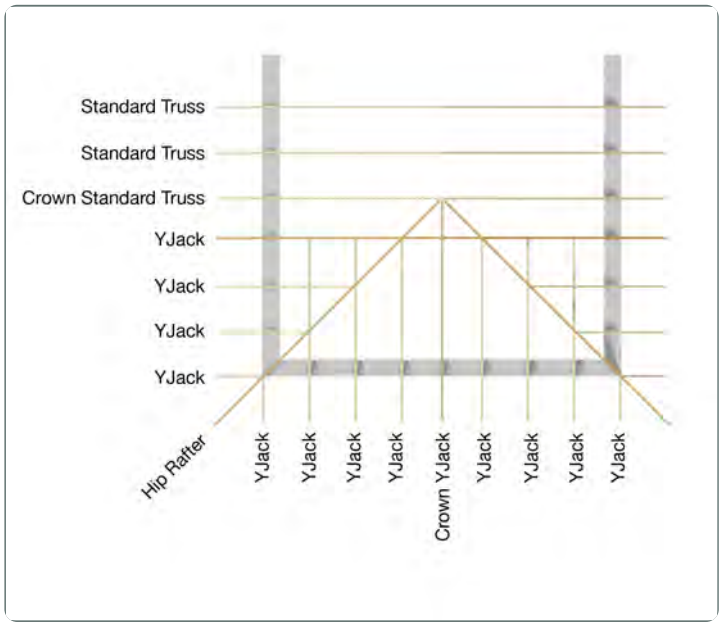


Figure C2-09-04-13

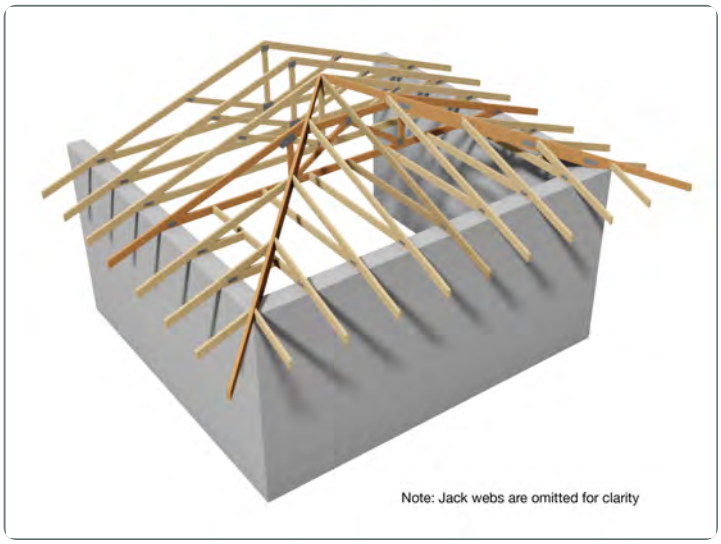


Figure C2-09-04-01

Step One

The TG is positioned according to the dimensions marked on the fabricators truss layout – this position will vary depending on the span of the trusses.

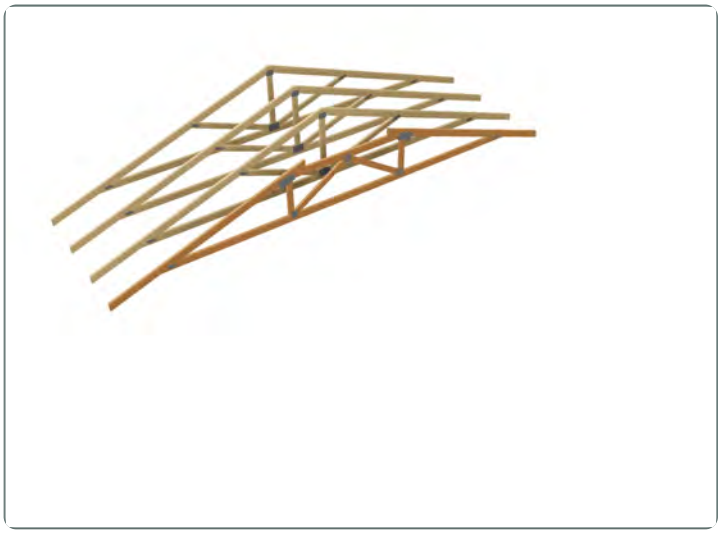


Figure C2-09-04-03

Step Two

The “Hip Rafters” are positioned from the corner of the span / area and to the centre of the Crown Standard – also they butt against either the sloping TC of the TG or a timber block fixed to the HTC.

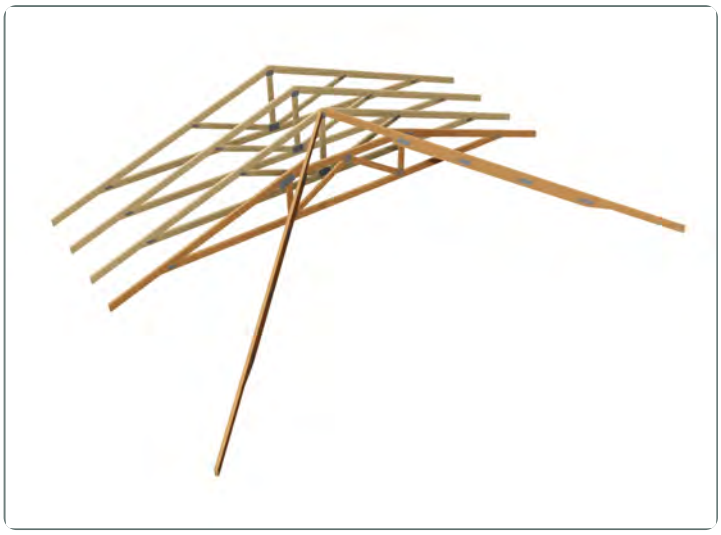


Figure C2-09-04-04

Step Three

The “Crown YJack” is positioned in the centre of the hip end and fixed to the end wall and the centre of the Truncated Girder to meet the hip trusses.

The Crown YJack is supported from the TC of the TG.

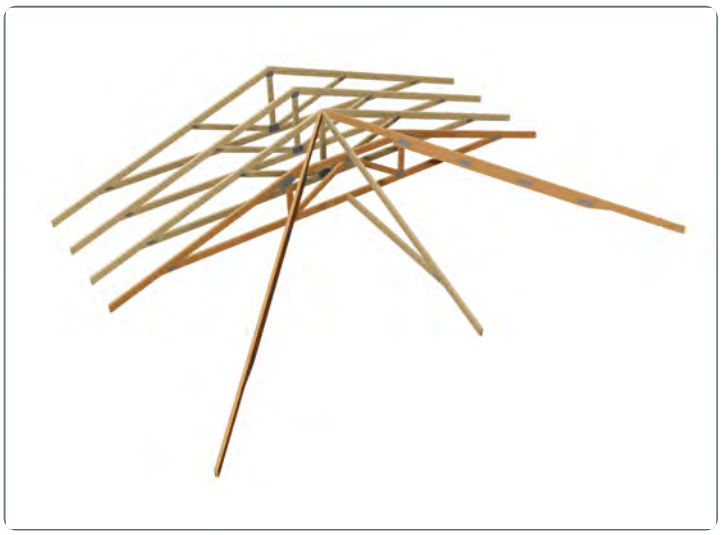


Figure C2-09-04-05

Step Four

The “YJacks ” are positioned from the centre of the span / area towards the spans corners but only the YJacks that are perpendicular to the TG.

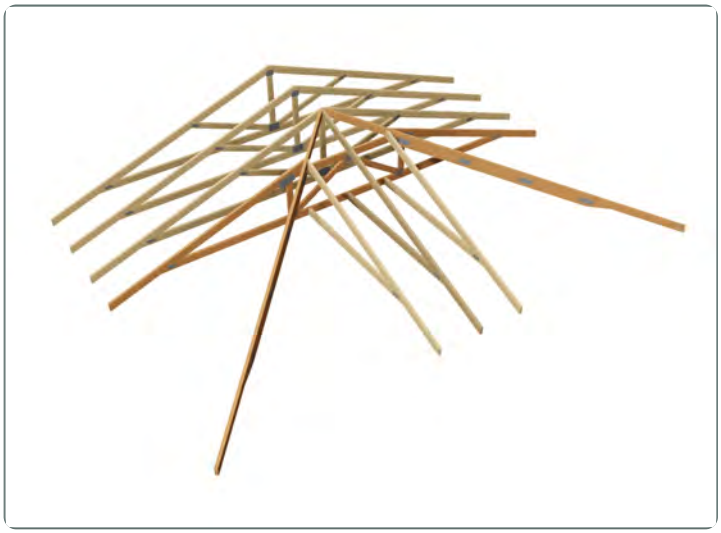


Figure C2-09-04-06

The “YJacks ” are positioned from the centre of the span / area towards the spans corners but only the YJacks that are perpendicular to the TG.

Figure C2-09-04-07

Step Five

The “YJacks ” are positioned from the centre of the span / area towards the spans corners but only the YJacks that are perpendicular to the TG.

The last YJack along the end of the span / area is placed at a truss spacing away from the corner. It will be used to support the YJacks that run parallel to the TG.

Figure C2-09-04-08

Step Six

The “YJacks ” are positioned parallel to the TG to in fill between the TG and the Hip Rafter.

Figure C2-09-04-09

The “YJacks ” are positioned parallel to the TG to in fill between the TG and the Hip Rafter.

Figure C2-09-04-10

Step Seven

The remaining “YJacks ” are positioned to complete the in fill of the end.

Figure C2-09-04-11

Multinail Hub - Conventional Type II hip end detail High Wind (N4, C2 or C3)

27 May 2020

Multinail Australia

Conventional Type II hip end detail High Wind (N4, C2 or C3)

Conventional II

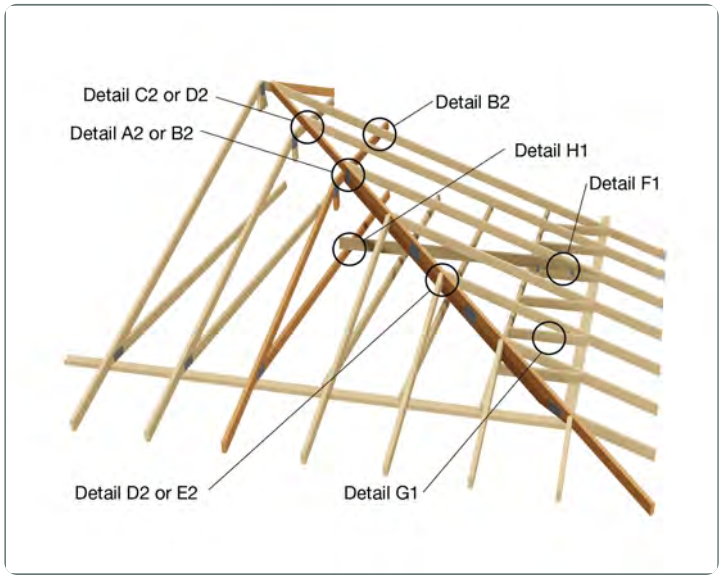


Figure C2-02-03-01

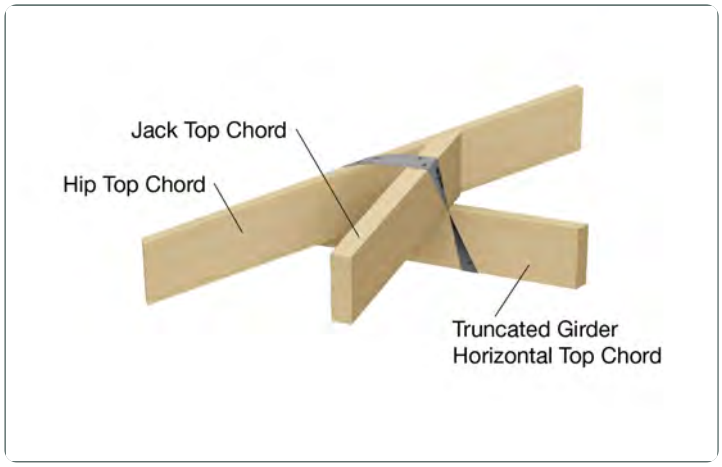


Figure C2-02-03-02

General Specification

Maximum truss spacing 900mm centres for tile roof and 1200mm centres for sheet roofs.

Maximum Truncated Girder Station – 3600mm.

Maximum Overhang – 900mm.

Maximum Roof Pitch - 45°

Note 1:

For effective skew nailing, the nail shall be driven into one member not closer than 25mm or more than 38mm from the arris in contact with the adjoining member. The nail shall be driven at an angle between 30 and 45 degrees to the face into which the nail is driven.

Note 2:

The restraint to the top and bottom chords of all trusses within the roof system is sometimes overlooked. Each ceiling batten, roof batten, or purlin MUST be fixed with a minimum of one effective 3.05mm diameter nail at each intersection with a chord.

Detail A2

Hip truss to truncated truss.

Top Chord - 1/30mm x 0.8mm G.I. looped strap, with 4/30mm x 2.8Ø reinforced-head nails to each leg.

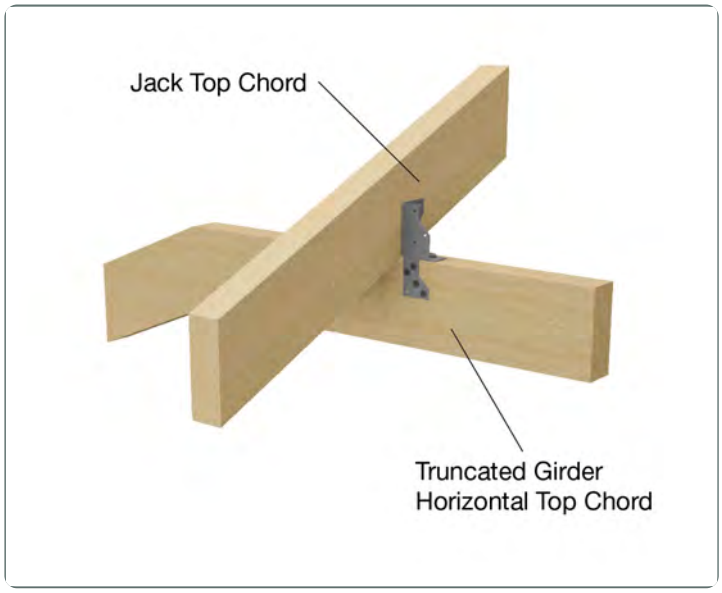


Figure C2-02-03-03

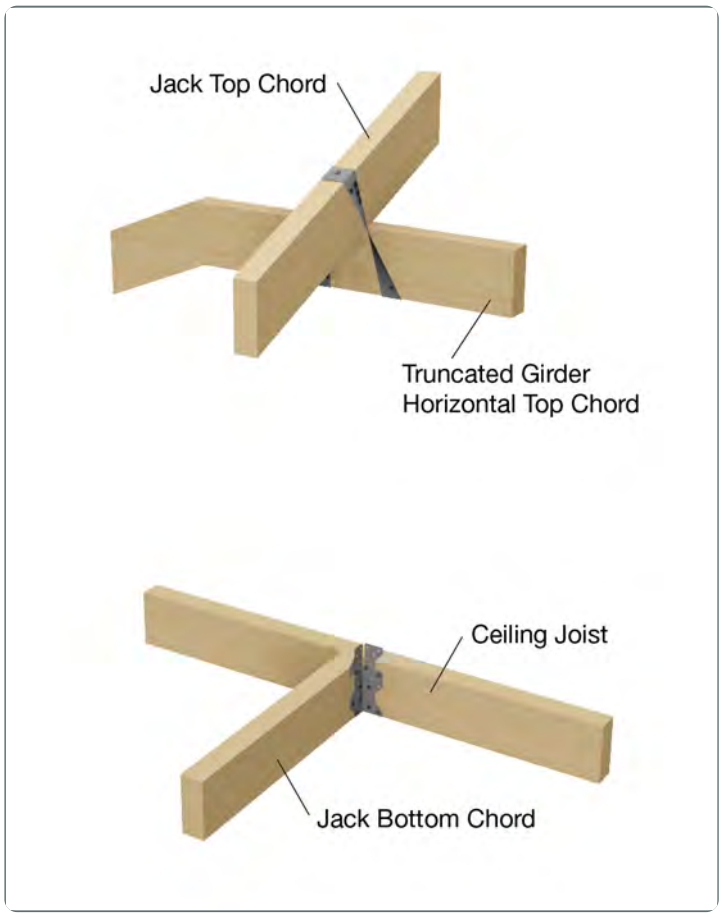


Figure C2-02-03-04

Detail B2

Method 1

Jack truss to truncated girder truss.

Top Chord - Station up to 2400mm - one framing anchor with 4/30mm x 2.8Ø reinforced-head nails into the side of each top chord.

Method 2

Jack truss to ceiling joist.

Top Chord - Station 2450mm to 3600mm - 1/30mm x 0.8mm G.I. looped strap bent under the horizontal top chord, fixed with 4/30mm x 2.8Ø reinforced-head nails to each leg.

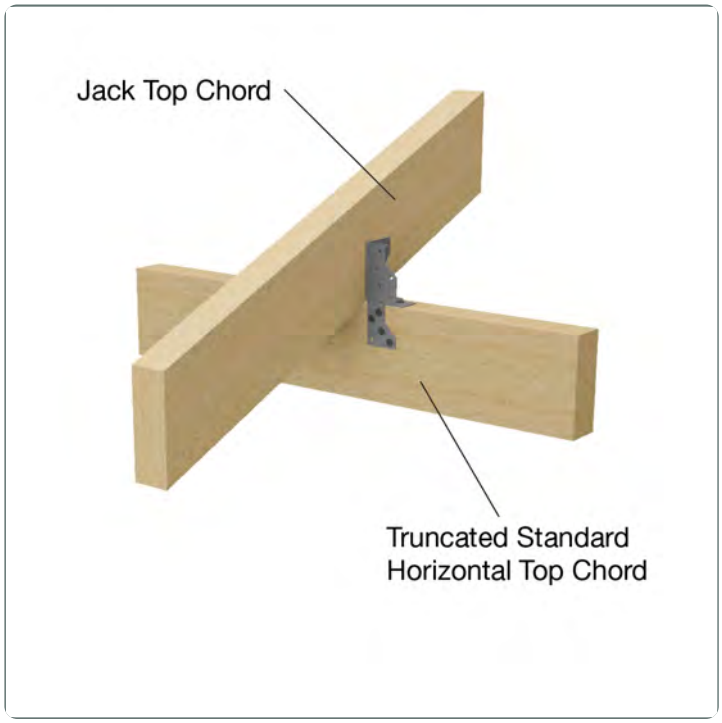


Figure C2-02-01-05

Detail C2

Top chord to truncated standard trusses.

One framing anchor with 4/30mm x 2.8Ø reinforced-head nails into the side of each top chord.

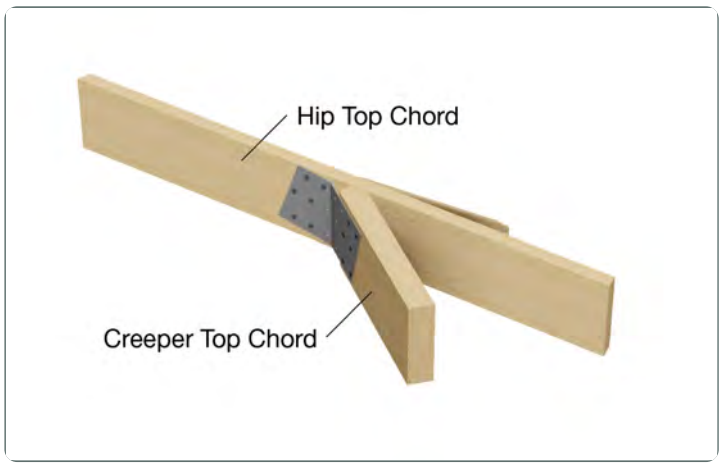


Figure C2-02-01-06

Detail D2

Creeper truss to hip truss
(maximum jack station 2400mm).

Top Chord - one mitre plate with 6/30mm x 2.8Ø reinforced-head nails into each face.

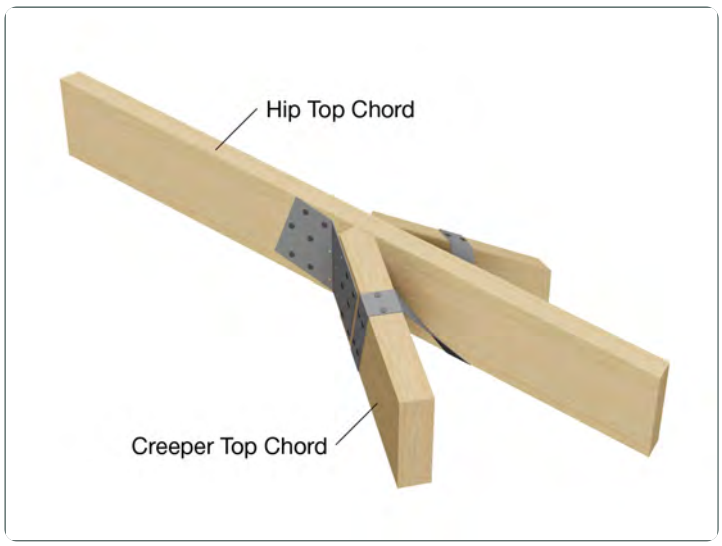


Figure C2-02-01-07

Detail E2

Creeper truss to hip truss
(maximum jack station 3600mm).

Top Chord - 1/30mm x 0.8mm G.I. looped strap with 4/30mm x 2.8Ø reinforced-head nails to each leg and one mitre plate with 6/30mm x 2.8Ø reinforced-head nails into each face.

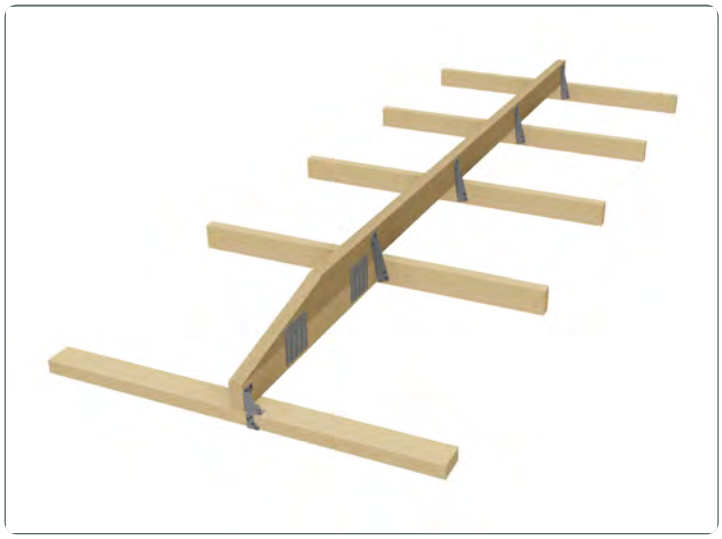


Figure C2-01-03-11

Detail F1

Hanging beam fixing

- Fix Hanging beam to ceiling joist with block or joist tie with min 2/2.8Ø nails.
- Hanging beam tied down of each end as per tie down report.

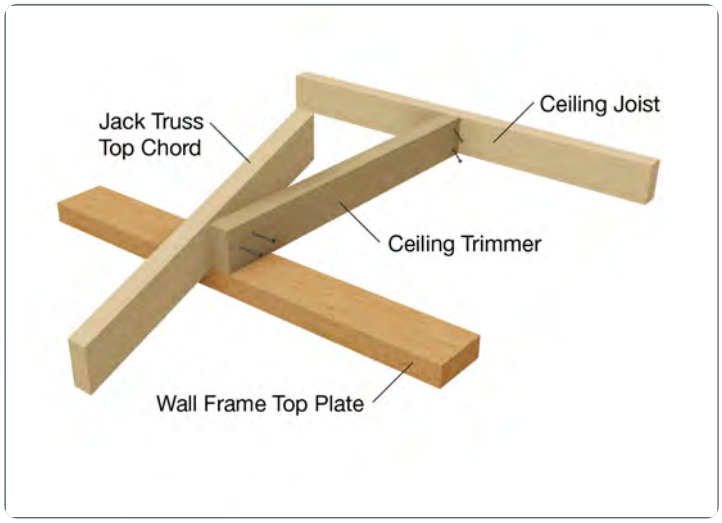


Figure C2-01-03-12

Detail G1

Ceiling trimmer fixing

- Fix ceiling trimmer to rafter and ceiling joist with 2/3.05Ø nails
- Rafter tied down as per tie down report

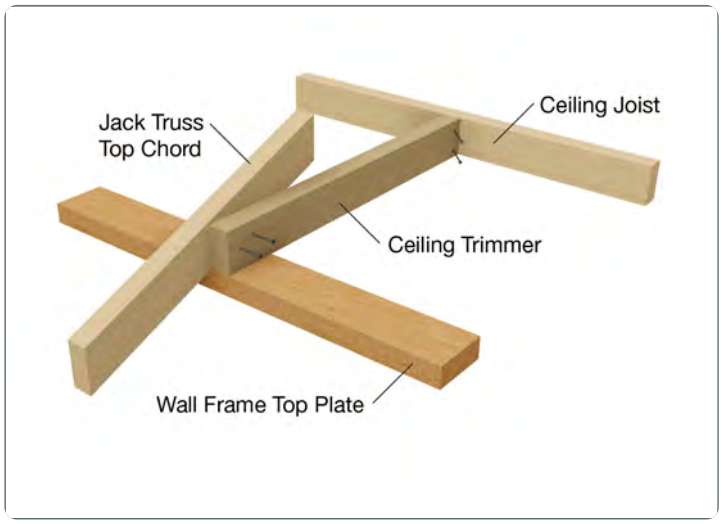


Figure C2-01-03-12

Detail H1

Joist Tie fixing

Timber with 2 nails per face of ceiling joist	Ceiling Joist Spacing (mm)		
	600	900	1200
	Mamimum Ceiling Joist Span (continus span) (mm)		
90x35 MGP10	2200	2000	1900
90x35 MGP12	2500	2500	2500

NOTE:

- Maximum spans are based on the support of a maximum ceiling mass of 12kg/m2
- Roof loads shall not be strutted onto ceiling joists.

Multinail Hub - Fully Trussed Hip End Detail High Wind (N4, C2 or C3)

27 May 2020

Multinail Australia

Fully Trussed Hip End Detail High Wind (N4, C2 or C3)

Full Trusses Hip End

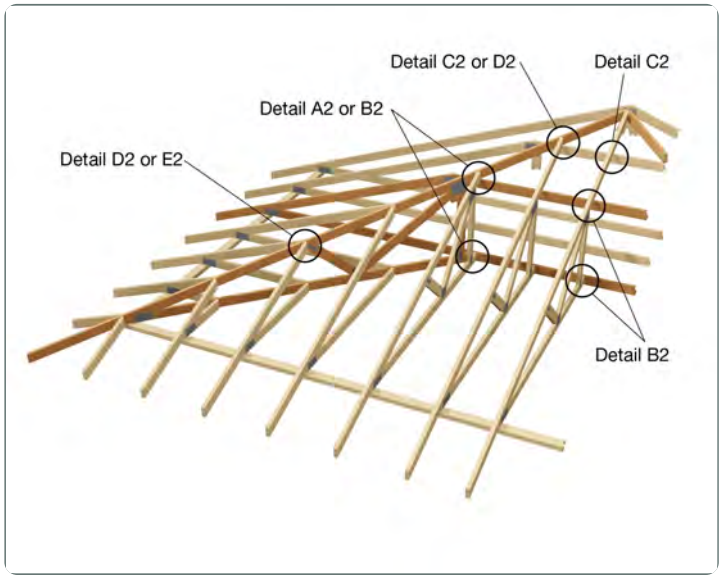


Figure C2-02-01-01

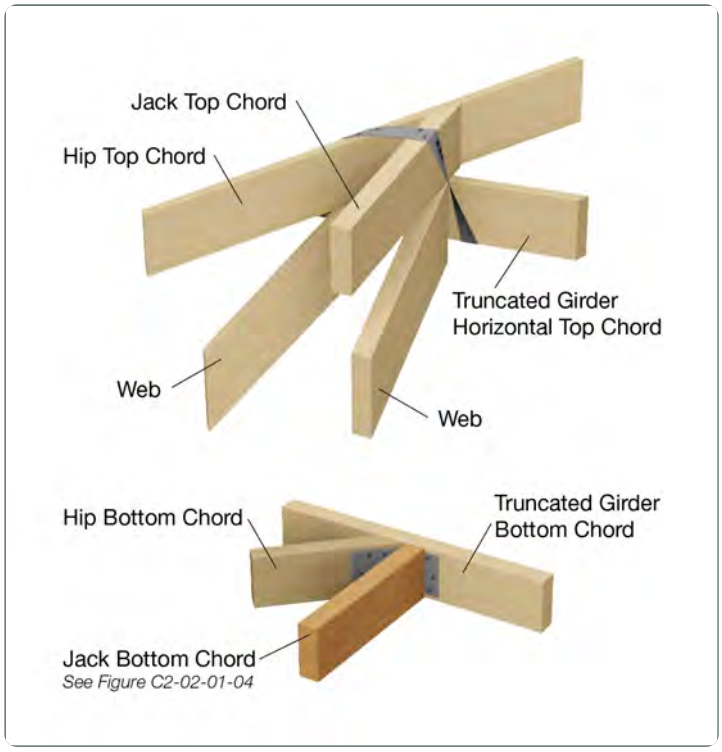


Figure C2-02-01-02

General Specification

Maximum truss spacing 900mm centres for tile roof and 1200mm centres for sheet roofs.

Maximum Truncated Girder Station – 3600mm.

Maximum Overhang – 900mm.

Maximum Roof Pitch - 45°

Note 1:

For effective skew nailing, the nail shall be driven into one member not closer than 25mm or more than 38mm from the arris in contact with the adjoining member. The nail shall be driven at an angle between 30 and 45 degrees to the face into which the nail is driven.

Note 2:

The restraint to the top and bottom chords of all trusses within the roof system is sometimes overlooked. Each ceiling batten, roof batten, or purlin MUST be fixed with a minimum of one effective 3.05mm diameter nail at each intersection with a chord.

Detail A2

Hip truss to truncated truss.

Top Chord - 1/30mm x 0.8mm G.I. looped strap, with 4/30mm x 2.8Ø reinforced-head nails to each leg.

Bottom Chord - use one mitre plate with 6/2.8Ø nails into each face.

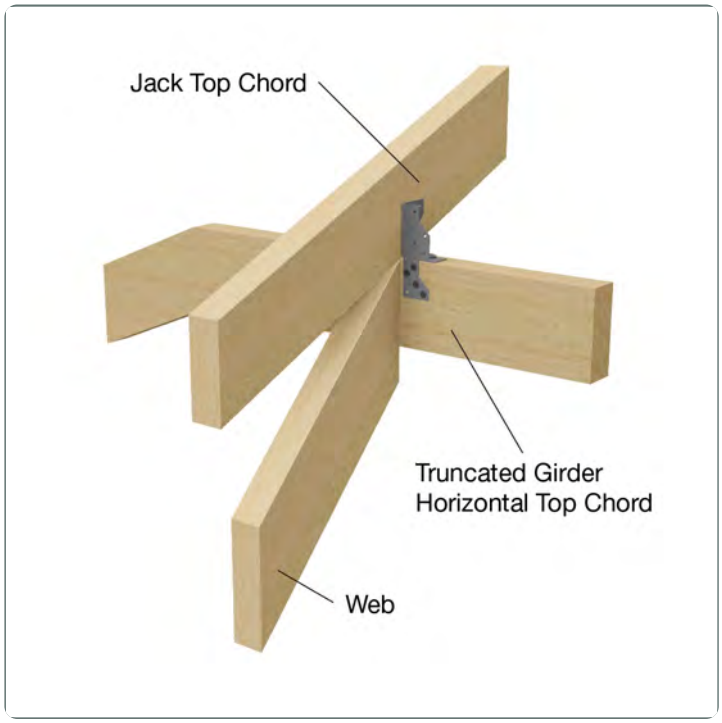


Figure C2-02-01-03

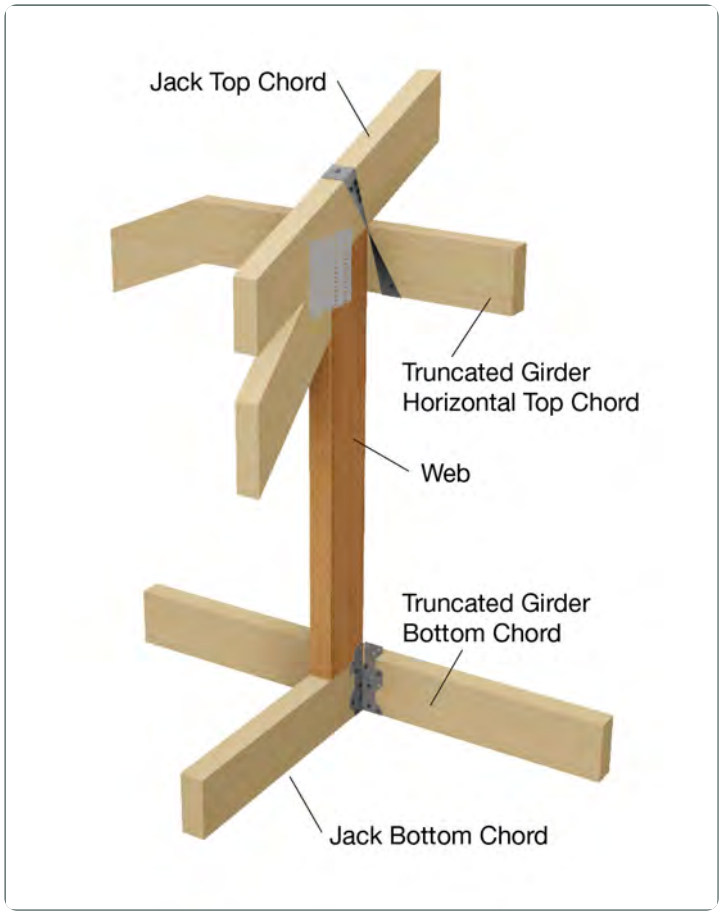


Figure C2-02-01-04

Detail B2

Method 1

Jack truss to truncated girder truss.

Top Chord - Station up to 2400mm - one framing anchor with 4/30mm x 2.8Ø reinforced-head nails into the side of each top chord.

Method 2

Jack truss to truncated girder truss.

Top Chord - Station 2450mm to 3600mm - 1/30mm x 0.8mm G.I. looped strap bent under the horizontal top chord, fixed with 4/30mm x 2.8Ø reinforced-head nails to each leg.

Bottom Chord - 1/Multi Grip with 4/2.8Ø nails into each side of each bottom chord

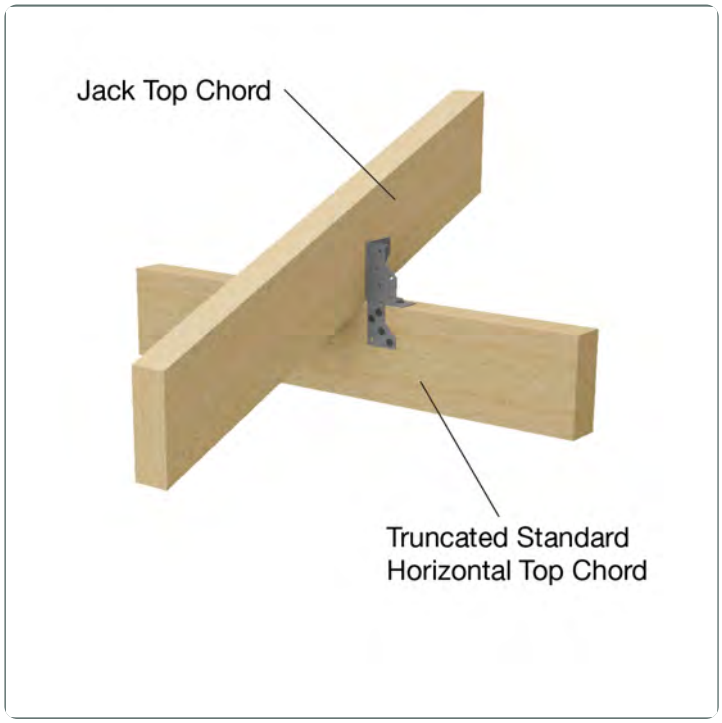


Figure C2-02-01-05

Detail C2

Top chord to truncated standard trusses.

One framing anchor with 4/30mm x 2.8Ø reinforced-head nails into the side of each top chord.

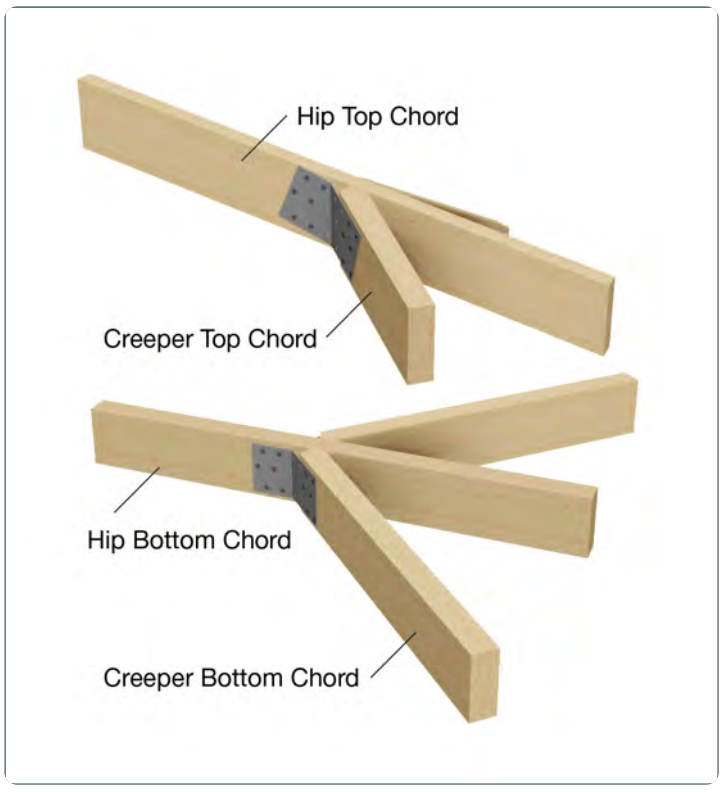


Figure C2-02-01-06

Detail D2

Creeper truss to hip truss
(maximum jack station 2400mm).

Top Chord - one mitre plate with 6/30mm x 2.8Ø reinforced-head nails into each face.

Bottom Chord - one mitre plate with 6/30mm x 2.8Ø reinforced-head nails into each face.

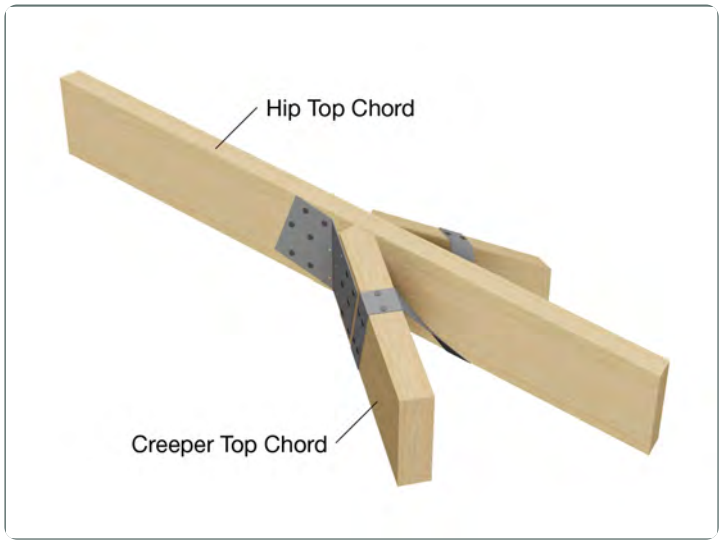


Figure C2-02-01-07

Detail E2

Creeper truss to hip truss
(maximum jack station 3000mm).

Top Chord - 1/30mm x 0.8mm G.I. looped strap with 4/30mm x 2.8Ø reinforced-head nails to each leg and one mitre plate with 6/30mm x 2.8Ø reinforced-head nails into each face.

Bottom Chord - one mitre plate with 6/30mm x 2.8Ø reinforced-head nails into each face.

Multinail Hub - Y-Jack (or Con I) Hip End Detail High Wind (N4, C2 or C3)

27 May 2020

Multinail Australia

Y-Jack (or Con I) Hip End Detail High Wind (N4, C2 or C3)

Y-Jack Hip End

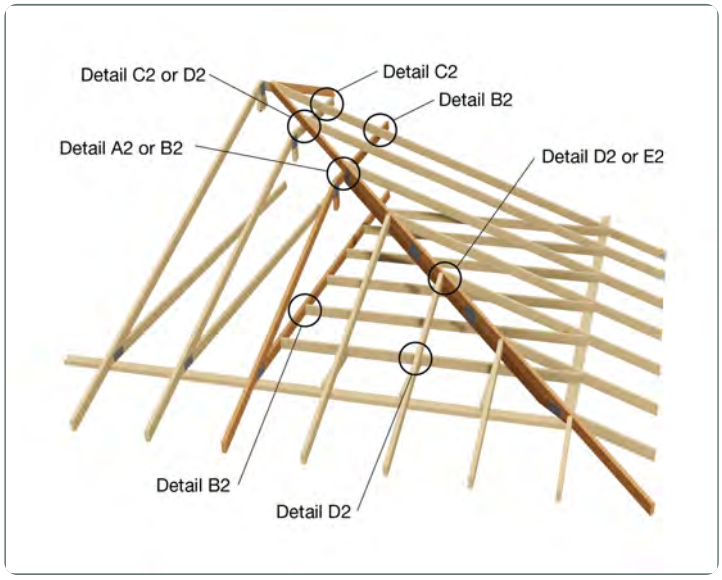


Figure C2-02-02-01

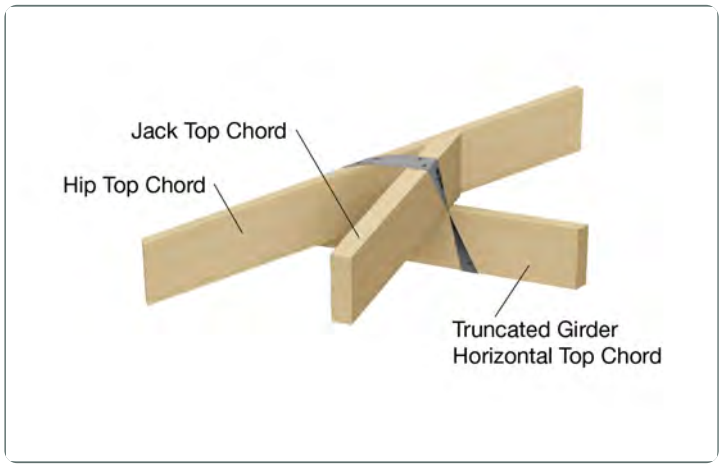


Figure C2-02-02-02

General Specification

Maximum truss spacing 900mm centres for tile roof and 1200mm centres for sheet roofs.

Maximum Truncated Girder Station – 3600mm.

Maximum Overhang – 900mm.

Maximum Roof Pitch - 45°

Note 1:

For effective skew nailing, the nail shall be driven into one member not closer than 25mm or more than 38mm from the arris in contact with the adjoining member. The nail shall be driven at an angle between 30 and 45 degrees to the face into which the nail is driven.

Note 2:

The restraint to the top and bottom chords of all trusses within the roof system is sometimes overlooked. Each ceiling batten, roof batten, or purlin MUST be fixed with a minimum of one effective 3.05mm diameter nail at each intersection with a chord.

Note 3:

Top Chord details of A1 and B1 also apply to GTG (Girder Truncated Girder).

Detail A2

Hip truss to truncated truss.

Top Chord - 1/30mm x 0.8mm G.I. looped strap, with 4/30mm x 2.8Ø reinforced-head nails to each leg.

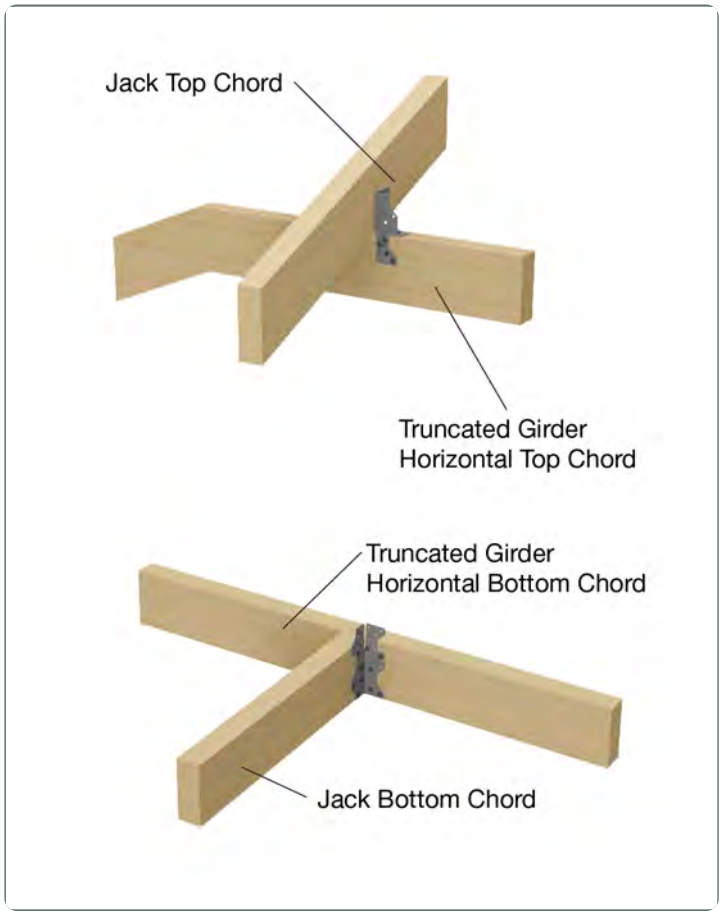


Figure C2-02-02-03

Detail B2

Method 1

Jack truss to truncated girder truss.

Top Chord - Station up to 2400mm - one framing anchor with 4/30mm x 2.8Ø reinforced-head nails into the side of each top chord.

Bottom Chord - 1/Multi Grip with 4/Ø2.8mmx30mm reinforced-head nails into the side of each bottom chord.

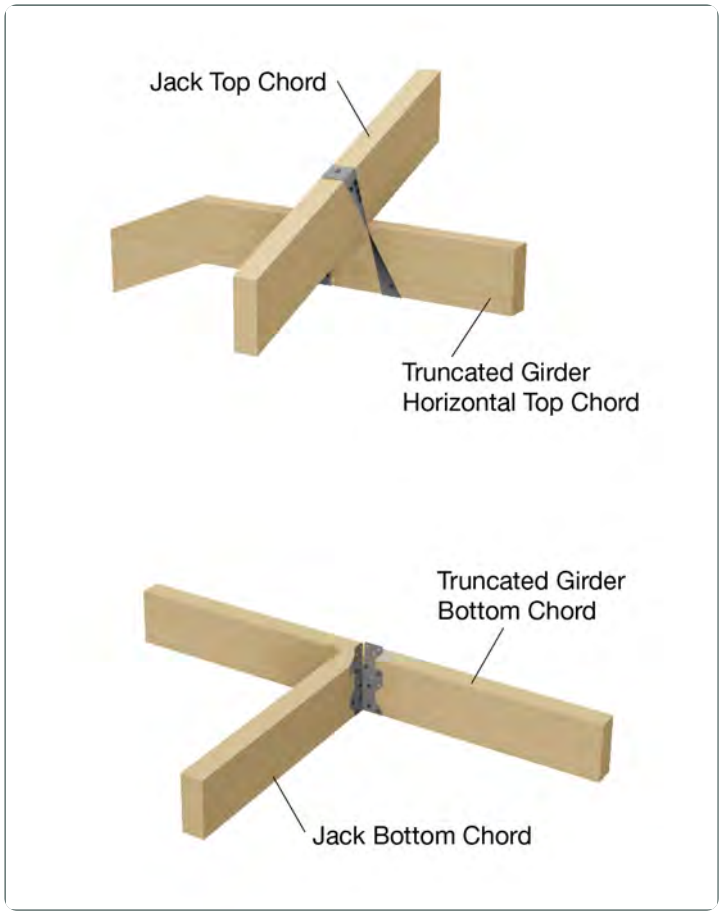


Figure C2-02-02-04

Method 2

Jack truss to truncated girder truss.

Top Chord - Station 2450mm to 3600mm - 1/30mm x 0.8mm G.I. looped strap bent under the horizontal top chord, fixed with 4/30mm x 2.8Ø reinforced-head nails to each leg.

Bottom Chord - 1/Multi Gripwith 4/Ø2.8mmx30mm reinforced-head nails into the side of each bottom chord.

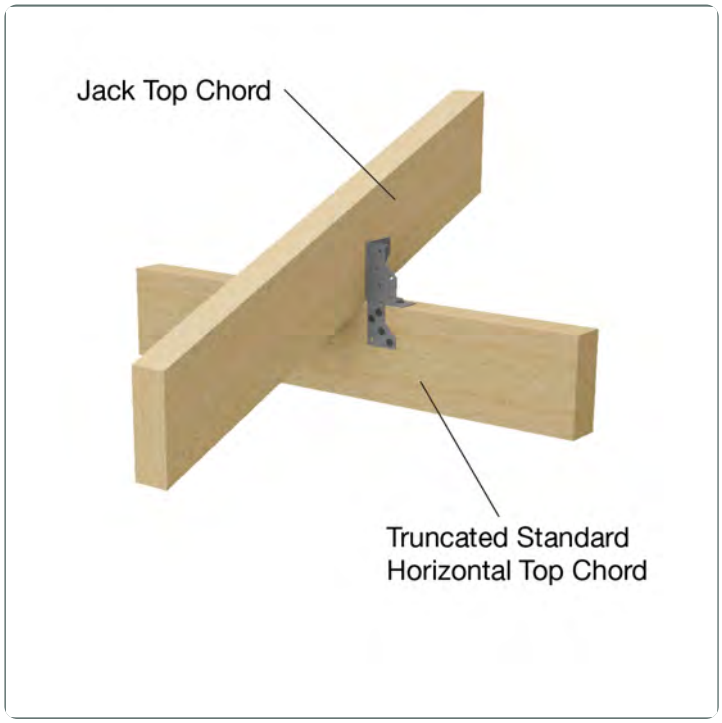


Figure C2-02-01-05

Detail C2

Top chord to truncated standard trusses.

One framing anchor with 4/30mm x 2.8Ø reinforced-head nails into the side of each top chord.

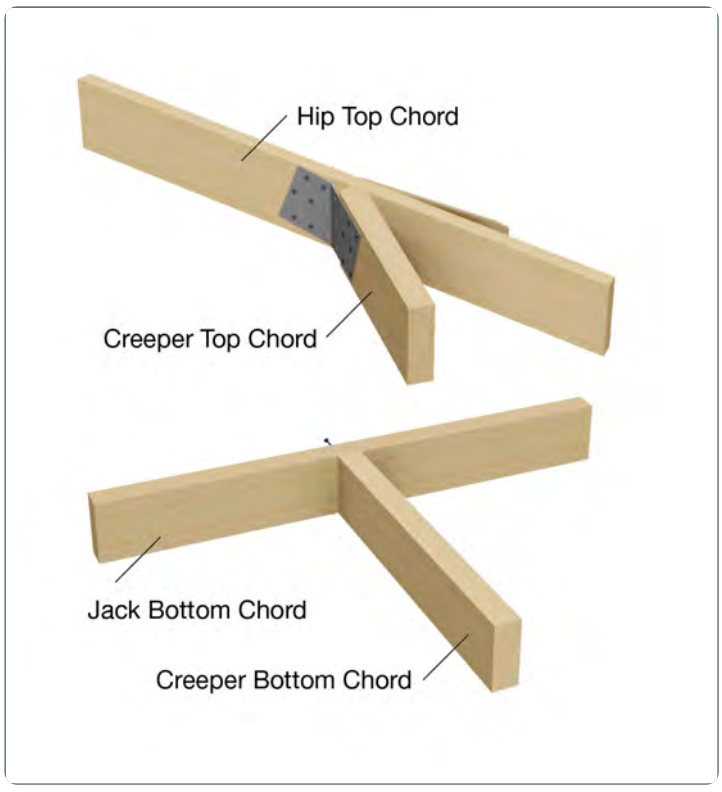


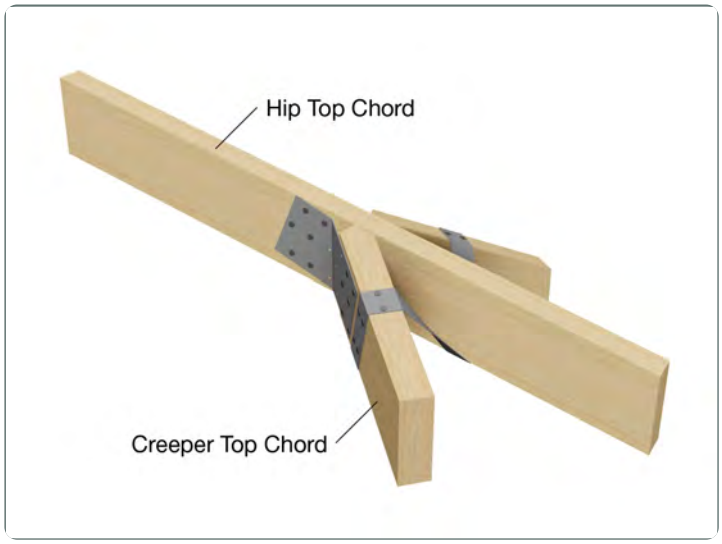
Figure C2-02-01-06

Detail D2

Creeper truss to hip truss
(maximum jack station 2400mm).

Top Chord - one mitre plate with 6/30mm x 2.8Ø reinforced-head nails into each face.

Bottom Chord - one mitre plate with 6/30mm x 2.8Ø reinforced-head nails into each face.



Detail E2

Creeper truss to hip truss
(maximum jack station 3000mm).

Top Chord - 1/30mm x 0.8mm G.I. looped strap with 4/30mm x 2.8Ø reinforced-head nails to each leg and one mitre plate with 6/30mm x 2.8Ø reinforced-head nails into each face.

Figure C2-02-02-07

Multinail Hub - Conventional Type II Hip End Detail Low Wind (N1, N2, N3 or C1)

27 May 2020

Multinail Australia

Conventional Type II Hip End Detail Low Wind (N1, N2, N3 or C1)

Conventional II

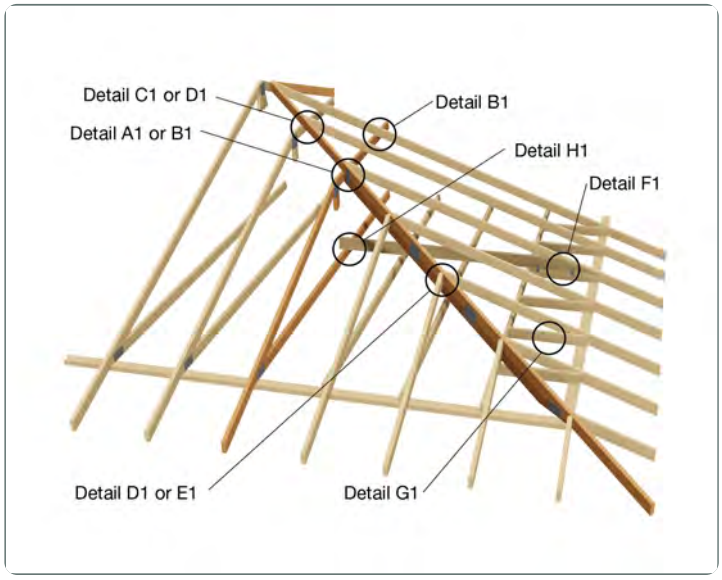


Figure C2-01-03-01

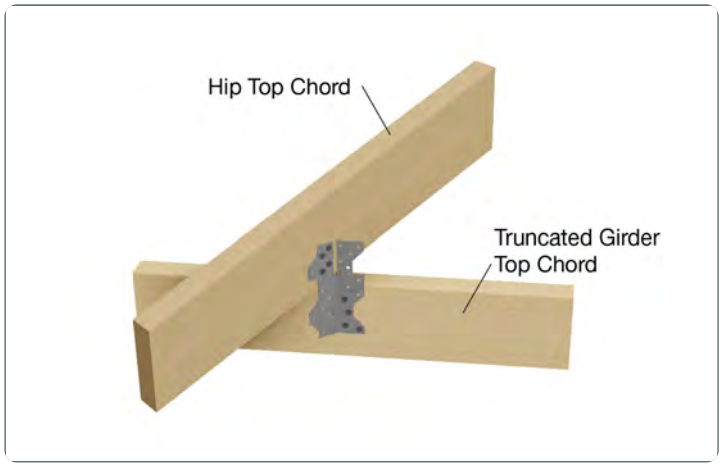


Figure C2-01-03-02

General Specification

Maximum truss spacing 900mm centres for tile roof and 1200mm centres for sheet roofs.

Maximum Truncated Girder Station – 3600mm.

Maximum Overhang – 900mm.

Maximum Roof Pitch - 45°

Note 1:

For effective skew nailing, the nail shall be driven into one member not closer than 25mm or more than 38mm from the arris in contact with the adjoining member. The nail shall be driven at an angle between 30 and 45 degrees to the face into which the nail is driven.

Note 2:

The restraint to the top and bottom chords of all trusses within the roof system is sometimes overlooked. Each ceiling batten, roof batten, or purlin MUST be fixed with a minimum of one effective 3.05mm diameter nail at each intersection with a chord.

Detail A1

Hip rafter to truncated trusses.

Top Chord - one framing anchor bent to suit, with 4/30mm x 2.8Ø reinforced-head nails into the side of each top chord for truncated girder.

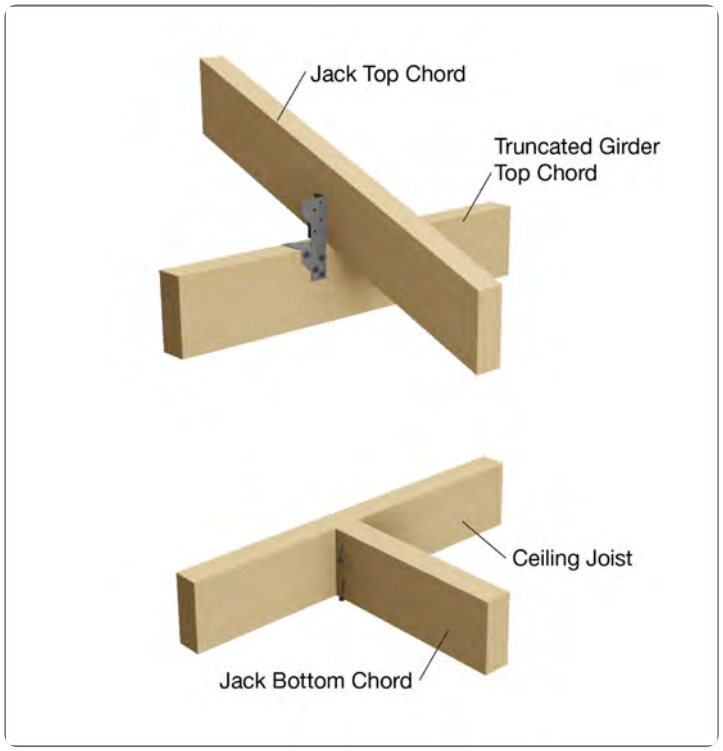


Figure C2-01-03-06

Detail B1

Jack rafter to truncated girder truss or ceiling joist

Top Chord - one framing anchor bent to suit, with 4/30mm x 2.8Ø reinforced-head nails into the side of each top chord for truncated girder.

Note:

For design wind speed up to N2, tile roofs, truncated girder with spans up to 8000mm and station up to 2400mm, detail C1 may be used.

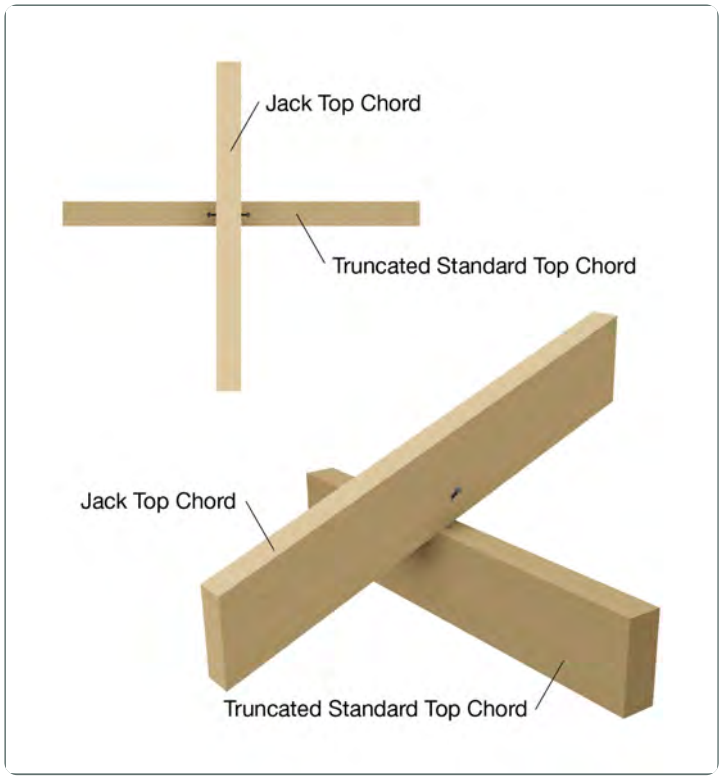


Figure C2-01-01-08

Detail C1

Extended jack rafter to top chord of truncated standard trusses.

2/75mm x 3.05Ø skew nails into the side of each top chord.

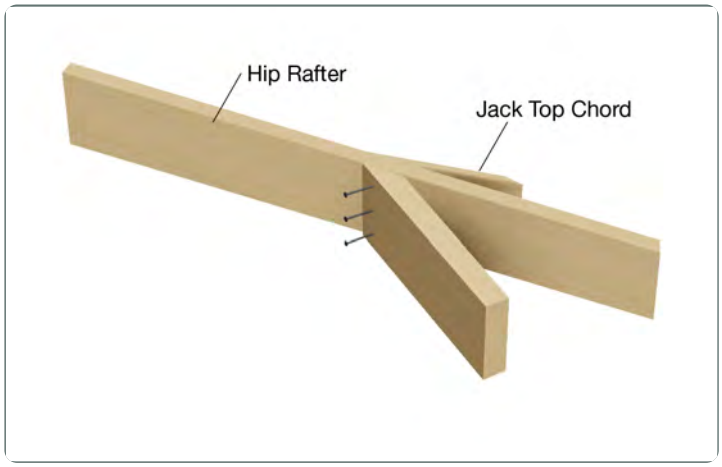


Figure C2-01-03-09

Detail D1

Creeper or jack rafter to hip rafter (maximum creeper/jack station 1800mm)

Top Chord - 3/75mm x 3.05Ø nails through jack truss top chord into hip truss top chord.

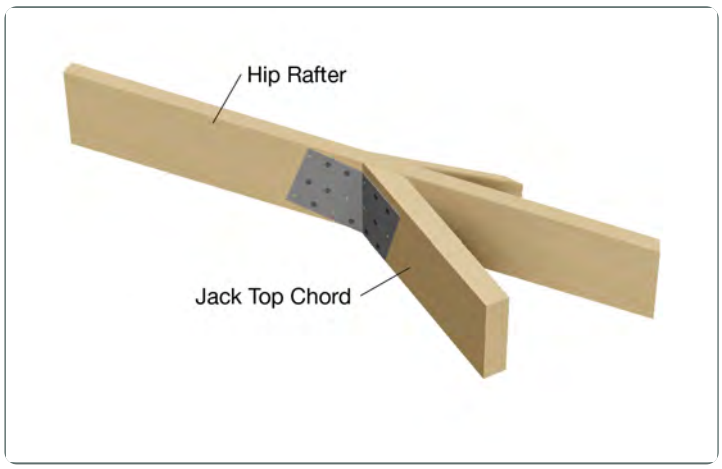


Figure C2-01-03-10

Detail E1

Creeper or jack rafter to hip rafter (maximum creeper/jack station 3000mm)

Top Chord - fix as detail D1 plus one mitre plate with 6/30mm x 2.8Ø reinforced-head nails to each top chord.

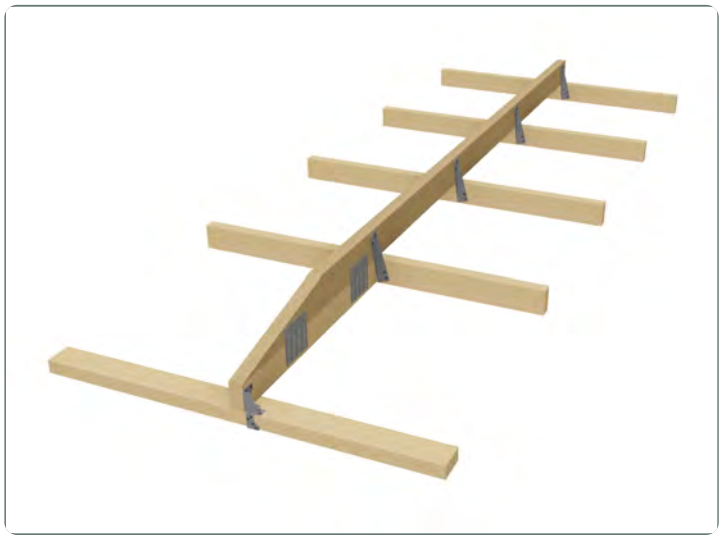


Figure C2-01-03-11

Detail F1

Hanging beam fixing

- Fix Hanging beam to ceiling joist with block or joist tie with min 2/2.8Ø nails.
- Hanging beam tied down of each end as per tie down report.

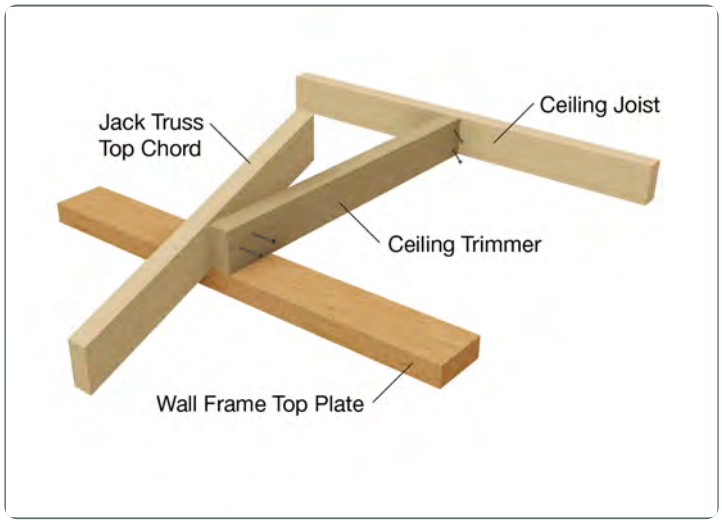


Figure C2-01-03-12

Detail G1

Ceiling trimmer fixing

- Fix ceiling trimmer to rafter and ceiling joist with 2/3.05Ø nails
- Rafter tied down as per tie down report

Figure C2-01-03-13

Detail H1

Joist Tie fixing

Timber with 2 nails per face of ceiling joist	Ceiling Joist Spacing (mm)		
	600	900	1200
	Mamimum Ceiling Joist Span (continus span) (mm)		
90x35 MGP10	2200	2000	1900
90x35 MGP12	2500	2500	2500

NOTE:

- Fix ceiling trimmer to rafter and ceiling joist with 2/3.05Ø nails
- Rafter tied down as per tie down report

Fully Trussed Hip End Detail Low Wind (N1, N2, N3 or C1)

Fully Trussed Hip End

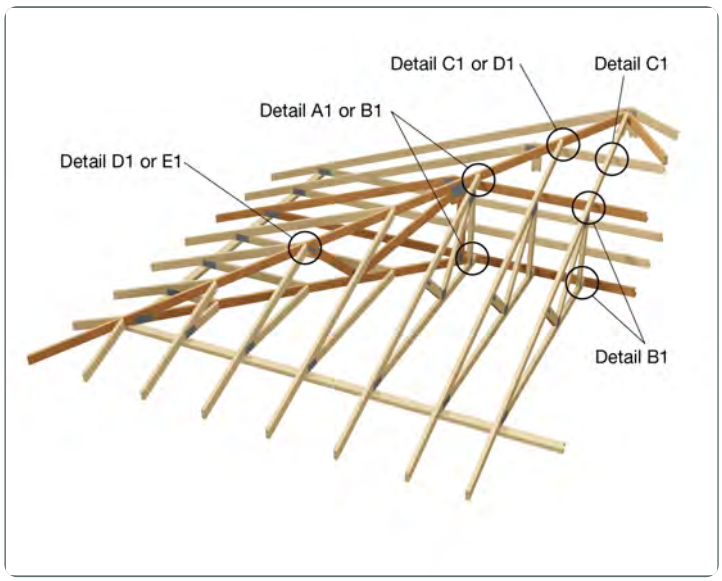


Figure C2-01-01-01

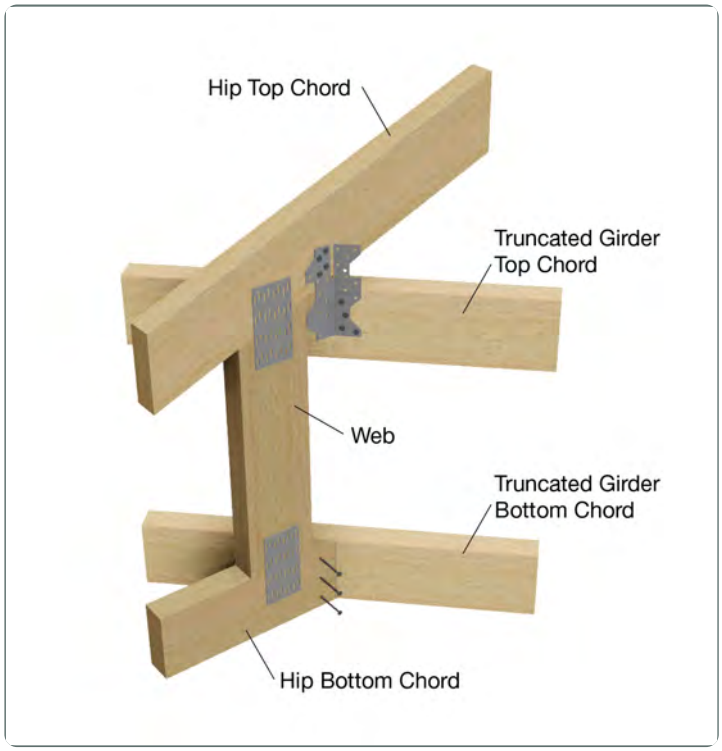


Figure C2-01-01-02

General Specification

Maximum truss spacing 900mm centres for tile roof and 1200mm centres for sheet roofs.

Maximum Truncated Girder Station – 3600mm.

Maximum Overhang – 900mm.

Maximum Roof Pitch - 45°

Note 1:

For effective skew nailing, the nail shall be driven into one member not closer than 25mm or more than 38mm from the arris in contact with the adjoining member. The nail shall be driven at an angle between 30 and 45 degrees to the face into which the nail is driven.

Note 2:

The restraint to the top and bottom chords of all trusses within the roof system is sometimes overlooked. Each ceiling batten, roof batten, or purlin MUST be fixed with a minimum of one effective 3.05mm diameter nail at each intersection with a chord.

Detail A1

Hip truss to truncated girder truss.

Top Chord - one framing anchor bent to suit, with 4/30mm x 2.8Ø reinforced-head nails into the side of each top chord for truncated girder.

Bottom Chord - 3/75mm x 3.05Ø nails.

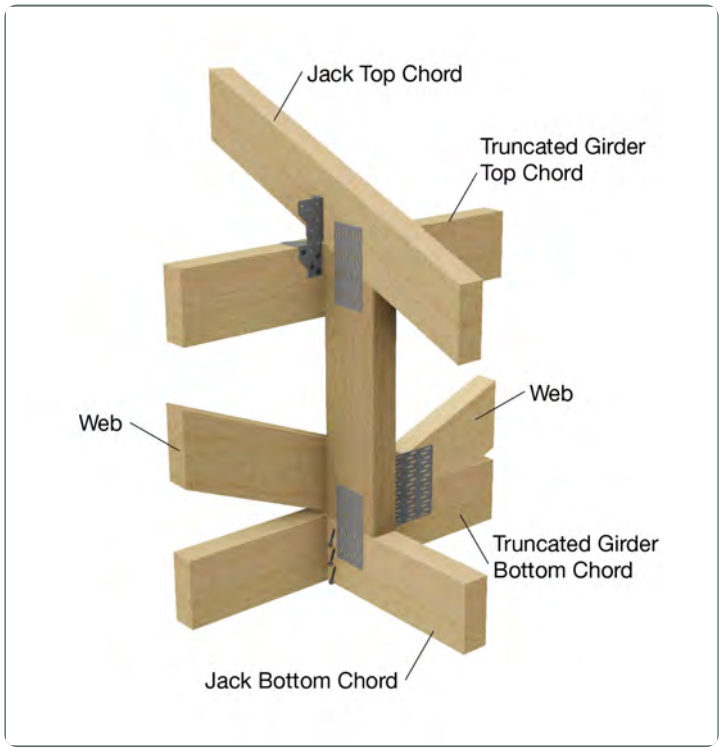


Figure C2-01-01-06

Detail B1

Jack truss to truncated girder truss.

Top Chord - one framing anchor bent to suit, with 4/30mm x 2.8Ø reinforced-head nails into the side of each top chord for truncated girder.

Note:

For design wind speed up to N2, tile roofs, truncated girder with spans up to 8000mm and station up to 2400mm, detail C1 may be used.

Bottom Chord - 3/75mm x 3.05Ø in end of jack truss.

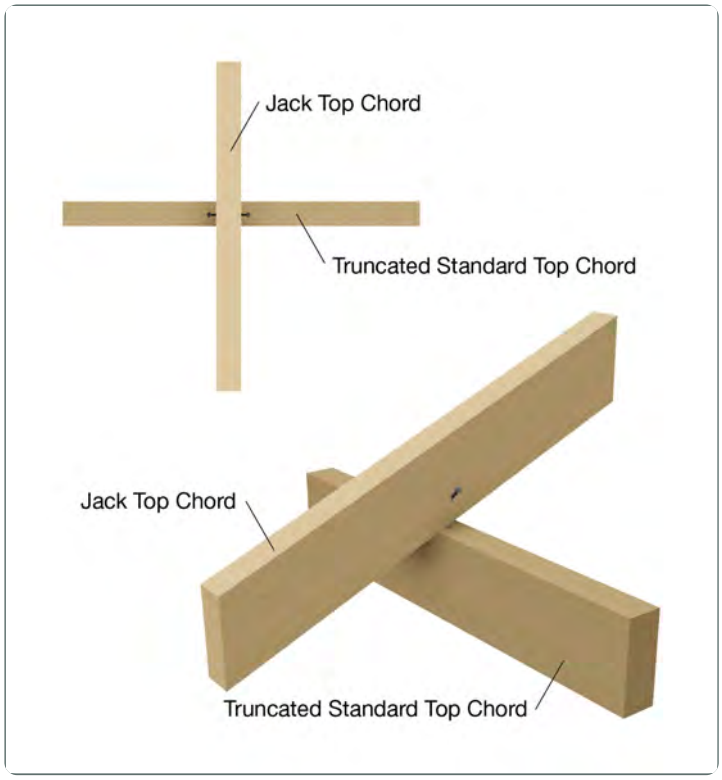


Figure C2-01-01-08

Detail C1

Extended jack truss to top chord to truncated standard trusses.

2/75mm x 3.05Ø skew nails into the side of each top chord.

Note:

Follow Detail A1 and B1 when a TS become a GTG (Girder Truncated Girder).

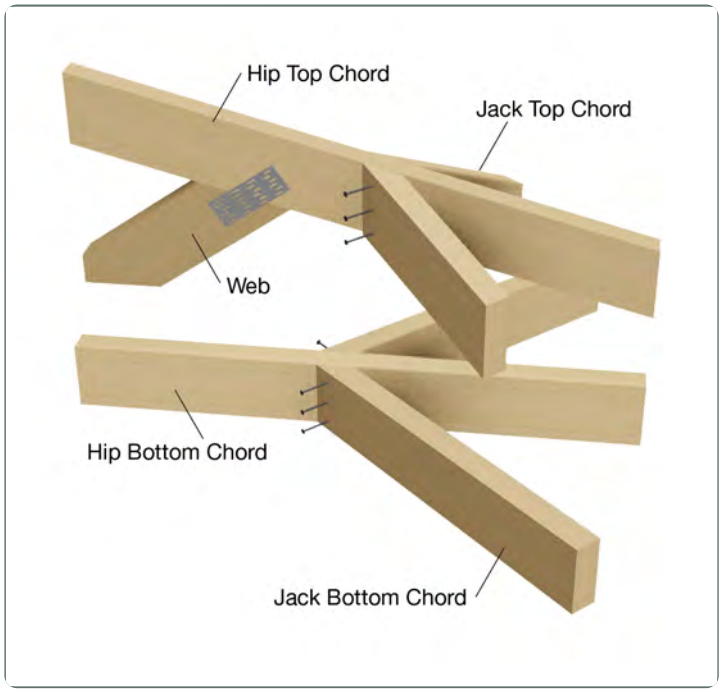


Figure C2-01-01-09

Detail D1

Creeper or jack truss to hip truss
(maximum creeper/jack station 1800mm)

Top Chord - 3/75mm x 3.05Ø nails through jack truss top chord into hip truss top chord.

Bottom Chord - 3/75mm x 3.05Ø nails through jack truss bottom chord to hip truss bottom chord.

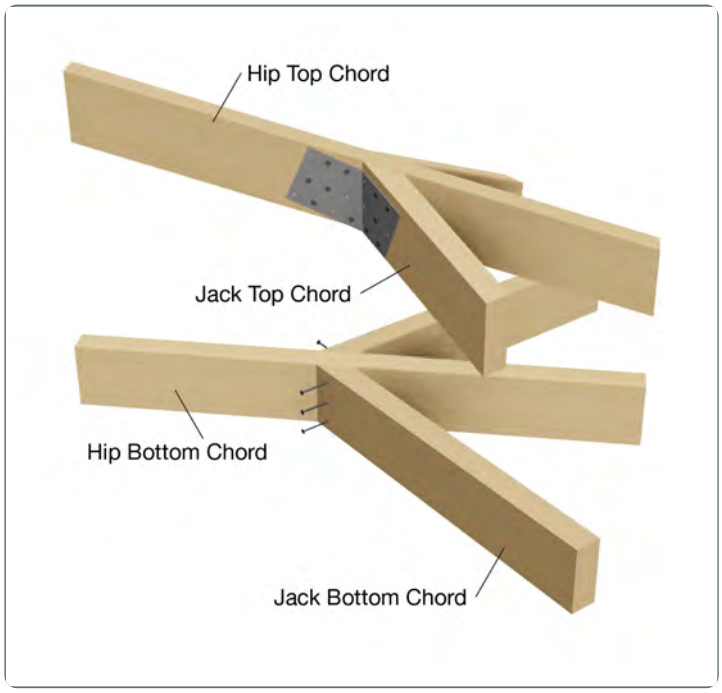


Figure C2-01-01-10

Detail E1

Creeper or jack truss to hip truss
(maximum creeper/ jack station 3000mm)

Top Chord - fix as detail D1 plus one Mitre plate with 6/30mm x 2.8Ø reinforced-head nails to each top chord.

Bottom Chord - 3/75mm x 3.05Ø nails through jack truss bottom chord to hip truss bottom chord.

Multinail Hub - Y-Jack (or Con I) Hip End Detail Low Wind

27 May 2020

Multinail Australia

Y-Jack (or Con I) Hip End Detail Low Wind (N1, N2, N3 or C1)

Y-Jack Hip End

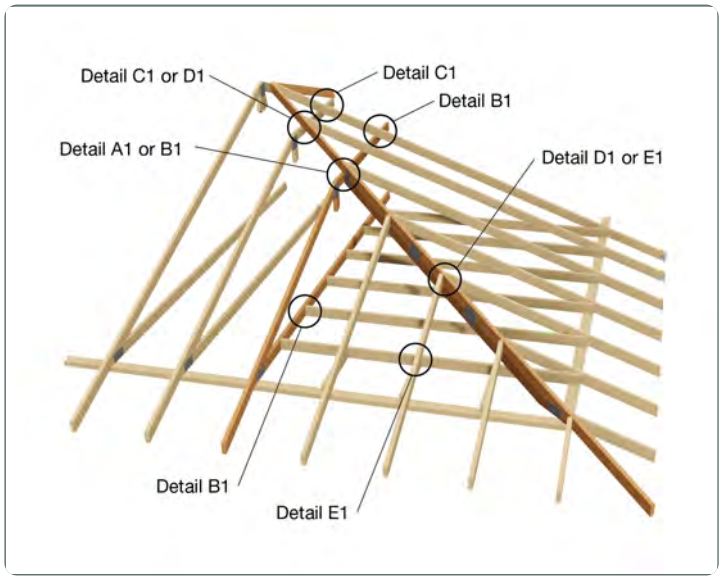


Figure C2-01-02-01

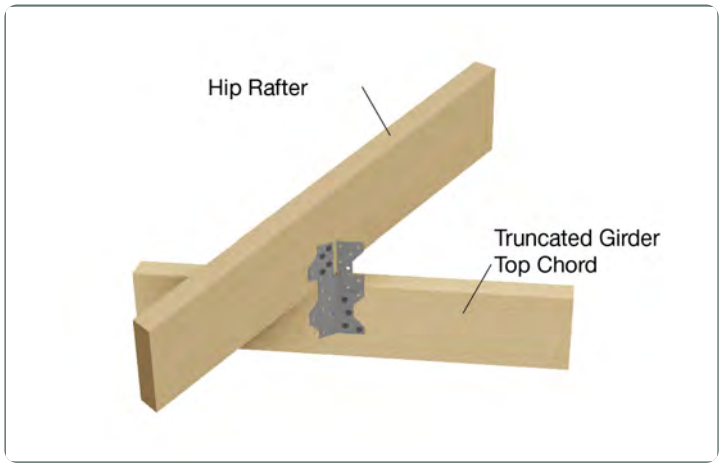


Figure C2-01-02-02

General Specification

Maximum truss spacing 900mm centres for tile roof and 1200mm centres for sheet roofs.

Maximum Truncated Girder Station – 3600mm.

Maximum Overhang – 900mm.

Maximum Roof Pitch - 45°

Note 1:

For effective skew nailing, the nail shall be driven into one member not closer than 25mm or more than 38mm from the arris in contact with the adjoining member. The nail shall be driven at an angle between 30 and 45 degrees to the face into which the nail is driven.

Note 2:

The restraint to the top and bottom chords of all trusses within the roof system is sometimes overlooked. Each ceiling batten, roof batten, or purlin MUST be fixed with a minimum of one effective 3.05mm diameter nail at each intersection with a chord.

Note 3:

Top Chord details of A1 and B1 also apply to GTG (Girder Truncated Girder).

Detail A1

Hip truss to truncated girder truss.

Top Chord - one framing anchor bent to suit, with 4/30mm x 2.8Ø reinforced-head nails into the side of each top chord for truncated girder.

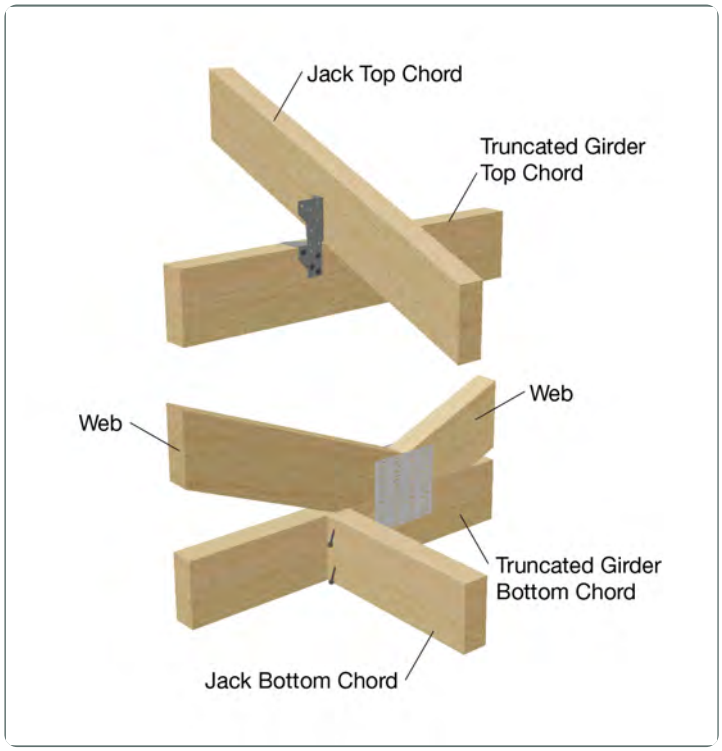


Figure C2-01-02-06

Detail B1

Jack truss to truncated girder truss.

Top Chord - one framing anchor bent to suit, with 4/30mm x 2.8Ø reinforced-head nails into the side of each top chord for truncated girder.

Note:

For design wind speed up to N2, tile roofs, truncated girder with spans up to 8000mm and station up to 2400mm, detail C1 may be used.

Bottom Chord - 3/75mm x 3.05Ø nails in end of jack truss.

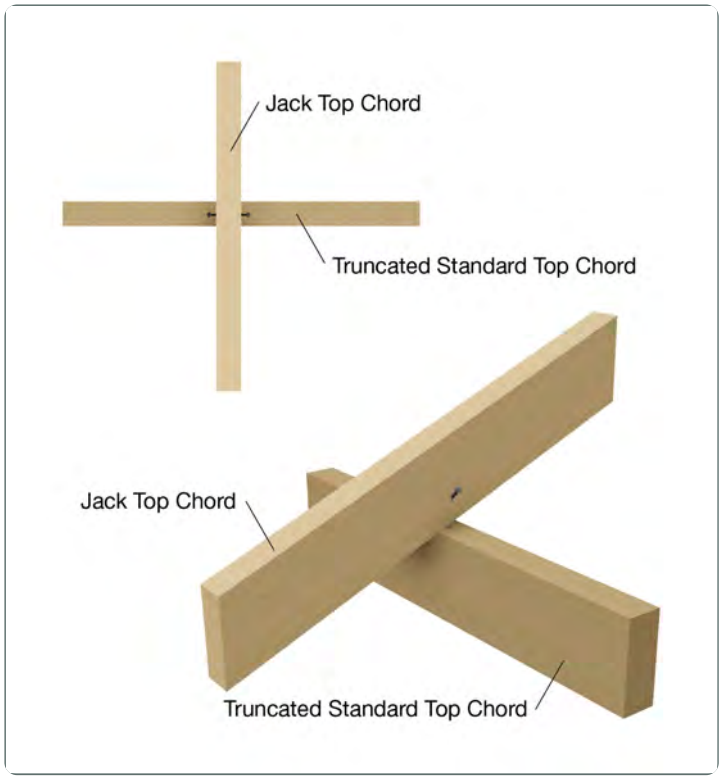


Figure C2-01-01-08

Detail C1

Extended jack truss to top chord to truncated standard trusses.

2/75mm x 3.05Ø skew nails into the side of each top chord.

Note:

Follow Detail A1 and B1 when a TS become a GTG (Girder Truncated Girder).

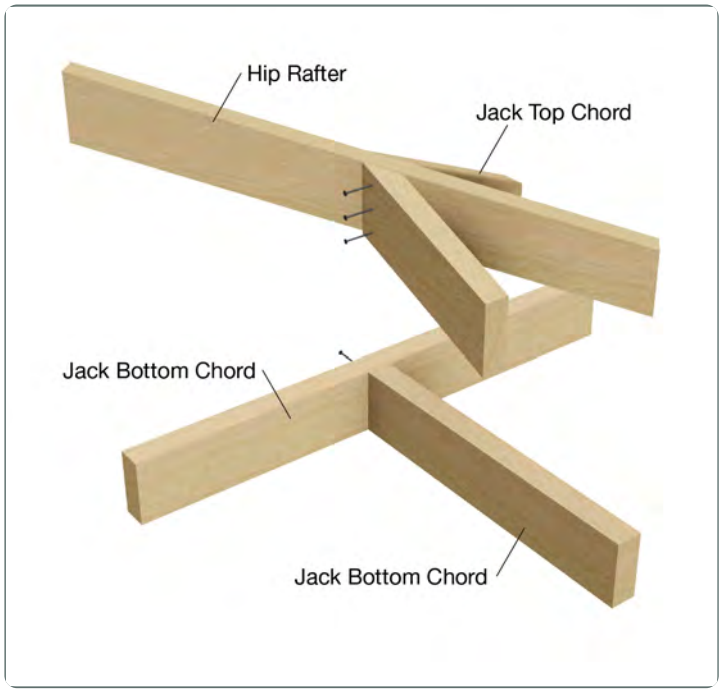


Figure C2-01-02-09

Detail D1

Creeper or jack truss to hip truss
(maximum creeper/jack station 1800mm)

Top Chord - 3/75mm x 3.05Ø nails through jack truss top chord into hip truss top chord.

Bottom Chord - 3/75mm x 3.05Ø nails through jack truss bottom chord to hip truss bottom chord.

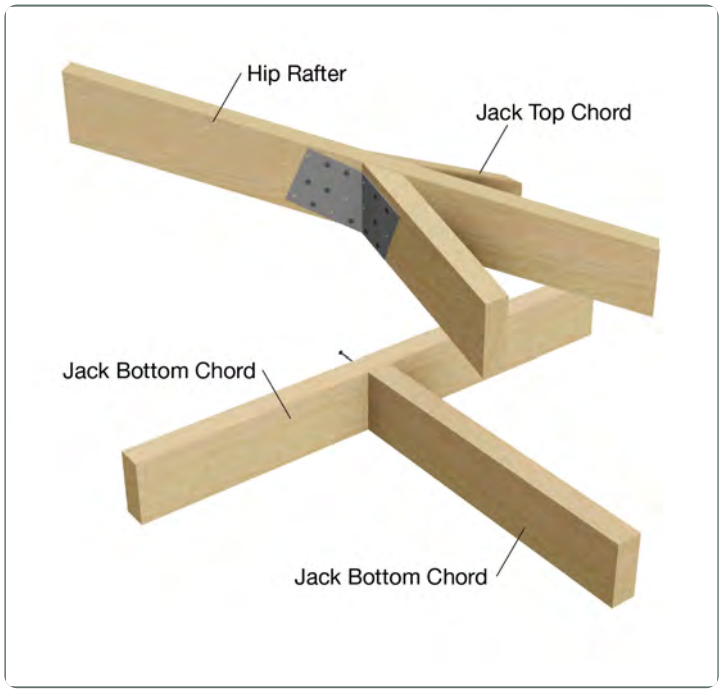


Figure C2-01-02-10

Detail E1

Creeper or jack truss to hip truss
(maximum creeper/ jack station 3000mm)

Top Chord - fix as detail D1 plus one Mitre plate with 6/30mm x 2.8Ø reinforced-head nails to each top chord.

Bottom Chord - 3/75mm x 3.05Ø nails through jack truss bottom chord to hip truss bottom chord.

Hip End

Scope of section

The following technical sheets are limited to 5 segment fan hip ends in accordance with Multinail Software.

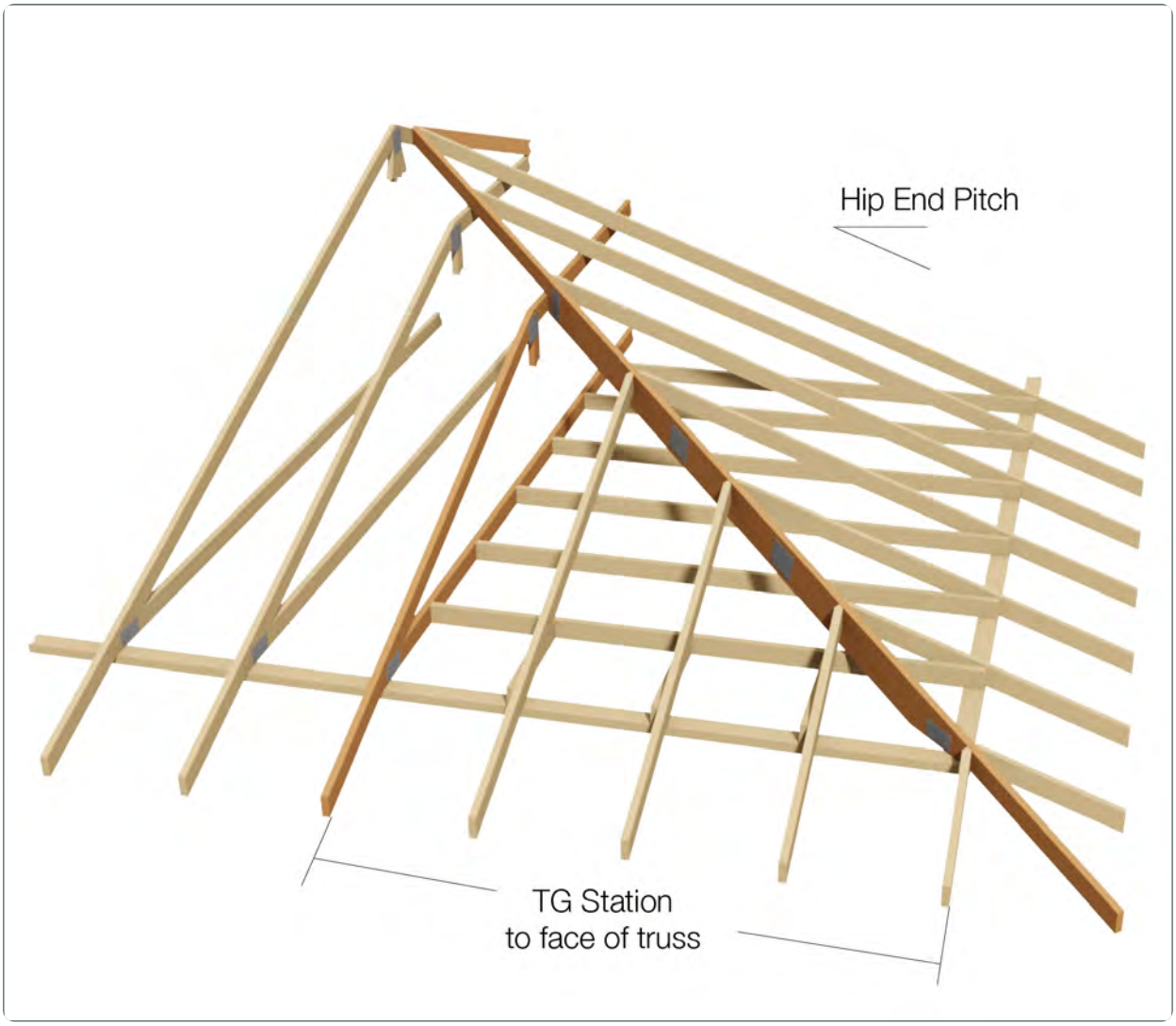
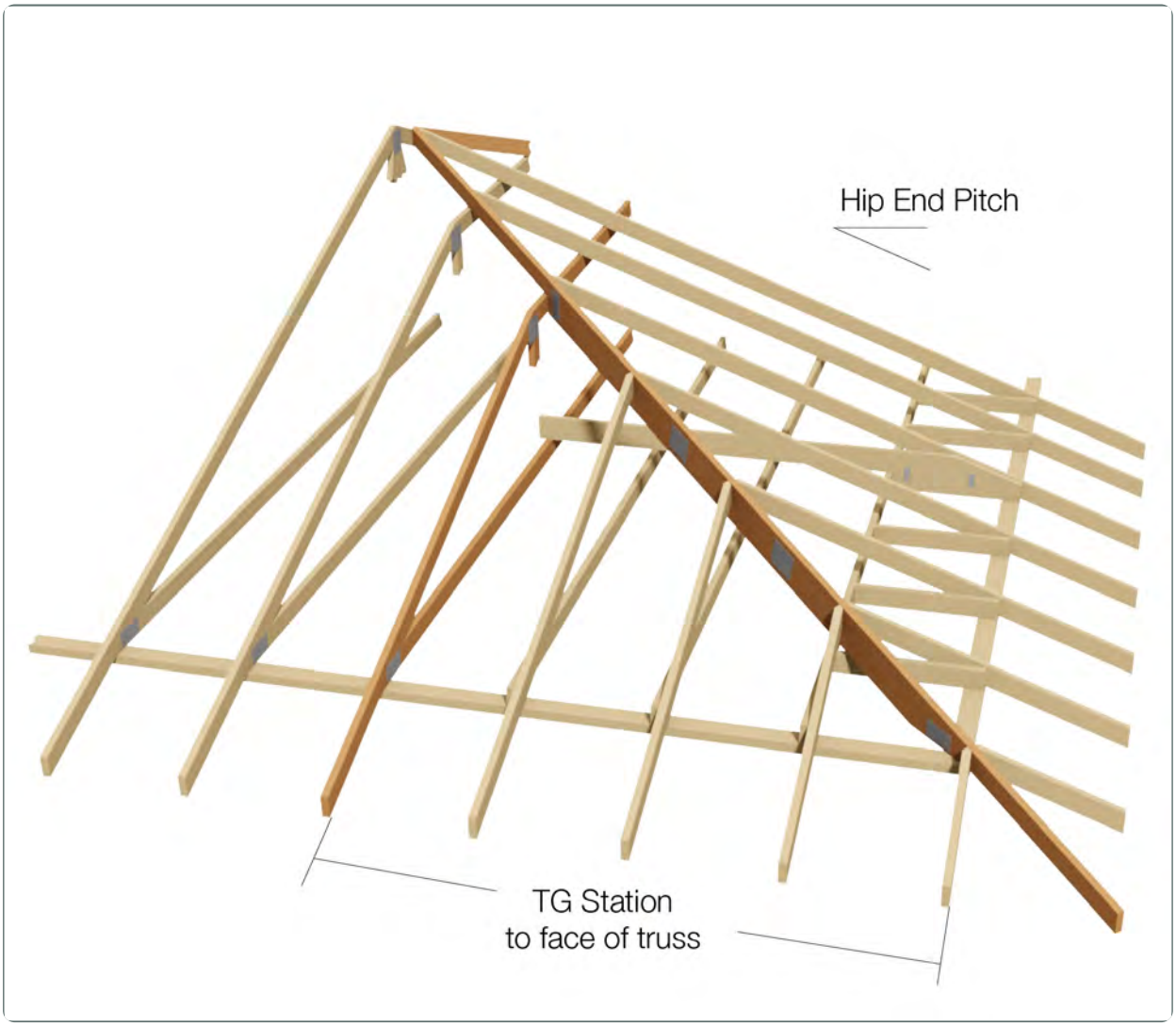


Figure C2-08-03-01



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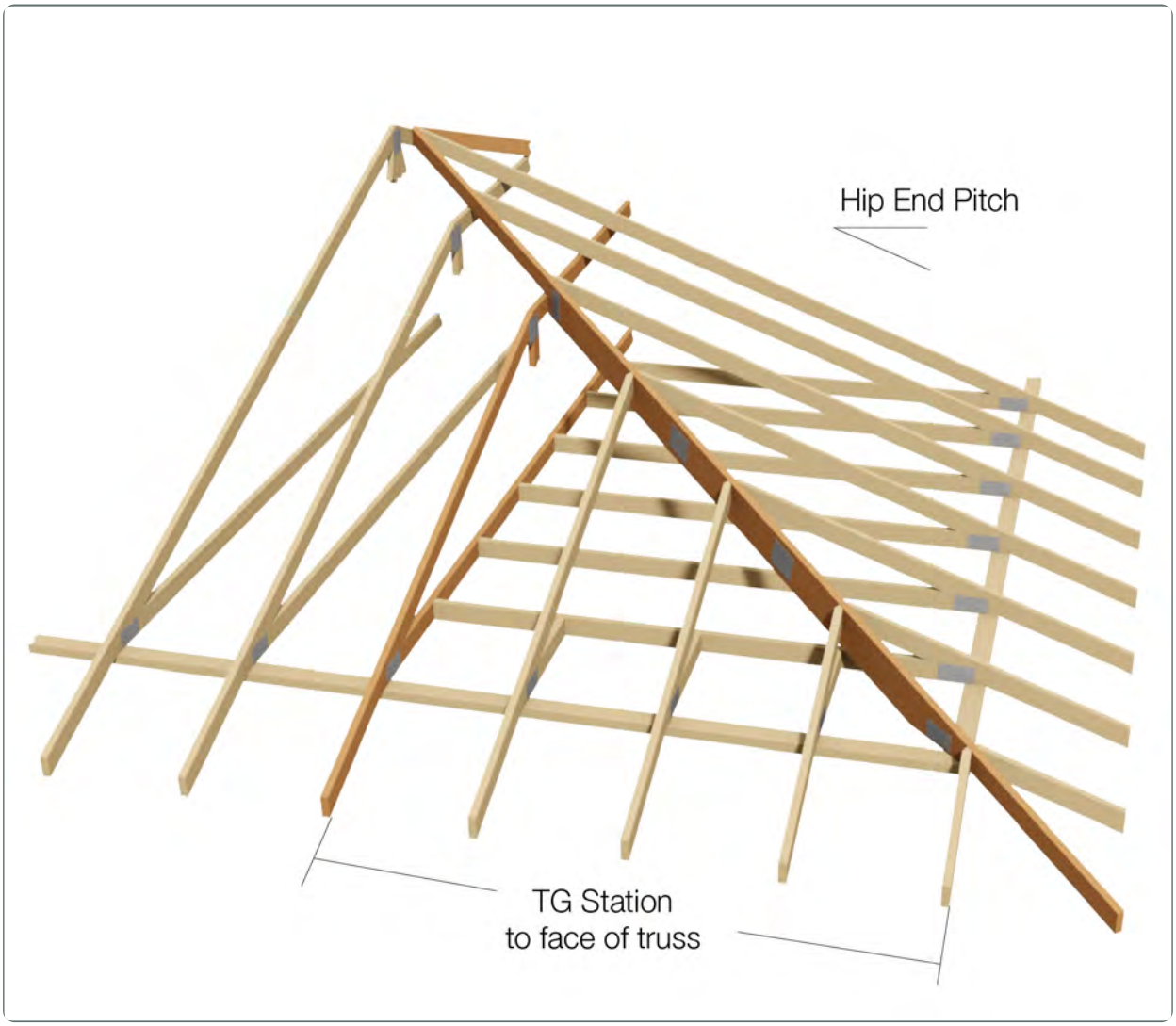


Figure C2-08-03-03

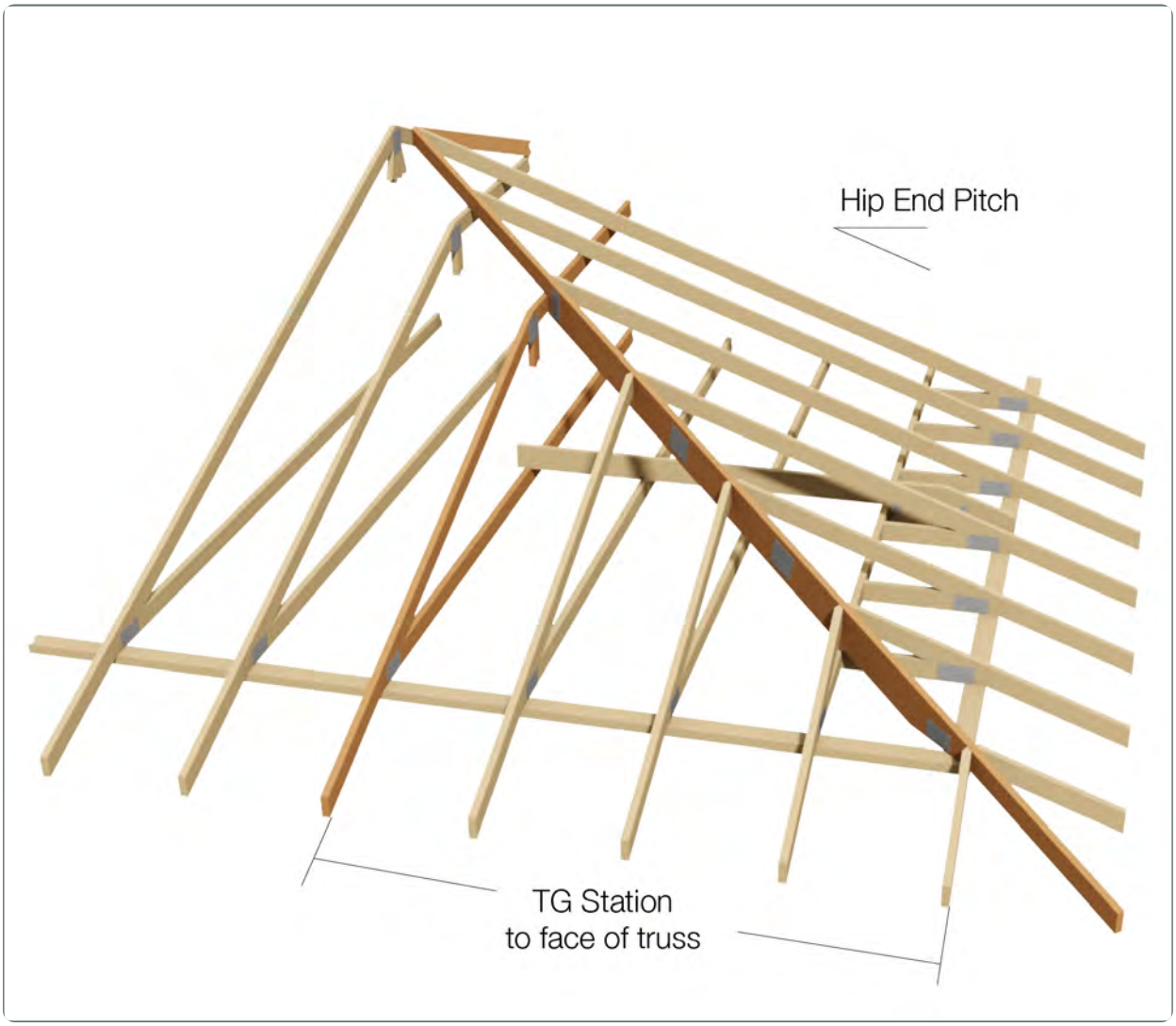


Figure C2-08-03-04

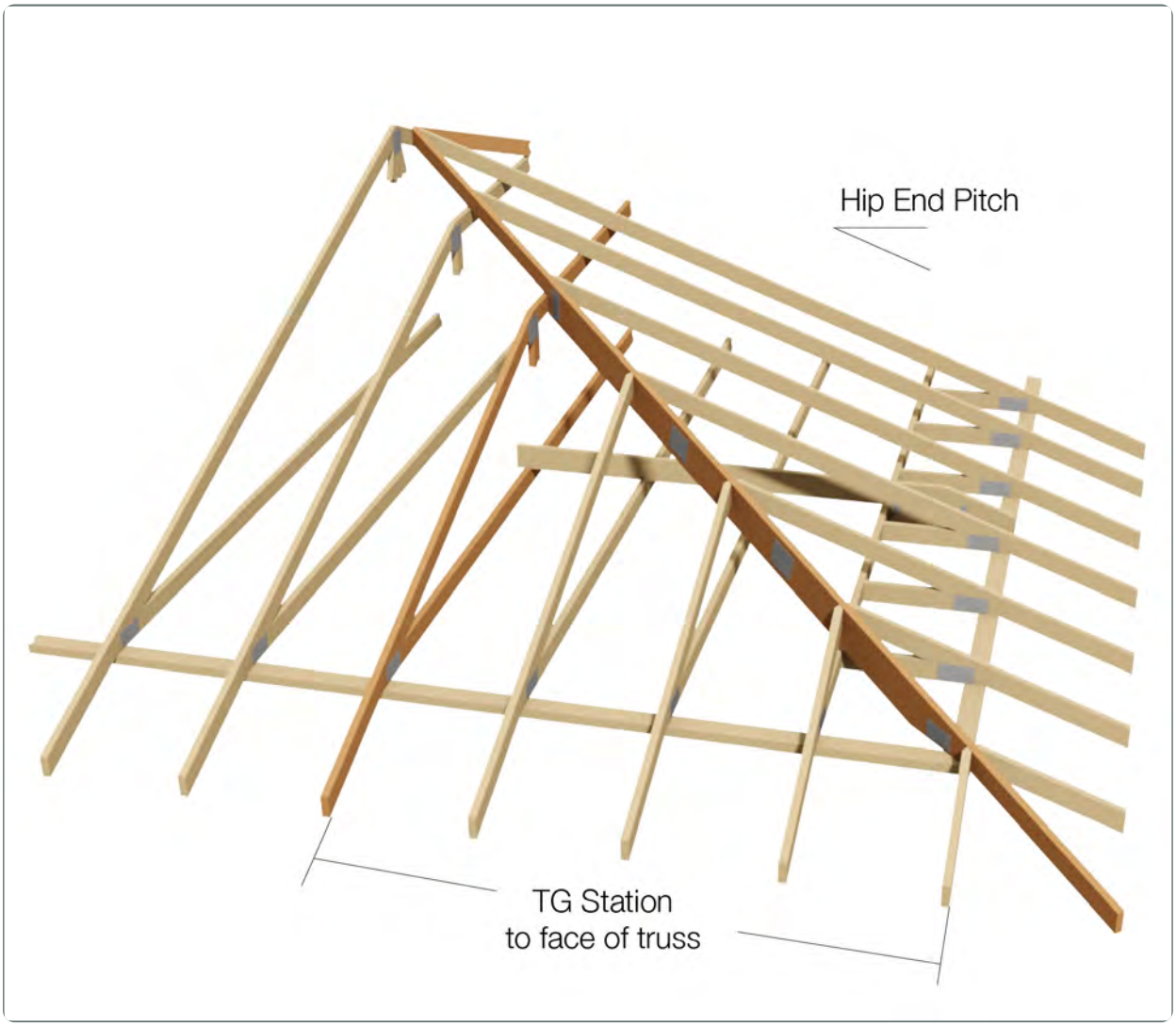


Figure C2-08-03-04

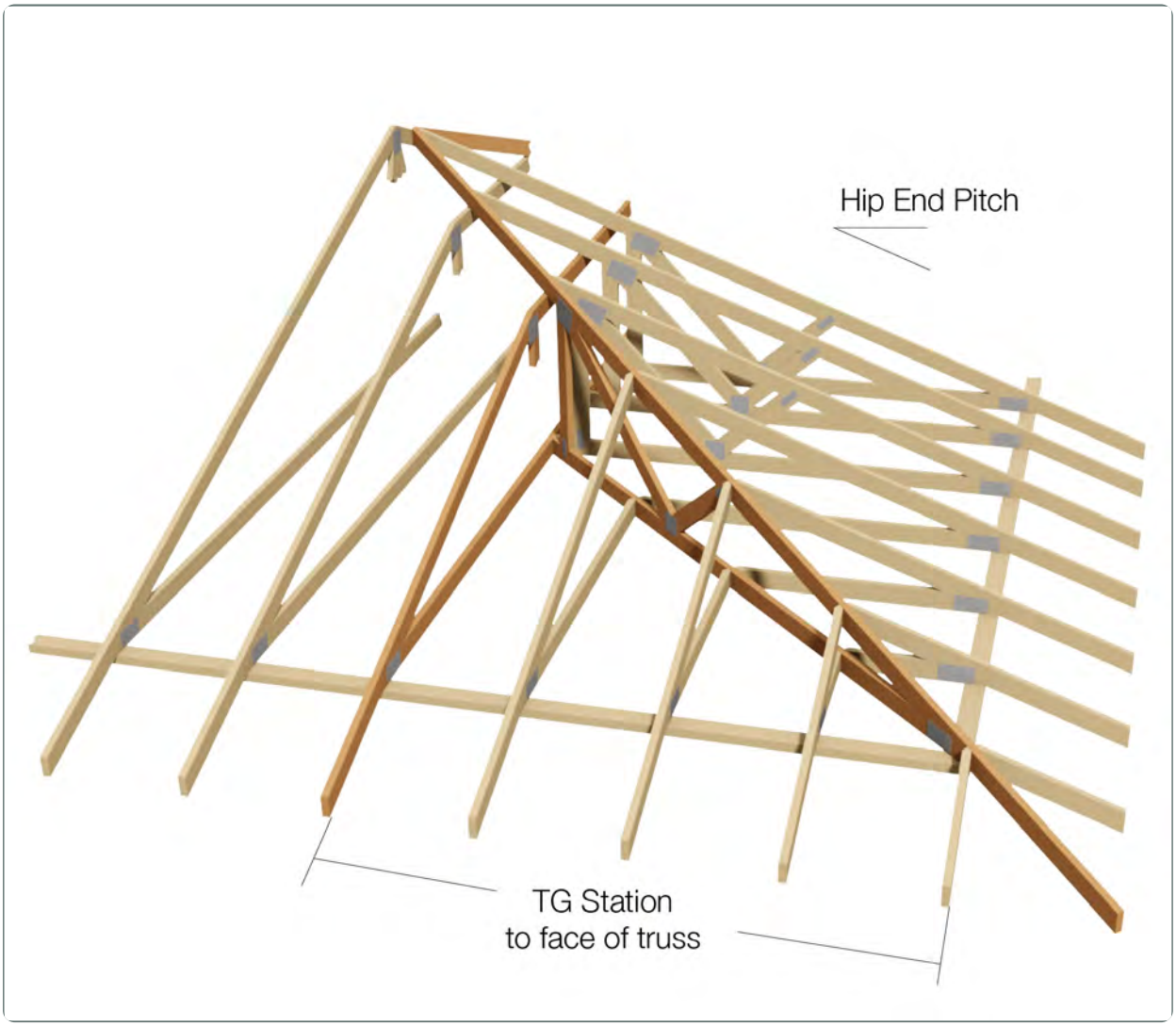


Figure C2-08-03-05

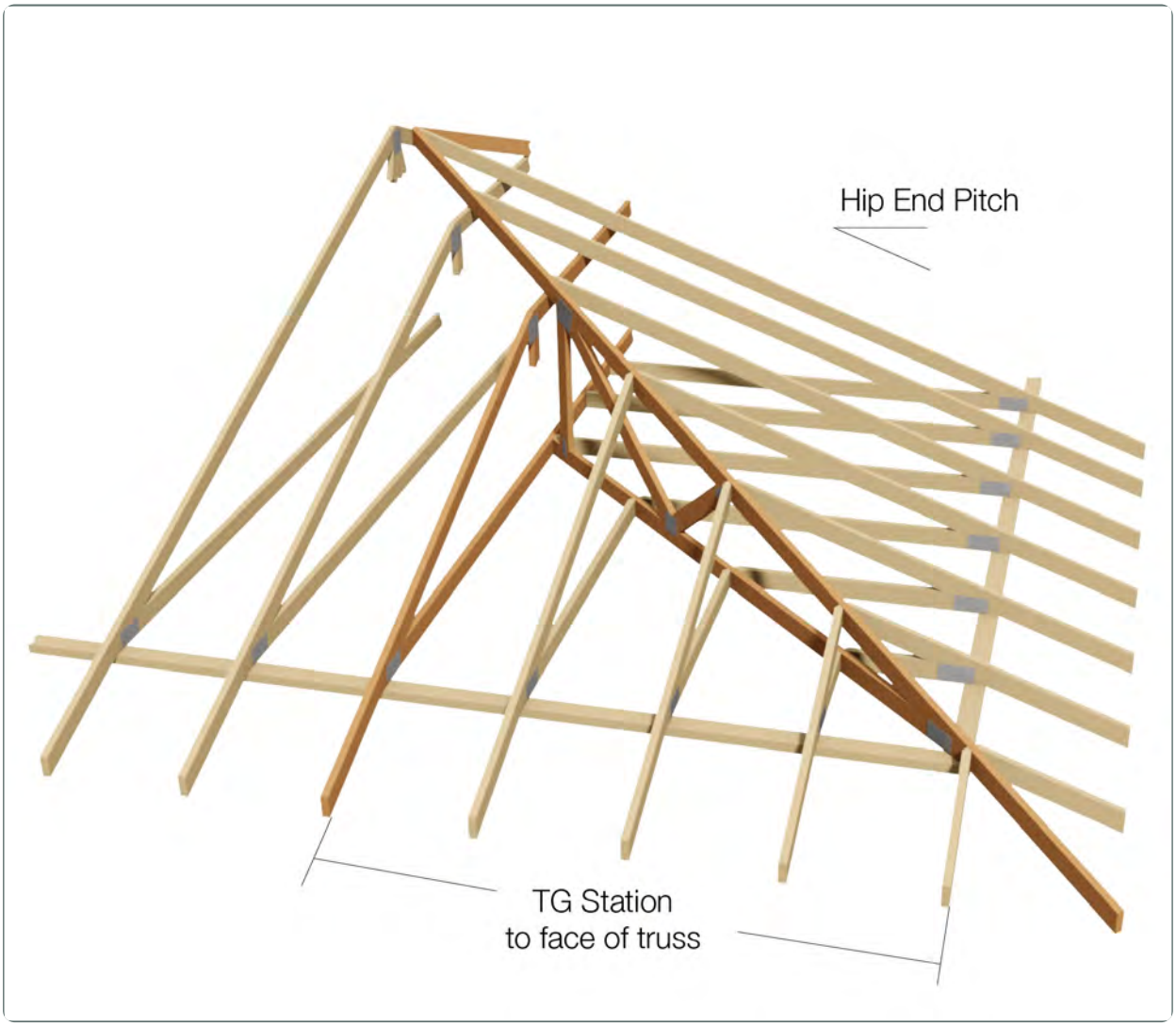


Figure C2-08-03-06

Laminated Hip Rafter

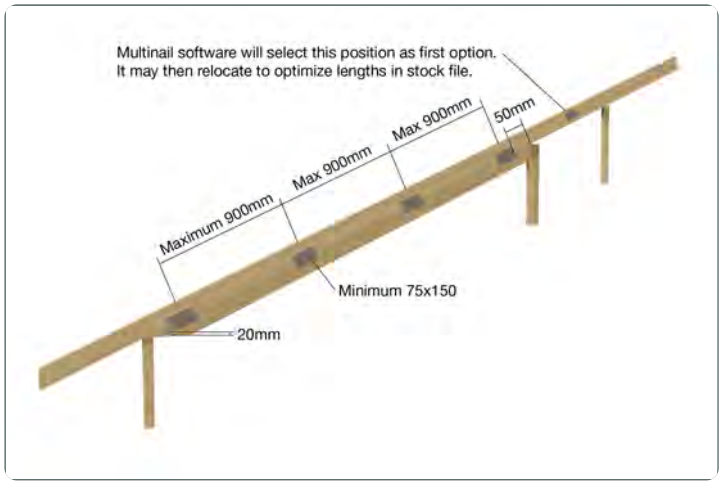


Figure C2-04-01-01

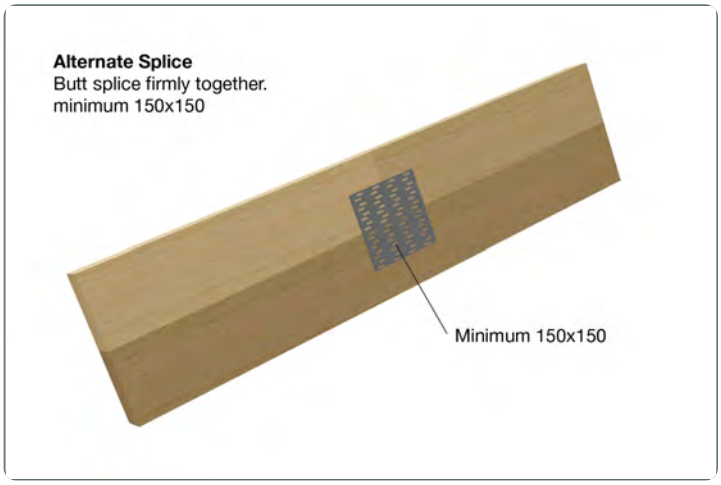


Figure C2-04-01-02

Notes:

When Laminated Hip option is selected in Multinail software, the programme will output a laminated hip when the hip rafter length, distance between the wall plate and truncated girder, exceeds 2500mm.

Standard Timber Fascia

The following detail is to be used for the support of the first jack rafter, if an overhang prop is not presented

Size of fascia as per AS1684 or as designed

Fix fascia with one Multigrip plus 2/75mm x 3.05Ø nails at each Jack Rafter.

Fix at Hip Corner 1/No14 type17 batten screw from each side. (with counter sunk head)

Note:

Maximum truss centres 1200mm

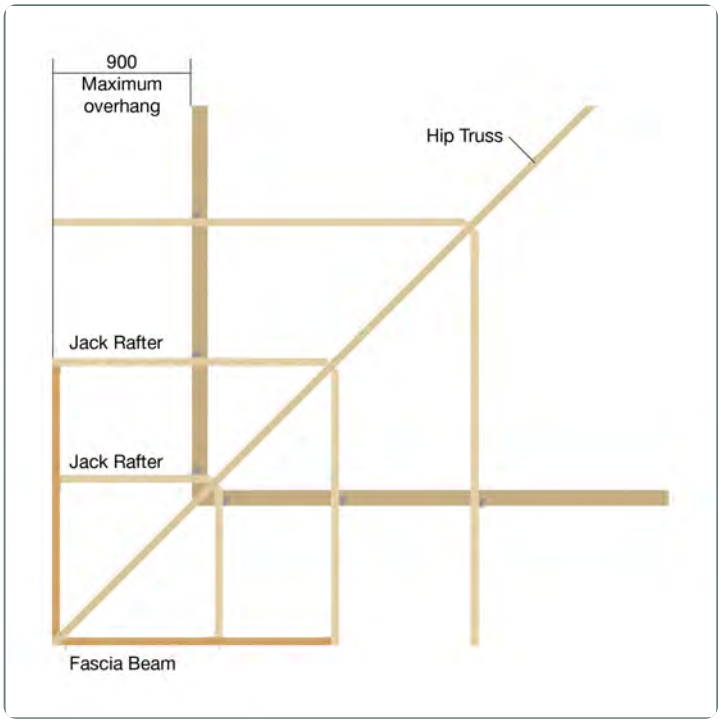


Figure C2-07-01-01

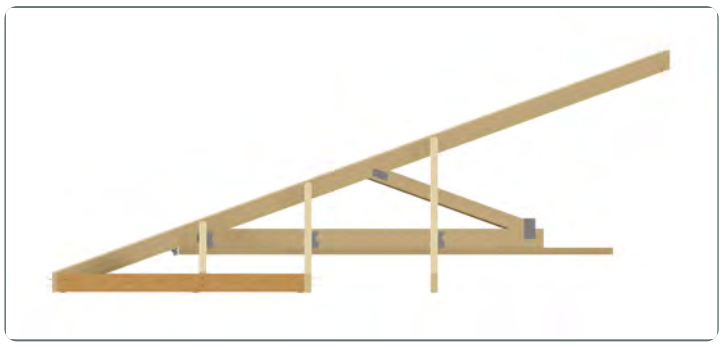


Figure C2-07-01-02

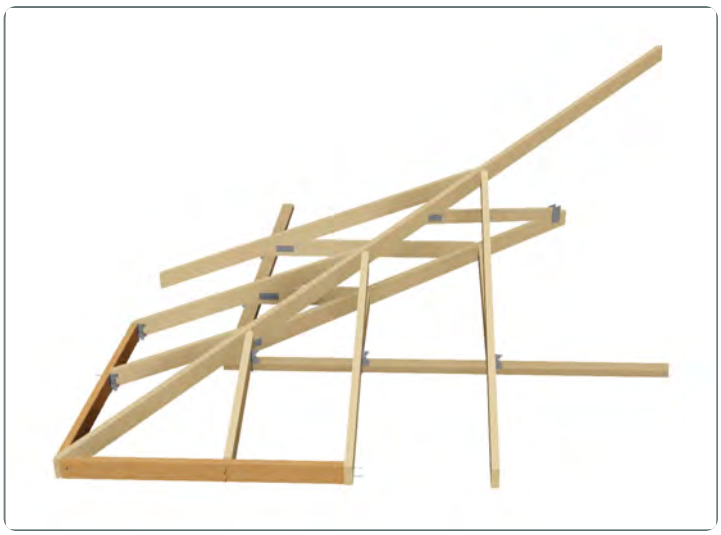


Figure C2-07-01-03

Span to depth ratios - Truncated Trusses

Truncated girder truss setback distances

Span/depth ratio:

The overall span of the truss (excluding overhangs) divided by the overall depth of the truss will provide this ratio. This ratio is set so as to restrict the camber levels of the truss and the short and long-term deflections.

The recommended Maximum Span/Depth Ratio for a concrete tile roof is 12 and for a sheet roof is 15. If the Span/Depth Ratio exceeds these values it is strongly recommended that the Truncated Girder is set back further to enable the above criteria to be maintained. However, if the truss is supported internally, the Span/Depth Ratio need only be considered for the longest span, not for the overall span.

To enable a second check on this Ratio to be made, there is a warning included in Multinail software, which highlight on the screen. The software will be halted until the user acknowledges the warning. In so doing, the program will allow the user to proceed with full knowledge of pending problems. Alternatively, the user can change the criteria to meet the recommended Span/Depth Ratio.

Also to ensure a truss has effective truss action the software limits the depth between chords to 150mm. Any less than 150mm and it becomes difficult to cut webs at these shallow angles.

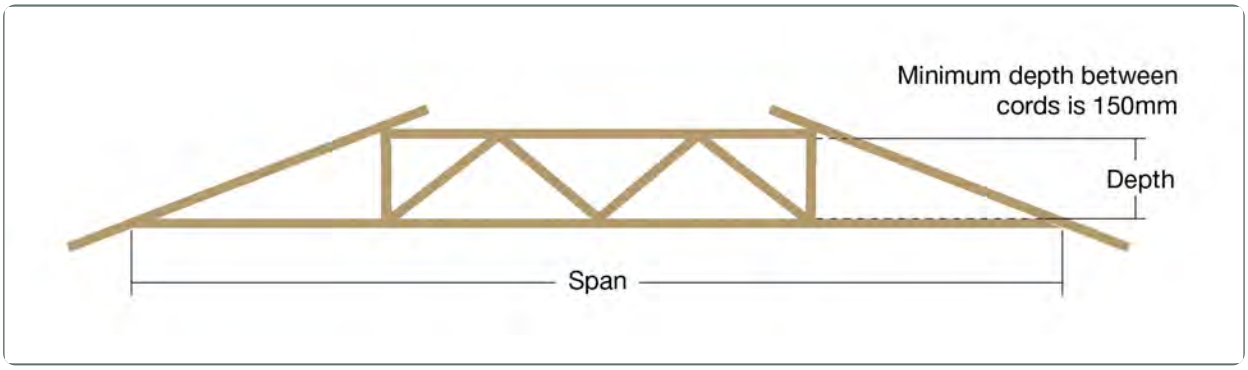


Figure C2-05-01-01

Minimum recommended truncated girder setback distances Tiled roof - span/depth ratio ≤ 12

Span	Pitch						
	12.5º	15.0º	17.5º	20.0º	22.5º	25.0º	27.5º
4000	1500	1200	1200	900	900	900	900
5000	1800	1500	1500	1200	1200	900	900
6000	2400	1800	1800	1500	1200	1200	1200
7000	2700	2100	1800	1800	1500	1200	1200
8000	3000	2400	2100	1800	1800	1500	1500
9000	3300	2700	2400	2100	1800	1800	1500
10000	3600	3000	2700	2400	2100	1800	1800
11000	4200	3300	3000	2700	2400	2100	1800
12000	4500	3600	3300	2700	2400	2100	2100
13000	4800	3900	3300	3000	2700	2400	2100
14000	5100	4200	3600	3300	2700	2400	2400
15000	5700	4500	3900	3300	3000	2700	2400
16000	6000	4800	4200	3600	3300	3000	2700
17000	6300	5100	4500	3900	3300	3000	2700
18000	6600	5400	4800	4200	3600	3300	3000
19000	6900	5700	5100	4200	3900	3300	3000
20000	7500	6000	5100	4500	3900	3600	3300

Minimum recommended truncated girder setback distances Sheet roof - span/depth ratio = 15

Span	Pitch						
	12.5º	15.0º	17.5º	20.0º	22.5º	25.0º	27.5º
4000	1200	1200	1200	1200	1200	600	600
5000	1800	1200	1200	1200	1200	1200	1200
6000	1800	1800	1200	1200	1200	1200	1200
7000	2400	1800	1800	1800	1200	1200	1200
8000	2400	2400	1800	1800	1800	1200	1200
9000	3000	2400	1800	1800	1800	1800	1200
10000	3000	2400	2400	1800	1800	1800	1800
11000	3600	3000	2400	2400	1800	1800	1800
12000	3600	3000	2400	2400	2400	1800	1800
13000	3700	3600	3000	2400	2400	1800	1800
14000	4000	3600	3000	3000	2400	2400	1800
15000	4300	3600	3000	3000	2400	2400	2400
16000	4600	3800	3600	3000	3000	2400	2400
17000	4800	4000	3600	3000	3000	2400	2400
18000	5100	4200	3600	3600	3000	3000	2400
19000	5400	4500	3800	3600	3000	3000	2400
20000	5700	4700	4000	3600	3600	3000	3000

Exploded view - Wailing plate to dutch hip girder

Legend

1. Top Chord of Dutch Hip Girder.
2. Waling Plate of Dutch Hip Girder.
3. Hole same diameter as specified Bolt # 4.
4. Specified Bolt.
5. Refer to Washer Chart as per C2-8.
6. Nut to suit bolt # 4.

Note:

Retighten all bolts at completion of contract and again three months later or end of maintenance period, especially in the case where unseasoned timber is used.

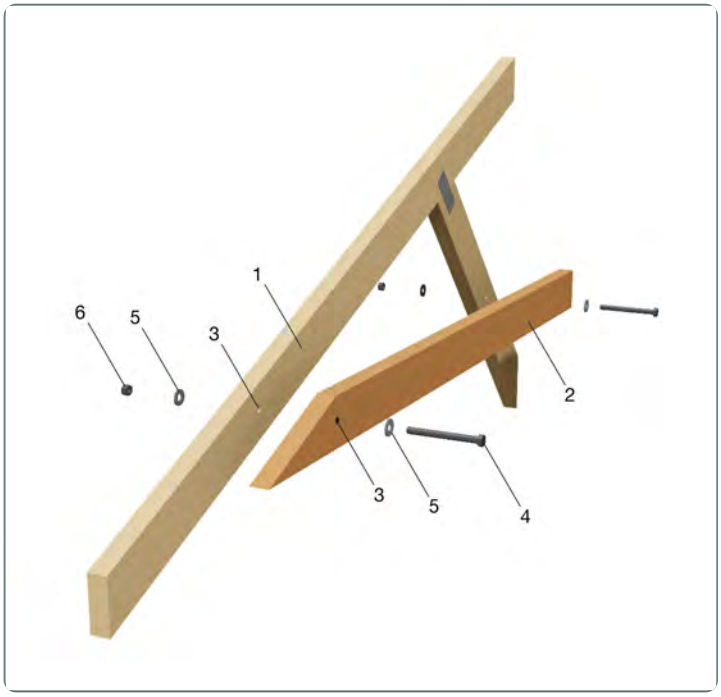


Figure C2-03-02-01

Waling plate fixing details to dutch hip girders

The recommendations for Waling Plate depth and fixing methods (in this technical sheet) have been determined based on the following criteria:

- Maximum Dutch Dip girder station 3600mm.
- Maximum roof pitch 35 degrees.
- Maximum truss centres 1200mm.
- Jack truss overhang plus cantilever not to exceed jack truss back span.
- Girder and waling plate to be designed using Multinail Software with a web layout similar to that selected from the table below.
- Minimum waling plate thickness to be 35mm.

Truss Web Layout	Maximum Truss Span
Queenpost	5000
A Type	8500
B Type	12000
C Type	16000

Notes:

The fixing method of the waling plate to the dutch hip girder will generally determine the waling plate depth. Refer to Tables, 1, 2, 3 or 4 to select the waling plate depth and fixing detail.

- The truss chords MUST be a minimum of 90mm deep and webs a minimum of 70mm deep UNLESS noted otherwise in the following fixing recommendations.
- Joint groups to be JD4/J3 for both waling plate and truss members.
- Engineered fixings may be individually designed for other specific cases.
- For complex roof layout please refer to Technical Manual C2-03-03

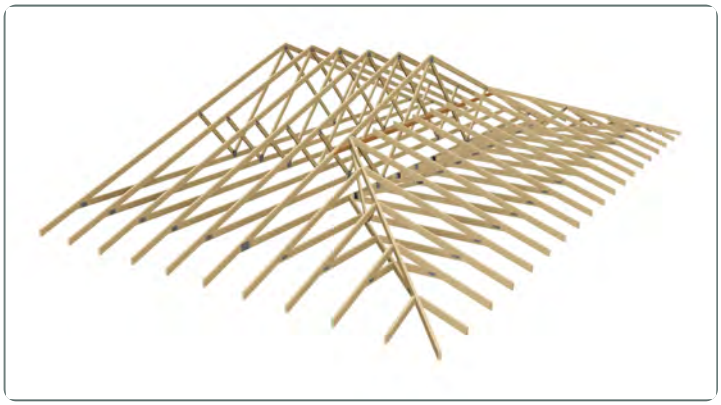


Figure C2-03-01-01

TABLE 1: Wind speed N1, N2 ,N3

DHG station (mm)	Steel sheet roof		Concrete tile roof	
	Waling plate depth	Fixing to chords and webs	Waling plate depth	Fixing to chords and webs
1800	90	3 Nails 1/MNGT 1/MNBT 1/M10	90	3 Nails 1/MNGT 1/MNBT 1/M10
2400	120 90 90	4 Nails 1/MNGT 1/MNBT 1/M10	120 120 120 90	4 Nails 2/MNGT 2/MNBT 1/M12
3000	120 120 90 90	4 Nails 2/MNGT 1/MNBT 1/M10	140 120 140 140	3/MNGT 2/MNBT 2/M12 1/M16
3600	120 120 90	2/MNGT 2/MNBT 1/M12	140	3/MNBT 2/M12

TABLE 2: Wind speed N4, C1

DHG station (mm)	Steel sheet roof		Concrete tile roof	
	Waling plate depth	Fixing to chords and webs	Waling plate depth	Fixing to chords and webs
1800	90	1/MNGT 1/MNBT 1/M10	90	3 Nails 1/MNGT 1/MNBT 1/M10
2400	120 120 90	2/MNGT 2/MNBT 1/M12	120 120 90	2/MNGT 2/MNBT 1/M12
3000	120 120 90	2/MNGT 1/MNBT 1/M12	140 120 140 140	3/MNGT 2/MNBT 2/M12 1/M16
3600	140	3/MNGT 3/MNBT 2/M12	140	3/MNBT 2/M12

TABLE 3: Wind speed C2

DHG station (mm)	Steel sheet roof		Concrete tile roof	
	Waling plate depth	Fixing to chords and webs	Waling plate depth	Fixing to chords and webs
1800	120 90 90	2/MNGT 1/MNBT 1/M10	90	1/MNGT 1/MNBT 1/M10
2400	120 120 140	2/MNGT 2/MNBT 2/M12	120 120 90	2/MNGT 2/MNBT 1/M12
3000	140	3/MNGT 3/MNBT 2/M12	140 120 140 140	3/MNGT 2/MNBT 2/M12 1/M16
3600	140	2/M12	140	3/MNBT 2/M12

TABLE 4: Wind speed C3

DHG station (mm)	Steel sheet roof		Concrete tile roof	
	Waling plate depth	Fixing to chords and webs	Waling plate depth	Fixing to chords and webs
1800	120 120 90	2/MNGT 2/MNBT 1/M10	90	1/MNGT 1/MNBT 1/M10
2400	140	3/MNGT 3/MNBT 2/M12	140	3/MNGT 3/MNBT 2/M12
3000	190	3/M12	140	2/M12
3600	190	3/M12 2/M16	190	3/M12 2/M16

Legend

MNGT Multinail Green Tip Screw

MNBT Multinail Black Tip Screw

M10 10Ø Bolt

M12 12Ø Bolt

M16 16Ø Bolt

Waling plate fixed with 3/75mm x 3.05 Ø nails per member.

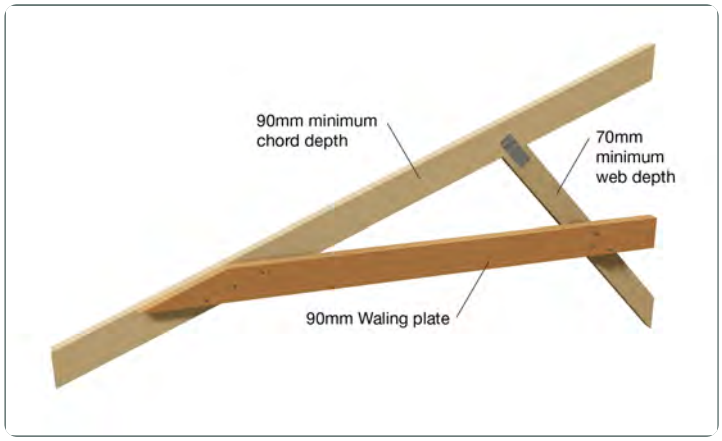


Figure C2-03-01-02

Waling plate fixed with 6/75mm x 3.05 Ø nails per member.

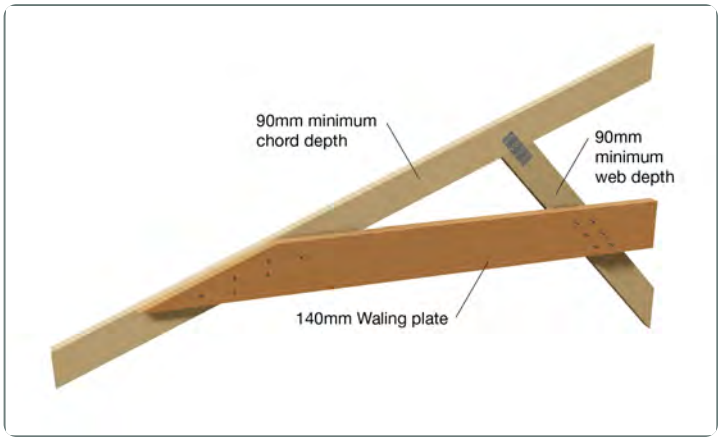


Figure C2-03-01-03

Waling plate fixed with 4/75mm x 3.05 Ø nails per member.

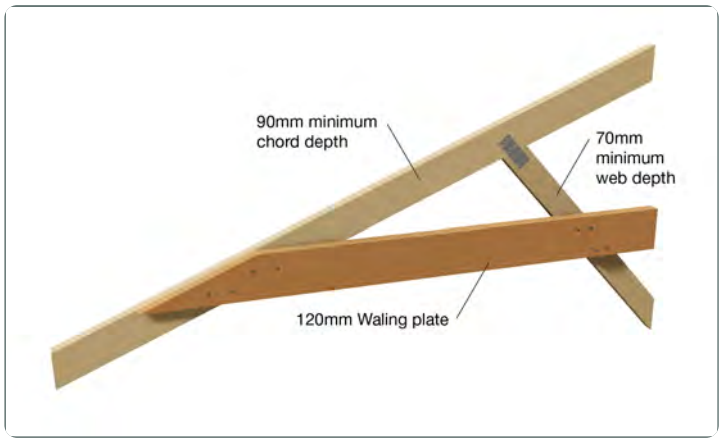


Figure C2-03-01-04

Waling plate fixed with one bolt per member.

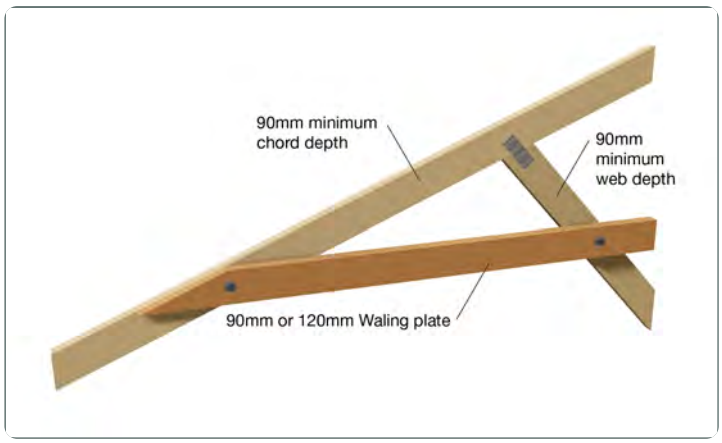


Figure C2-03-01-05

Waling plate fixed with two bolt per member.

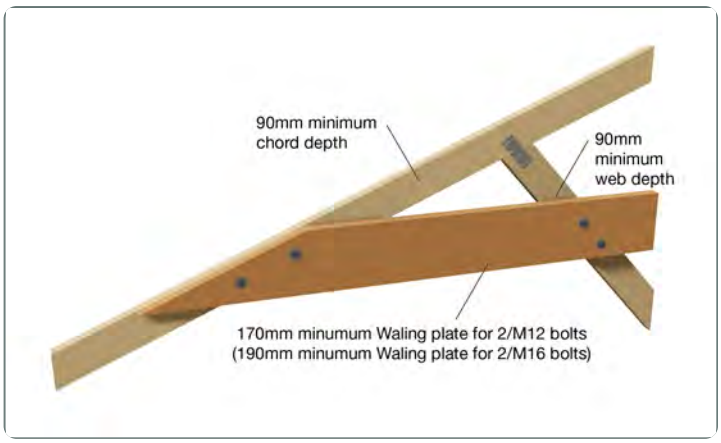


Figure C2-03-01-06

Washers Required For Bolts As Per AS1720.1				
Bolt diameter	Thickness	Circular Washer	Square Washer	Edge Distance
M10	2.5mm	45mm	40mm	40mm
M12	3.0mm	55mm	50mm	50mm
M16	4.0mm	65mm	57mm	65mm

2/MNGT or 2/MNBT with 90mm web and 90mm Waling plate

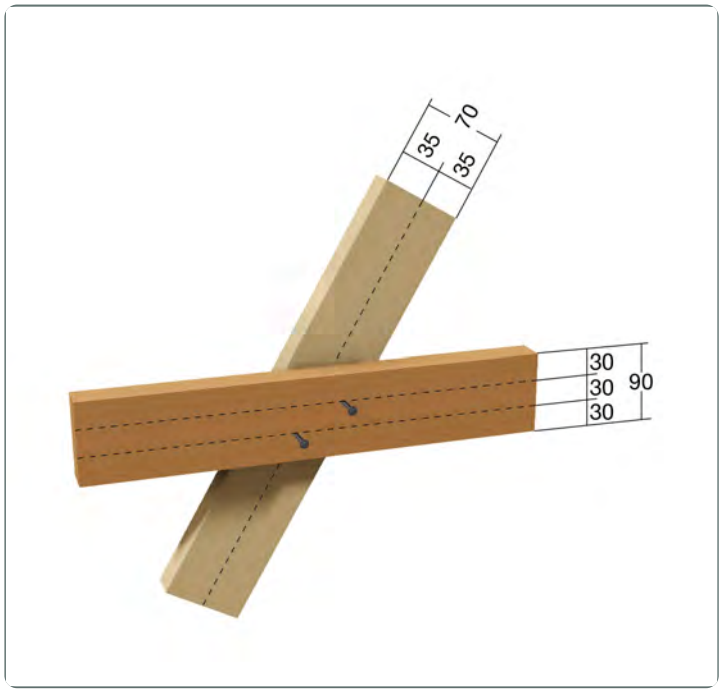


Figure C2-03-01-07

2/MNGT or 2/MNBT with 70mm web and 120mm Waling plate

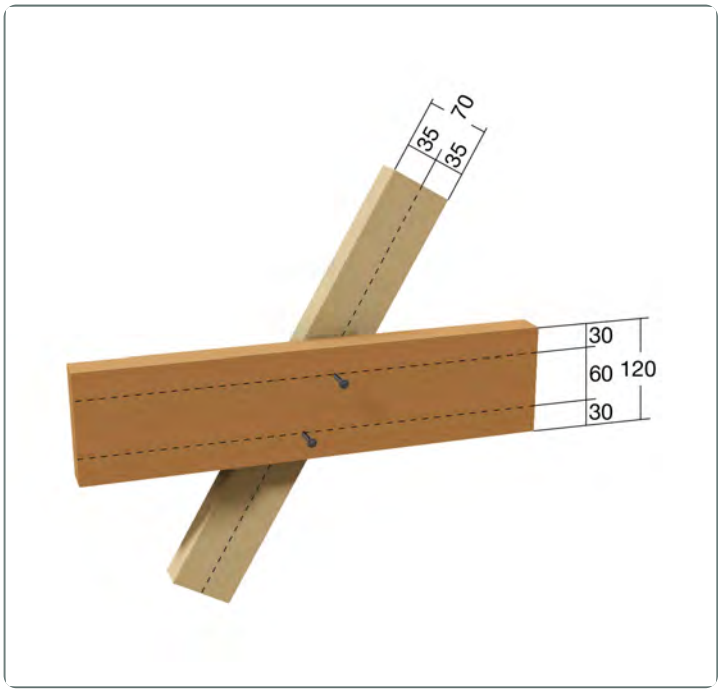


Figure C2-03-01-08

3/MNGT or 3/MNBT with 70mm web and 140mm Waling plate

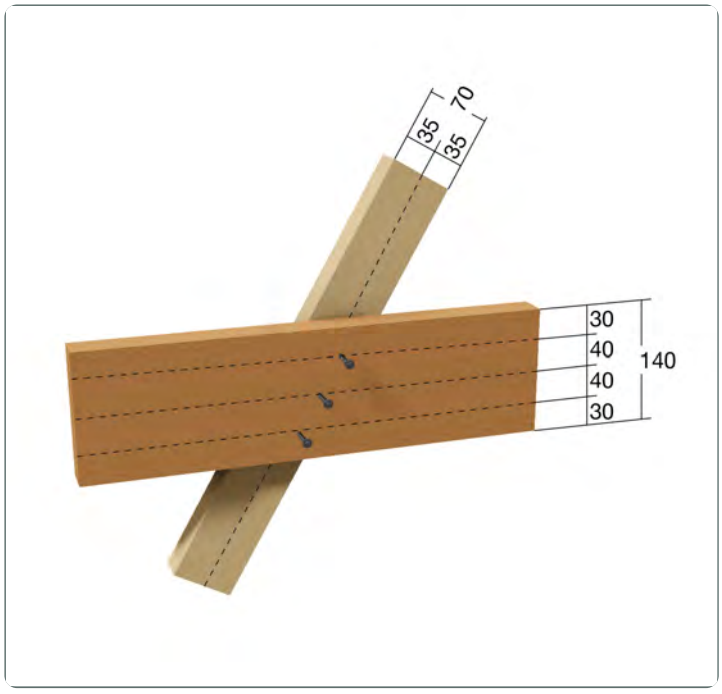


Figure C2-03-01-09

2/MNGT or 2/MNBT 120mm Waling plate

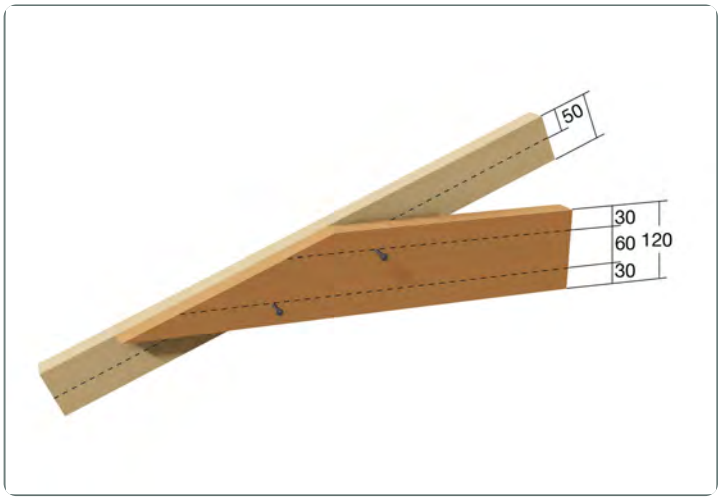
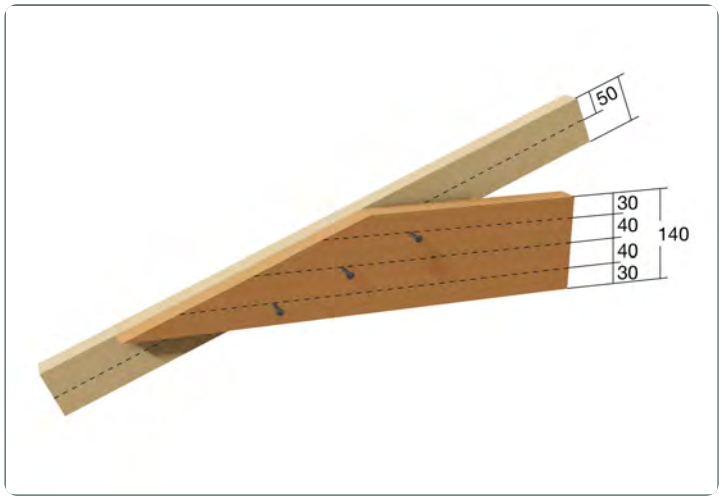


Figure C2-03-01-10

3/MNGT or 3/MNBT 140mm Waling plate



	Easy fix screws D=5.6mm	Batten screws D=6.3 mm
End distance 10D	56mm	63mm
Edge distance 5D	28mm	32mm
Spacing along grain 10D	56mm	63mm
Spacing across grain 3D	17mm	19mm

Figure C2-03-01-11

Multinail Hub - Waling Plate Size and Fixing Details to Dutch Hip Girder

27 May 2020 Multinail Australia

Waling Plate Size and Fixing Details to Dutch Hip Girder

Waling plate size and fixing instructions

These instructions can be used for the size and fixing of waling plates for Dutch Hip Girder (DHG) trusses designed through Complex Editor.

Step 1 -

Referring to the DHG truss cutting sheet, add the first two waling plate panel lengths together for use in Equation 1. (Note: if the truss is not symmetrical the first two panel lengths from both ends of the waling plate need to be checked and the larger of the two adopted).

Step 2 -

From the DHG truss cutting sheet, take note of the largest waling plate panel length between any two fixing points for use in Equation 2.

Step 3 -

Determine the largest value from either Equation 1 or Equation 2.

Step 4 -

Using the higher value from step 3, refer to the appropriate table (1,2 or 3) to determine the preferred fixing of the Waling Plate at each intersecting Top Chord and web.

Step 5 -

Refer to Table 4 to select the size the depth of the waling plate and set the depth of webs.

Determine the higher of the two equations:

Equation 1 = $STN^2/3$ + STN x (length of first two panels)/4

Equation 2 = STN x (length of longest panels)/2

Note:

Panel lengths in Meters (m)

STN = DHG Truss Station, in meters (m) eg. 1800station = 1.8m

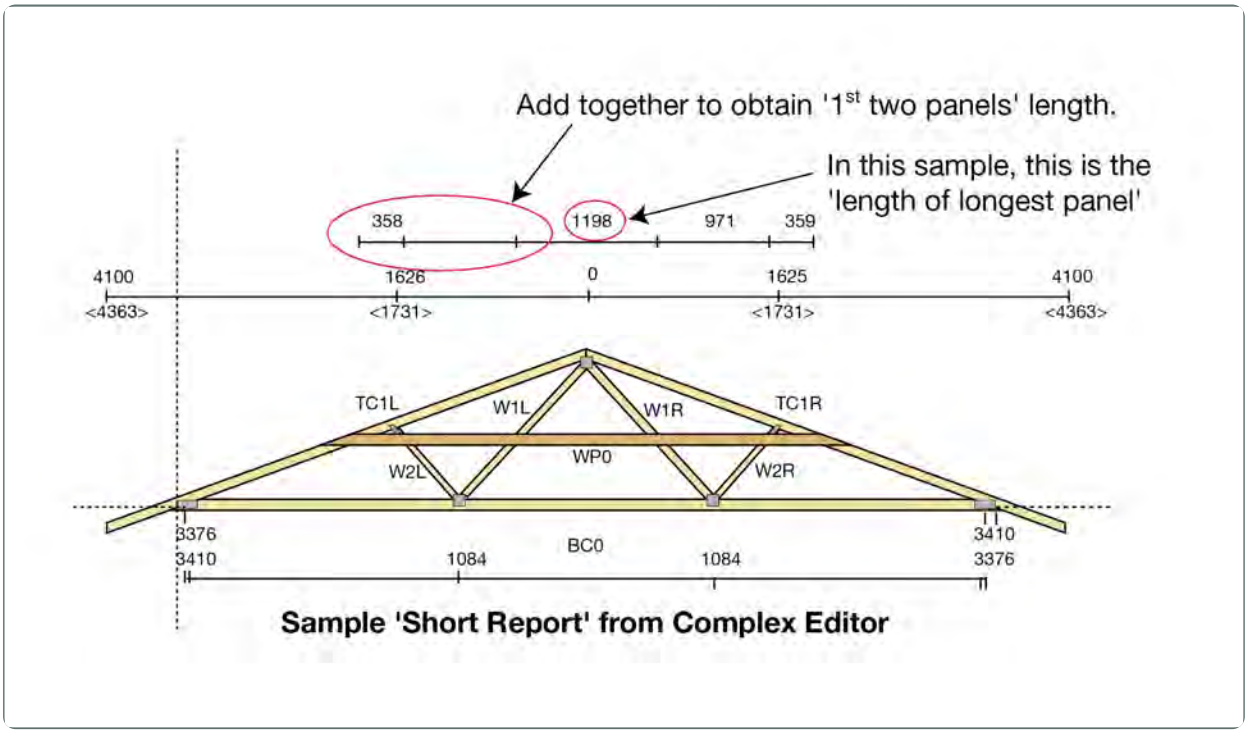


Figure C2-03-03-01

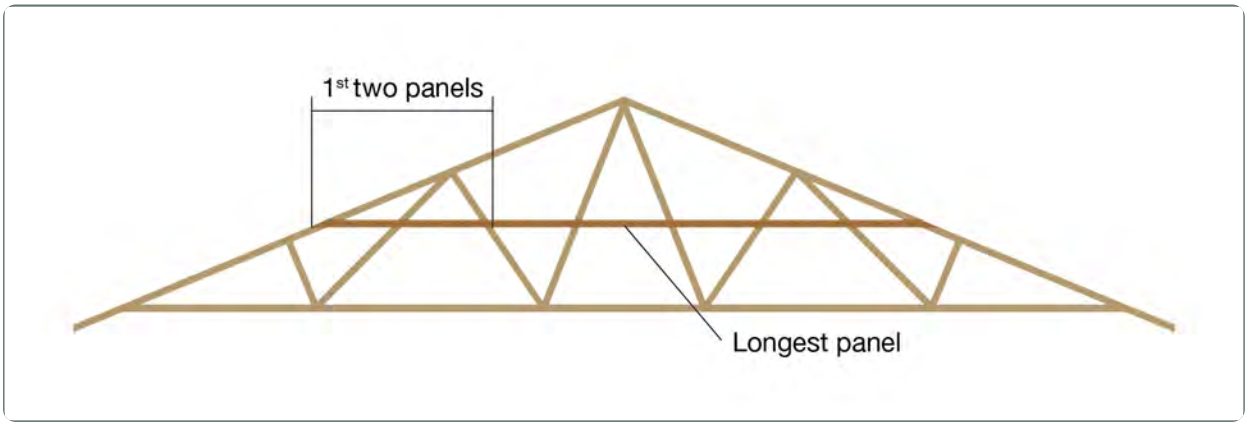


Figure C2-03-03-03

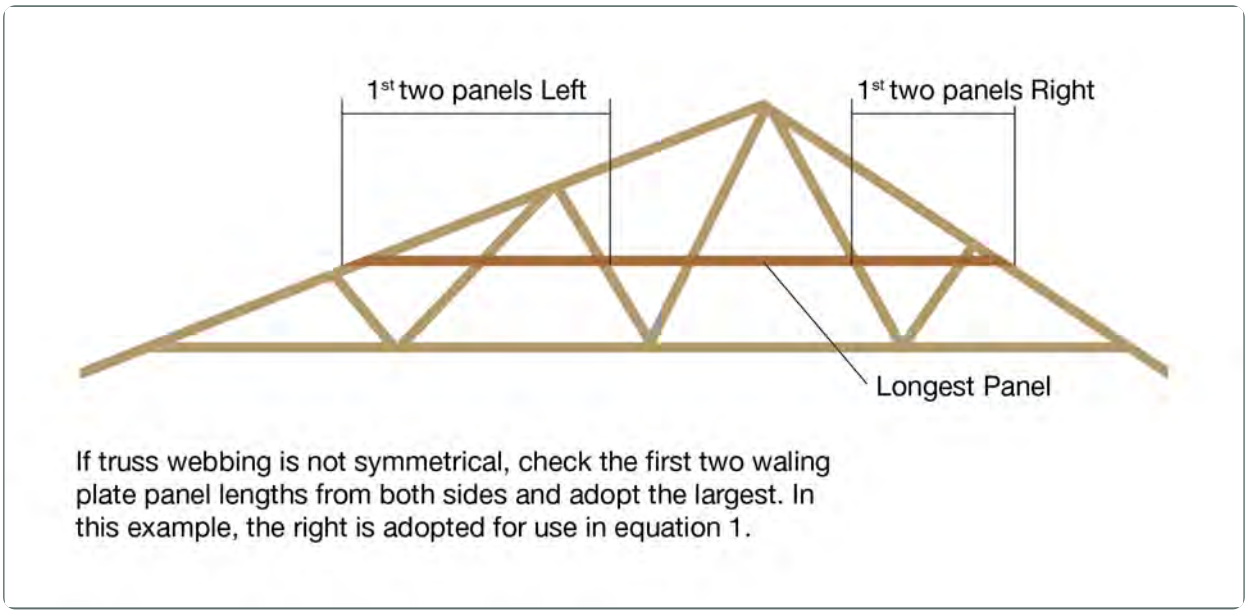


Figure C2-03-03-04

Table 1: Sheet Roof. Wind Classification N1/N3

Larger of Equations	J2	J3	JD3	JD4	JD5
1.00	1M10 1MNGT 3 Nails	1M10 2MNGT 3 Nails	1M10 1MNGT 3 Nails	1M10 2MNGT 3 Nails	1M10 2MNGT 4 Nails
1.25	1M10 2MNGT 3 Nails	1M10 2MNGT 3 Nails	1M10 2MNGT 3 Nails	1M10 2MNGT 3 Nails	1M10 3MNGT 4 Nails
1.50	1M10 2MNGT 3 Nails	1M10 2MNGT 3 Nails	1M10 2MNGT 3 Nails	1M10 2MNGT 3 Nails	1M10 3MNGT 4 Nails
1.75	1M10 2MNGT 3 Nails	1M10 2MNGT 4 Nails	1M10 2MNGT 3 Nails	1M10 2MNGT 4 Nails	1M10 3MNGT 4 Nails
2.00	1M10 2MNGT 3 Nails	1M10 2MNGT 4 Nails	1M10 2MNGT 3 Nails	1M10 2MNGT 4 Nails	1M10 3MNGT 5 Nails
2.25	1M10 2MNGT 3 Nails	1M10 2MNGT 5 Nails	1M10 2MNGT 3 Nails	1M10 2MNGT 5 Nails	1M10 3MNGT 5 Nails
2.50	1M10 2MNGT 3 Nails	1M10 2MNGT 5 Nails	1M10 2MNGT 4 Nails	1M10 2MNGT 5 Nails	1M10 3MNGT 6 Nails
2.75	1M10 2MNGT 4 Nails	1M10 2MNGT 5 Nails	1M10 2MNGT 4 Nails	1M10 2MNGT 5 Nails	1M12 3MNGT 6 Nails
3.00	1M10 2MNGT 4 Nails	1M10 3MNGT 6 Nails	1M10 2MNGT 4 Nails	1M10 3MNGT 6 Nails	1M12 3MNGT 7 Nails
3.25	1M10 2MNGT 5 Nails	1M10 3MNGT 6 Nails	1M10 2MNGT 5 Nails	1M10 3MNGT 6 Nails	1M16 4MNGT 7 Nails
3.50	1M10 2MNGT 5 Nails	1M10 3MNGT 7 Nails	1M10 2MNGT 5 Nails	1M10 3MNGT 7 Nails	1M16 4MNGT 8 Nails
3.75	1M10 2MNGT 5 Nails	1M12 3MNGT 7 Nails	1M10 2MNGT 5 Nails	1M12 3MNGT 7 Nails	1M16 4MNGT 9 Nails
4.00	1M10 3MNGT 6 Nails	1M12 3MNGT 8 Nails	1M10 3MNGT 6 Nails	1M12 3MNGT 8 Nails	1M16 4MNGT 9 Nails
4.25	1M10 3MNGT 6 Nails	1M12 3MNGT 8 Nails	1M10 3MNGT 6 Nails	1M12 3MNGT 8 Nails	1M16 5MNGT
4.50	1M10 3MNGT 6 Nails	1M16 4MNGT 9 Nails	1M10 3MNGT 6 Nails	1M12 4MNGT 9 Nails	2M10 5MNGT
4.75	1M10 3MNGT 7 Nails	1M16 4MNGT	1M10 3MNGT 7 Nails	1M16 4MNGT	2M10 5MNGT
5.00	1M10 3MNGT 7 Nails	1M16 4MNGT	1M10 3MNGT 7 Nails	1M16 4MNGT	2M10 5MNGT
5.25	1M10 3MNGT 7 Nails	1M16 4MNGT	1M12 3MNGT 7 Nails	1M16 4MNGT	2M10 6MNGT
5.50	1M10 3MNGT 8 Nails	1M16 4MNGT	1M12 3MNGT 8 Nails	1M16 4MNGT	2M12 6MNGT
5.75	1M12 3MNGT 8 Nails	2M10 4MNGT	1M12 3MNGT 8 Nails	1M16 4MNGT	2M12 6MNGT
6.00	1M12 3MNGT 8 Nails	2M10 5MNGT	1M12 3MNGT 8 Nails	2M10 5MNGT	2M12 6MNGT
6.25	1M12 4MNGT 8 Nails	2M10 5MNGT	1M16 4MNGT 8 Nails	2M10 5MNGT	2M12 6MNGT
6.50	1M12 4MNGT 9 Nails	2M10 5MNGT	1M16 4MNGT 9 Nails	2M10 5MNGT	2M12 6MNGT

Legend

MNGT Multinail Green Tip Screw

Nail 75mm x 3.05Ø nails

M10 10Ø Bolt

M12 12Ø Bolt

M16 16Ø Bolt

Table 2: Sheet Roof. Wind Classification N4/C1

Larger of Equations	J2	J3	JD3	JD4	JD5
1.00	1M10 2MNGT 3 Nails	1M10 2MNGT 4 Nails	1M10 2MNGT 3 Nails	1M10 2MNGT 4 Nails	1M10 3MNGT 4 Nails
1.25	1M10 2MNGT 3 Nails	1M10 2MNGT 5 Nails	1M10 2MNGT 3 Nails	1M10 2MNGT 5 Nails	1M12 3MNGT 5 Nails
1.50	1M10 2MNGT 4 Nails	1M10 3MNGT 5 Nails	1M10 2MNGT 4 Nails	1M10 3MNGT 5 Nails	1M16 4MNGT 6 Nails
1.75	1M10 2MNGT 5 Nails	1M12 3MNGT 6 Nails	1M10 2MNGT 5 Nails	1M12 3MNGT 6 Nails	1M16 4MNGT
2.00	1M10 3MNGT 5 Nails	1M16 4MNGT 7 Nails	1M10 3MNGT 5 Nails	1M16 4MNGT 7 Nails	2M10 5MNGT
2.25	1M10 3MNGT 6 Nails	1M16 4MNGT	1M12 3MNGT 6 Nails	1M16 4MNGT	2M10 5MNGT

Larger of Equations	J2	J3	JD3	JD4	JD5
2.50	1M12 3MNGT 6 Nails	2M10 4MNGT	1M12 3MNGT 6 Nails	1M16 4MNGT	2M10 6MNGT
2.75	1M12 4MNGT 7 Nails	2M10 5MNGT	1M12 4MNGT 7 Nails	2M10 5MNGT	2M12
3.00	1M16 4MNGT	2M10 5MNGT	1M16 4MNGT	2M10 5MNGT	2M12
3.25	1M16 4MNGT	2M12 6MNGT	1M16 4MNGT	2M12 6MNGT	2M16
3.50	1M16 4MNGT	2M10 6MNGT	1M16 4MNGT	2M12 6MNGT	2M16
3.75	1M16 5MNGT	2M16 6MNGT	1M10 5MNGT	2M12 6MNGT	2M16
4.00	2M10 5MNGT	2M16	2M10 5MNGT	2M16	
4.25	2M10 5MNGT	2M16	2M10 5MNGT	2M16	
4.50	2M10 6MNGT	2M16	2M12 6MNGT	2M16	
4.75	2M10 6MNGT		2M12 6MNGT	2M16	
5.00	2M12 6MNGT		2M12 6MNGT	2M16	
5.25	2M12 6MNGT		2M12 6MNGT		
5.50	2M12		2M16		
5.75	2M12		2M16		
6.00	2M16		2M16		
6.25	2M16		2M16		
6.50	2M16		2M16		

Legend

MNGT Multinail Green Tip Screw

Nail 75mm x 3.05Ø nails

M10 10Ø Bolt

M12 12Ø Bolt

M16 16Ø Bolt

Table 3: Tiled Roof. Wind Classification N1/C1

Larger of Equations	J2	J3	JD3	JD4	JD5
1.00	1M10 2MNGT 3 Nails	1M10 2MNGT 4 Nails	1M10 2MNGT 3 Nails	1M10 2MNGT 4 Nails	1M10 3MNGT 4 Nails
1.25	1M10 2MNGT 3 Nails	1M10 3MNGT 4 Nails	1M10 2MNGT 3 Nails	1M10 3MNGT 4 Nails	1M12 4MNGT 5 Nails
1.50	1M10 2MNGT 4 Nails	1M12 3MNGT 5 Nails	1M10 2MNGT 4 Nails	1M10 3MNGT 5 Nails	1M16 4MNGT 6 Nails
1.75	1M10 3MNGT 4 Nails	1M16 3MNGT 6 Nails	1M10 3MNGT 4 Nails	1M12 3MNGT 6 Nails	1M16 5MNGT
2.00	1M10 3MNGT 5 Nails	1M16 4MNGT	1M12 3MNGT 5 Nails	1M16 4MNGT	2M10 5MNGT
2.25	1M10 3MNGT 6 Nails	2M10 4MNGT	1M12 3MNGT 6 Nails	1M16 4MNGT	2M12 6MNGT
2.50	1M12 4MNGT 6 Nails	2M10 5MNGT	1M16 4MNGT 6 Nails	2M10 5MNGT	2M12
2.75	1M12 4MNGT	2M10 5MNGT	1M16 4MNGT	2M10 5MNGT	2M16
3.00	1M16 4MNGT	2M12 6MNGT	1M16 4MNGT	2M10 6MNGT	2M16
3.25	1M16 4MNGT	2M12 6MNGT	1M16 4MNGT	2M12 6MNGT	2M16
3.50	1M16 5MNGT	2M16	2M10 5MNGT	2M12	2M16
3.75	2M10 5MNGT	2M16	2M10 5MNGT	2M16	

Larger of Equations	J2	J3	JD3	JD4	JD5
4.00	2M10 5MNGT	2M16	2M12 5MNGT	2M16	
4.25	2M10 6MNGT	2M16	2M12 6MNGT	2M16	
4.50	2M12 6MNGT		2M12 6MNGT	2M16	
4.75	2M12 6MNGT		2M12 6MNGT	2M16	
5.00	2M12		2M16		
5.25	2M12		2M16		
5.50	2M16		2M16		
5.75	2M16		2M16		
6.00	2M16		2M16		
6.25	2M16		2M16		
6.50	2M16				

Legend

MNGT Multinail Green Tip Screw

Nail 75mm x 3.05Ø nails

M10 10Ø Bolt

M12 12Ø Bolt

M16 16Ø Bolt