

RESIDENTIAL



June 2008

GANG-NAIL[®] ROOF TRUSS SYSTEM (incorporating Attic Trusses) Residential Manual

**GANG-NAIL Roof Truss Systems are available only through GANG-NAIL
Fabricators throughout New Zealand**

Refer to the MiTek New Zealand website for up to date GANG-NAIL Roof Truss System
information and a GANG-NAIL Fabricator listing

www.mitek.nz.co.nz



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History of GANG-NAIL Trusses

The GANG-NAIL Timber Connector System was introduced into New Zealand in the 1960's.

The system revolutionised house construction by prefabricating roof trusses, eliminating the need for expensive on-site "stick construction". Light, efficient timber trusses are factory manufactured using the GANG-NAIL toothed metal plate connector, enabling quicker construction schedules, better quality control and reduced construction cost.

Wall frames, portal frames, floor trusses (the Posi-STRUT™ system) structural GANGLAM beams and FLITCH Beams are also prefabricated using the GANG-NAIL System.

The GANG-NAIL System allows the principles of structural engineering to be applied to house building. The science of timber engineering came of age on the introduction of the GANG-NAIL System.

The GANG-NAIL Truss System is based on the GANG-NAIL Timber Connector, which is a steel plate with multiple spikes or teeth projecting from one face. The connectors are pressed into the timber using hydraulic or pneumatic presses, causing the teeth to embed in the timber. Timber elements can be joined together with strength and ease to make trusses and other structural timber components.

The ease of installation and effectiveness as a timber connector make GANG-NAIL Connectors ideal for the prefabrication industry where speed and reliability are paramount. The name "GANG-NAIL Truss" has now become synonymous with quality prefabricated timber roof trusses.

GANG-NAIL is a registered trade name of MiTek New Zealand Ltd.

Where MiTek fits in

MiTek New Zealand Ltd is the 'Home of GANG-NAIL Building Systems' but does not manufacture trusses. We manufacture the steel connector plates and ancillary items that are supplied to a select national network of licensed truss fabricators. Each of these companies has been appointed as an accredited GANG-NAIL Fabricator because of their high standards of manufacture and for their professionalism within the building components industry.

The supply of connectors is only a small part of MiTek's activities. It is the technical support provided to accredited GANG-NAIL Fabricators, which is the true strength of the GANG-NAIL System.

Technical support starts with supply of engineered and tested connector plate design and includes MiTek's commitment to research and development both within New Zealand and internationally.

MiTek has further revolutionised the industry with the MiTek 20/20™ software. This leading edge software has been developed by MiTek and is used by GANG-NAIL Fabricators to design, detail and cost truss and wall frame systems. The truss and wall frame programs minimise detailing errors and enable cutting information to be directly downloaded to computer controlled saws.

Further support is provided by the MiTek Design Office. Architects, builders and fabricators utilise the engineering expertise for technical advice, feasibility studies, preliminary designs, and fully certified designs.

Today it is this innovative and extensive technical support which maintains MiTek's leadership in roof truss and associated building component manufacture.

Training for detailers on MiTek 20/20™ software is carried out by MiTek personnel with certificates of competency awarded after rigorous examinations.

Advantages of GANG-NAIL Roof and Floor Trusses

Prefabricated timber roof and floor truss systems offer greater design freedom, guaranteed strength and improved project cost control.

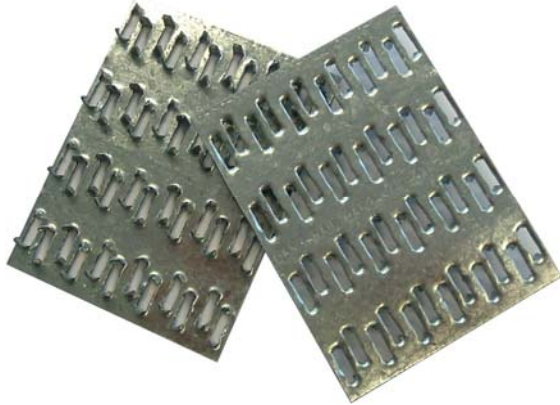
Almost any shape of truss is practicable and economical. Intricate roof surfaces and ceiling profiles can be achieved, and trusses can be designed for a variety of roof loadings – ranging from cyclonic winds to snow loads – with spans up to 30 metres. Visually, the bold patterns of exposed structural truss elements can be used to architectural advantage.

GANG-NAIL Trusses meet the New Zealand Standards for Timber Structures, wind loads, live loads and dead loads. The timber specified for each truss element is described by both size and stress grade. GANG-NAIL Connector Plate sizes specified for each truss joint are determined by the forces being transmitted and the nail-holding capacity of the type of timber in the truss.

Prefabricated trusses are cost-effective – trusses use the inherent strength of timber efficiently and factory automation brings the economies of scale to even the shortest production run. Site labour and supervision are greatly reduced and the effects of the weather on construction timelines are minimised.

GANG-NAIL Connectors

The GANG-NAIL Connector Plate is a steel plate with a collection of spikes or teeth projecting from the face (see photo). When pressed into timber members a strong joint is formed. The same size plate is used on both faces of the joint.



GANG-NAIL Trade Name

“GANG-NAIL” is a registered trade name of MiTek New Zealand Ltd. This is written with capitals, and used as follows: “GANG-NAIL Connectors”, “GANG-NAIL Components”, “GANG-NAIL Trusses” and the “GANG-NAIL System”. They are not referred to as “Gang-Nails”. This is to comply with N.Z. Trademark law.

Connector Types

MiTek has developed three ranges of connector plates. These are:

1. GNQ for general residential applications. It is manufactured from 1.0mm thick, G300 grade steel, (galv. spec Z275) steel strip.
2. GN16 for heavy duty applications. Manufactured from 1.6mm, G300 grade steel, (galv. spec Z275) steel strip.
3. GS12 stainless steel for high corrosive environments. Manufactured from 1.2mm 316 grade stainless steel.

Durability of Connectors

Consult MiTek New Zealand Ltd for advice.

Timber Specification

GANG-NAIL Trusses may be fabricated from Radiata Pine, Douglas Fir, or equivalent strength species. The minimum timber grade of top and bottom chords is MSG/VSG 8. The maximum moisture content is 16% at time of manufacture. A higher grade timber may be specified in the design, with provisions for LVL members.

Timber treatment as specified in the New Zealand Building Code. Note that H3 treatment and higher may affect the durability of the connector plates. Consult MiTek New Zealand Ltd for advice.

Manufacturing

GANG-NAIL Trusses are manufactured by accredited GANG-NAIL Fabricators. The fabricator generally designs the trusses using MiTek 20/20™ proprietary truss design software supplied by MiTek New Zealand Ltd. The MiTek Design Office is on hand to assist architects, builders and fabricators with engineering.

Quality Control

The GANG-NAIL Fabricator is responsible for the supply of the timber, proper use of the software to design the trusses, and manufacture of the trusses. Roof trusses are to specific design and are outside NZS 3604.

Camber

Camber is built into the trusses to allow for the normal deflection in the loaded condition.

Truss Bracing

The correct bracing of GANG-NAIL Trusses is essential. In most residential applications the bracing is to NZS 3604. In other cases refer to the truss designer, or request the LUMBERLOK® Roof Bracing Specification brochure.

Design Information

The purpose of this section is to enable house designers to draw truss layouts and to choose truss sizes for preliminary designs. It is the responsibility of GANG-NAIL Fabricators to provide a final 'Buildable' layout design and Producer Statement for the truss system with the use of computer aided design and selection charts.

MiTek New Zealand Ltd manufactures and distributes connector plates and fixing systems to accredited GANG-NAIL Fabricators throughout New Zealand (See the Fabricator List at www.mitek.nz.co.nz).

Backup service is provided by MiTek New Zealand Ltd in the form of truss designs, computer systems, engineering and fabricator equipment.

Timber	Radiata Pine OR Douglas Fir	MSG 8, or higher - Top and bottom chords VSG 8, or higher - Top and bottom chords
	OR	Equivalent Grade of other species – refer MiTek New Zealand Ltd.
	Moisture Content	Dry – MiTek New Zealand Ltd recommend moisture content of 16% or less at time of fabrication.
Design Loads		Refer NZS 3604 and AS/NZS 1170
	Dead Loads Live Loads Floor Loads Wind Loads Snow Loads	Heavy Roof – 0.65kPa (eg Concrete tile) Light Roof – 0.25kPa (eg Colorsteel) Ceiling – 0.20kPa (eg 10mm GIB® board) These include the weight of trusses, battens, purlins and associated framing. 0.25kPa for roof 1.5kPa to Attic truss bottom chords Low to Very High Wind Zones 0.5kPa
References		NZS 3603 NZS 3604 AS/NZS 1170
Truss Joints		The GANG-NAIL Connector Plates are pressed into both sides at each joint. The standard connectors (GNQ and GN16) are manufactured from galvanised steel. For high corrosion environments connectors are available in 316 grade stainless steel (GS12).

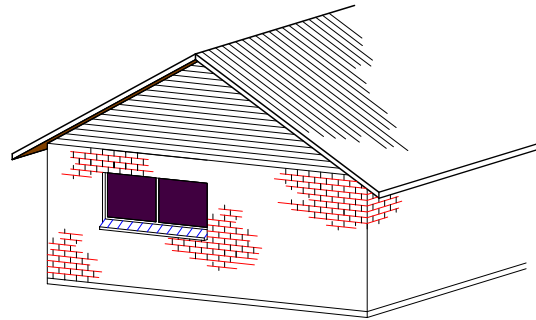
Roof Shape

The GANG-NAIL Truss System allows for a wide range of roof shapes. Some of the more popular standard shapes are:

- ◆ Gable Roof
- ◆ Hip Roof
- ◆ Dutch Hip Roof
- ◆ T Shape Roof
- ◆ T Shape Roof with Radial Hip End
- ◆ L Shape Roof
- ◆ Boomerang Roof

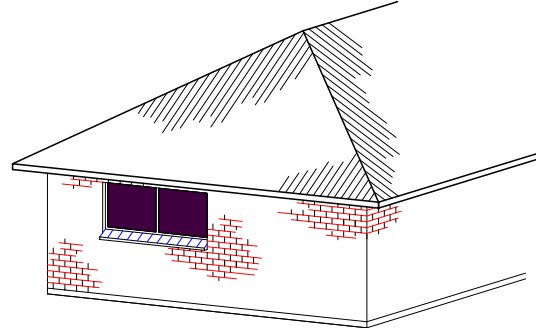
Gable Roof

A Gable Roof is a roof shape with equal roof pitches meeting at a ridge point that is located in the middle of the building.



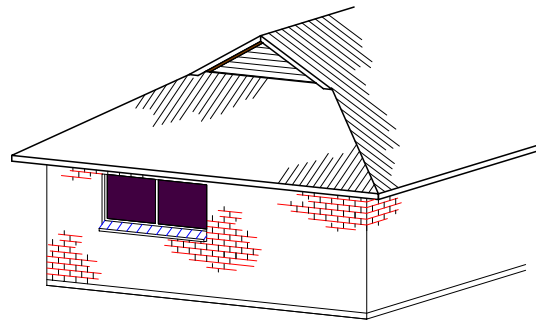
Hip Roof

A Hip Roof runs from each corner of the roof to the ridge point.

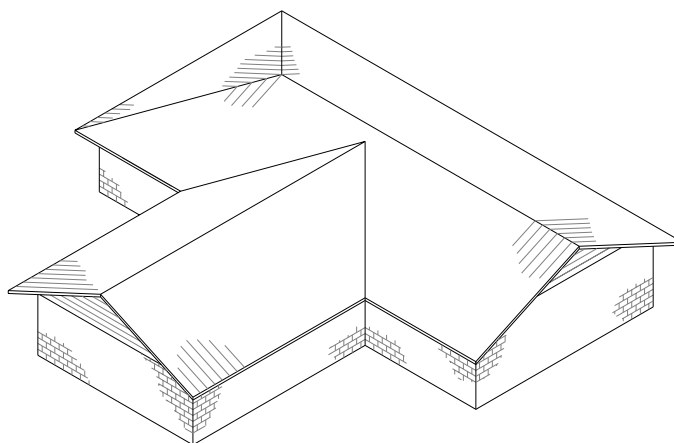


Dutch Hip Roof (Or Semi Gable)

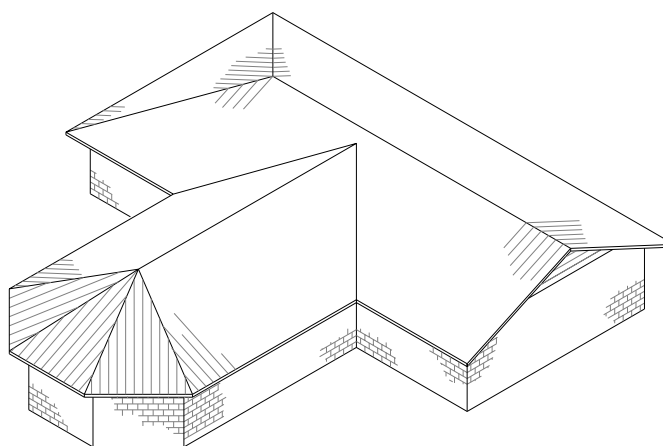
A Dutch Hip Roof is similar to a Hip Roof except that there is a small gable section located between the end of the building and the normal apex of the hip end near the end of the ridge.



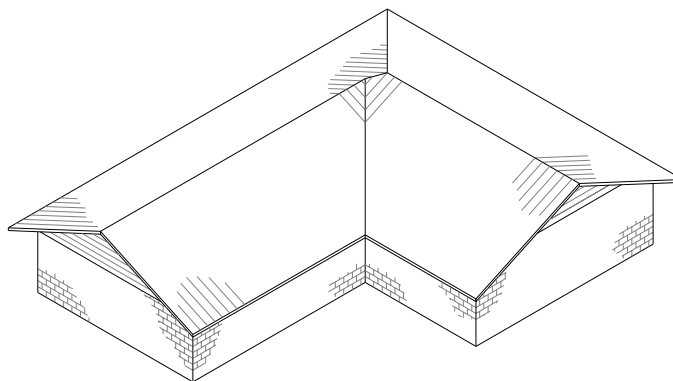
T Shape Roof



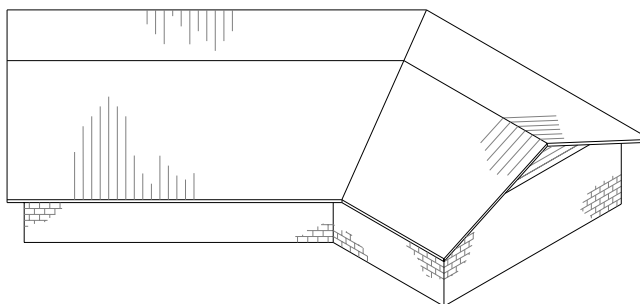
T Shape Roof with Radial Hip End



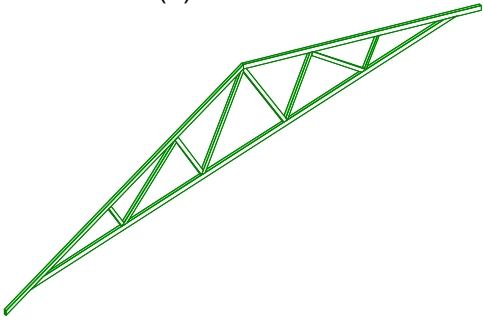
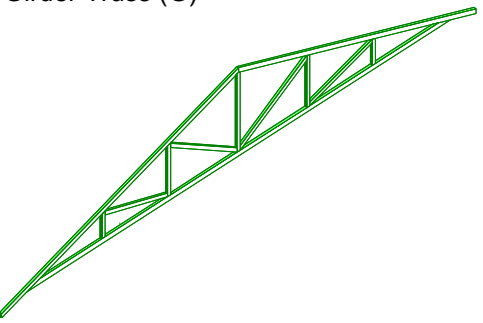
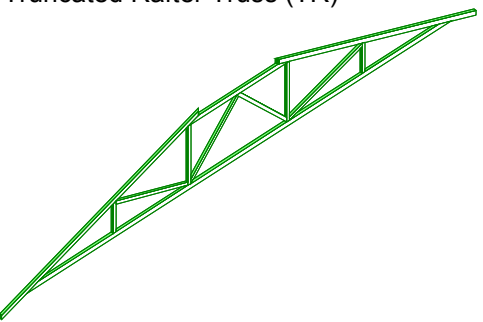
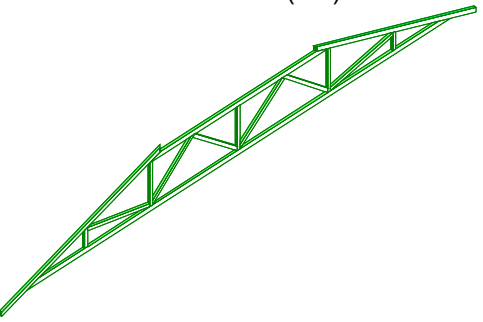
L Shape Roof



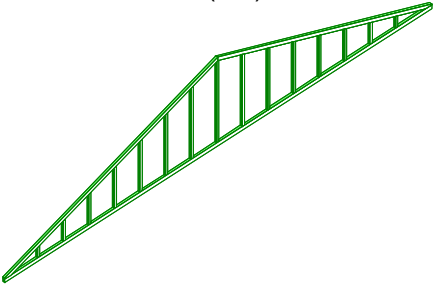
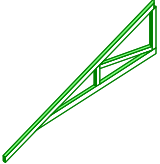
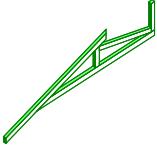
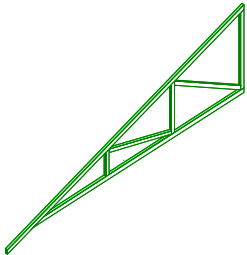
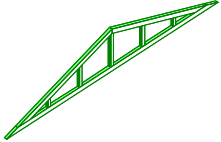
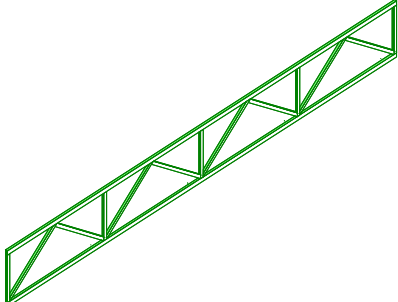
Boomerang Roof



Truss Types and Coding

<p>◆ Rafter Truss (T)</p> 	<p>Truss supporting roofing battens or roofing purlins in conventional construction.</p>
<p>◆ Girder Truss (G)</p> 	<p>Truss designed to support one or more other trusses.</p>
<p>◆ Truncated Rafter Truss (TR)</p> 	<p>Standard Rafter Truss with top cut short and apex removed.</p>
<p>◆ Truncated Girder Truss (TG)</p> 	<p>Standard Girder Truss with top cut short and apex removed. Supports hip end jack trusses.</p>

Truss Types and Coding

<p>◆ Gable End Truss (GE)</p> 	<p>Standard triangular shaped truss for the end of a gable roof. Truss is usually non-structural, being supported by the end wall and has vertical webs to suit the cladding.</p>
<p>◆ Jack Truss (J)</p> 	<p>Truss supported by Girder Truss.</p>
<p>◆ Truncated Jack Truss (TJ)</p> 	<p>Standard Jack Truss with top cut short and apex removed.</p>
<p>◆ Half Truss (H)</p> 	<p>“Half” truss supporting roofing battens or roofing purlins.</p>
<p>◆ Saddle or Valley Trusses (S or V)</p> 	<p>Trusses at the intersection of two roof surfaces over an internal corner of a building.</p>
<p>◆ Flat Truss (Parallel Chord Truss)</p> 	<p>Truss with top and bottom chords parallel.</p>

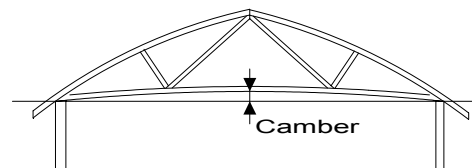
Camber

Camber is a slight curve in the fabricated shape of a truss such that when it deflects it will end up producing a flat ceiling and a straight roof. Some deflection occurs as the truss is loaded, more deflection will occur over a period of time due to the “creep”.

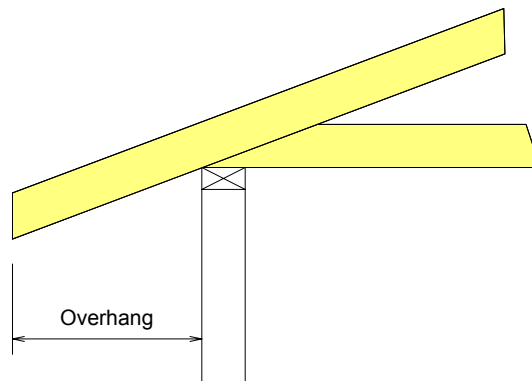
As the chords are subjected to a distributed load, they will deflect in between panel points, in addition to the whole truss as a unit deflecting downwards. This local deflection of the chords is called “panel deflection” and is compensated for by keeping the deflection within acceptable limits.

Too much camber in a truss can cause problems lining the ceiling. To avoid this, the camber can be limited through using stiffer trusses or load bearing internal walls.

Note that trusses **should not** be fixed to internal walls that have not been designed as load bearing. Supporting trusses where a support has not been designed can cause over-stressing of the truss and rippled ceilings.



Overhang



Overhangs are currently designed with a live load of 1.0 kN at the end. (AS/NZS 1170 proposes a higher live load)

This allows for a person to stand at the end of the overhang to fix the last purlin or to attach the fascia and gutter. It also allows for the continued maintenance after construction, e.g. cleaning out the gutter etc.

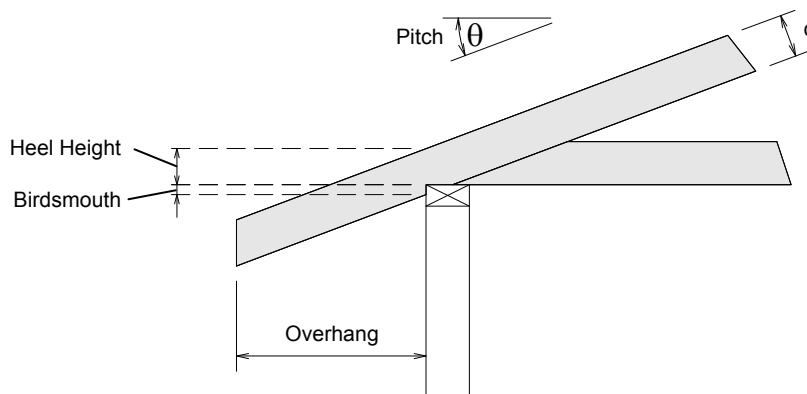
The following is a guide to the maximum overhang lengths attainable using MSG 8 timber based on an 8000 mm span truss and 20° roof pitch.

Timber Size	Max Overhang	
	Light Roof	Heavy Roof
90 x 45 MSG 8	730mm	630mm
140 x 45 MSG 8	1400mm	1160mm
90 x 35 MSG 8	540mm	530mm
140 x 35 MSG 8	1000mm	960mm

Overhangs can be increased by using higher grade timber, or doubling up (Scabbing) the top chord. Ensure that the scab member laps the existing top chord as far back as the first top chord panel point.

Heel Height

Heel height is the distance from the top of the load bearing wall to the top edge of the top chord.



The heel height can be calculated using the following:

$$\text{Heel Height} = (d / \cos \theta) - \text{Birdsmouth}$$

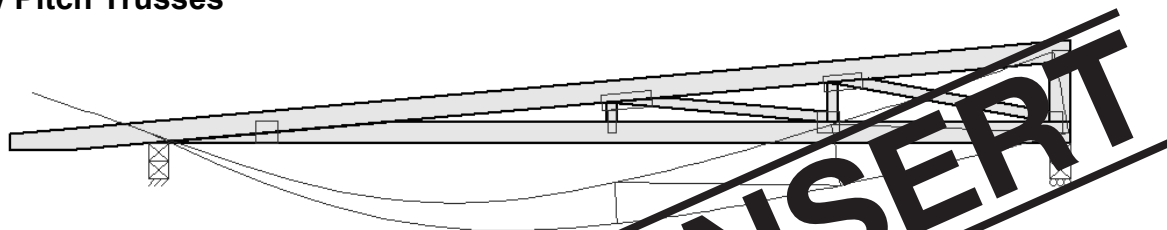
Birdsmouth

The net depth of the rafter at the notch (or birdsmouth) shall not be less than 80% of the actual depth of the rafter, nor less than 65mm as per NZS 3604:1999.

Span

The truss span is the horizontal distance between the outside faces of the external load bearing walls.

Low Pitch Trusses



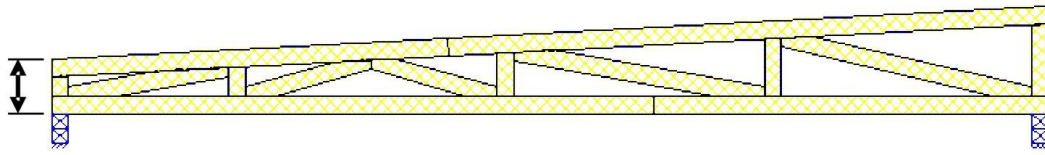
There are an increasing number of low pitch trusses being specified where a truss solution can be designed, but the camber is impossible to apply and the trusses usually deflect more than practical.

The Span / Heel Height ratio checks are introduced to prevent excessive deflection for low pitch roof trusses. The Span / Heel Height ratio gives the required minimum heel height for trusses at 900 centres.

Roof type	Roof Pitch	Min. Heel Height
Light	Less than 7.5°	Span / 25
Light	7.5° to 10°	Span / 40
Medium	Less than 12.5°	Span / 23
Heavy	Less than 15.0°	Span / 20

Example: 8000mm span truss at 9° roof pitch; Min. Heel Height = $8000 / 40 = 200\text{mm}$.
Therefore an 8000mm truss with 9° roof pitch must have at least a 200mm heel height.

Low Pitch Trusses



Heel height

There is an increasing number of low pitch trusses being specified where a truss can be designed, but the camber is impossible to apply. The trusses are usually straight when fabricated and hence will deflect more than anticipated when roofing and ceiling loads are applied.

The Span to Heel Height check is intended to prevent excessive deflection for low pitch roof trusses. Use Chart 1 to determine if the minimum heel height should be checked, and use Charts 2a & 2b to determine the minimum heel height.

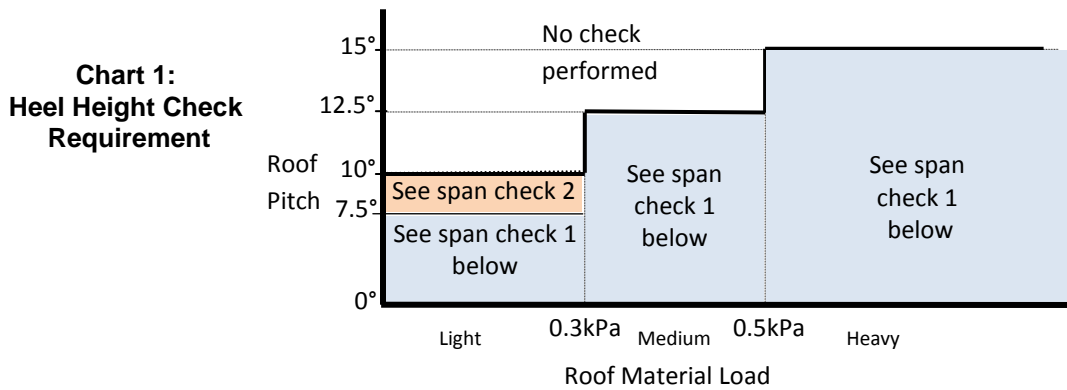


Chart 2a: For Trusses at 900 centres		
Span (mm)	Minimum Heel Height (mm)	
	Span Check 1	Span Check 2
Up to 2100	90	90
Up to 3400	140	140
Up to 4300	190	140
Up to 4600	240	140
4601 to 5600	10 + Span/20	140
Above 5600	10 + Span/20	Span/40

Chart 2b: For Trusses at 450 centres and 2 ply Trusses at 900 centres	
Span (mm)	Minimum Heel Height (mm)
	All low pitch roof types
Up to 2600	90
Up to 3900	140
Up to 5200	190
Up to 6400	240
Above 6400	Span/26.7

Examples:

- 8000mm span truss at 9° roof pitch for light roof with trusses at 900mm centres. Therefore minimum required heel height = $8000/40 = 200\text{mm}$.
- Similar to Example 1 but with 3° roof pitch. Therefore minimum required heel height = $(8000/20) + 10 = 410\text{mm}$.
- Similar to Example 2 but with trusses at 450mm centres. Therefore minimum required heel height = $8000/26.7 = 300\text{mm}$.

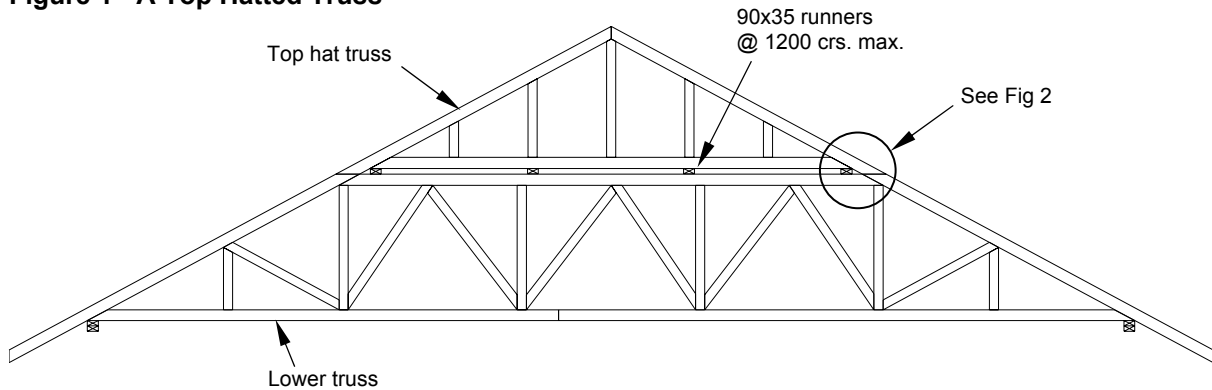
Over Height Trusses

Over height trusses can be split into two separate trusses, i.e. top hatting the truss.

A top hatted truss is a lower truncated truss with a smaller truss sitting on top, the top hat. It is also known as a piggy back truss. The lower truss is designed to carry the load, with the upper truss forming the roof shape, see Fig 1.

The trusses need to be joined together as shown in Fig 2.

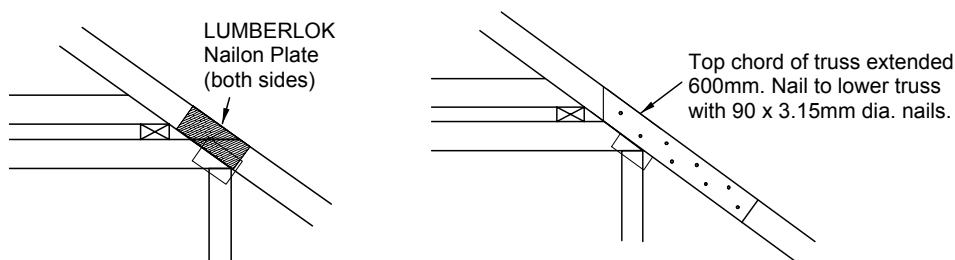
Figure 1 - A Top Hatted Truss



Restraining Truss Chords

In Fig 1 runners are shown fixed between the trusses. These are essential to ensure that the chords are restrained. Under gravity loading the top chord of a truss is in compression so unless it is restrained it has a tendency to buckle. On a standard truss, the top chord is restrained by purlins. For a top hat truss runners are required for this purpose.

Figure 2 - Two Options for Fixing Top Truss to Lower Truss

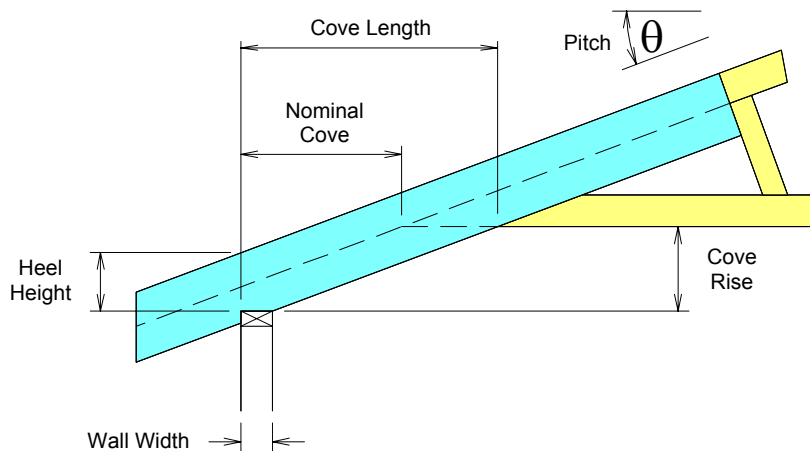


Requirements for Attic Trusses

For top hatted Attic trusses runners are generally not required as it is assumed that the ceiling battens will restrain the flat top chord. In this circumstance the two chords are fixed together with Tylok 4T10 plates at 1.0m centres.

In situations where there is no ceiling, then runners will be required.

Cove or Vaulted Truss Selection Chart



The cove dimensions can be calculated by using one the following:

$$\text{Cove Length} = (\text{Cove Rise} / \tan \theta) + \text{Wall Width}$$

$$\text{Cove Rise} = (\text{Cove Length} - \text{Wall Width}) \times \tan \theta$$

$$\text{Heel Height} = (\text{Cove Member Size} / \cos \theta) - (\text{Wall Width} \times \tan \theta)$$

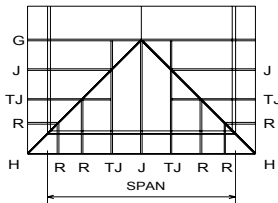
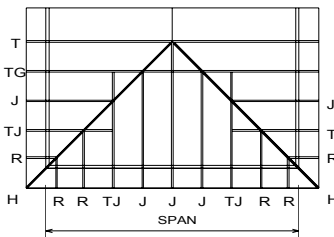
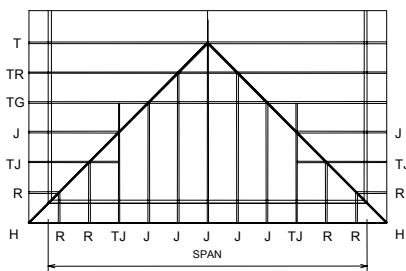
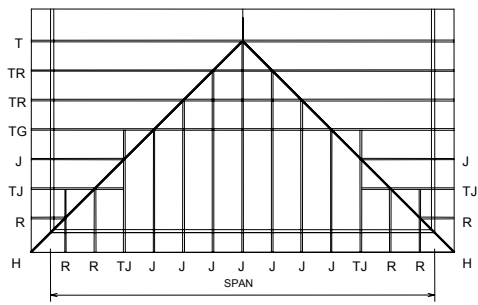
The nominal cove length is the cove length using the standard top chord size (usually 90 x 45). Typically the roof plane is fixed and the cove length increases as the cove member size increases.

Truss Span	Member Sizes	Maximum Cove Length	
		Light Roof	Heavy Roof
3 - 5m	90 x 45	150mm	N/A
	140 x 45	400mm	350mm
	190 x 45	1100mm	800mm
	240 x 45	1100mm	1100mm
	290 x 45	1200mm	1200mm
5 - 8m	90 x 45	N/A	N/A
	140 x 45	300mm	250mm
	190 x 45	650mm	400mm
	240 x 45	900mm	650mm
	290 x 45	1100mm	750mm
8 - 12m	90 x 45	N/A	N/A
	140 x 45	N/A	N/A
	190 x 45	350mm	250mm
	240 x 45	650mm	450mm
	290 x 45	800mm	600mm

Notes:

- ◆ Chart applies to roof pitch between 15° and 30°.
- ◆ Truss spacing 900mm centres.

Hip End Selection Chart

Truss Layout	Span									
	Light Roof	Heavy Roof								
<p>◆ Girder Truss At Apex</p> 	Up to 7.4m	Up to 6m								
<p>◆ One Truncated Truss Hip System</p> 	6 to 9m	5 to 8m								
<p>◆ Two Truncated Truss Hip System</p> 	8 to 11m	7 to 10m								
<p>◆ Three Truncated Truss Hip System</p> 	10 to 13m	9 to 12m								
<p>Key:</p> <table> <tr> <td>T Rafter Truss</td> <td>J Jack Truss</td> </tr> <tr> <td>G Girder Truss</td> <td>TJ Truncated Jack Truss</td> </tr> <tr> <td>TR Truncated Rafter Truss</td> <td>R Rafter</td> </tr> <tr> <td>TG Truncated Girder Truss</td> <td>H Hip Board</td> </tr> </table>			T Rafter Truss	J Jack Truss	G Girder Truss	TJ Truncated Jack Truss	TR Truncated Rafter Truss	R Rafter	TG Truncated Girder Truss	H Hip Board
T Rafter Truss	J Jack Truss									
G Girder Truss	TJ Truncated Jack Truss									
TR Truncated Rafter Truss	R Rafter									
TG Truncated Girder Truss	H Hip Board									

Notes:

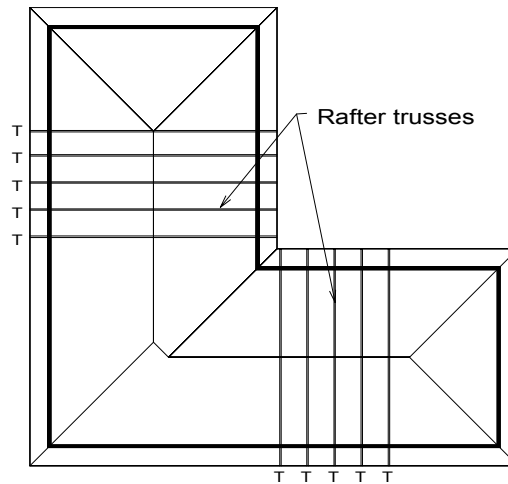
- ◆ Chart applies to roof pitch between 15° and 45°.
- ◆ Truss spacing at 900mm centres.

Truss Layouts

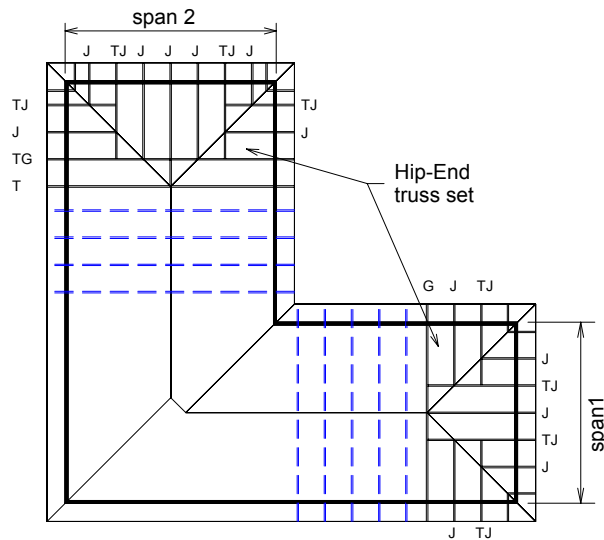
The purpose of drawing a truss layout is to:

- ◆ Check that the spans, pitches and roof loading are feasible for trusses.
- ◆ Find the load paths so that the lintels, wall framing and foundations can be designed.
- ◆ Supply a truss layout to the territorial authority for building consent.
(see www.mitek.nz for a list of GANG-NAIL Fabricators)

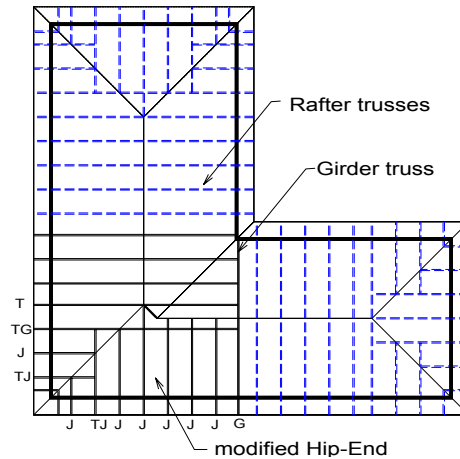
1. Draw the rafter trusses. Check that the top chord size is 90 x 45, otherwise the heel height for the job will be affected.



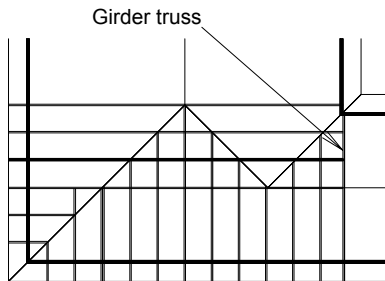
2. Select and draw trusses at hip ends. See page 14 for Hip End Selection Chart. The number of truncated trusses required depends on the span and type of roof.



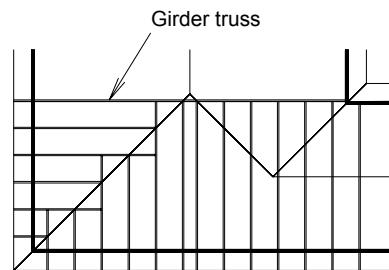
- Recognise blocks and fill in trusses. Blocks are areas that have the same roof details and hence the same truss layouts. In this case the hip end is nearly the same as the other end of the building, just slightly modified.



Note: The main girder truss normally spans across the shorter span.

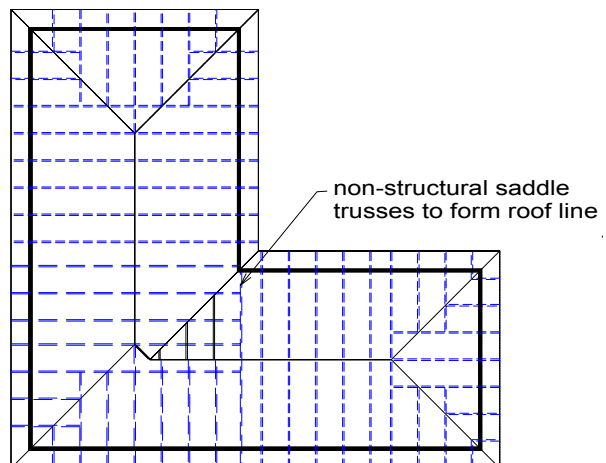


✓ RIGHT

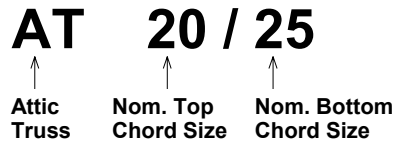


✗ WRONG

- Add saddle or valley trusses as necessary to form the roofline. These trusses are non-structural, so do not require design.



Attic Truss Coding

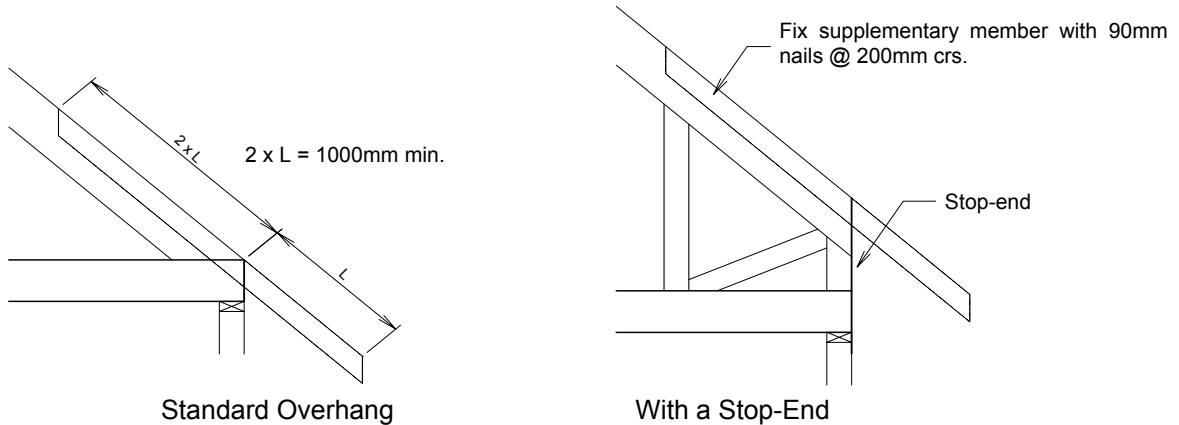


Design Criteria

- ◆ Typical roof pitch 45°
- ◆ Truss spacing at 900mm centres normally. Maximum spacing is 1200mm. (Requires specific design by GANG-NAIL Fabricator or MiTek New Zealand Ltd.)
- ◆ Maximum floor spans determined by allowable span of intermediate joists as per NZS 3604:1999.
- ◆ Bottom chord size to be the same as the intermediate floor joist size.

Overhangs

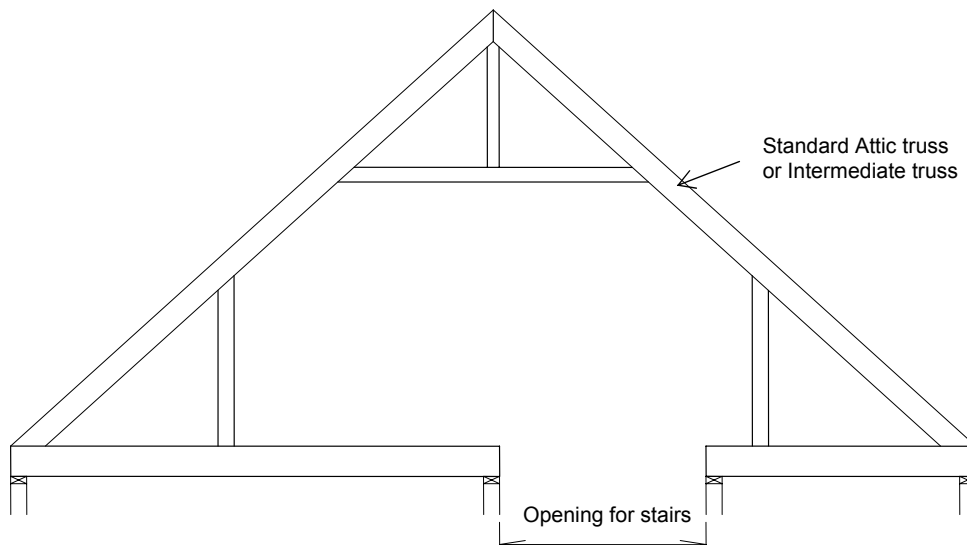
An overhang may be added to the Attic truss by attaching a supplementary member on to the side as shown in the figure below. The truss may also be stop-ended if required, usually to give a higher wall height to rooms.



Modifications for Stairs

The bottom chord of standard Attic trusses and Intermediate trusses (**not Girder Attic trusses**) may be trimmed to accommodate a stair opening.

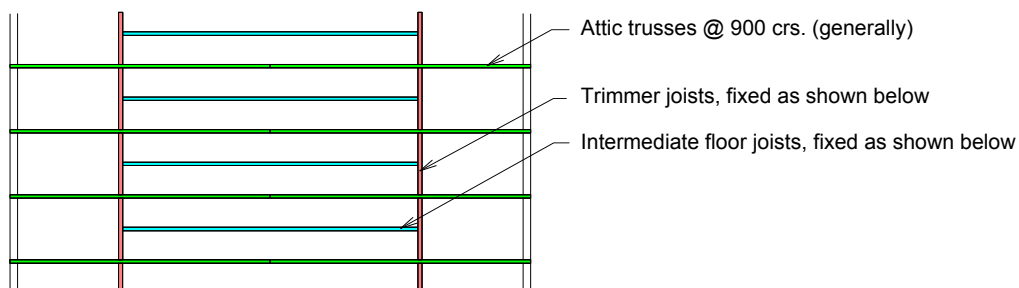
This requires specific design from MiTek New Zealand Ltd.



Floor Details – 1.5kPa Live Load

Number of Supports	Max. Floor Span	Floor Joist Size
2	3400	190 × 45
2	4300	240 × 45
2	5000	290 × 45

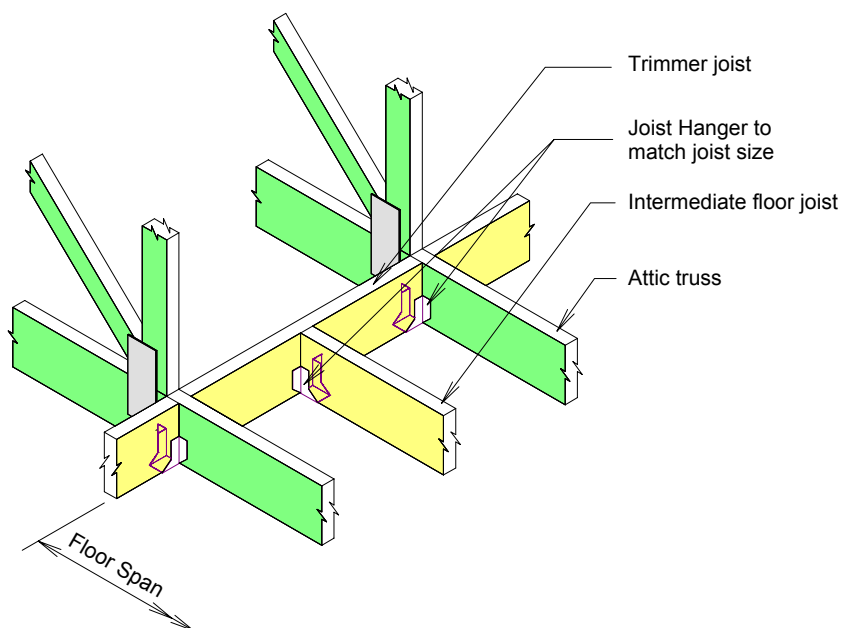
Definition



Attic Trusses – to be fixed to top plate with a minimum of 2 Wire Dogs each end.

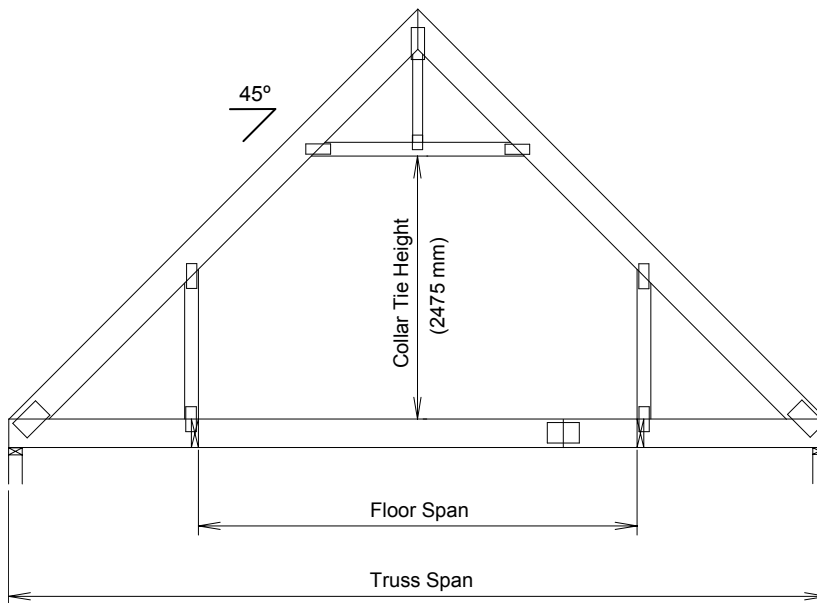
Floor Joists

- ◆ Intermediate floor joist size as per NZS 3604:1999.
- ◆ Bottom chord size to be the same as the intermediate joist size.
- ◆ Trimmer joist size to match the intermediate floor joist size.
- ◆ Fix trimmer and intermediate floor joists with LUMBERLOK® Joist Hangers, size and fixing as per LUMBERLOK® “Joist Hanger Selection and Nailing / Screw Fixing” brochure.



Attic Truss Selection Table for 45° Roof Pitch

Two Supports			2475 Collar Tie Height	
Floor Span	Truss Centres	Truss Type	Truss Span Light Roof	Truss Span Heavy Roof
3400	900mm	2 AT 20/20	7300 - 10400	7700 - 10200
		2 AT 25/20	4400 - 12400	4400 - 12100
4300	900mm	2 AT 20/25	8700 - 11300	8800 - 11100
		2 AT 25/25	8200 - 13200	8000 - 12800
		2 AT 30/25	5600 - 15000	5600 - 14800
5000	900mm	2 AT 20/30	9600 - 12600	9800 - 12200
		2 AT 25/30	9400 - 14200	9200 - 13800
		2 AT 30/30	8800 - 15000	8200 - 15000

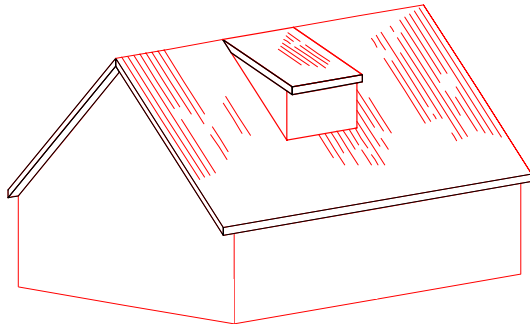


NOTE: The above selection table is for Attic trusses at 45° roof pitch. Attic trusses at lower roof pitch will require specific engineering design by an accredited GANG-NAIL Fabricator or MiTek New Zealand Ltd.

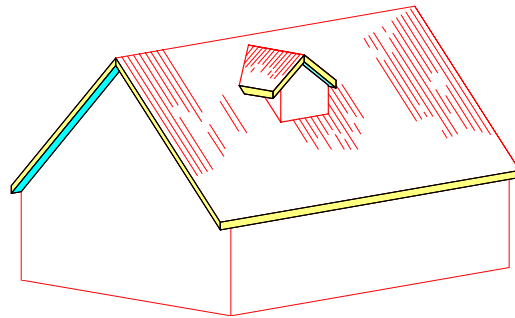
Dormers

Dormers can be added to most Attic truss roofs but special care must be taken to ensure all vertical and horizontal loads (Wind, Dead and Live loads) have been allowed for.

All Dormer designs must be certified by MiTek New Zealand Ltd.

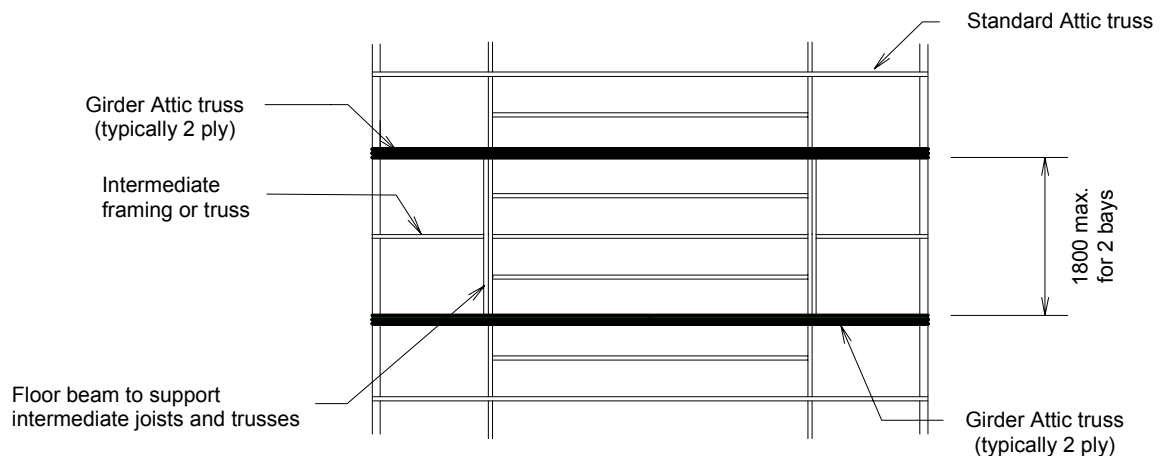


Flat Dormer



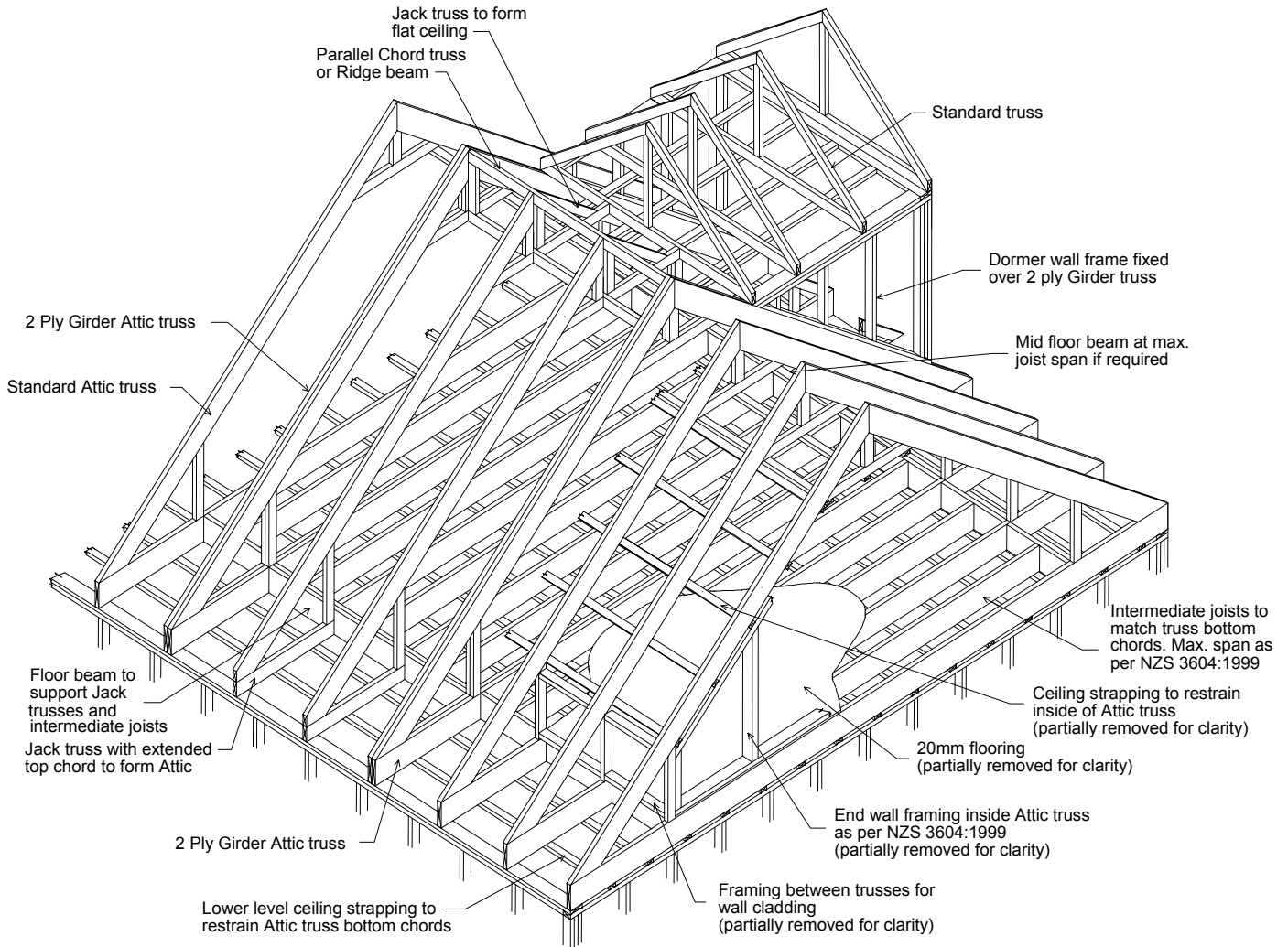
Pitched Dormer

Two common types of Dormers



Typical Dormer Floor Plan

Construction Details



Apex

The highest point on a truss.

Attic Truss

A truss with an attic room space within the truss. The bottom chord doubles as the floor joist and the top chord as the rafter.

Barge

Trim along the edge of roofing at a gable end. Slopes at roof pitch. It is fixed to ends of battens, purlins or verge rafters.

Batten

Roofing battens or ceiling battens. Usually timber members fixed at the truss chords to support roof tiles or ceiling material. Also provides lateral restraint to the truss.

Bearing / Support Point

Point at which the truss is supported. A truss must have two or more supports located at truss panel points.

Bottom Chord

Truss member forming bottom edge of truss.

Butt Joint Splice

End-to-end joint between two pieces of timber.

Camber

Vertical displacement built into a truss to compensate for the downward movement expected when truss is fully loaded.

Cantilever

That part of a truss that projects beyond an external main support, not including top chord extensions or overhangs.

Chord

The truss members forming the top and bottom edges of the truss.

Concentrated Load

A load applied at a specific position e.g. load applied by an intersecting truss.

Connector

Light gauge steel plates with teeth projecting from one face. When pressed into intersecting timber members the plate connects the members in a rigid joint.

Cove

A truss supported on an extended top or bottom chord.

Creep

Movement resulting from long-term application of load to a timber member.

Dead Load

Permanent loads due to the weight of materials and truss self-weight.

Deflection

Movement in a truss due to the applied loads.

Design Loads

The various loads that a truss is designed to support.

Distributed Load

Loads spread evenly along truss member.

Fascia

Trim along the edge of the eaves.

Gable Truss

Standard triangular shaped truss.

Girder Truss

Truss designed to support one or more trusses.

Heel Joint

The joint on a truss where the top and bottom chords meet.

Heel Point

The position on a truss where the bottom edge of the bottom chord meets the top chord.

Hip

Intersection of two roof surfaces over an external corner of a building.

Hip Roof

Roof constructed with rafters or trusses pitched over all perimeter walls.

Jack Truss

Half truss and part of family of trusses that makes a hipset.

Joint Strength Group

Classification of timber according to its ability to perform with fasteners such as bolts, nails and GANG-NAIL Connectors. The grouping depends on timber species and moisture content.

King Post

Vertical web at the centre of a gable truss, or the vertical web at the end of a half gable truss.

Lateral Brace

Bracing restraint applied at right angles to web or chord to prevent buckling.

Longitudinal Tie

Bracing restraint applied at right angles to web or chord to prevent buckling.

Live Load

Load as a result of occupancy or use of the building.

Overhang

Extension of top chord beyond support.
Provision of eaves on gable trusses.

Panel-point

The point where several truss members meet to form a joint.

Panel-point Splice

Splice joint in a chord coinciding with web intersection.

Pitch

Angular slope of truss chord measured in degrees.

Purlin

Roofing purlins. Usually timber members fixed at right angles to the truss chords to support roof sheeting. Also provides lateral restraint to truss. Similar to battens except more widely spaced.

Rafter

A roof member supporting roofing battens or roofing purlins in conventional construction. Rafters employ only the bending strength of the timber. A roof truss may also be called a trussed rafter.

Ridge

The highest point on a gable roof.

Setback

The position of a truss measured from the outside face of the end wall. Usually used to describe the position of Truncated Girder and Standard trusses in a Hip End.

Span

The horizontal distance between the outer edges of the truss supports.

Span Carried

The span of standard trusses that are supported by a girder truss.

Stop End

Description of a truss based on standard shape but which is cut-off short of its full span.

Top Chord

Truss member forming top edge of truss.

Truss

A framework of members forming a light, strong, rigid structure. Usually a triangulated structure.

Valley

Intersection of two roof surfaces over an internal corner of a building.

Valley Truss or Saddle Truss

Part of a set of non-structural trusses to form valleys.

Verge

Roof overhang at a gable-end.

Verge Rafter

Rafter projecting from gable end to support verge.

Web

The internal members of a truss. Usually only subject to axial loads due to truss action.

Wind Load

Load applied to the roof by the wind.