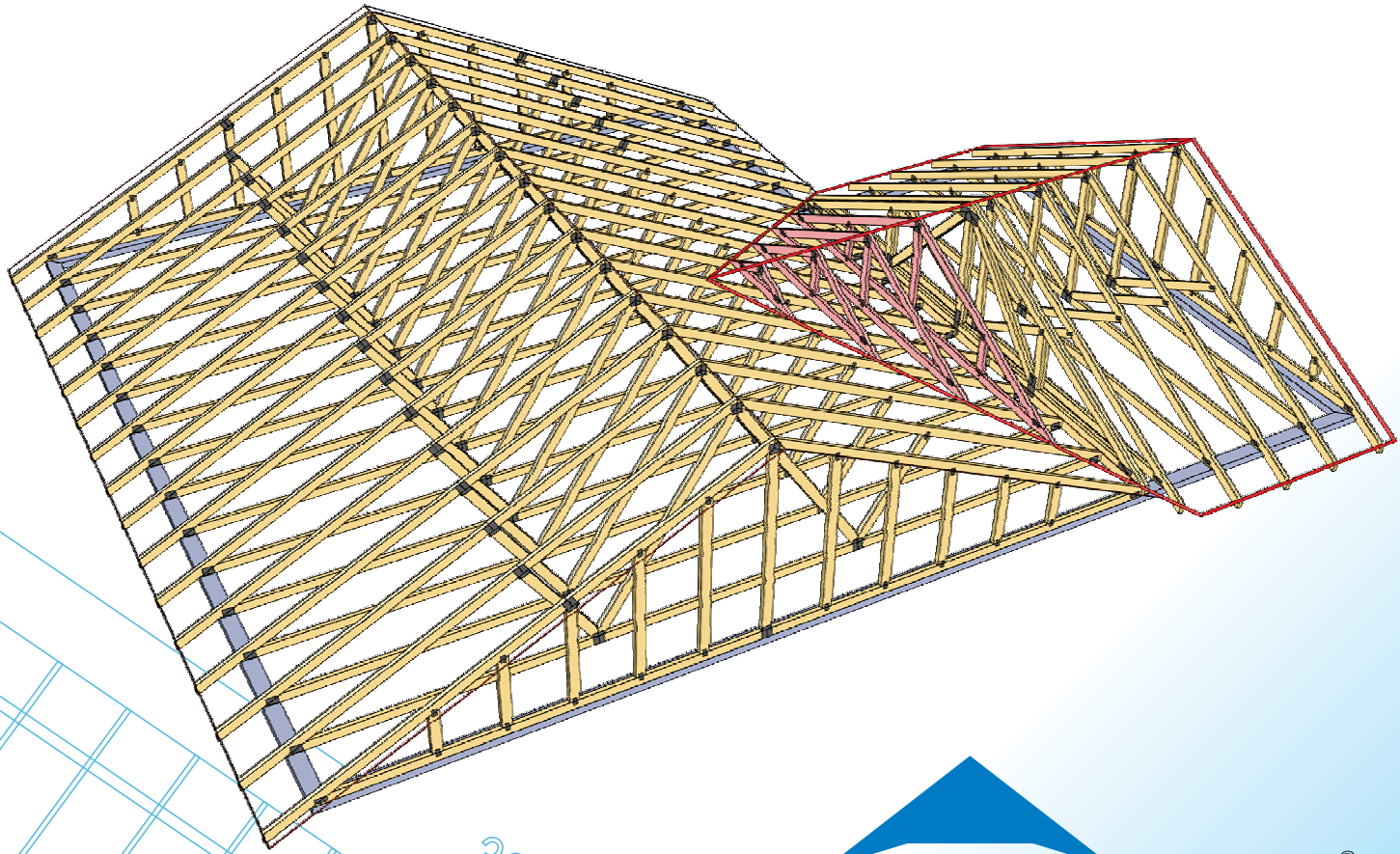
Get more Quality, Flexibility and Labor Savings using

ROOF TRUSSES



ALPINE®

AN ITW COMPANY

Wood Roof Trusses are Environmentally Compatible.

Get more Quality, Flexibility and Labor Savings using

Roof Trusses

Builders want solutions that help them stay on schedule and maintain quality construction and profits. When compared to traditional beam construction, manufactured wood roof truss systems are better, stronger, and can be installed faster. A manufactured truss is an engineered structural component assembled from wood members, metal connector plates and other mechanical fasteners. The truss members form a semi-rigid structural framework and are assembled such that the members form triangles. Trusses are designed to engineering standards with a substantial factor of safety applying to every truss in the roof. Most builders are familiar with roof truss systems, but may not realize the advantages of a manufactured system. Traditional stick built roofs which are based on historical conservative carpentry practices, use greater quantities of lumber to achieve acceptable factors of safety. The reserve strength of these traditional roofs is also variable and depends on the skill of the individual carpenter.

The benefits of manufactured wood truss systems are many. Trusses can span great distances, creating larger open spaces below unobstructed by columns and partitions. Roof truss systems are manufactured in controlled environments, so there's less chance of warping, shrinking, and twisting of lumber. Trusses also save timber resources by reducing the amount of wood waste generated during construction. The owner can enjoy piece of mind knowing that the trusses have been professionally engineered and quality manufactured for that specific job.

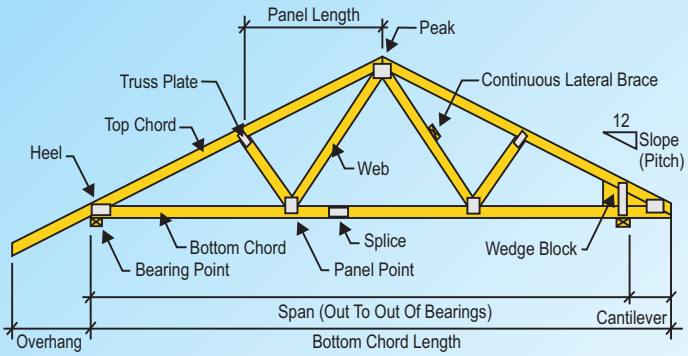
The Benefits of Wood Trusses:

- A wood trussed-home costs less. The total in-place cost of trussed roof and floor systems is lower. Trusses are delivered to the site ready to be installed. Labor is saved because trusses can be installed three to four times faster than it would take a carpenter to build the roof on-site. The open spaces in the trusses allows duct work, plumbing and wiring to be installed quickly and easily. Construction costs also are reduced because the building is “closed-in” faster, there is less pilferage of materials, and it takes less time to clean up the site.
- You get peace of mind – knowing that the trusses were professionally computer-designed, engineered and factory-built to assure the highest quality and reliability.
- Trusses allow virtually unlimited architectural versatility. That means designs can include vaulted or studio ceilings inside the home and high pitched or hipped roofs on the exterior, offering greater aesthetic and functional advantages.
- Proven performance – hundreds of millions of wood trusses have been installed throughout the country. In fact, wood trusses are used in more than 75% of all homes built in the U. S. and Canada today.
- Pre-engineered wood trusses are scientifically designed for strength. A pre-engineered framing system eliminates guesswork on the construction site.

Framing with

Roof Trusses

Parts of a Truss:



The component manufacturing process is simple and offers the professional builder plenty of time- and cost-saving resources along the way. **Here's how it works:**

House plans are sent by the builder to the truss manufacturer. There are dozens of truss manufacturers operating nationwide, but builders should research the quality and delivery costs before choosing a vendor.

The manufacturer determines what loads the building designer requires to be supported within the home, how many trusses will be required, and their specific placement in the home. The manufacturer then builds the trusses, numbers them for accurate installation, and ships them to the builder on the jobsite.

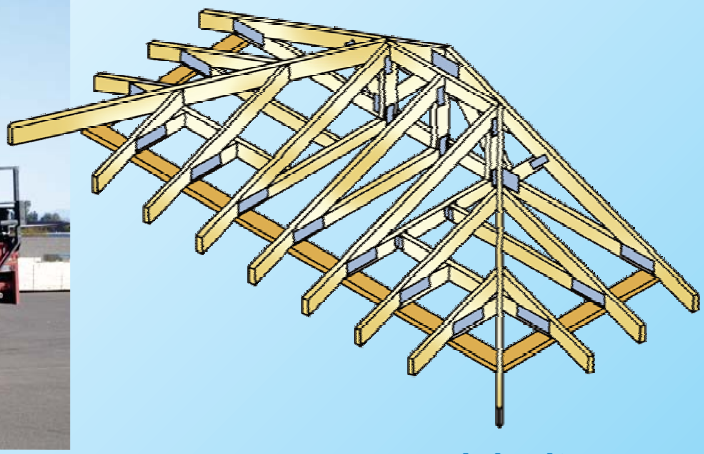
A detailed diagram with the placements of the trusses is sent along with the trusses to help the builder place the trusses exactly where they should be installed.

Once the trusses are on the site, the builder can really start to see the benefits. The consistent size and height of the manufactured truss will mean easier sheathing material installation, and the open web design allows for utilities to be run between in the roof system without drilling or cutting holes. These benefits will reduce the amount of time trade contractors spend on site, speed up construction, and ultimately save the builder money. The technology used in the design and manufacturing of roof trusses makes them a superior choice for builders looking to streamline construction and provide a higher quality home to their customers.

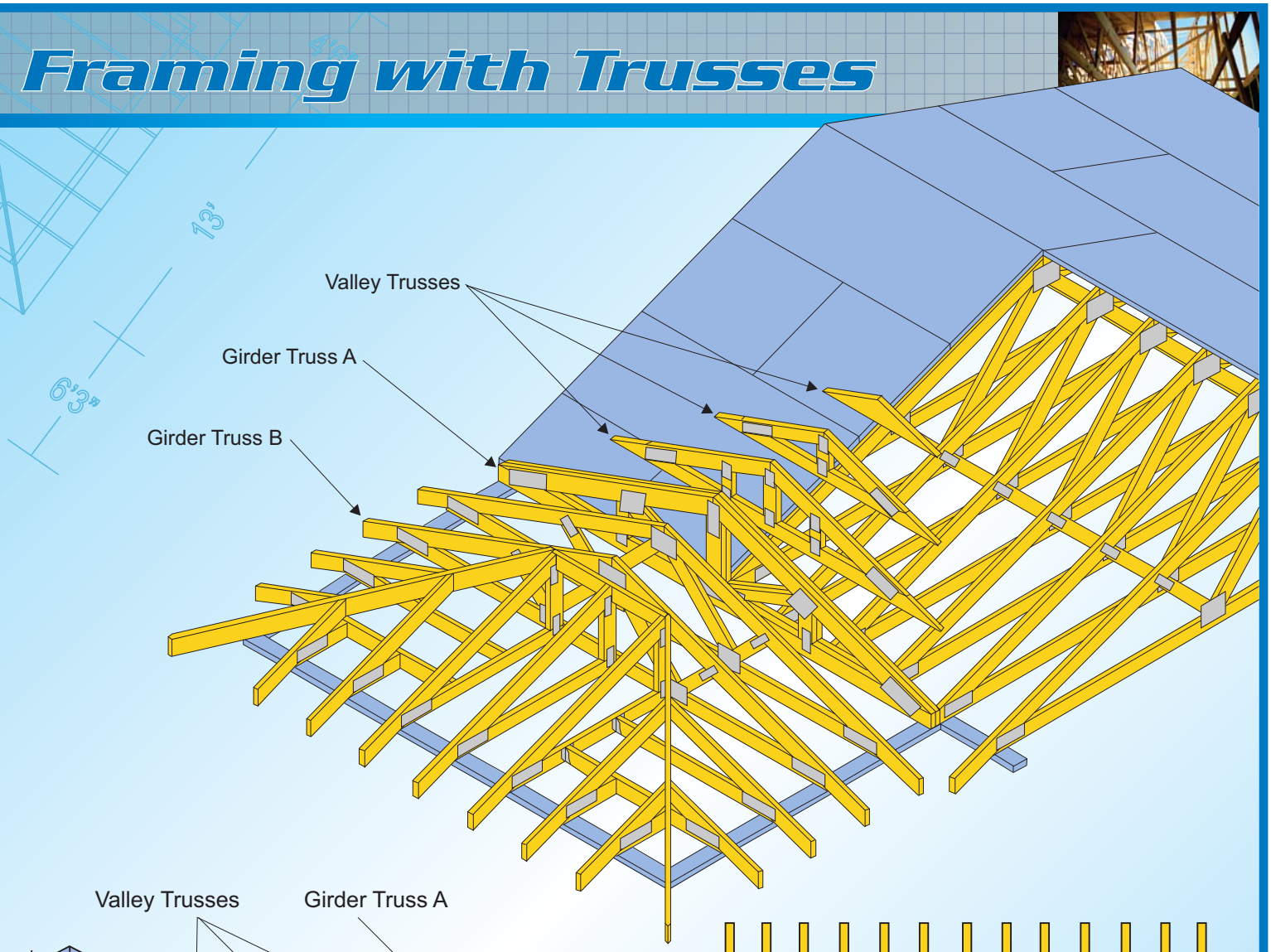


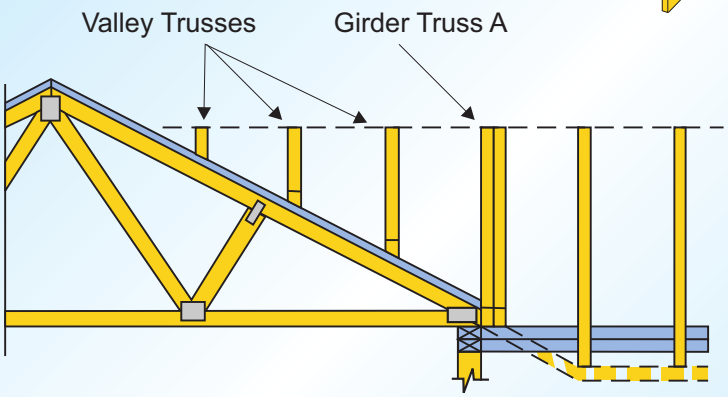






Framing with Trusses





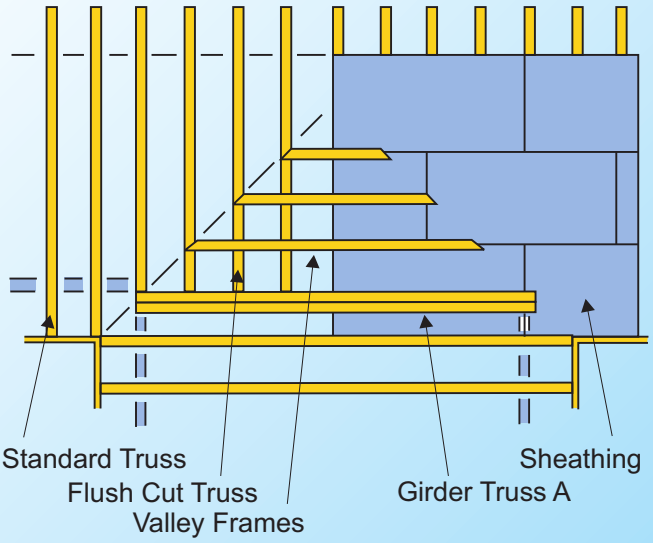
Girder Trusses

Girder trusses have two main purposes. The first (Girder Truss A) exists in L, T, H and U shaped buildings to eliminate the need for an interior load-bearing wall. The girder is used to support one end of the intersecting trusses. The trusses are carried on the bottom chord of the girder by hangers.

The second use of a girder truss (Girder Truss B) is to support perpendicular framing in hip roofs. In some plans girder truss A and B may be one in the same. The hip framing is carried on both the top and bottom chords of the girder truss by nailing or by hangers.

Girder trusses, because of the heavy loads they support, are generally multiple units with larger chord members than the adjacent trusses. Generally, because of the construction of girders, overhangs are not used.

The girder truss may also be designed for “drag strut” loads which are calculated and specified by the building designer.



Valley Framing Sets

Valley framing sets are primarily used to form a ridge line by framing over the main roof where perpendicular building sections intersect.

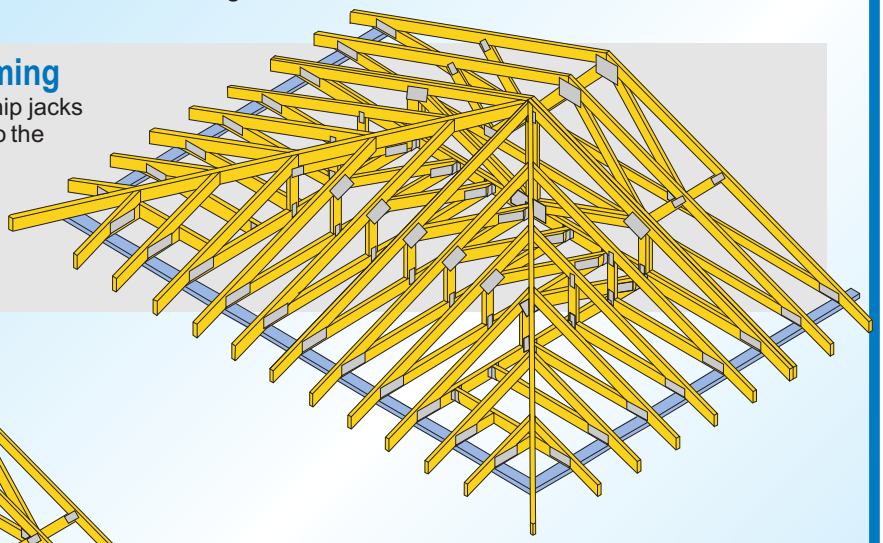
Valley trusses are set directly on the main trusses. Sheathing is required for main trusses with 2x4 top chords, and is recommended for other top chord sizes, under valley frames to continue the lateral bracing of the main truss top chords. The bottom chords of the valley trusses are generally beveled to match the slope of the roof below.

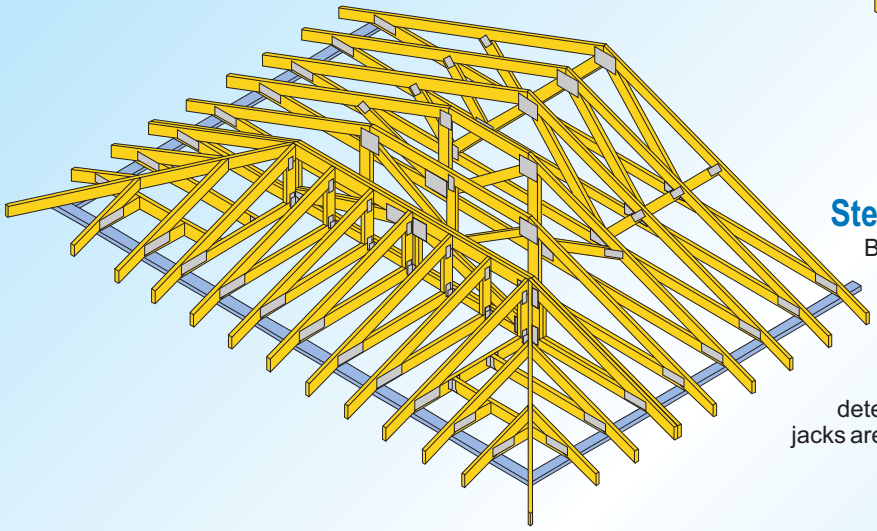
Hip Framing

Trussed hip framing offers the advantage of clear span, an eave or fascia line at the same elevation around the building, and the speed of pre-built components. The end slope may be equal to or different from the side slope. The ceiling line may be flat or sloped. Sloped ceilings have limitations, therefore, consult the truss designer.

Terminal Hip Framing

Best suited for relatively short spans of 26'-0" or less, the hip jacks extend directly to the peak. The distance from the end wall to the face of the girder is equal to one half the span, provided the slopes are equal. The last standard truss is designed as a girder to carry the loads transferred by the hip jack.



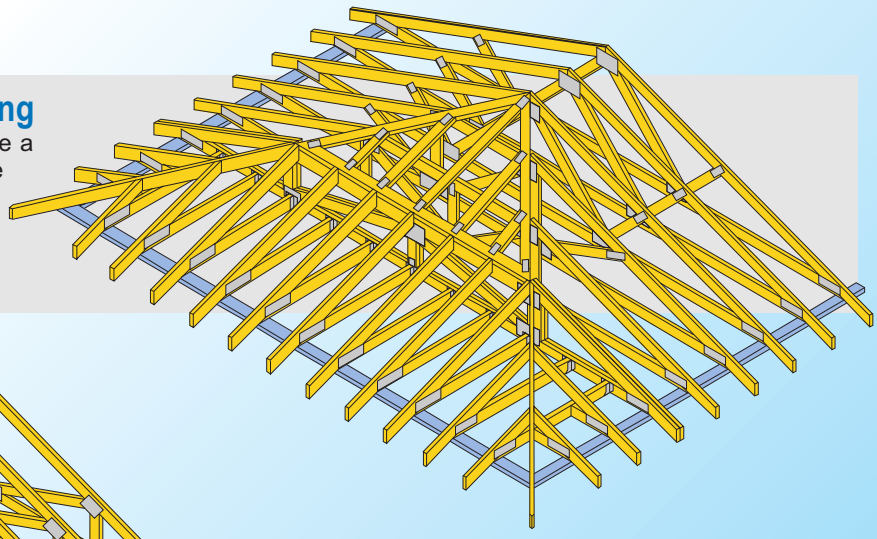


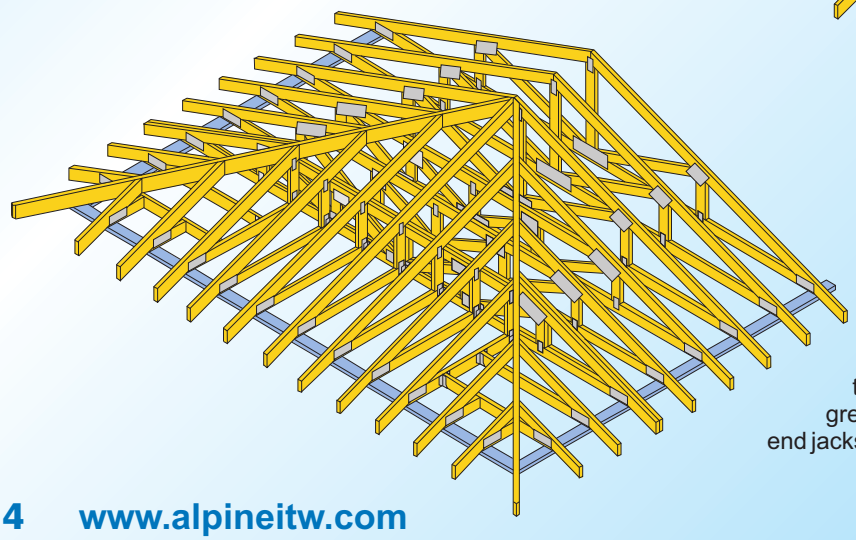
Step Down Hip Framing

Better suited for longer spans, the Step Down hip is the most versatile of all hip types. Each of the "step down" trusses is the same span and has the same overhang as the adjacent standard trusses, but decrease in height to form the end slope. The girder location is generally from 8 to 12 feet from the end wall and is determined by the span to depth ratio. The corner and end jacks are normally pre-built components.

Midwest Hip Framing

The Midwest type hip framing was developed to create a more uniform configuration of each of the trusses in the hip. This hip type also provides for a more uniform structure for attaching the decking. Span capability is the same as the step down hip.





California Hip Framing

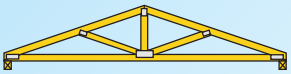
Although this type hip framing is used as an alternative to the step down hip, the California hip is similar in span capability and field installation. The base portion of each truss inside the girder is the same, except that the sloping top chord of each successive truss is extended upward greater amounts to form the slope intersection. Corner and end jacks are used to form the area outside the girder.

Typical Wood Truss

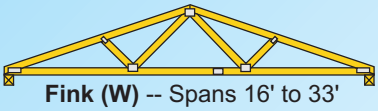
Configurations

Wood trusses are pre-built components that function as structural support members. A truss commonly employs one or more triangles in its construction. The wood truss configurations illustrated here are a representative sampling. The number of panels, configuration of webs and length of spans will vary according to given applications, building materials and regional conditions. Always refer to an engineered drawing for the actual truss design.

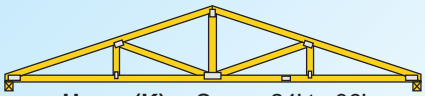
King Post -- Span Up to 16'



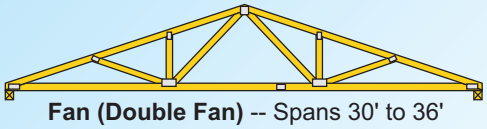
Queen Post (Fan) -- Spans 10' to 22'



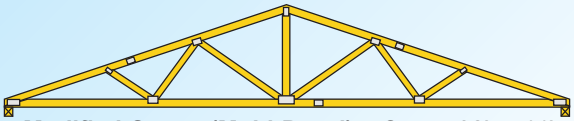
Fink (W) -- Spans 16' to 33'



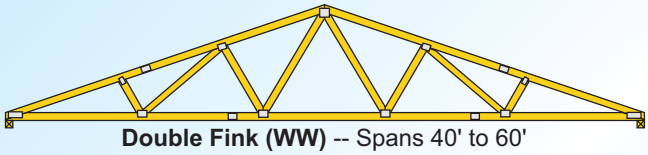
Howe (K) -- Spans 24' to 36'



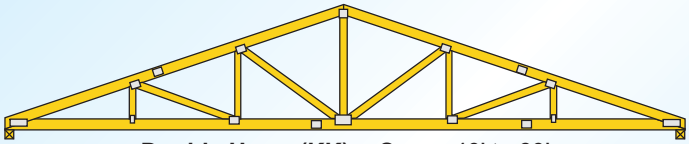
Fan (Double Fan) -- Spans 30' to 36'



Modified Queen (Multi-Panel) -- Spans 32' to 44'

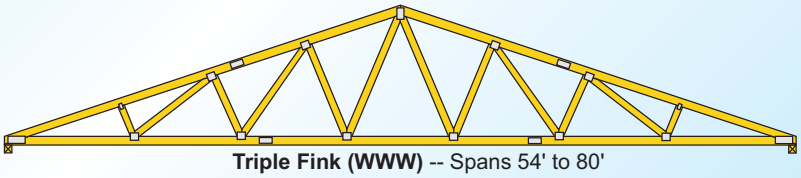


Double Fink (WW) -- Spans 40' to 60'

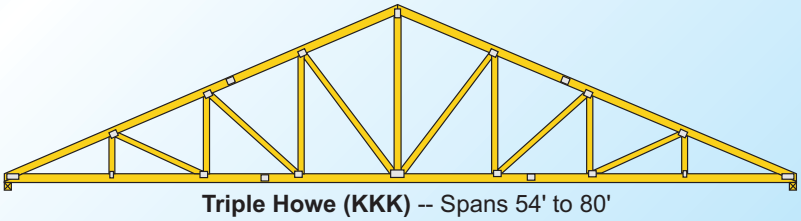


Double Howe (KK) -- Spans 40' to 60'

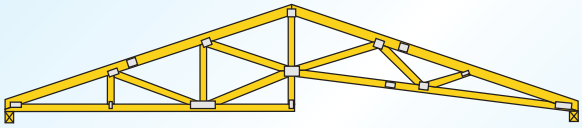
Modified Fan (Triple Fan) -- Spans 44' to 60'



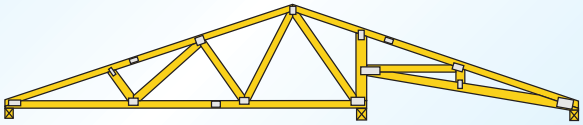
Triple Fink (WWW) -- Spans 54' to 80'



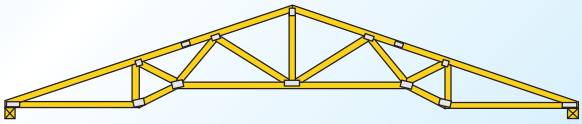
Triple Howe (KKK) -- Spans 54' to 80'



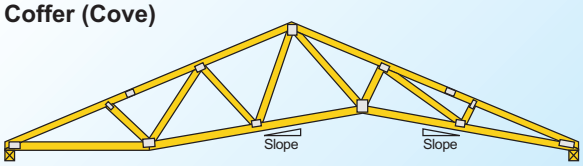
Vault - Two Bearing Points



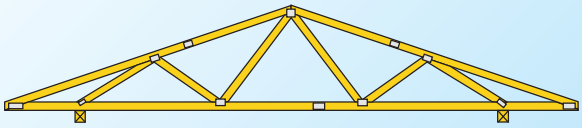
Vault - Three Bearing Points



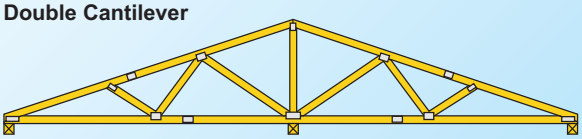
Coffer (Cove)



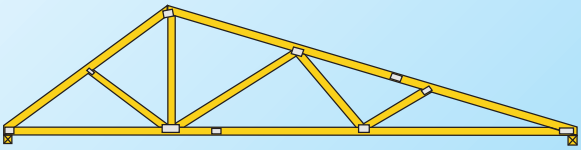
Cathedral (CATH)



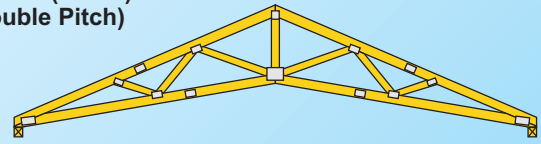
Double Cantilever



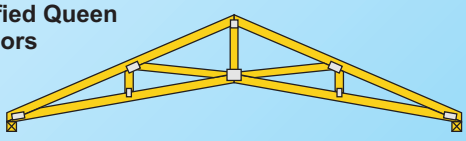
Tri-Bearing



Double (DUBL)
(Double Pitch)



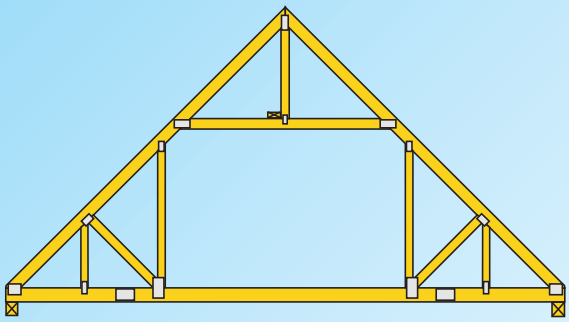
Modified Queen
Scissors



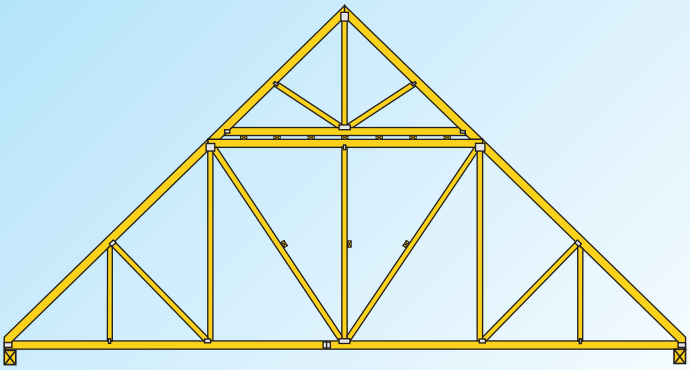
Howe Scissors

Typical Wood Truss

Configurations

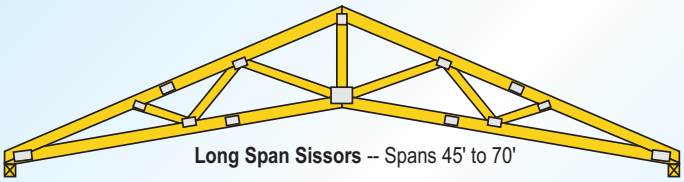


Room-In-Attic

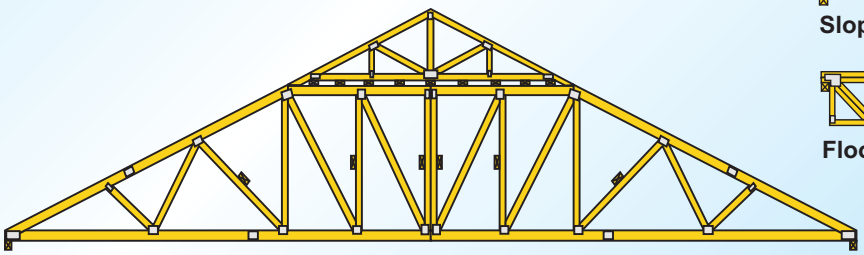


Piggyback

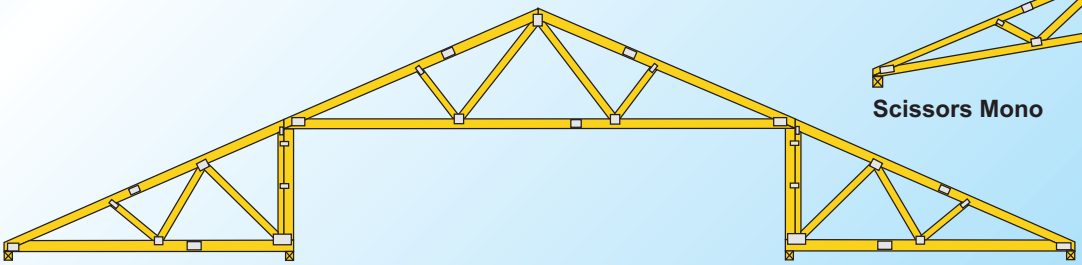
Large, Long Span Trusses require special handling and erection specifications. The installation of wood trusses requires the same high degree of safety awareness as the installation of any other structural material. Spans over 60' may require complex permanent bracing. Please ask your sales representative for more information.



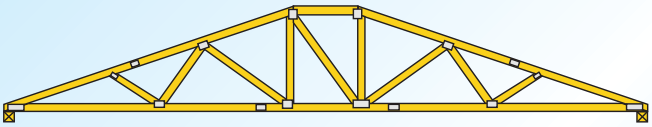
Long Span Sissors -- Spans 45' to 70'



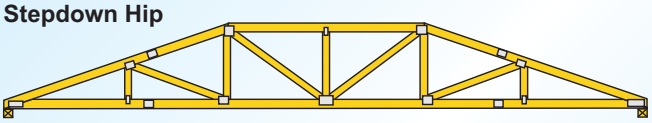
Three Piece Long Span (Field Connected) -- Spans 60' to 80'



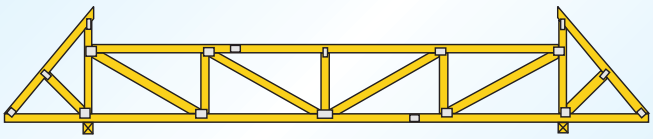
Three Piece Raised Center Bay -- Lengths 50' to 100'+



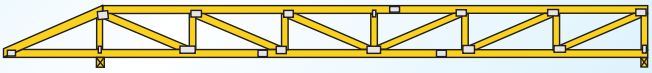
Stepdown Hip



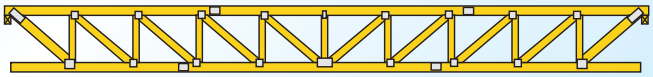
Hip Girder



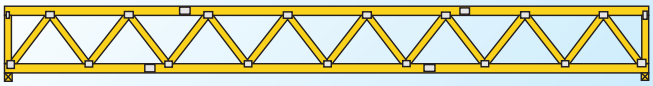
Double Cantilever With Parapets



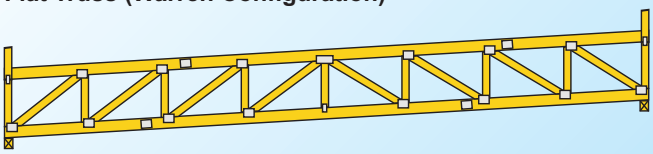
Flat Truss With Cantilever (Pratt Configuration)



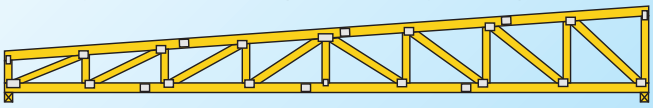
Top Chord Bearing Flat Truss (Pratt Configuration)



Flat Truss (Warren Configuration)

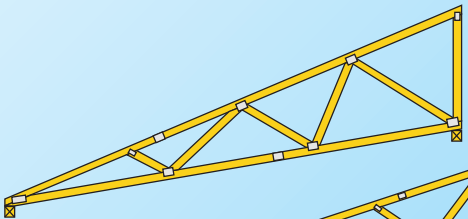


Sloping Parallel Chords (Howe Configuration)

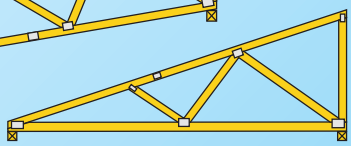


Sloping Top Chord (Howe Configuration)

Floor Truss (System 42 - Modified Warren Configuration)



Scissors Mono



Mono

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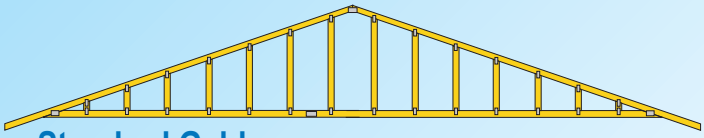
Framing with Trusses

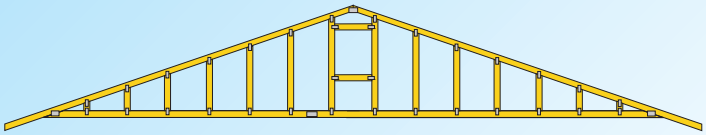
Gable Framing

Gable ends when not configured in triangles as a truss, are more related to stud walls. However, they are structural elements and are analyzed to resist wind and seismic loads as noted on the truss design. The web design or framing pattern is determined by the type of siding, either horizontal or vertical, and the need for a louver in the end of the building. The type of gable required is controlled by the end overhang and the need to match a soffit line.

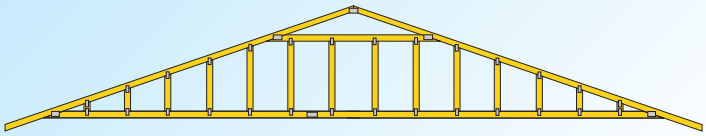


Standard Gable

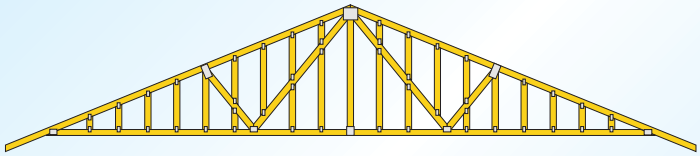
Stud spacing as necessary to support siding.



Standard Gable Framed For Rectangular Louver

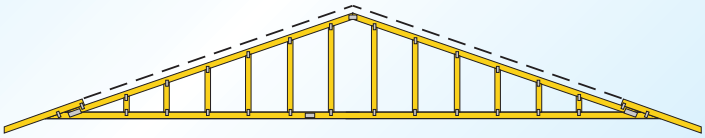


Standard Gable Framed For Triangular Louver



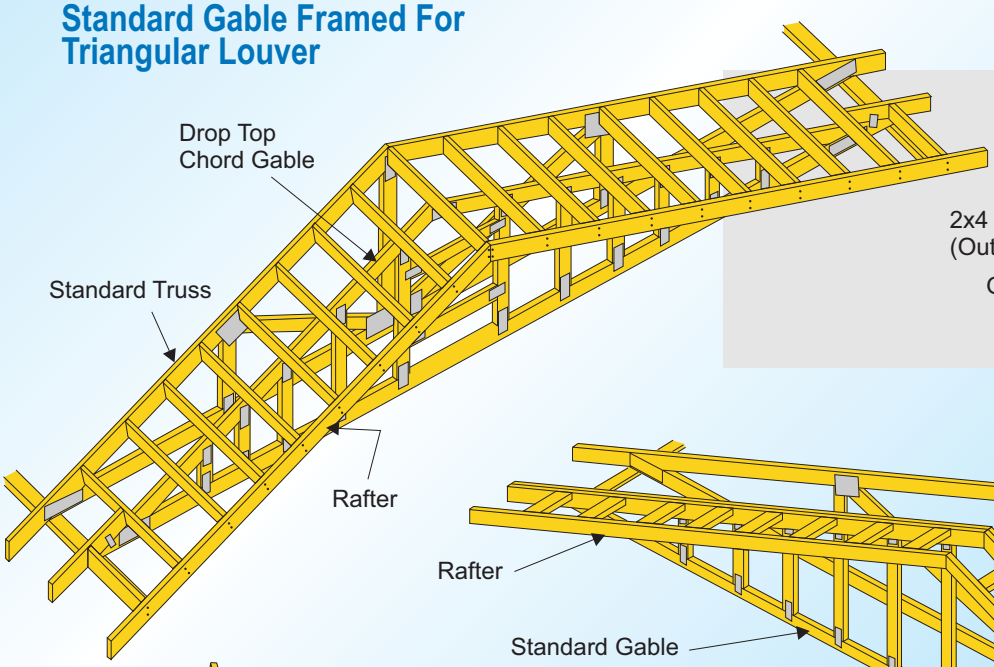
Clearspan Gable

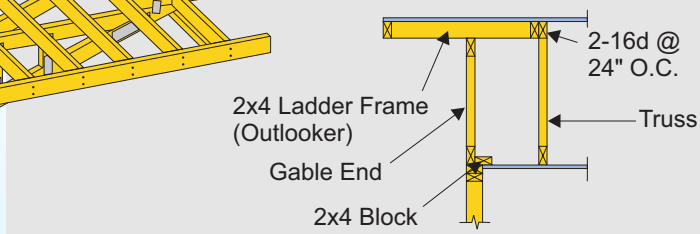
Used when the gable wall does not provide continuous bearing support for the gable framing.

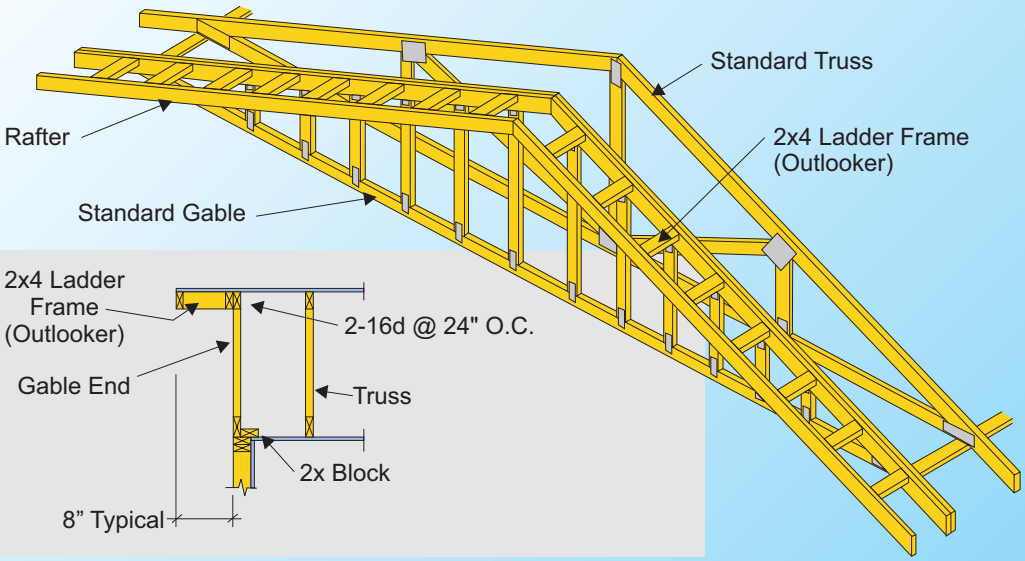


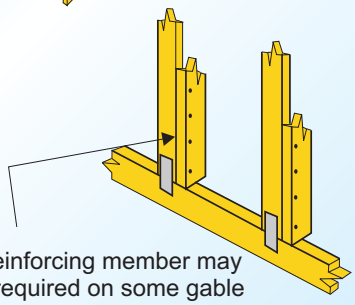
Dropped Top Chord Gable

Illustrated with studs. Also available with framing for rectangular, square or triangular louver.







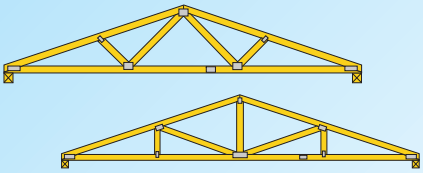


A reinforcing member may be required on some gable end vertical members.

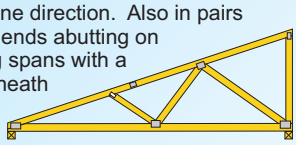
Roof Truss Span Tables

Alpine truss designs are engineered to meet specific span, configuration and load conditions. The shapes and spans shown here represent only a fraction of the millions of designs produced by Alpine Engineers.

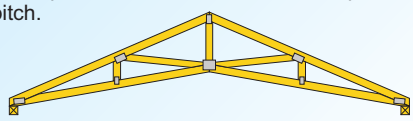
Common -- Truss configurations for the most widely designed roof shapes.



Mono -- Used where the roof is required to slope only in one direction. Also in pairs with their high ends abutting on extremely long spans with a support underneath the high end.



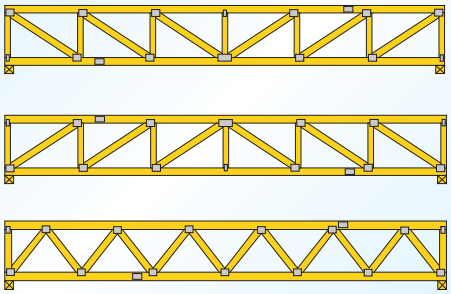
Scissors -- Provides a cathedral or vaulted ceiling. Most economical when the difference in slope between the top and bottom chords is at least 3/12 or the bottom chord pitch is no more than half the top chord pitch.



Total load(PSF) / Duration factor / Live load(PSF) / Roof type	55 / 1.15 40 snow shingle; 55 / 1.15 30 snow tile			47 / 1.15 30 snow shingle			40 / 1.15 20 snow shingle			40 / 1.25 20 ** shingle **construction or rain, not snow load		
Top Chord	2x4	2x6	2x6	2x4	2x6	2x6	2x4	2x6	2x6	2x4	2x6	2x6
Bottom Chord	2x4	2x4	2x6	2x4	2x4	2x6	2x4	2x4	2x6	2x4	2x4	2x6
Pitch	**Spans in feet to out of bearing**											
2/12	24	24	33	27	27	37	31	31	43	33	33	46
2.5/12	29	29	39	33	33	45	37	38	52	39	40	55
3/12	34	34	46	37	39	53	40	44	60	43	46	64
3.5/12	39	39	53	41	44	61	44	50	65	47	52	70
4/12	41	43	59	43	49	64	46	56	69	49	57	74
5/12	44	52	67*	46	58	69*	49	66	74*	53	66	80*
6/12	46	60*	69*	47	67*	71*	51	74*	76*	55	74*	82*
7/12	47	67*	70*	48*	72*	72*	52*	77*	77*	56*	80*	83*
2/12	24	24	33	25	27	38	27	31	41	29	32	44
2.5/12	28	29	40	29	32	43	31	37	46	33	37	49
3/12	30	33	45	31	37	47	34	42	50	36	42	54
3.5/12	33	37	49*	34	41	51*	36	46	54*	39	46	58*
4/12	35	41	52*	36	45*	54*	39	50*	58*	42*	49*	62*
5/12	38*	47*	57*	39*	51*	59*	42*	56*	63*	45*	54*	68*
6/12 - 2/12 ‡	40	43	59*	42	49	62*	45	56*	66	48	57*	71*
6/12 - 2.5/12 ‡	37	38	52	38	44	57*	41	50	61*	44	52	66*
6/12 - 3/12 ‡	33	33	45	35	38	52	38	43	56*	40	46	60*
6/12 - 3.5/12 ‡	28	28	38	32	32	44	34	37	50	36	39	54
6/12 - 4/12 ‡	22	22	31	26	26	36	30	30	41	32	32	44

‡ Other pitch combinations available with these spans
For Example, a 5/12 - 2/12 combination has approx. the same allowable span as a 6/12 - 3/12

Flat -- The most economical flat truss for a roof is provided when the depth of the truss in inches is approximately equal to 7% of the span in inches.



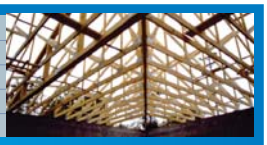
Total load(PSF) / Duration factor / Live load(PSF)	55 / 1.15 40 snow			47 / 1.15 30 snow			40 / 1.15 20 snow			40 / 1.25 20 rain or constn.		
Top Chord	2x4	2x6	2x6	2x4	2x6	2x6	2x4	2x6	2x6	2x4	2x6	2x6
Bottom Chord	2x4	2x4	2x6	2x4	2x4	2x6	2x4	2x4	2x6	2x4	2x4	2x6
Depth	**Spans in feet to out of bearing**											
16"	23	24	25 §	25 §	25 §	25 §	25 §	25 §	25 §	25 §	25 §	25 §
18"	25	27	28	27	27	29 §	29 §	29 §	29 §	29 §	29 §	29 §
20"	27	28	30	28	28	32	31	30	33 §	32	31	33 §
24"	29	30	33	31	31	35	34	33	38	35	34	40
28"	32	32	36	34	33	39	37	36	42	38	37	44
30"	33	33	38	35	35	40	38	37	44	40	39	45
32"	34	34	39	36	36	42	39	39	45	41	40	47
36"	36	36	42	39	38	45	42	41	48	43	43	50
42"	39	39	45	41	41	48	44	44	52	45	46	54
48"	40	42	49	43	44	52	46	47	56	46	49	58
60"	44	47	55	46	49	58	48	53	63	49	55	65
72"	45	51	60	48	54	64	51	57	68	51	59	69

§ = Span Limited by length to depth ratio of 24

NOTES: These overall spans are based on NDS '01 with 4" nominal bearing each end, 24" o.c. spacing, a live load deflection limited to L/240 maximum and use lumber properties as follows: 2x4 f_b =2000 psi f_t=1100 psi E=1.8x10^6 2x6f_b=1750 psi f_t=950 psi f_c=1900 psi E=1.8x10^6. Allowable spans for 2x4 top chord trusses using sheathing other than plywood (e.g. spaced sheathing or 1x boards) may be reduced slightly. Trusses must be designed for any special loading such as concentrated loads from hanging partitions or air conditioning units, and snow loads caused by drifting near parapet or slide-off from higher roofs. To achieve maximum indicated spans, trusses may require six or more panels. Trusses with an asterisk (*) that exceed 14' in height may be shipped in two pieces. Contact your Alpine truss manufacturer for more information.

Recommendations for

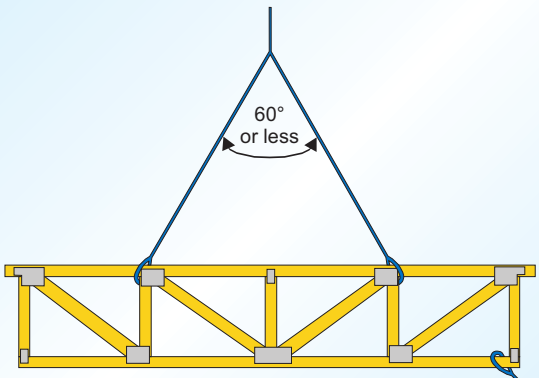
Handling and Lifting



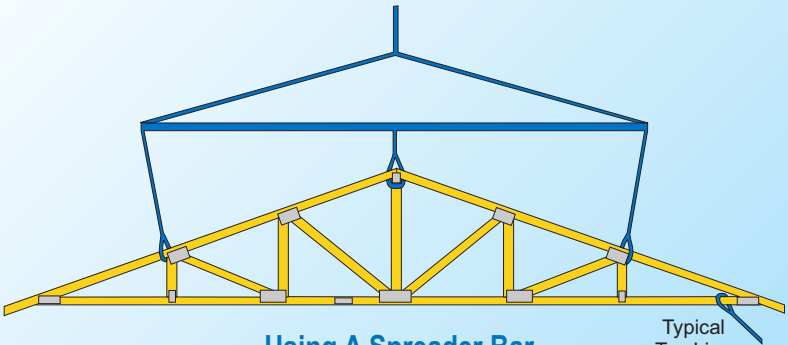
The installation of wood trusses requires the same high degree of safety awareness as the installation of any other structural material. It is essential that prudent methods be used at all times. Trusses may be installed manually, by crane, or by forklift, depending on truss size, wall height and job conditions. Individual trusses should always be carried vertically to avoid lateral strain and damage to joints and members.

Trusses installed manually are slid into position over the sidewall and rotated into place using poles. The longer the span, the more workers are needed to avoid excessive lateral strain on the trusses. Trusses should be supported at joints and the peak while being raised.

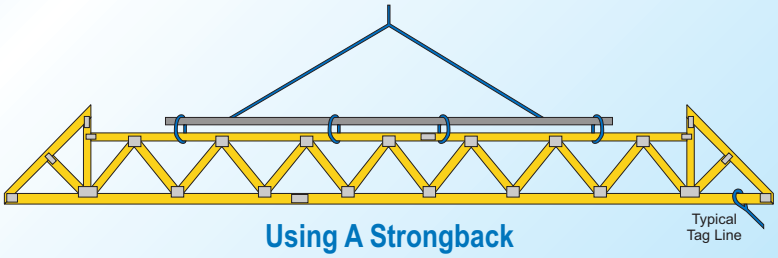
Large trusses require the most planning and attention before lifting and should be installed by a crane or forklift employing chokers, slings, spreader bars and strongbacks to prevent lateral bending. Trusses may be lifted singly, in banded groups, or preassembled in groups. Planning ahead is essential before lifting any truss. First determine the proper location of lift points and the type of rigging and lifting procedure that will assure truss balance. Tag lines should always be used to control movement of trusses during lifting and placement.



Using A Sling



Using A Spreader Bar



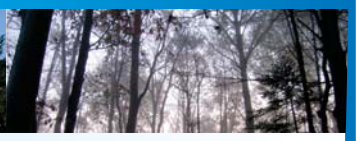
Using A Strongback

IMPORTANT SAFETY INFORMATION: Refer to BCSI Guide to Good Practice for Handling, Installing, Restraining & Bracing of Metal Plate Connected Wood Trusses for more detailed information. This publication is jointly produced by the Truss Plate Institute and Wood Truss Council of America for proper methods of installation. Installation procedures are the responsibility of the installer. Job conditions and procedures vary considerably. Every project has different site conditions that can have an effect on the erection process. Before the first truss is erected every individual involved needs to understand the installation plan and the intended bracing requirements for a safe, efficient and accident-free jobsite. These are only guidelines and may not be proper under all conditions. Visit **www.sbcindustry.com** for specific details.

Wood Roof and Floor Trusses are

Environmentally Compatible

BUILDING GREEN: Using less gives more.



"Building Green" isn't new to the structural building components industry. In fact, we've been green since 1952! **At Alpine**, we are committed to helping our builders, remodelers and home owners practice environmental responsibility and sustainability by conserving today's resources for tomorrow's children. Every effort is made to offer products that balance design and performance with environmental responsibility. There's no getting around it, the wood you purchase comes from one of the Earth's most renewable resources—trees. Wood is the most energy efficient of major building products.

Components minimize the amount of material used and jobsite waste created. This is a no brainer, but it's a good point to reinforce with builders and general contractors. And there's data to prove it! The 1996 WTCA Framing the American Dream® project reported a more than 25 percent material savings (and labor savings of more than 60 percent!) when components were used to frame a 2600-sq.ft. home. visit **www.sbcindustry.com/pubs/fad-d** to view a pdf.

Components are designed to utilize materials most efficiently. Don't forget that material efficiency is inherent to the process of component design. Design software from Alpine enables the designer or technician to value engineer and optimize virtually any component design. This means material is not used when it isn't needed. Many green building rating systems recognize this benefit of components and award points based on their use. The National Resource Defense Council realized this fact in 1998 when they placed trusses high on their list of great products due to optimum value engineering. View their detailed report at **www.nrdc.org/cities/building/rwoodus.asp**.

Visit **www.sbcindustry.com** for more details on green building component fabrication.

Why Build Green? In the United States, buildings account for:

39 percent of total energy use, 12 percent of the total water consumption, 68 percent of total electricity consumption and 38 percent of the carbon dioxide emissions.

The built environment has a vast impact on the natural environment, human health, and the economy. By adopting green building strategies, we can maximize both economic and environmental performance. Green construction methods can be integrated into buildings at any stage, from design and construction, to renovation and deconstruction. However, the most significant benefits can be obtained if the design and construction team takes an integrated approach from the earliest stages of a building project. Potential benefits of green building can include:

Environmental benefits: Enhance and protect biodiversity and ecosystems, Improve air and water quality, Reduce waste streams and Conserve, restore natural resources.

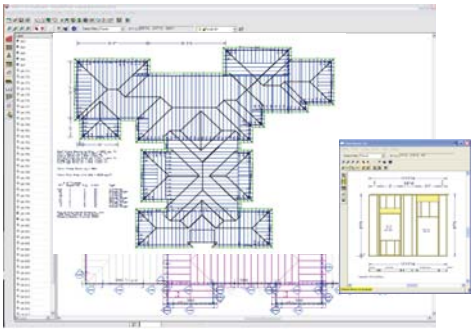
Economic benefits: Reduce operating costs, Expand markets for green product and services, Improve occupant productivity, Optimize life-cycle economic performance.

Social benefits: Enhance occupant comfort and health, Heighten aesthetic qualities, Minimize strain on local infrastructure, Improve overall quality of life.

www.epa.gov/greenbuilding/pubs/whybuild.htm

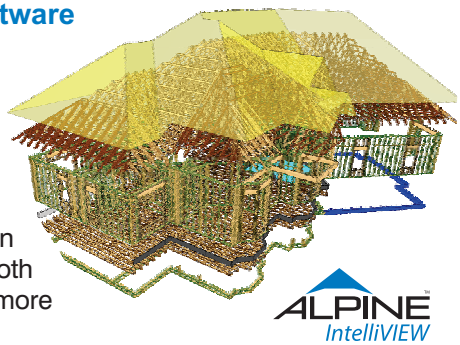
Get more Quality, Flexibility and Labor Savings using

Roof Trusses



Layout, Design and Engineering Software

Powerful CAD-based design software from Alpine generates traditional plan view layouts, and 3-D graphics that give an accurate picture of a structure from virtually any perspective by showing every component in place. Work confidently with the industry's best fully integrated design solution. Our IntelliVIEW software reduces both designer time and aggravation, giving you more peace of mind with fewer mouse clicks.



Bracing is extremely IMPORTANT!! Every roof system needs adequate bracing. The purpose of most bracing is to ensure that the trusses and truss members remain straight and do not bow out of their plane. Inadequate, improper or incorrectly installed bracing can lead to collapses, failures and serious accidents. An engineered bracing system will avoid these pitfalls and ensure the structural integrity of the truss system. Trusses need to be braced during installation, which is called temporary bracing and they need permanent bracing which will remain installed for the life of the roof system. Follow the recommendations for handling, installing and temporary restraining and bracing of trusses.

Temporary Bracing Guidelines: For metal plate connected wood truss systems, refer to BCSI Guide to Good Practice for Handling, Installing, Restraining & Bracing of Metal Plate Connected Wood Trusses for more detailed information. Truss design drawings may specify locations of permanent lateral restraint or reinforcement for individual truss members. Refer to the BCSI-B3 Summary Sheet – Permanent Restraint/Bracing of Chords & Web Members for more information. All other permanent bracing design is the responsibility of the Building Designer. Contact the Component Manufacturer for more information or consult a Professional Engineer for assistance.

The innovative software, equipment, products and services available from Alpine, enables our customers to manufacture and sell the finest truss and wall components available in North America. Alpine offers component engineering services, design and management software, production equipment and truss connector plates. The pioneering concept developed for wood trusses was also applied to our revolutionary line of products and services for cold-formed steel components used in commercial applications. Alpine's software includes design and manufacturing programs that work together to quickly produce structural framing components. Our powerful CAD-based software generates highly accurate 3D layouts that show structural framing with every component in place from any perspective. iCommand, part of the IntelliView suite, enables truss manufacturers to manage business their way with unprecedented power and flexibility.

Alpine is part of the Residential Construction (North America) Division of Illinois Tool Works Inc. (NYSE: ITW), a Fortune 250 global multi-industrial manufacturing leader of value added consumables and specialty equipment with related service businesses. Founded in 1912, ITW's recipe for success has been consistent: value added products and outstanding service win the day with customers. ITW places a high premium on the development of highly engineered products and systems – most of which are developed in tandem with customers. And the company continues to ensure that customers receive timely, cost-effective service for the innovative products ITW provides. ITW's more than 50,000 dedicated colleagues around the world thrive in our decentralized, entrepreneurial culture. In 2016, the company achieved revenues of $13.6 billion, with roughly half coming from outside North America. For more information, visit www.itw.com.

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