

MWPS-42' Truss

42' span, 4-web trusses

with plywood gussets.

CAUTION!

Additional professional services will be required to tailor this plan to your situation, including but not limited to: assurance of compliance with codes and regulations; review of specifications for materials and equipment; supervision of site selection, bid letting and construction; and provision for utilities, waste management, roads or other access. **Furthermore, any deviation from the given specifications may result in structural failure, property damage, and personal injury including loss of life.**

WARRANTY DISCLAIMER

This plan provides conceptual information only. **Neither midwest plan service nor any of the cooperating land-grant universities, or their respective agents or employees, have made, and do not hereby make, any representation, warranty or covenant with respect to the specifications in this plan.** Additional professional services will be required to tailor this plan to your situation, including but not limited to: assurance of compliance with codes and regulations; review of specifications for materials and equipment; supervision of site selection, bid letting and construction; and provision for utilities, waste management, roads or other access.

MIDWEST PLAN SERVICE
Cooperative Extension Work in Agriculture and Home Economics and Agricultural Experiment Stations of North Central Region - USDA Cooperating
42' Truss
Title Page
MIDWEST PLAN NO. 42'

42' span, 4-web trusses with plywood gussets

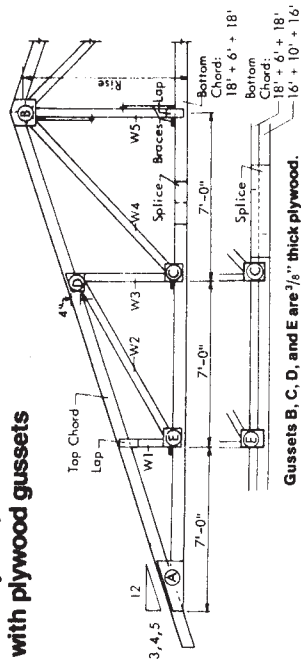


Table of lengths

Roof Slope	Top Chord	W1	W2	W3	W4	W5
3/12	18'-4"	2'	8'	4'	9'-8"	5'
4/12	18'-5"	2'	8'	5'	10'-9"	7'
5/12	18'-9"	3'	9'	6'	11'	9'

4+4, 4+6+6 indicate stacked lower chord.
4&4, 6&4 indicate double web; a 2x4 is attached to the web member to increase its stiffness.

This sheet is to help you **SELECT** and **ERECT** trusses. **DO NOT** try to **BUILD** trusses from it, because it does not include enough information on gluing, joints, splices, and fabrication. See "Designs for Glued Trusses," MWFS-9. If you buy metal-plate trusses, use their designer's data.

To select a truss:

1. estimate roof dead load
2. determine appropriate snow load
3. roof dead load plus snow load = roof design load, psf
4. select a truss to carry at least the total roof load for the lumber quality, slope, spacing, and ceiling dead load you will use.

For more information see back page and MWFS-9, Designs for Glued Trusses, 4th Edition, 1981.

1400f Lumber

Top chord	Truss spacing, ft.					Web member sizes					Gusset Sizes, in.				
	0	2	4	6	8	W1	W2	W3	W4	W5	A	B	C	D	E
2x4	2x4	2x4	2x4	2x4	2x4	2x4	2x4	2x4	2x4	2x4	3/8x3x25	8x12	8x8	8x8	8x8
2x6	2x6	2x6	2x6	2x6	2x6	2x6	2x6	2x6	2x6	2x6	3/8x16	10x12	8x10	8x10	8x10
2x8	2x8	2x8	2x8	2x8	2x8	2x8	2x8	2x8	2x8	2x8	3/8x24	10x16	10x10	10x10	10x10
2x10	2x10	2x10	2x10	2x10	2x10	2x10	2x10	2x10	2x10	2x10	3/8x24	12x16	10x10	8x8	8x8
2x12	2x12	2x12	2x12	2x12	2x12	2x12	2x12	2x12	2x12	2x12	3/8x32	16x16	12x12	10x8	10x8
2x12	2x12	2x12	2x12	2x12	2x12	2x12	2x12	2x12	2x12	2x12	3/8x32	16x20	12x12	10x8	10x8
2x12	2x12	2x12	2x12	2x12	2x12	2x12	2x12	2x12	2x12	2x12	3/8x32	18x20	16x12	12x10	12x10
2x12	2x12	2x12	2x12	2x12	2x12	2x12	2x12	2x12	2x12	2x12	3/8x32	18x20	18x12	16x10	16x10

1600f Lumber

Top chord	Truss spacing, ft.					Web member sizes					Gusset Sizes, in.				
	0	2	4	6	8	W1	W2	W3	W4	W5	A	B	C	D	E
2x4	2x4	2x4	2x4	2x4	2x4	2x4	2x4	2x4	2x4	2x4	3/8x17	8x12	8x8	8x8	8x8
2x6	2x6	2x6	2x6	2x6	2x6	2x6	2x6	2x6	2x6	2x6	3/8x20	10x16	8x10	8x10	8x10
2x8	2x8	2x8	2x8	2x8	2x8	2x8	2x8	2x8	2x8	2x8	3/8x24	12x16	10x10	8x8	8x8
2x10	2x10	2x10	2x10	2x10	2x10	2x10	2x10	2x10	2x10	2x10	3/8x24	16x20	12x12	8x10	8x10
2x12	2x12	2x12	2x12	2x12	2x12	2x12	2x12	2x12	2x12	2x12	3/8x32	18x20	16x12	12x10	12x10
2x12	2x12	2x12	2x12	2x12	2x12	2x12	2x12	2x12	2x12	2x12	3/8x32	20x20	18x14	16x10	16x10

This page is a summary of the information in "Designs for Glued Trusses," MMWPS-9. Refer to this publication before building trusses.

ROOF SLOPE (Inches of rise/inches of run)

Roof slope significantly affects the forces in the truss members. A steeper roof allows higher roof loads. **3/12 slope**—used in low snow load areas or for short spans and narrow spacings. **4/12 slope**—most common for farm buildings. **5/12 slope**—used in high snow load areas or for long spans and wide spacings.

TRUSS SPACING

Roof and ceiling materials and wall framing influence truss spacing selection. In pole buildings it is desirable to support each truss on a pole. **2' spacing** uses more material and labor. It is common for buildings with ceilings and plywood roof decks. **4' spacing** is common in insulated livestock buildings with ceilings and metal roofs and in some storage buildings. **8' spacing** is least material and labor for buildings without ceilings such as machinery storage, uninsulated livestock buildings, etc. Total costs may be greater if a ceiling is needed.

CEILING DEAD LOAD

Three ceiling dead load cases are included in the tables. **0 psf** allows for no materials in addition to the truss, bracing and stiffeners. **5 psf** ceiling dead load allows for a metal or plywood ceiling with insulation (warm livestock buildings). **8 psf** ceiling dead load allows for a gypsum board ceiling with insulation (residential or light commercial buildings).

ROOF DEAD LOAD

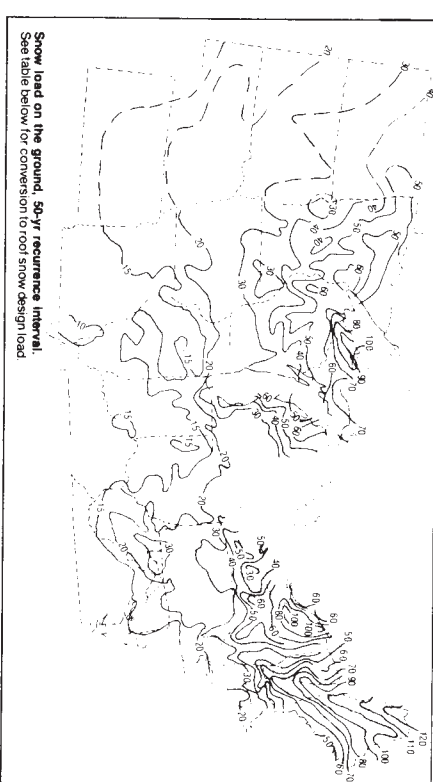
Add the weights of the truss, purlins or decking, roofing, and roof insulation to get the dead load on the top chord.

Approximate weights of trusses, psf

Example: a 4-span truss for 4' spacing with 2x6 top chord and 2x6 bottom chord weights are $1.6 \times 4 + 0.7 = 2.0$ psf. Dashed lines in table indicate example.

Board Size, in. by in.	Truss spacing		
	2'	4'	8'
2x4	1.6	0.8	0.4
2x6	2.0	1.0	0.5
2x8	2.4	1.2	0.6
2x8	2.7	1.3	0.7
2x4	3.3	1.6	0.8
2x4	4.0	2.0	1.0
2x6	4.4	2.2	1.1

Add the following for:
 2x4s, 4' Truss: 1.4
 2x4s, 8' Truss: 1.7
 6 Web Truss: 2.1



Snow load on the ground, 50-yr recurrence interval. See table below for conversion to roof snow design load.

Use the map above and the table below for determining snow load for your building.

Recommended snow loads.

Recommended by the MAPS and IRAS Committees for roofs up to about 1:12 slope for buildings outside the insulation of a building roof. Farm buildings, 50-yr map load $\times 0.9$ for 25-yr $\times 0.8$ for snow on roof. Other buildings, 50-yr map load $\times 0.8$ to convert from snow on ground to snow on roof. In areas where the map load results from a single storm without significant wind, the maximum roof load may equal the ground snow load.

Map load	Farm	Other
15	15	15
20	14.4	16
30	21.6	24
40	28.8	32
50	36.0	40
60	43.2	48
70	50.4	56
80	57.6	64
90	64.8	72
100	72.0	80
110	79.2	88
120	86.4	96

Weights of roofing and ceiling materials.

Material	Weight (psf)
Roof framing	0.7 psf
2x4 purlins 2 o.c.	1.1
2x6 purlins 2 o.c.	1.1
Ceiling framing	0.4 psf
2x4 lurring 2 o.c.	0.7
2x4 lurring 16 o.c.	0.7
Sheathing etc.	2.2 psf
1/2" lumber sub	1.4
1/2" plywood	1.4
0.024 aluminum	0.4
28 ga steel	0.9
Asphalt shingles	2.6
Insulation per inch of thickness	0.1-0.4

Wind Loads

Trusses are designed to withstand winds of 30 mph on a building less than 30' high.

LUMBER

Three lumber groups are indicated in the tables. Example of species in each group are listed below. SS = Select structural (15%) = moisture content at time of milling.

1600 Group

Species	Grade	Size
Douglas Fir—Larch	No. 1	2x4
	SS	2x6
Douglas Fir—Larch (North)	No. 1	2x4
	SS	2x6
Southern Pine (15%)	No. 2 dense	2x4
	No. 1	2x4
Southern Pine (19%)	No. 2 dense	2x6
	No. 1	2x4

1400 Group

Species	Grade	Size
Douglas Fir—Larch	No. 2	2x4
	No. 1	2x4
Douglas Fir—Larch (North)	No. 2	2x4
	No. 1	2x4
Hem—Fir	No. 1	2x4
	SS	2x6
Southern Pine (15%)	No. 2	2x4
Southern Pine (19%)	No. 2	2x6
	No. 1	2x4
Spurce—Pine—Fir	SS	2x4

1100 Group

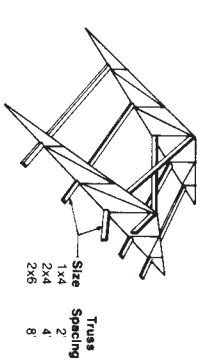
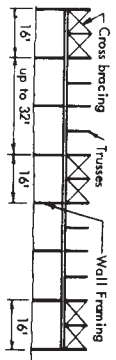
Species	Grade	Size
Douglas Fir—Larch	No. 2	2x6
Douglas Fir (North)	No. 2	2x4
	No. 2	2x6
Douglas Fir (South)	No. 2	2x4
	No. 2	2x6
Hem—Fir	No. 1	2x4
	No. 2	2x6
Hem—Fir (North)	No. 1	2x4
Hem—Fir (North)	SS	2x6
Southern Pine (15%)	No. 1	2x6
Southern Pine (19%)	No. 2	2x6
Southern Pine (19%)	No. 1	2x4
	SS	2x6

Plywood

Use exterior C-C grade 1/2" or 5/8" plywood with outer plies of Group 1 species wood. Identification in decks 2x10 and 3x16 respectively. Use 3-ply 1/2" plywood and 5-ply 1/2" plywood on use Structural 4-ply 1/2" plywood.

BUILDING CONSTRUCTION

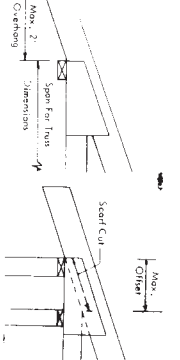
Windbracing
 Brace and anchor the trusses as they are placed. Bottom chord stiffeners are required at panel points unless a rigid ceiling is to be installed. Use king post crossbracing in all buildings.



Wind Anchorage
 Minimum fasteners for wind anchorage, both ends of each truss.

Truss Span	Truss Spacing	Truss Size
20'-30'	2	8
26'-30'	4	8
32'-46'	1A or 1B	1A or 1B
48'-50'	1A or 1B	1A or 1B
52'-60'	1A or 1B	2A or 2B
	1A or 1B	2A or 2B
	1A or 1B	4A or 2B
	1A or 1B	4A or 2B

A = metal framing anchor
 4-30d ring-shank nails = 1/2" bolt
 B = 1/2" bolt



Roof Purlins
 Stagger purlin joints for continuity across the trusses. Purlins may be laid flat with 2' and 4' truss spacings and butt joints used. Alternating purlin lengths may be used in pole buildings where the poles are spaced evenly and the trusses are not. For poles 8' o.c. they may be of alternating 16' and 18' lengths with staggered and lapped end joints if pairs of trusses are mounted on alternate sides of the poles.

