

MWPS-32'

32' span, 2-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.**

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MIDWEST PLAN SERVICE
Cooperative Extension Work in Agriculture and Home Economics and Agricultural Experiment Stations of North Central Region - USDA Cooperating
32' Truss
Title Page

32' span, 2-web trusses with plywood gussets

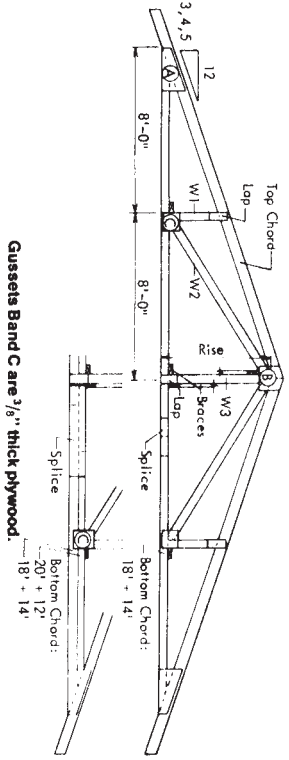


Table of lengths

Roof Slope	Rise	Chord Top	W1	W2	W3
3/12	4'-0"	17'	2'	9'+8"	4'
4/12	5'-4"	18'	3'	10'+9"	5'
5/12	6'-8"	18'	3'	10'+9"	7'

4+4, 4+6, 6+6 indicates 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," MWPS-9. If you buy metal plate trusses, use their designer's data.

1100F Lumber

Top Chord	Bottom Chord	Truss spacing, ft.						Web member sizes			Gusset Sizes, in.		
		0	5	8	0	5	8	W1	W2	W3	A	B	C
2x4	2x4	20	18	0	0	0	0	2x4	2x4	2x4	3/8x3x14	8x12	8x8
2x6	2x4	40	30	0	0	0	0	"	"	"	3/8x3x23	10x12	8x8
2x6	2x6	39	36	3x4	17	14	0	"	"	"	3/8x6x25	10x16	8x10
2x8	2x6	53	48	4x6	23	18	0	2x4	2x4	2x4	3/8x6x31	12x16	8x10
2x10	4x4	80	74	6x8	35	29	0	"	"	"	5/8x8x28	14x16	10x10
2x12	4x6	100+	98	8x8	45	39	30	2x4	2x4	"	5/8x8x36	16x16	12x12
2x12	6x6	-	-	9x0	43	38	35	21	16	0	3/8x6x35	"	16x10
2x4	2x4	22	21	0	0	0	0	2x4	2x4	2x4	3/8x3x12	8x12	8x8
2x6	2x4	46	40	0	0	0	0	"	"	"	3/8x4x20	10x12	8x10
2x6	2x6	45	42	4x1	19	17	0	"	"	"	3/8x6x22	"	"
2x8	2x6	67	63	6x3	29	26	0	2x4	2x4	2x4	3/8x6x29	14x12	10x10
2x10	4x4	93	86	8x2	40	30	0	"	"	"	5/8x8x22	14x16	12x10
2x12	4x6	100+	100+	10x0+	52	47	38	26	13	0	5/8x8x28	18x16	16x12
2x12	6x6	-	-	5x0	46	44	25	21	0	0	3/8x6x34	"	16x12
2x4	2x4	24	22	0	0	0	0	2x4	2x4	2x4	3/8x3x10	8x12	8x8
2x6	2x4	50	48	0	0	0	0	"	"	"	3/8x4x19	10x12	"
2x6	2x6	49	47	4x6	21	19	15	0	0	0	3/8x6x19	"	"
2x8	2x6	74	70	6x8	32	29	15	0	0	0	3/8x6x26	12x16	8x10
2x10	4x4	100+	96	8x6	45	38	0	2x4	2x4	2x4	5/8x8x21	14x16	10x10
2x12	4x6	-	-	10x0+	56	51	46	28	16	0	5/8x8x27	18x16	14x10
2x12	6x6	-	-	5x0	51	49	28	24	0	0	3/8x6x30	"	16x10

- 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 MWPS-9, Designs for Glued Trusses, 4th Edition, 1981.

1400F Lumber

Top Chord	Bottom Chord	Truss spacing, ft.						Web member sizes			Gusset Sizes, in.		
		0	5	8	0	5	8	W1	W2	W3	A	B	C
2x4	2x4	25	23	21	0	0	0	2x4	2x4	2x4	3/8x3x18	8x12	8x8
2x6	2x4	50	47	22	0	0	0	"	"	"	5/8x6x16	10x16	8x10
2x6	2x6	48	45	4x3	21	18	16	0	0	0	3/8x6x30	"	"
2x8	2x6	70	63	6x0	30	25	19	0	0	0	2x4	2x4	2x4
2x10	4x4	99	91	9x1	43	38	13	0	0	0	4x4	"	4x4
2x12	4x6	-	-	10x0+	55	50	48	27	20	0	"	"	5/8x8x29
2x12	6x6	-	-	5x2	48	45	26	22	17	0	3/8x6x38	"	16x12
2x4	2x4	28	26	25	12	0	0	2x4	2x4	2x4	3/8x3x15	8x12	8x8
2x6	2x4	57	54	3x4	25	11	0	"	"	"	5/8x6x17	10x12	8x10
2x6	2x6	56	53	5x1	24	21	20	0	0	0	3/8x6x26	12x12	10x10
2x8	2x6	83	78	7x5	36	33	27	0	0	0	2x4	2x4	2x4
2x10	4x4	100+	100+	10x0+	50	46	18	25	0	0	4x4	"	4x4
2x12	4x6	-	-	6x2	64	58	56	31	26	0	"	"	5/8x8x29
2x12	6x6	-	-	5x6	56	54	31	26	23	0	5/8x6x34	"	18x12
2x4	2x4	30	28	28	13	0	0	2x4	2x4	2x4	3/8x3x13	8x12	8x8
2x6	2x4	62	60	45	27	0	0	"	"	"	5/8x6x13	10x12	"
2x6	2x6	61	58	57	26	24	23	13	0	0	4x4	"	4x4
2x8	2x6	92	87	8x4	40	38	34	20	0	0	2x4	4x4	2x4
2x10	4x4	100+	100+	10x0+	55	52	26	27	0	0	4x4	"	4x4
2x12	4x6	-	-	6x4	65	61	35	31	0	0	"	"	5/8x8x27
2x12	6x6	-	-	6x9	64	61	36	30	28	0	"	"	5/8x8x28

1600F Lumber

Top Chord	Bottom Chord	Truss spacing, ft.						Web member sizes			Gusset Sizes, in.		
		0	5	8	0	5	8	W1	W2	W3	A	B	C
2x4	2x4	30	28	26	13	0	0	2x4	2x4	2x4	3/8x3x21	8x12	8x8
2x6	2x4	60	57	42	26	0	0	"	"	"	5/8x6x19	10x16	8x10
2x6	2x6	58	54	5x2	25	22	20	0	0	0	"	"	3/8x6x35
2x8	2x6	84	76	7x2	36	31	29	0	0	0	2x4	2x4	2x4
2x10	4x4	100+	100+	10x0+	52	48	26	26	0	0	4x4	"	4x4
2x12	4x6	-	-	6x7	61	58	33	29	0	0	5/8x8x39	14x20	12x12
2x12	6x6	-	-	6x3	58	55	32	27	24	0	5/8x6x34	18x24	16x14
2x4	2x4	33	32	30	14	0	0	2x4	2x4	2x4	3/8x3x18	8x12	8x10
2x6	2x4	68	65	5x1	29	17	0	"	"	"	5/8x6x17	10x16	8x10
2x6	2x6	66	63	6x1	29	26	24	0	0	0	4x4	"	4x4
2x8	2x6	100	94	9x0	43	39	35	14	0	0	2x4	4x4	2x4
2x10	4x4	-	-	10x0+	60	55	41	30	0	0	"	"	5/8x8x32
2x12	4x6	-	-	7x0	70	66	38	34	15	0	"	"	5/8x8x35
2x12	6x6	-	-	7x4	68	65	37	33	30	0	"	"	5/8x6x36
2x4	2x4	35	34	34	15	0	0	2x4	2x4	2x4	3/8x3x16	8x12	8x8
2x6	2x4	74	71	6x3	32	0	0	"	"	"	5/8x6x15	10x16	8x10
2x6	2x6	73	69	6x8	31	29	28	13	0	0	4x4	"	4x4
2x8	2x6	100+	100+	10x0	48	45	43	29	18	0	2x4	4x4	2x4
2x10	4x4	-	-	6x6	62	59	33	0	0	0	"	"	5/8x8x21
2x12	4x6	-	-	6x8	78	78	42	38	23	0	"	"	5/8x8x25
2x12	6x6	-	-	8x3	78	73	41	37	35	0	"	"	5/8x8x32

This page is a summary of the information in "Designs for Glued Trusses," MWPS-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 uses least material and labor for buildings without ceilings such as machinery storages, un-insulated livestock buildings, etc. Total cost 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).

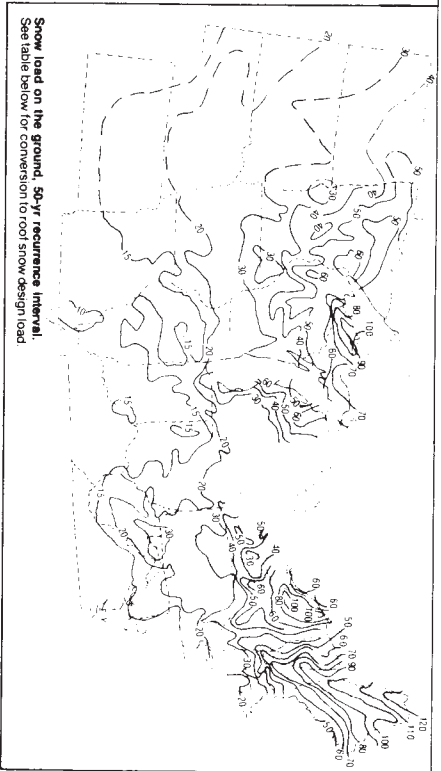
ROOF DEAD LOAD

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-web truss for 4 spacing with 2x8 top chord and 2x6 bottom chord weighs about $13 + 0.7 = 20$ psf. Dashed lines in table indicate example.

Chord size Top Bottom	Truss spacing	
	2'	4'
2x6 2x4	1.6	0.8
2x6 2x4	2.0	1.0
2x6 2x6	2.4	1.2
2x8 2x6	2.7	1.3
2x10 2x4x2x6	3.1	1.6
2x12 2x4x2x6	4.0	2.0
2x12 2x6x2x6	4.4	2.2

Add the following for:
 2x4x6-Web Truss 1.4 0.7 0.4
 6-Web Truss 2.1 1.2 0.6



SNOW LOAD

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

Recommended snow loads

Recommended by the MWPS and NDS Committees for roofs up to about 1 1/2 slope for buildings outside the jurisdiction of a building code.

1. Douglas Spruce—Map load of 0.9 for 25' x 0.9 for snow on roof. Other buildings—50 psf map load x 0.8 to convert from snow on ground to snow on roof.

2. Minimum recommended load is 12 psf.

In areas where all of the maximum snow load results from a single storm without significant wind, the maximum roof load may equal the ground snow load.

Map load	Roof snow load		
	Farm	Other	Other
15	12.0	12	12
20	14.4	16	16
30	21.6	24	24
40	28.8	32	32
50	36.0	40	40
60	43.2	48	48
70	50.4	56	56
80	57.6	64	64
90	64.8	72	72
100	72.0	80	80
110	79.2	88	88
120	86.4	96	96

Weights of roofing and ceiling materials.

Roof framing		
2x4 purlins 2 o.c.	0.7 psf	
2x6 purlins 2 o.c.	1.1	
Ceiling framing		
1x3 lurring 16 o.c.	0.4 psf	
2x4 lurring 2 o.c.	0.7	
Sheathing, etc.		
1 lumber solid plywood	2.2 psf	
1/2 plywood	1.1	
0.024 aluminum	0.4	
28 ga steel	0.9	
Asph/Flt shingles	2.6	
Insulation per inch of thickness	0.1-0.4	

Wind Loads

Trusses are designed to withstand winds of 80 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.

2x6 + = 2x6, 2x8, 2x10, 2x12
 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	2x6
Southern Pine (19%)	No. 2 dense	2x4
	No. 1	2x6

1400 Group

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

1100 Group

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

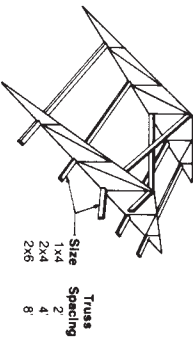
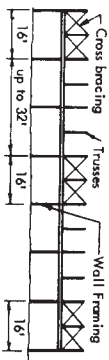
Plywood

Use exterior C-C grade 1/2" or 5/8" plywood with outer plies of Group 1 species wood. Identification indexes, 240 and 321/6 respectively.

Use 3-ply 1/2" plywood and 5-ply 1/2" plywood or use Structural I, 4-ply, 1/2" plywood.

BUILDING CONSTRUCTION

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

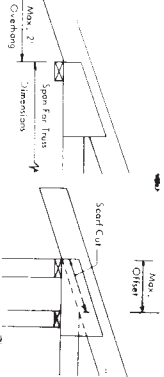
Minimum fasteners for wind anchorage, both ends of each truss.

Truss Span	Truss Spacing	Truss Size
20'-24'	2	2x4
25'-30'	4	2x4
32'-46'	4	2x6
48'-50'	4	2x6
52'-60'	4	2x6

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

Overhang

For a 2' to 4' overhang, use the top chord and heel gusset design for a V-larger snow load.



Roof Purlins

Slagger 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 16' and 18' lengths with staggered and lapped end joints if pairs of trusses are mounted on alternate sides of the poles.

