Iowa FFA Agricultural Mechanics Career Development Event
2005

State of Iowa
DEPARTMENT OF EDUCATION
Career Education Division
Grimes State Office Building
Des Moines, IA 50319

CONESTENT NAME _____

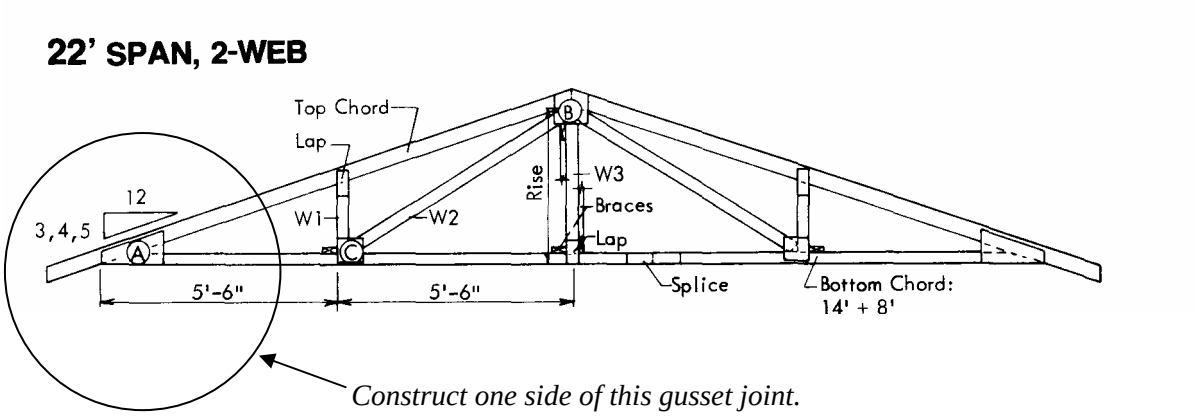
CONTESTANT SCHOOL _____

STRUCTURAL SYSTEMS

Wood Construction – Truss Rafter for a Chemical Storage Building
(15 minutes)

Your job is to layout, cut and nail together a heel gusset (A) for a truss in a chemical storage building. It is a 2-web, 22-ft span truss using a 5/12 slope, 2-ft truss spacing, 0 psf ceiling dead load and 44 psf maximum snow + roof dead load, with 2x4 1100f lumber. Use the fact sheet printed on the back to determine sizes and construction procedures for the heel gusset.

1. Determine the required length (in feet) of the top chords. Record it here: _____ (feet)
2. Use the shortened top chord provided (do not make any cuts on it). Measure and cut the angle on the bottom chord from the 2x4 provided.
3. Layout and cut <u>one</u> of the two gussets from the plywood furnished.
4. Nail the one gusset to the upper chord and bottom chord, as shown, with 5 nails, just to hold it together.



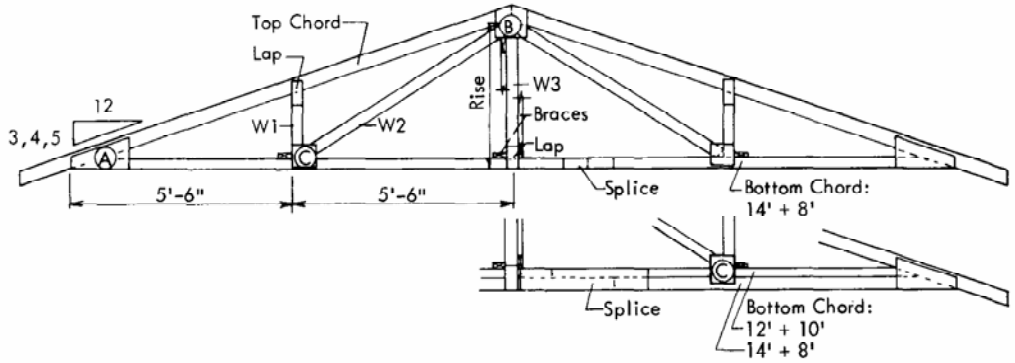
Construct one side of this gusset joint.

Use the tools, materials, and sawhorse at your work station to complete this job. When completed turn in your skill sheet and completed job for evaluation and leave your work station in order.

EVALUATION SCORE SHEET

ITEM	POINTS POSSIBLE	POINTS EARNED
1. Length of top chord	3	_____
2. Layout (angle) of bottom chord	6	_____
3. Size and angles of gussets	6	_____
4. Face grain of gusset to bottom chord	2	_____
5. Location of gusset on chords	3	_____
6. Correct number of nails and proper nailing of gusset to chords	2	_____
7. Use of tools, safety and work habits	3	_____
.....TOTAL	25	

Fact Sheet for 22-ft span, 2-web glued truss



Gussets B and C are $^3/_8$" thick plywood.

Web Lengths

Roof Slope	Rise	Top Chord	W1	W2	W3
3/12	2'-9"	12'	2'	6'	3'
4/12	3'-8"	12'	2'	7'	4'
5/12	4'-7"	13'	2'	7'	5'

1100f Lumber

	Top chord	Bottom chord	Truss spacing, ft. 2' Ceiling dead load, psf 0	2' 5	2' 8	4' 0	4' 5	4' 8	8' 0	8' 5	8' 8	Web member sizes W1	W2	W3	Gusset Sizes, in. A T H W	B H W	C H W
			---Max. snow + roof dead load, psf---														
3/12 Slope	2x4	2x4	36	33	31	15	12	0	0	0	0	2x4	2x4	2x4	3/8x3½x16	8x12	8x8
	2x6	2x4	61	59	54	26	15	0	13	0	0	"	"	"	3/8x4x23	10x12	"
	2x6	2x6	67	62	59	29	25	23	14	0	0	"	"	"	3/8x4x26	"	"
	2x8	2x6	85	77	72	37	32	29	18	13	0	2x4	2x4	2x4	3/8x4x31	12x12	8x8
	2x10	4+4	100+	100+	100+	58	51	46	29	16	0	"	"	"	½x4x28	14x16	10x10
	2x12	4+6	–	–	–	73	66	62	36	31	24	"	"	"	3/8x4x47	16x16	12x10
	2x12	6+6	–	–	–	74	66	62	37	31	27	"	"	"	3/8x4x50	"	14x10
4/12 Slope	2x4	2x4	41	39	37	17	15	0	0	0	0	2x4	2x4	2x4	3/8x3½x14	8x12	8x8
	2x6	2x4	81	76	74	35	22	0	17	0	0	"	"	"	3/8x4x23	10x12	8x10
	2x6	2x6	78	73	70	34	30	28	17	13	0	"	"	"	3/8x4x23	"	"
	2x8	2x6	100+	100+	100+	51	47	45	25	21	0	2x4	2x4	2x4	½x4x18	14x12	8x10
	2x10	4+4	–	–	–	70	64	58	35	22	0	"	"	"	½x4x22	16x12	12x10
	2x12	4+6	–	–	–	92	83	82	46	40	32	"	"	"	½x4x28	16x16	14x10
	2x12	6+6	–	–	–	88	80	76	44	39	36	"	"	"	½x4x34	"	16x10
5/12 Slope	2x4	2x4	44	43	41	19	17	0	0	0	0	2x4	2x4	2x4	3/8x3½x12	8x12	8x8
	2x6	2x4	89	83	83	38	29	0	19	0	0	"	"	"	3/8x4x21	10x12	"
	2x6	2x6	86	81	78	37	34	32	18	16	0	"	"	"	3/8x4x21	10x16	8x10
	2x8	2x6	100+	100+	100+	56	52	50	28	24	13	2x4	2x4	2x4	½x4x16	12x16	8x10
	2x10	4+4	–	–	–	77	71	67	38	31	0	"	"	"	½x4x19	14x16	10x10
	2x12	4+6	–	–	–	100	91	92	50	45	38	"	"	"	½x4x24	16x16	12x10
	2x12	6+6	–	–	–	–	88	88	48	44	41	"	"	"	½x4x28	"	16x10