

Detail of outside rafters

$$a = 2.8125' = \text{const}$$

$$b = .6570'$$

$$c = .5000'$$

$$d = .5000'$$

$$e = 7.75', e^2 = 60.0625$$

$$(a-b) = 2.1555, (a-b)^2 = 4.6462 = \log^{-1}.66710$$

$$(d-c) = 0$$

$$2(a-b)(d-c) = 0$$

$$4(a-b)^2(d-c)^2 = 0$$

$$-4[(a-b)^2 + e^2][(d-c)^2 - e^2] = 4.64.7087.60.0625$$

$$= \log^{-1} 4.19163$$

$$\log^{-1} 2.09582 = \frac{12469}{129.42} = \log^{-1} 9.98382 - 10$$

$$2[(a-b)^2 + e^2] = \frac{129.42}{2} = \log^{-1} 9.98382 - 10 = \cos^2 \theta$$

$$\theta = 15^\circ 32\frac{2}{3}'$$

$$\cos \theta = .963425 = \log^{-1} 9.98382 - 10$$

$$\sin \theta = .26799 = \log^{-1} 9.42811 - 10$$

$$\tan \theta = .27816 = \log^{-1} 9.44430 - 10$$

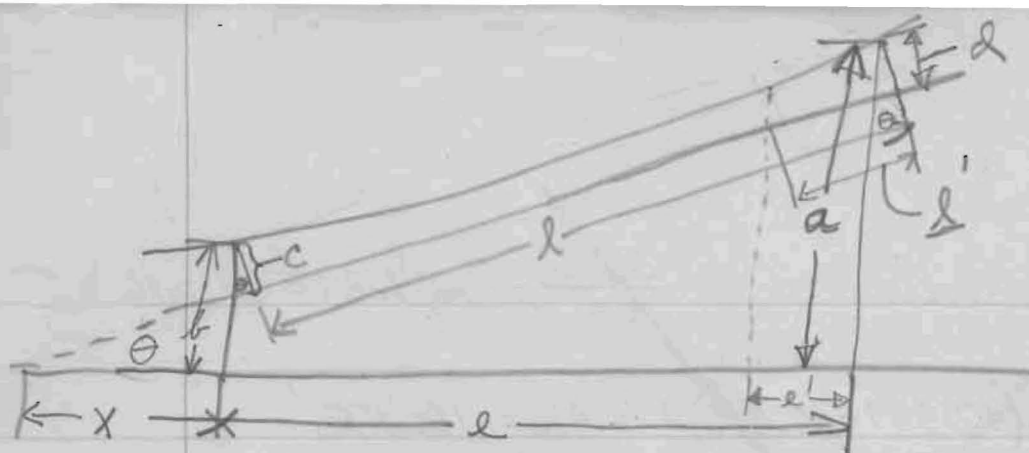
$$1/\cos \theta = 1.0380 = \log^{-1} .01618$$

$$d \tan \theta = .0811' \text{ where } d = 3\frac{1}{2}''$$

detail of outside rafters.

Fut radius	e	$e \sin \theta$	b	$(a-b) \cos \theta$	c
7.25	7.75	2.07692	.6570	2.0863	.49062
8.	7	1.87593	.8000	1.9389	.43703
9	6	1.60794	1.0125	1.7342	.37374
10	5	1.33995	1.2500	1.5054	.33455
11	4	1.07206	1.5125	1.2525	.31956
12	3	.80397	1.8000	.97548	.32849
13	2	.53598	2.1125	.67440	.36158
14	1	.26799	2.4500	.34925	.41874
15	0	0	2.8125	0	.50000
15.67	-.67	-.1786	3.070	-.257	.578

c	l	$e / \cos \theta$	$(l-c) \tan \theta$	l
5 $\frac{7}{8}$ "	8' 9 $\frac{9}{16}$ "	8.0443	.0025	8.0468'
5 $\frac{1}{4}$ "	7' 3 $\frac{3}{8}$ "	7.2660	.0176	7.2836
4 $\frac{1}{2}$ "	6' 3 $\frac{3}{16}$ "	6.2280	.0363	6.2643
4 "	5' 2 $\frac{9}{16}$ "	5.1700	.0459	5.2159
3 $\frac{13}{16}$ "	4' 2 $\frac{1}{4}$ "	4.1420	.0524	4.1944
3 $\frac{15}{16}$ "	3' 1 $\frac{15}{16}$ "	3.1140	.0479	3.1619
4 $\frac{1}{4}$ "	2' 1 $\frac{3}{8}$ "	2.0760	.0386	2.1146
5 "	1' 3 $\frac{3}{4}$ "	1.0380	.0225	1.0605
6 "	0	0	0	0
6 $\frac{15}{16}$ "	- 8 $\frac{9}{16}$ "	-.6925	-.0217	-.7142



$$\frac{(a - d/\cos\theta)}{x + e} = \tan\theta = \frac{(b - c/\cos\theta)}{x}$$

$$x = \frac{(a - d/\cos\theta)}{\tan\theta} - e = \frac{(b - c/\cos\theta)}{\tan\theta}$$

$$a - d/\cos\theta - e \tan\theta = b - c/\cos\theta$$

$$a \cos\theta - d - e \sin\theta = b \cos\theta - c$$

$$(a - b) \cos\theta - e \sin\theta = d - c$$

$$\sin\theta = \sqrt{1 - \cos^2\theta}$$

$$(a - b) \cos\theta - e \sqrt{1 - \cos^2\theta} = (d - c)$$

$$(a - b) \cos\theta - (d - c) = e \sqrt{1 - \cos^2\theta}$$

$$(a - b)^2 \cos^2\theta - 2(a - b)(d - c) \cos\theta + (d - c)^2 = e^2 (1 - \cos^2\theta)$$

$$[(a - b)^2 + e^2] \cos^2\theta - 2(a - b)(d - c) \cos\theta + [(d - c)^2 - e^2] = 0$$

$$\cos\theta = \frac{2(a - b)(d - c) \pm \sqrt{4(a - b)^2(d - c)^2 - 4[(a - b)^2 + e^2][(d - c)^2 - e^2]}}{2[(a - b)^2 + e^2]}$$

$$c = d + e \sin\theta - (a - b) \cos\theta$$

$$l = e/\cos\theta + (d - c) \tan\theta$$

$$l' = e'/\cos\theta + d \tan\theta$$