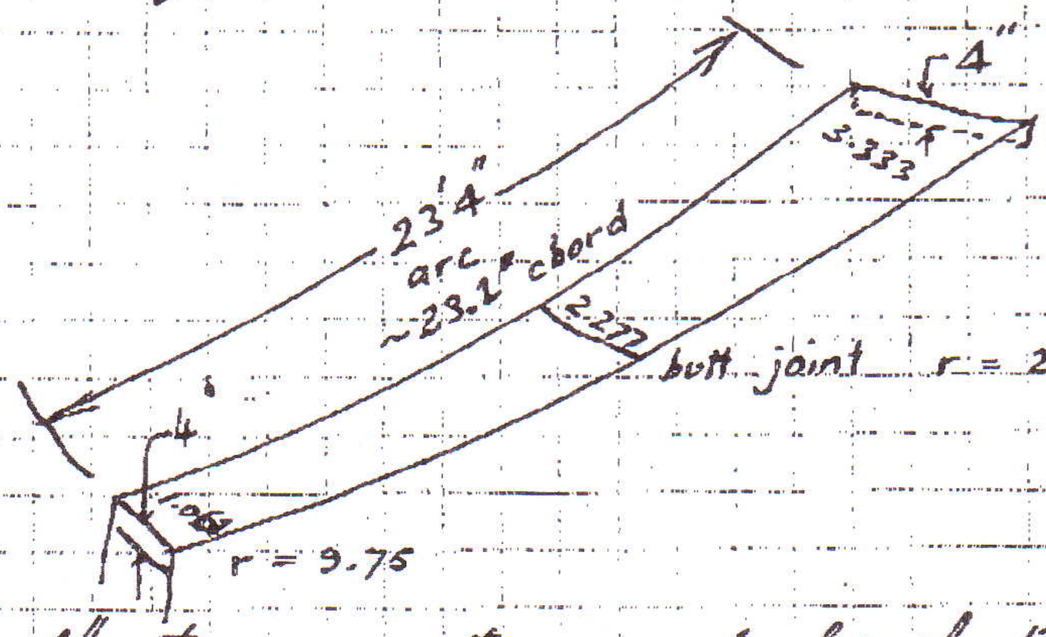
Composite Truss-Panel Design

This design uses 12×4 sheet aluminum which is procurable without delay. There will be 56 identical sectors

$$\frac{360}{56} = 6\frac{3}{7}°$$



Allowing 4" turn over at one end of each 12 ft. sheet, arc covered is 23'4". Corresponding chord is abt. 23.2 ft.

At outer rim allow 4" turn over. Then width is 3'4"

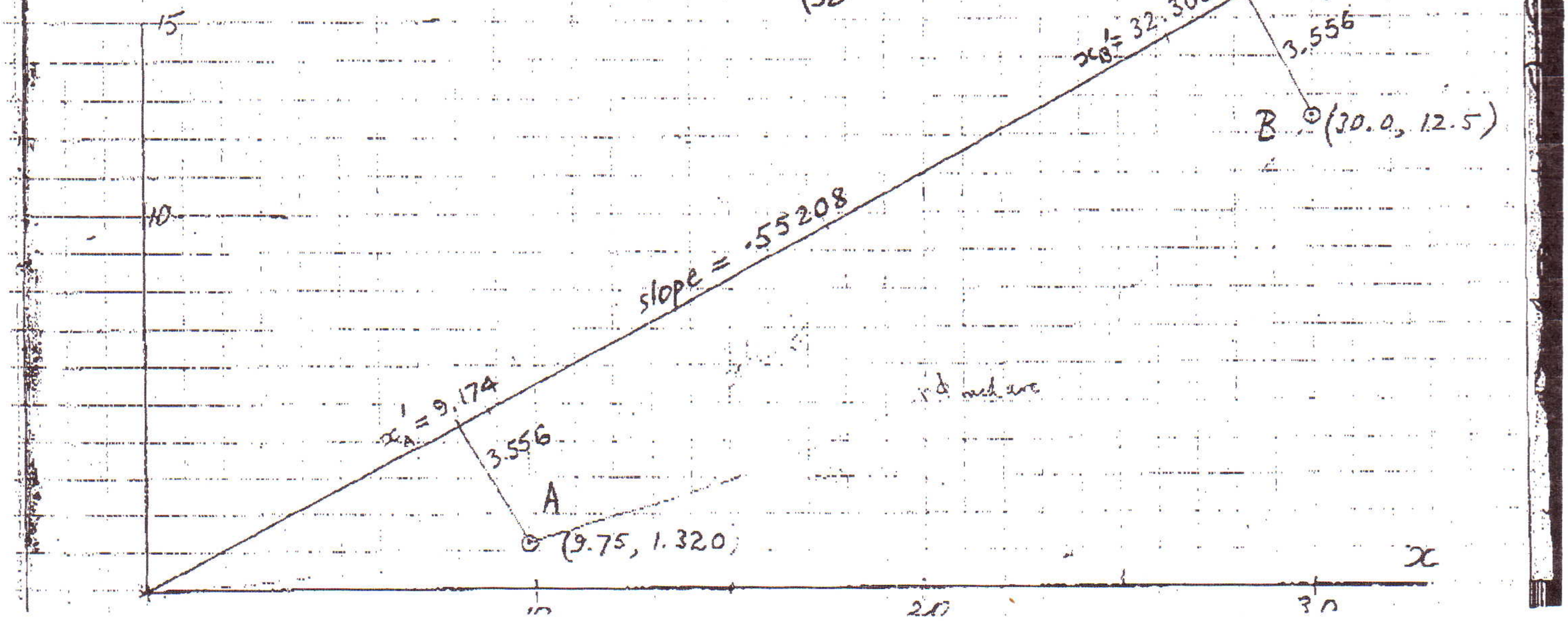
$$\text{Perimeter}/56 = \frac{\pi \times 60}{56} = 3.366$$

Gap between sectors $\underline{0.033}$ ft. = 0.4 in

$\underline{3.333}$ = 3'4"

$$\text{Width at butt joint} = \left(\frac{20.5}{30} \times 3.366\right) - .033 = 2.277 \text{ ft.}$$

$$\text{Width at narrow end} = \left(\frac{9.75}{30} \times 3.366\right) - .033 = 1.061 \text{ ft.} = 12.73"$$



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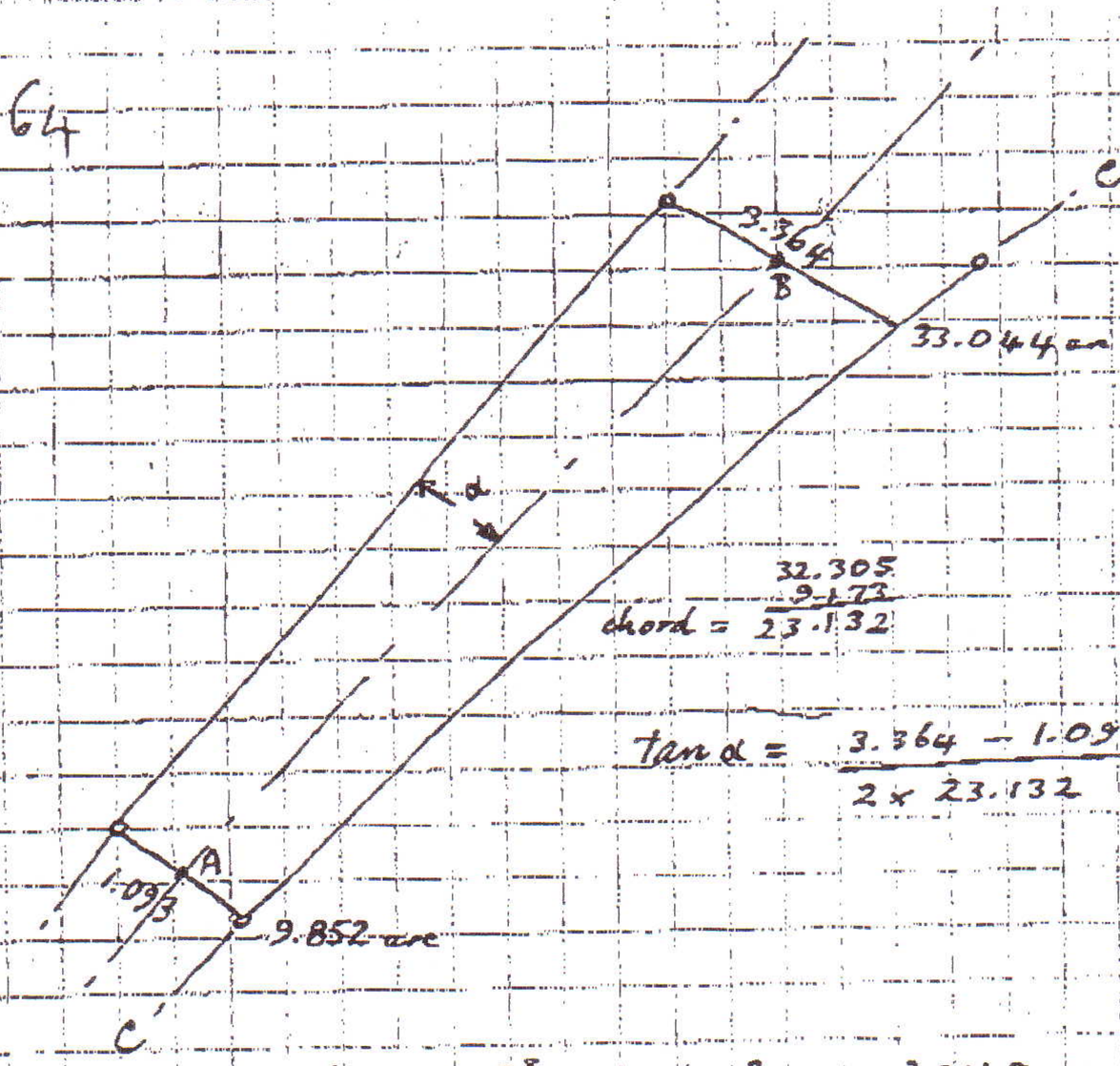


chord = 32.305 − 9.173 = 23.132

$$\tan\alpha = \frac{3.364 - 1.093}{2 \times 23.132} = \frac{2.271}{46.264} = .4909$$

$\alpha = 2^\circ 49' = 2.817^\circ$

Check: $3\frac{3}{14} \cos 28.9^\circ = 3.2143 \cos 28.9^\circ = 2.814^\circ$

Note: α is angle between ℄'s not parcel edges

Assume a horizontal ref. plane through A, B. Where does the axial plane on CC cut the ref. plane

Ref plane $z' = -42.68'$

Axial plane $y = mx$ $\quad m = \tan 3.2143^\circ = 3^\circ 13'$

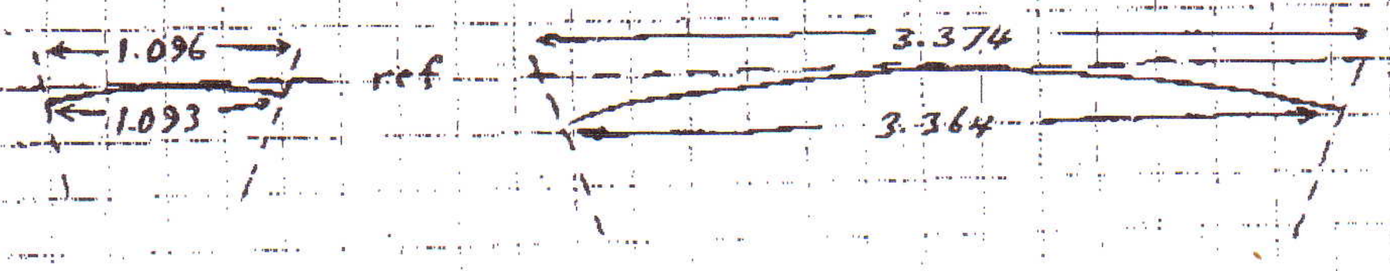
Eliminate z' $\quad = m(Kx' - Sz')$ $\quad K = .87544$ $\quad S = .48332$

$y = mK x' + mS\ 42.68$

$= .0492\, x' + 1.16$

$x' = 9.173$ $\quad y = .451 + .087 = .548$ ft $\quad (1.096)$

$x' = 32.305$ $\quad y = 1.588 + .097 = 1.687$ ft $\quad (3.374)$



The

X		
9.		
9.		
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13.		
13.	$\frac{35622}{66525}$	
14.	$.49097$	
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27.	$\frac{9.94224}{50709}$	
27	$.44933$	
28		
28	$\frac{8.74974}{-.94223}$	
29	8.69197	
29	1.74974	
30	$-.68424$	
30	1.63022	
31	$.06420$	
31		
32		
32		