

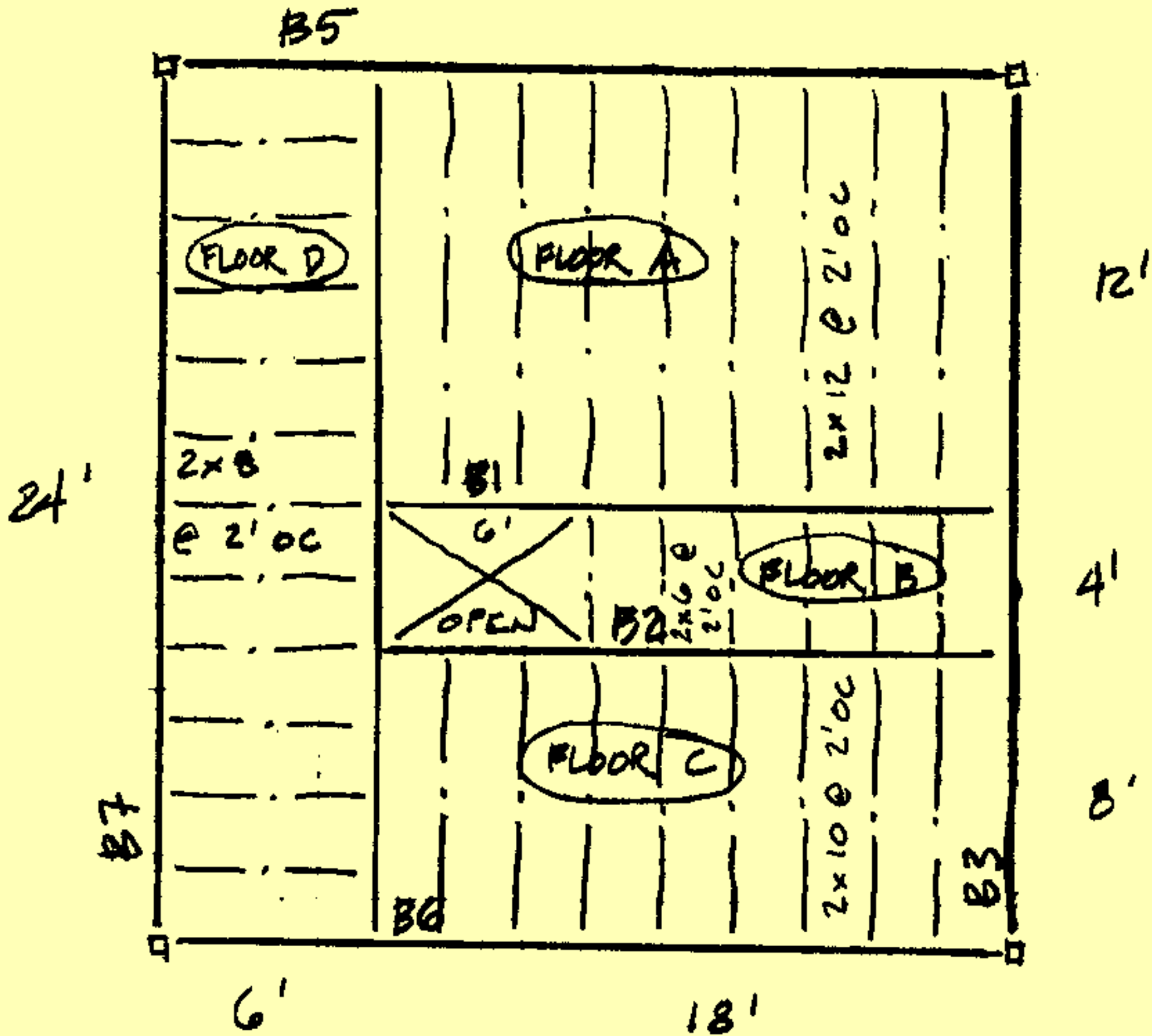
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22-141 50 SHEETS  
 22-142 100 SHEETS  
 22-144 200 SHEETS



FLOOR LOAD 100 PSF

EXTERIOR WALL 300 PSF

B1 - B7, GLULAM BEAMS

JOISTS

$$F_b = 1200 \text{ psi}$$

$$F_v = 90 \text{ psi}$$

CHECK FLEXURE  
 AND SHEAR STRESS  
 IN ALL MEMBERS

GLULAM

$$F_b = 2000 \text{ psi}$$

$$F_v = 135 \text{ psi}$$

## CHECK JOISTS

FLOOR (A)

$$\begin{aligned} \text{SPAN} = l &= 12' \\ \text{o.c.} &= 2' \\ \text{SIZE} &= 2 \times 12 \\ S &= 31.64 \\ A &= 16.88 \end{aligned}$$

$$M = \frac{wl^2}{8} = \frac{(200)12^2}{8} = 3600 \text{ ft} \cdot \text{lb}$$

$$f_b = M/S = 3600 \times 12 / 31.64 = 1365 > 1200$$

$\therefore$  NO GOOD!  
TRY SMALLER O.C. SPACING

FLOOR (B)

$$\begin{aligned} \text{SPAN} = l &= 4' \\ \text{o.c.} &= 2' \\ \text{SIZE} &= 2 \times 6 \\ S &= 7.56 \\ A &= 8.25 \end{aligned}$$

$$M = \frac{wl^2}{8} = \frac{200(4)^2}{8} = 400 \text{ ft} \cdot \text{lb}$$

$$f_b = M/S = 400 \times 12 / 7.56 = 635 < 1200$$

$$V = \frac{wl}{2} = \frac{200(4)}{2} = 400$$

$$f_v = \frac{3}{2} \frac{V}{A} = 1.5 \frac{400}{8.25} = 72.7 < 90 \checkmark$$

$\therefore$  2x6 OK  $\checkmark$

FLOOR (C)

$$\begin{aligned} \text{SPAN} = l &= 8' \\ \text{o.c.} &= 2' \\ \text{SIZE} &= 2 \times 10 \\ S &= 21.39 \\ A &= 13.88 \end{aligned}$$

$$M = \frac{wl^2}{8} = \frac{200(8)^2}{8} = 1600 \text{ ft} \cdot \text{lb}$$

$$f_b = M/S = 1600(12) / 21.39 = 897.6 < 1200$$

$$V = \frac{wl}{2} = \frac{200 \cdot 8}{2} = 800$$

$$f_v = \frac{3}{2} \frac{V}{A} = 1.5 \frac{800}{13.88} = 86 < 90 \checkmark$$

$\therefore$  2x10 OK

FLOOR (D)

$$\begin{aligned} \text{SPAN} = l &= 6' \\ \text{o.c.} &= 2' \\ \text{SIZE} &= 2 \times 8 \\ S &= 13.14 \\ A &= 10.88 \end{aligned}$$

$$M = \frac{wl^2}{8} = \frac{200 \cdot 6^2}{8} = 900 \text{ ft} \cdot \text{lb}$$

$$f_b = M/S = 900 \times 12 / 13.14 = 822 \text{ psi} < 1200 \checkmark$$

$$V = \frac{wl}{2} = \frac{200 \cdot 6}{2} = 600 \text{ lb}$$

$$f_v = \frac{3}{2} \frac{V}{A} = 1.5 \frac{600}{10.88} = 82.7 < 90 \checkmark$$

$\therefore$  USE 2x8  $\checkmark$

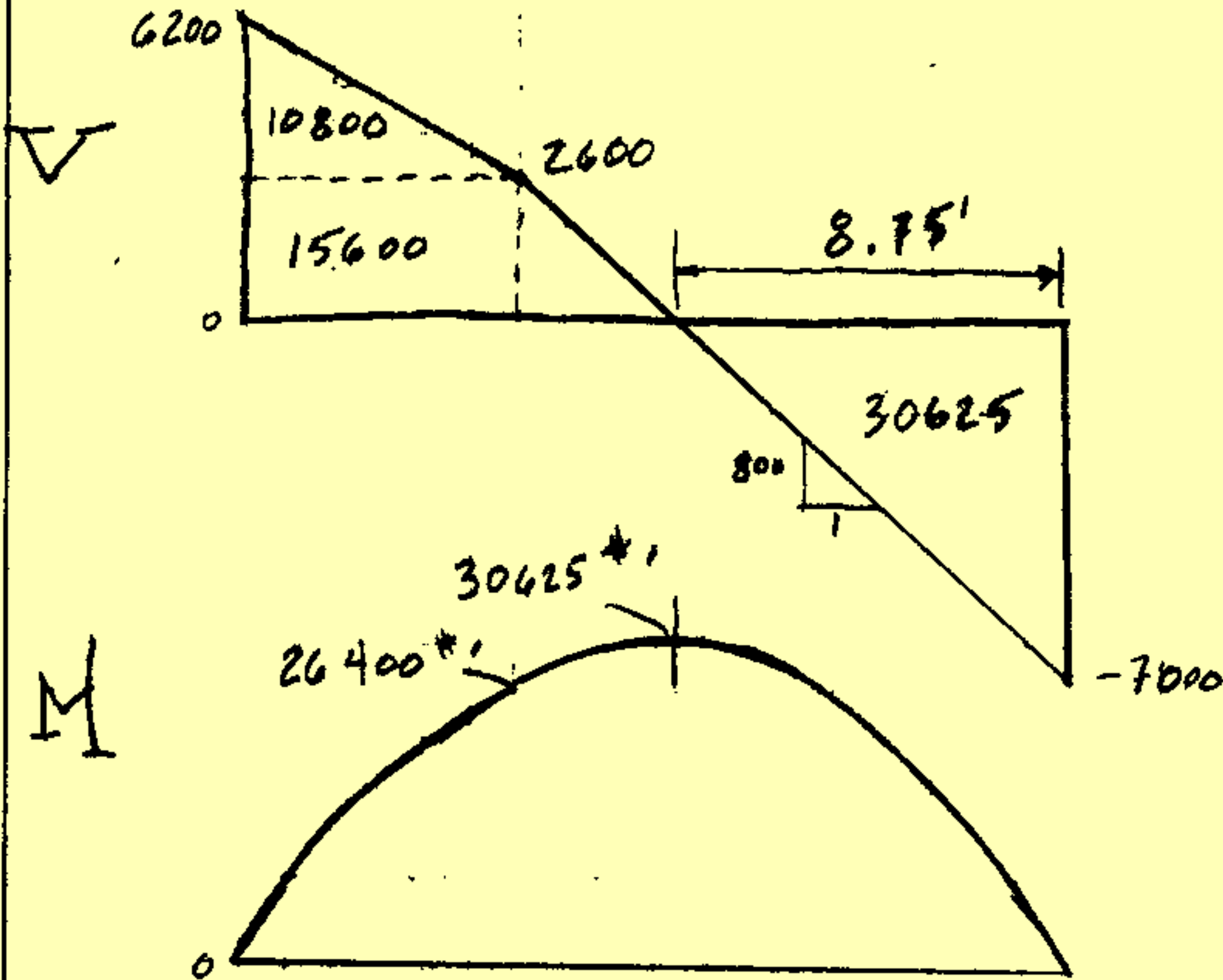
B1

$$w_2 = 200 \text{ lb/ft} = 2400$$

$$w_1 = 600 \text{ lb/ft} = 10800$$

$$\begin{array}{r} 5400 \\ + 1800 \\ \hline 7200 \end{array} \uparrow$$

$$\begin{array}{r} 5400 \\ + 600 \\ \hline 6000 \end{array} \uparrow$$



BENDING:

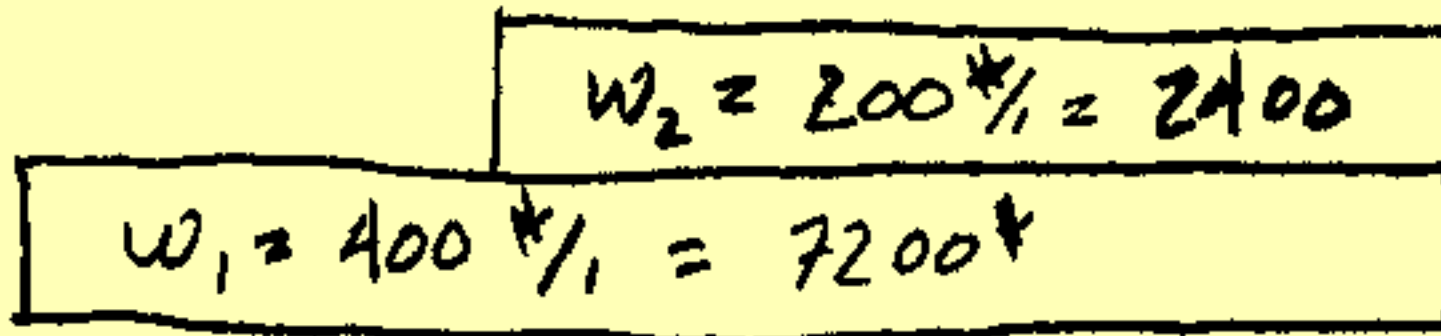
$$F_b = 2000 = \frac{M}{S} ; S = \frac{30625 \times 12}{2000} = 183.72 \text{ in}^3$$

SHEAR:

$$F_v = 135 = \frac{3}{2} \frac{V}{A} ; A = 77.8 \text{ in}^2 \leftarrow \text{CONTROLS}$$

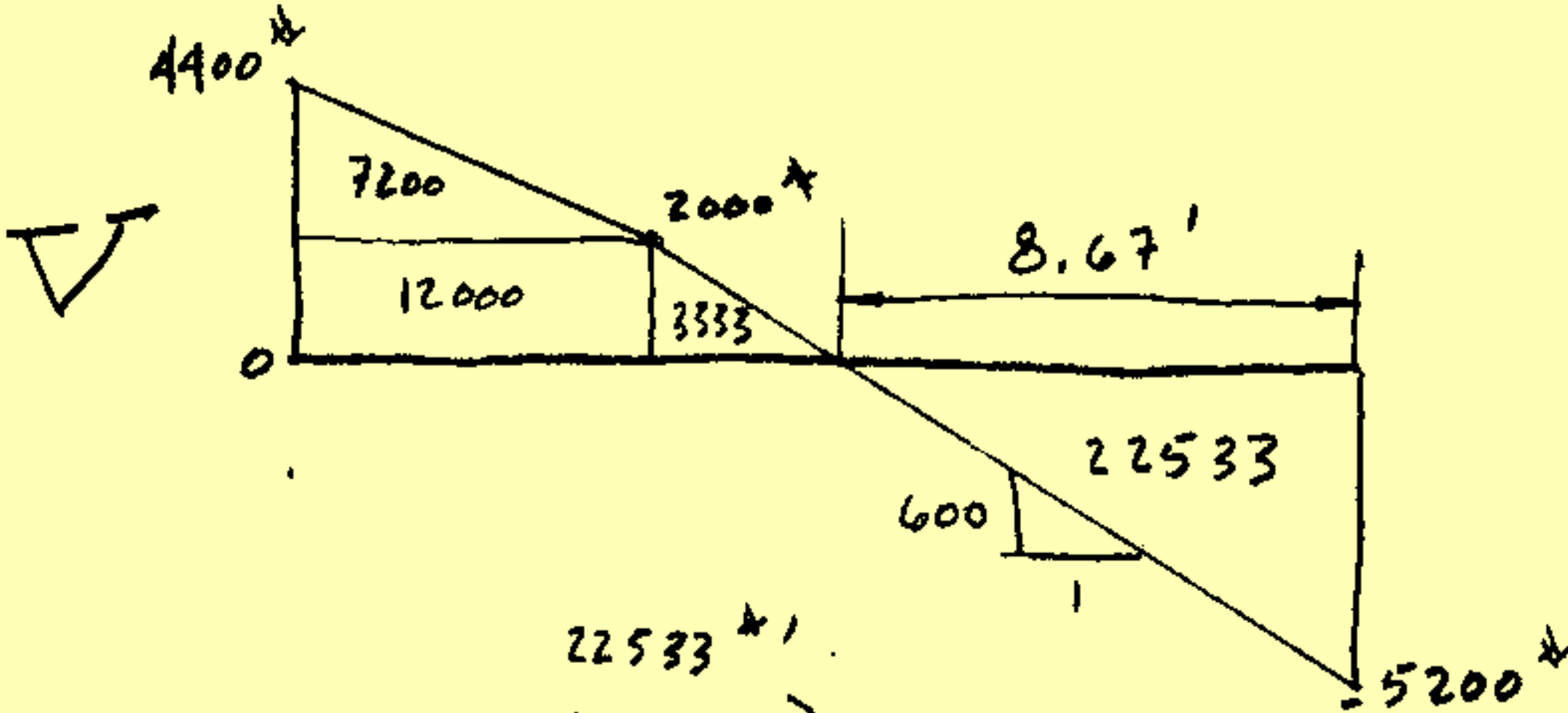
USE  $5 \frac{1}{8} \times 16 \frac{1}{2}$

B2

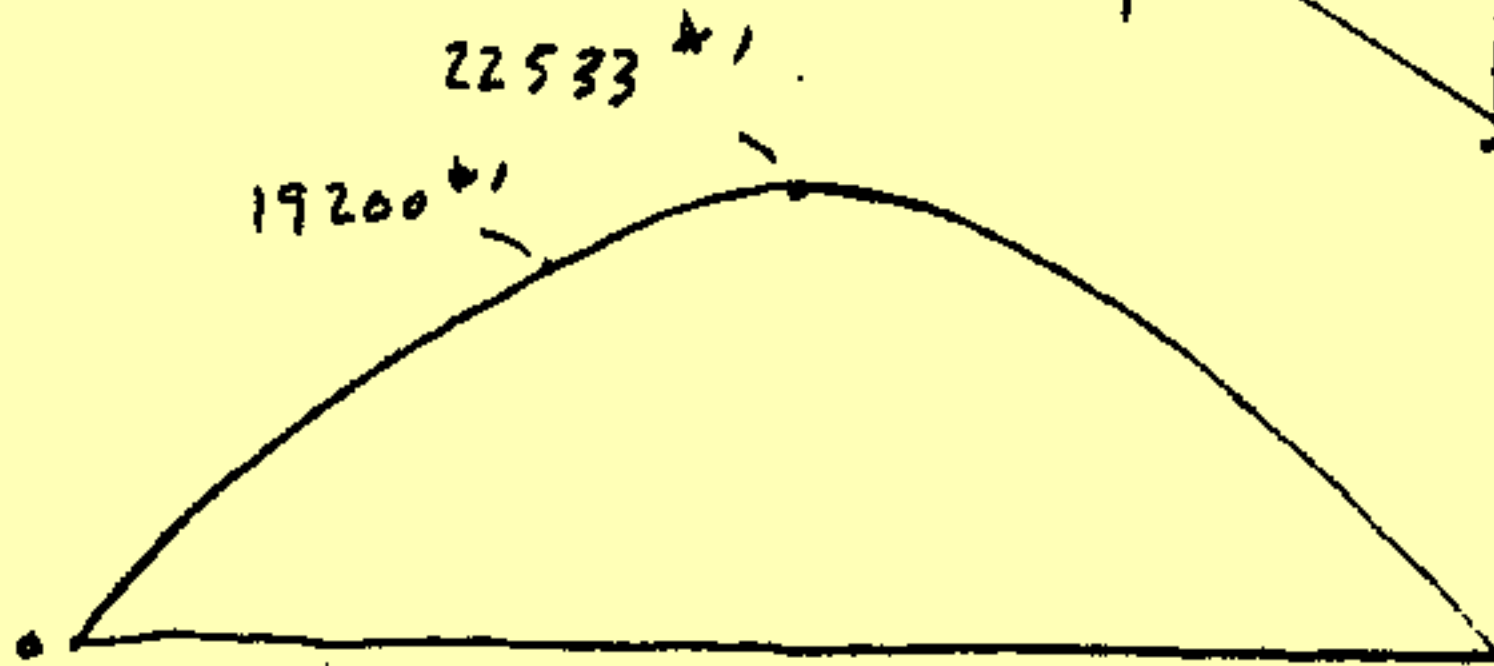


$$\begin{array}{r} 3600 \\ 800 \\ \hline 4400 \end{array} \uparrow$$

$$\begin{array}{r} 3600 \\ 1600 \\ \hline 5200 \end{array} \uparrow$$



M



BENDING:

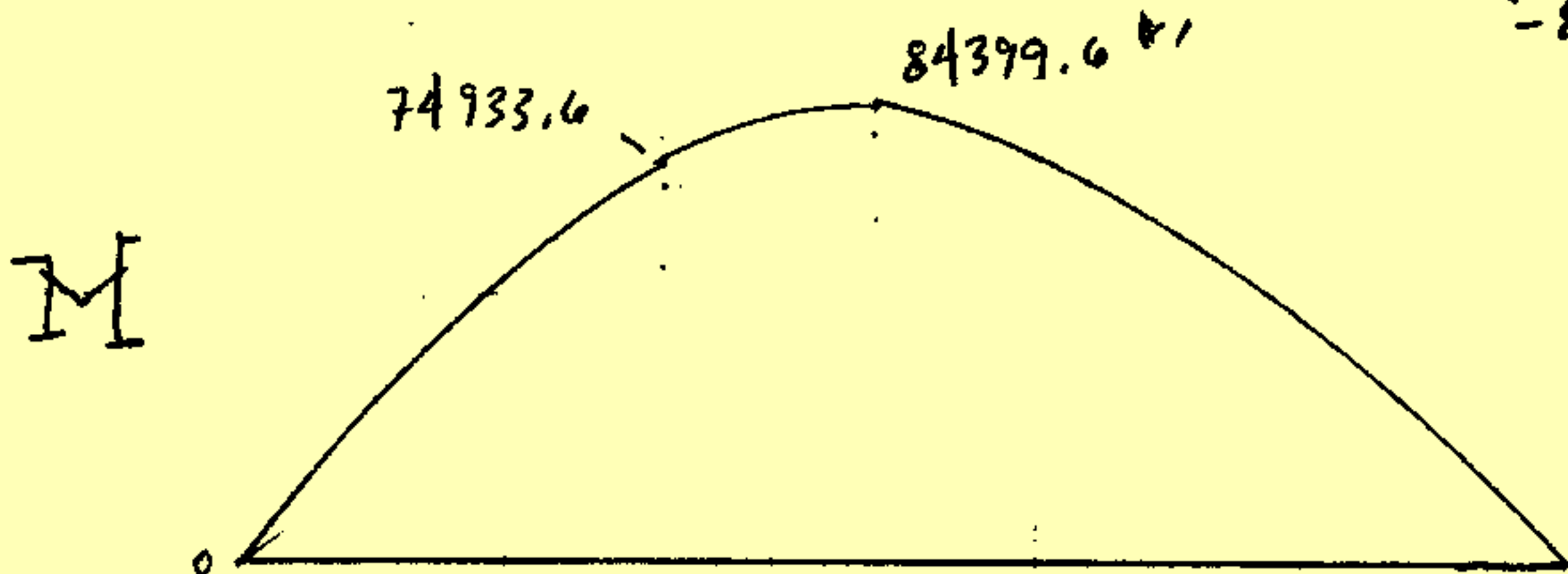
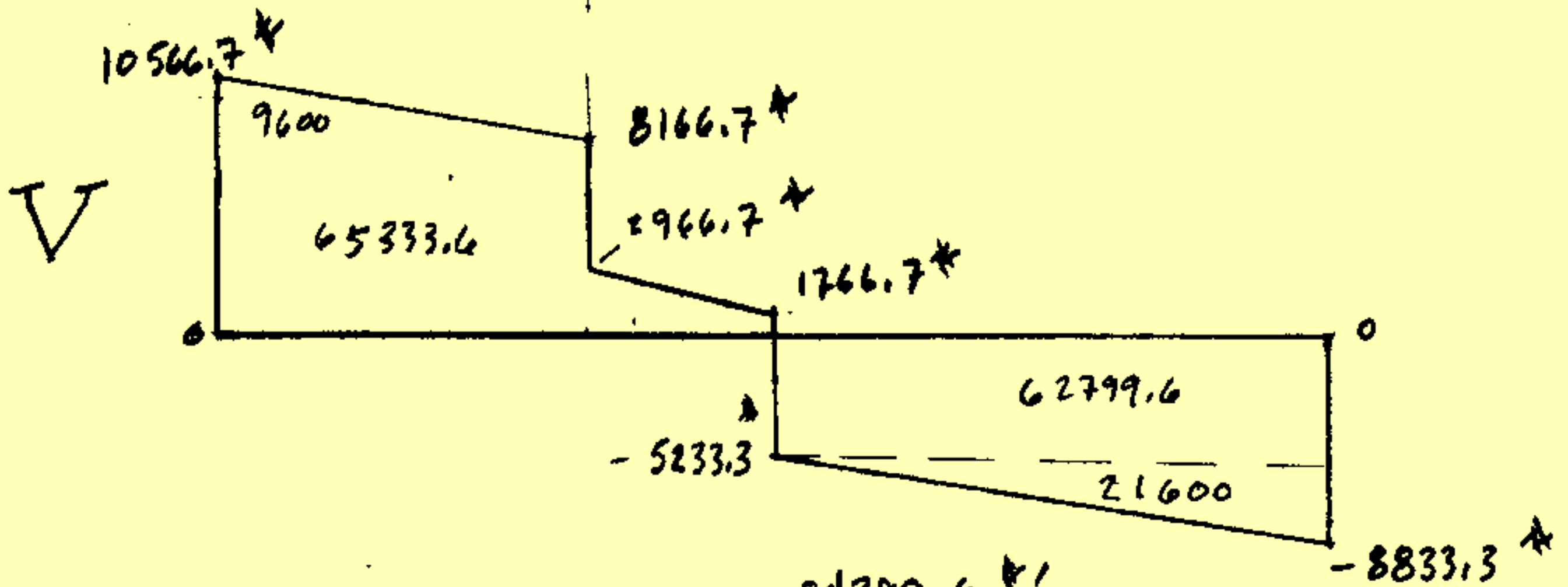
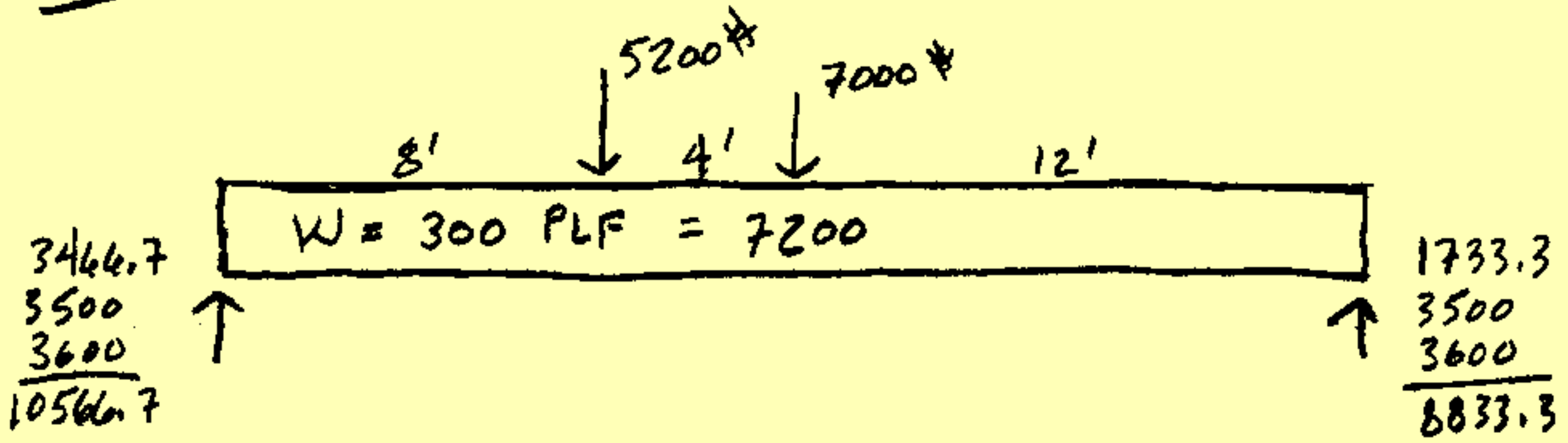
$$F_b = 2000 \text{ psi} = \frac{M}{S} ; S = \frac{22533 \times 12}{2000} = 135.2 \text{ in}^3$$

SHEAR:

$$F_v = 135 \text{ psi} = \frac{V}{A} ; A = 1.5 \frac{5200}{135} = 57.8 \text{ in}^2$$

USE 5 1/8" x 15"

B3



BENDING:

$$F_b = 2000 \text{ psi} = \frac{M}{S} ; S = \frac{M}{F_b} = \frac{84399.6 \times 12}{2000} = 506.4$$

SHEAR:

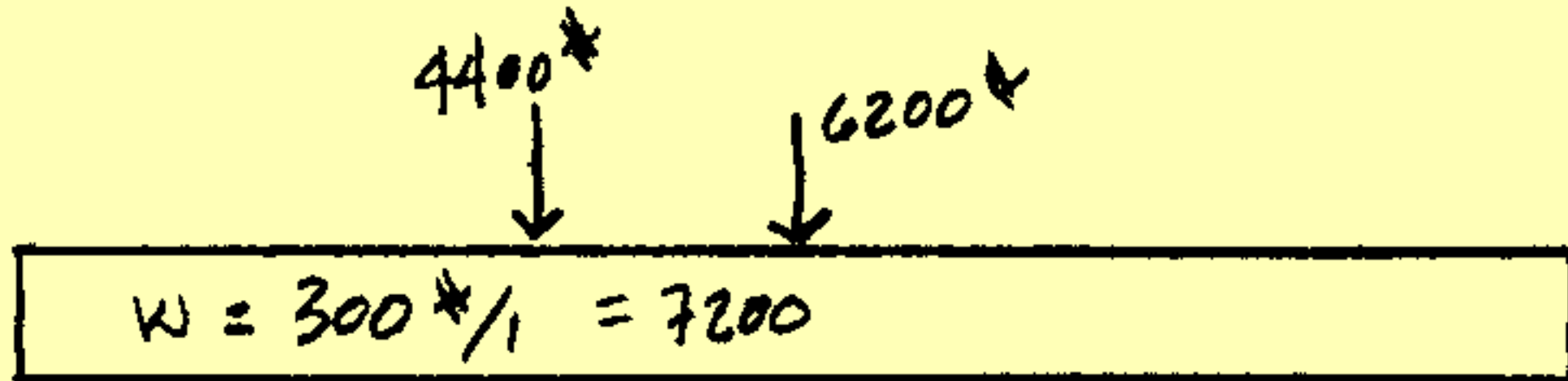
$$F_v = \frac{3}{2} \frac{V}{A} ; A = 1.5 \frac{10566.7}{135} = 117.4 \text{ in}^2$$

↑ CONTROLS

USE 6 3/4" x 22 1/2"



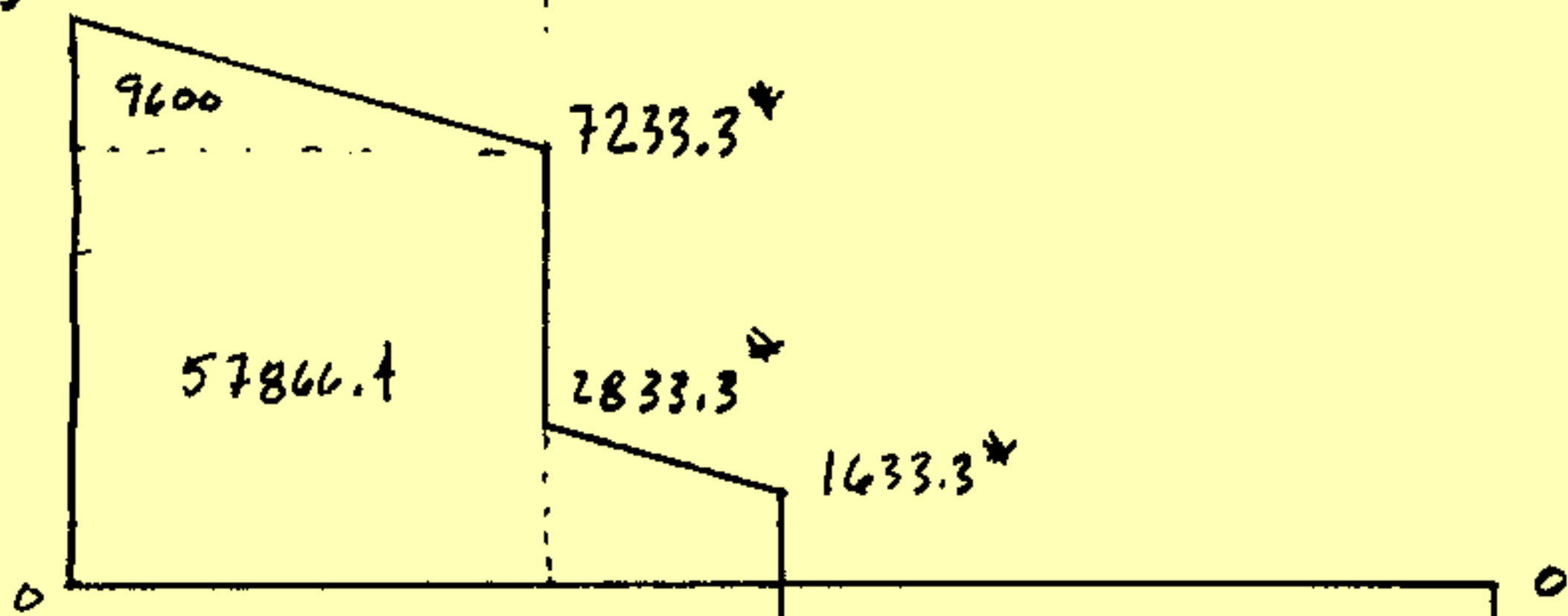
BA



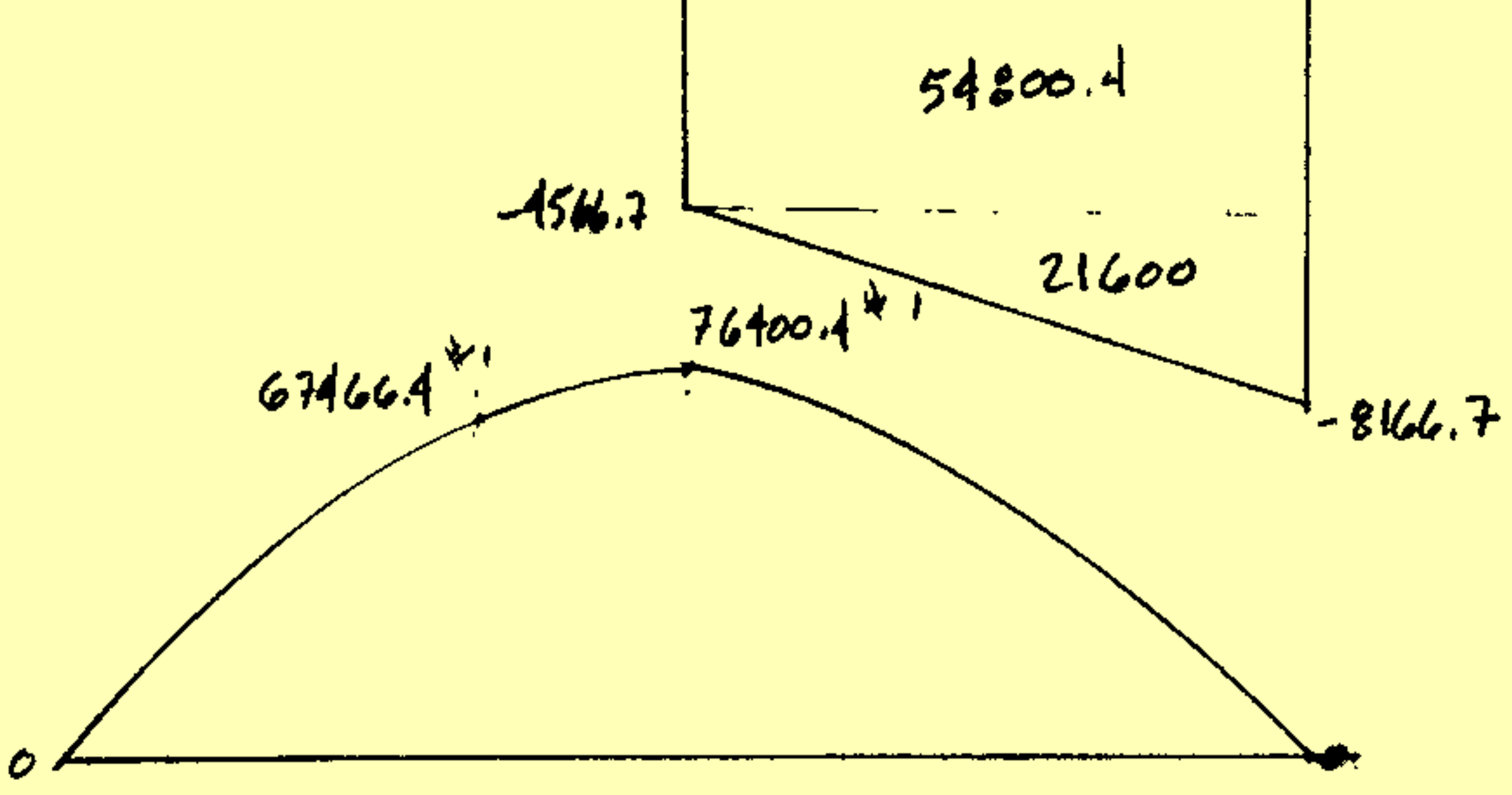
2933.3  
3100.0  
3600.0  
9633.3\*

1466.7  
3100.0  
3600.0  
8166.7\*

V



M



BENDING:

$$F_b = 2000 \text{ psi} = \frac{M}{S}; \quad S = \frac{76400.4 \times 12}{2000} = 458.4 \text{ in}^3$$

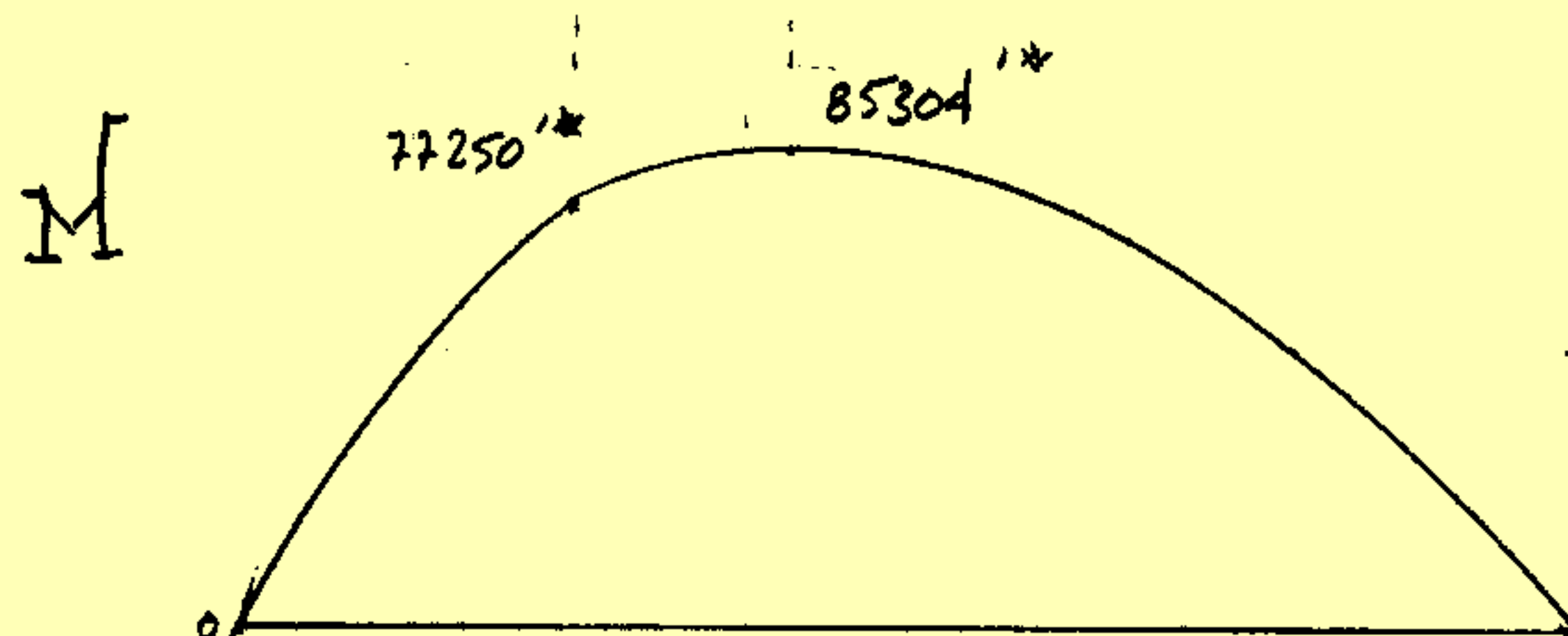
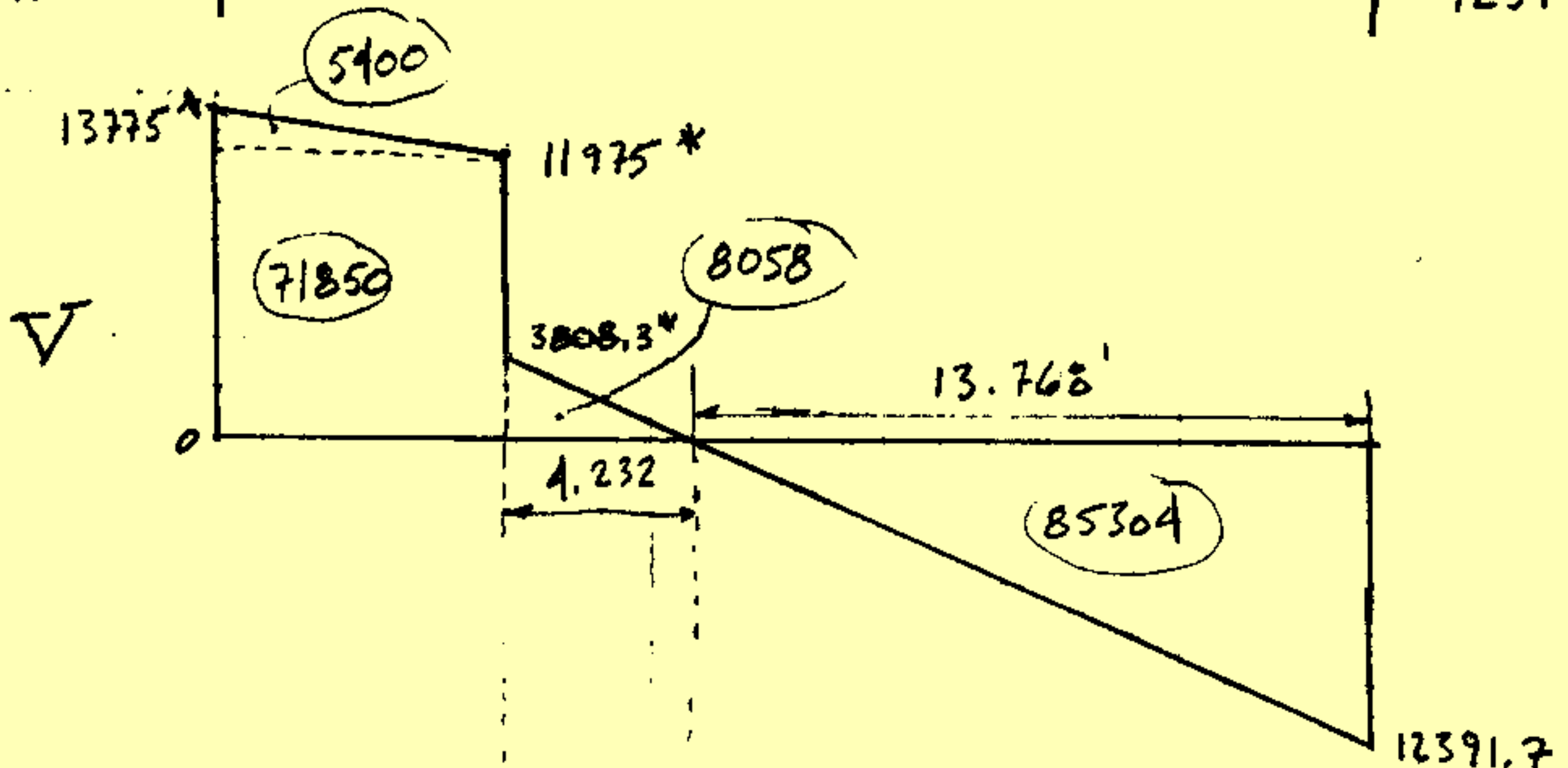
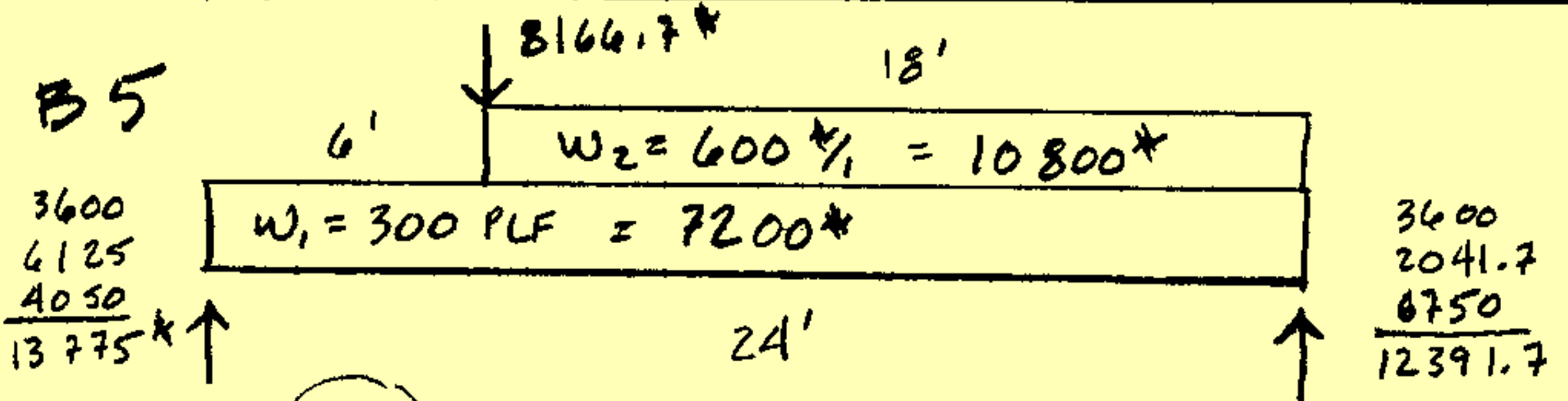
↑ CONTROLS

SHEAR:

$$F_v = \frac{3}{2} \frac{V}{A} = 135 \text{ psi}; \quad A = 1.5 \frac{9633.3}{135} = 107.03 \text{ in}^2$$

USE 5 1/8" x 24"

22-141 50 SHEETS  
22-142 100 SHEETS  
22-144 200 SHEETS



BENDING:

$$F_b = 2000 \text{ psi} = \frac{M}{S_x} ; S_x = \frac{85304 \times 12}{2000} = 511.8 \text{ in}^3$$

↑ CONTROLS

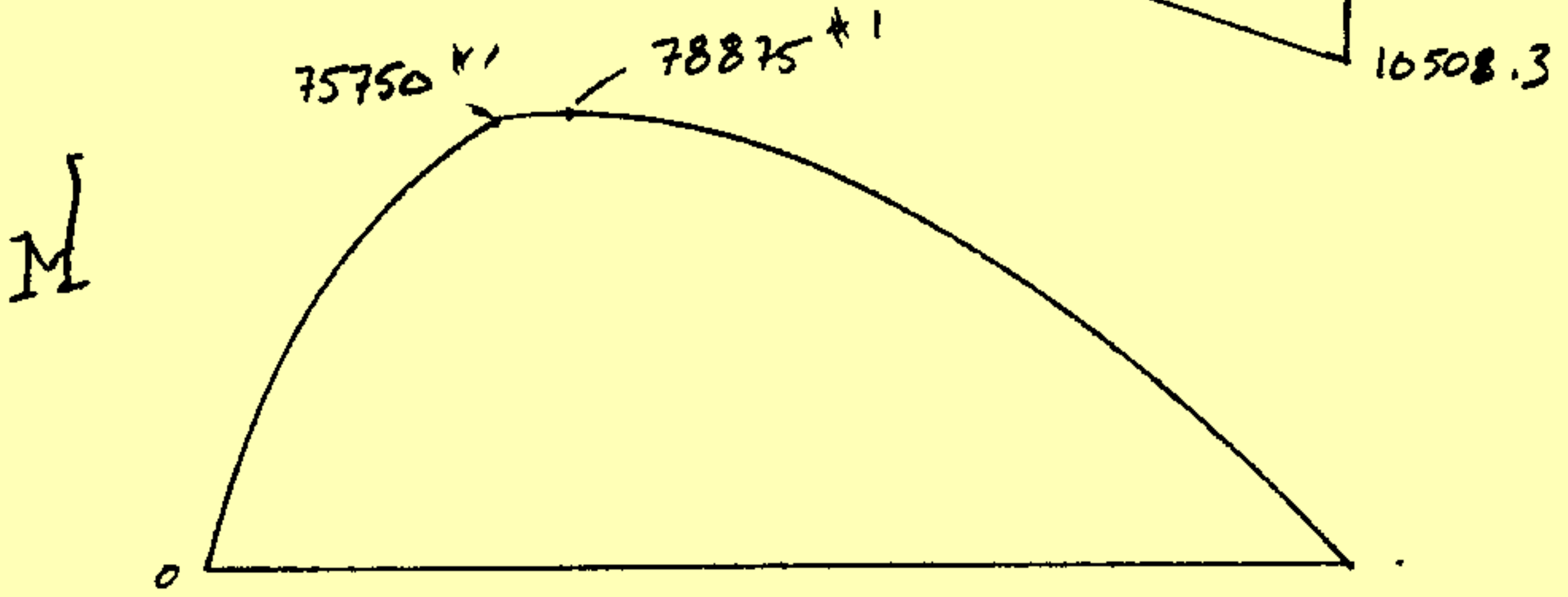
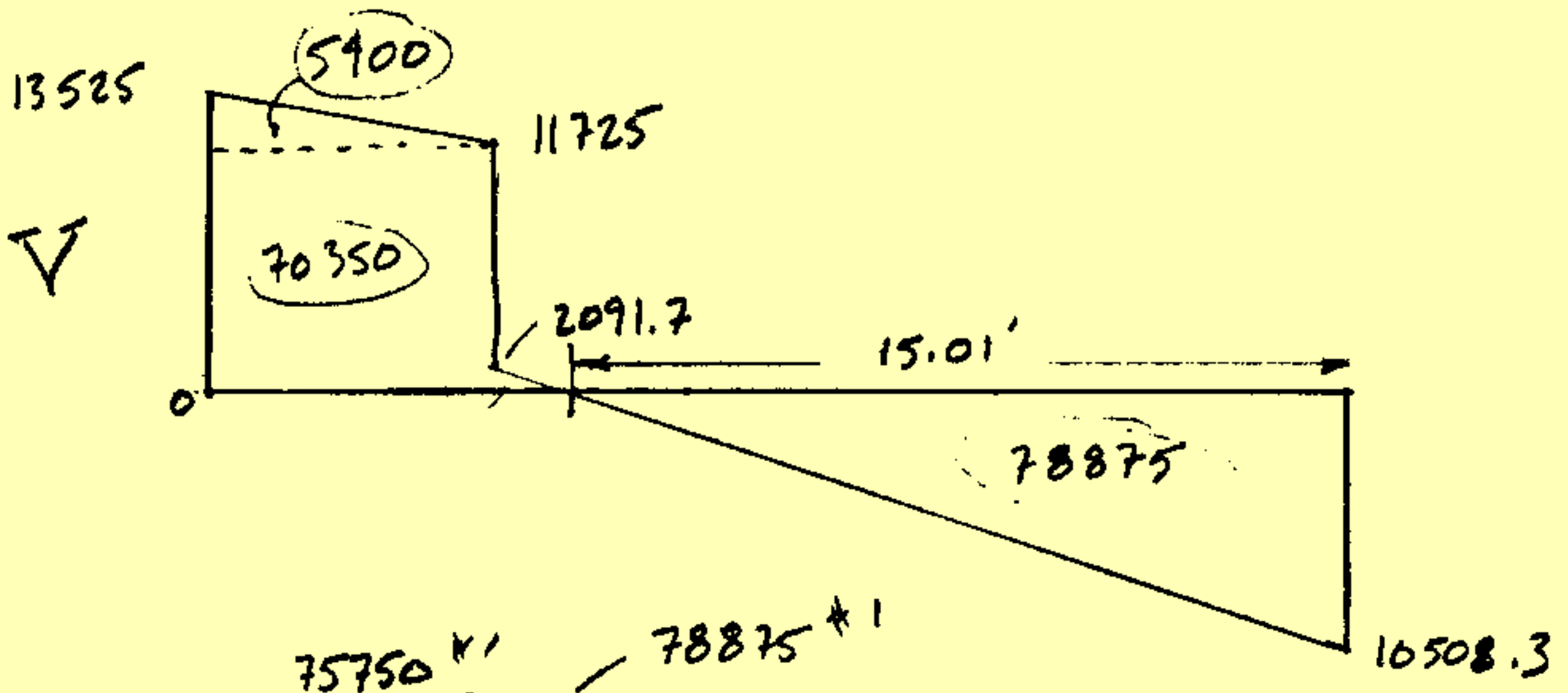
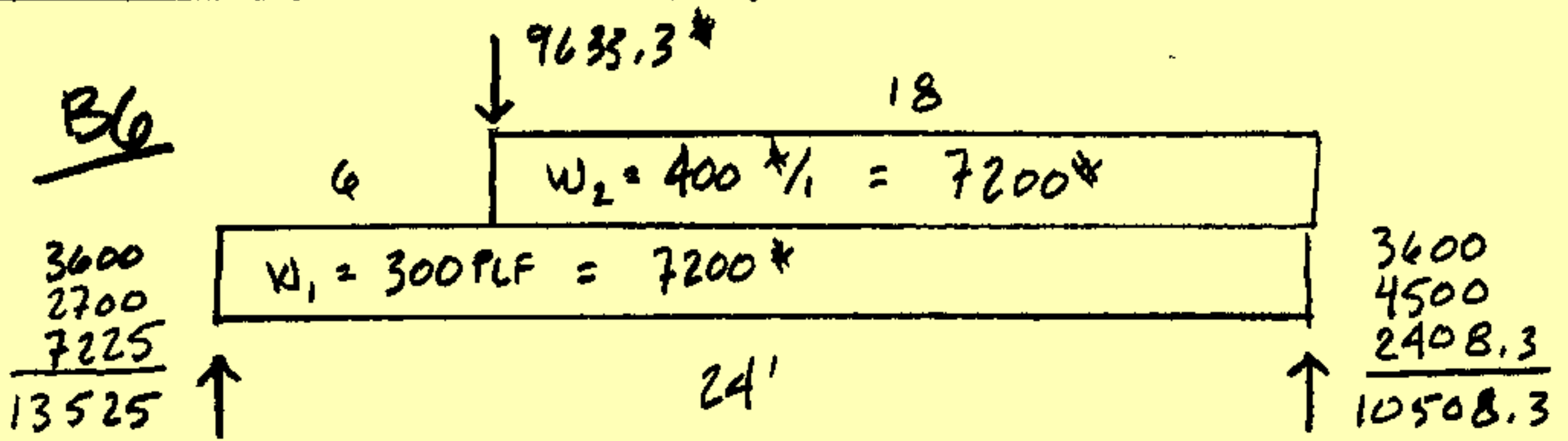
SHEAR:

$$F_v = 135 \text{ psi} = \frac{3}{2} \frac{V}{A} ; A = 1.5 \frac{13775}{135} = 102 \text{ in}^2$$

USE  $5\frac{1}{8}'' \times 25\frac{1}{2}''$

22-141 50 SHEETS  
22-142 100 SHEETS  
22-144 200 SHEETS  
AMARC





BENDING:

$$F_b = 2000 = \frac{M}{S} \quad ; \quad S = \frac{78875 (12)}{2000} = 473.2 \text{ in}^3$$

↑ CONTROLS

SHEAR:

$$F_v = 135 = \frac{3}{2} \frac{V}{A} \quad ; \quad A = 1.5 \frac{13525}{135} = 100.2 \text{ in}^2$$

USE 5 1/8" x 24"

22-141 50 SHEETS  
22-142 100 SHEETS  
22-144 200 SHEETS

B7

$$W_2 = 300 \text{ PLF} = 7200 \#$$

$$W_1 = 300 \text{ PLF} = 7200 \#$$

$$\uparrow 7200 \#$$

$$\uparrow 7200 \#$$

$$V_{\max} = \frac{wL}{2} = \frac{600(24)}{2} = 7200 \#$$

$$M_{\max} = \frac{wL^2}{8} = \frac{600(24)^2}{8} = 43200 \# \cdot \text{ft}$$

BENDING:

$$F_b = 2000 \text{ psi} = \frac{M}{S} ; S = \frac{43200 \times 12}{2000} = 259.2 \text{ in}^3$$

↑ CONTROLS

SHEAR:

$$F_v = 135 \text{ psi} = \frac{3}{2} \frac{V}{A} ; A = 1.5 \frac{7200}{135} = 80 \text{ in}^2$$

USE  $5\frac{1}{8} \times 18$