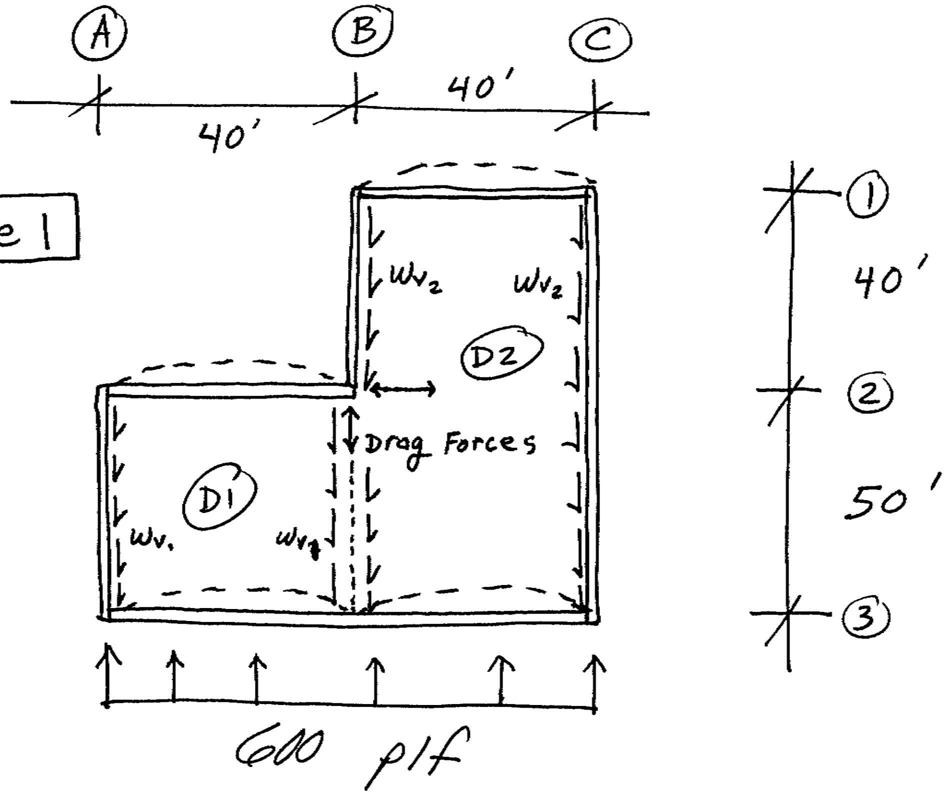


Example 1

Problem

- Draw Drag Diagram for Line B
- Find Drag Force At B2, Line B

Solution

- Determine Edge Shears

$$w_{v_1} = \frac{600(40)}{2(50)} = 240 \text{ plf}$$ reaction to 600 plf eave load

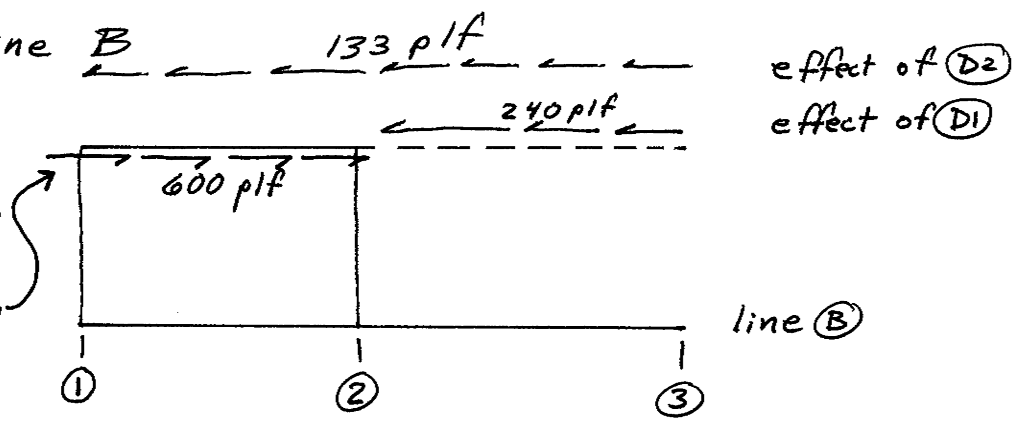
$$w_{v_2} = \frac{600(40)}{2(90)} = 133 \text{ plf}$$ reaction to 600 plf eave load

- Consider Line B

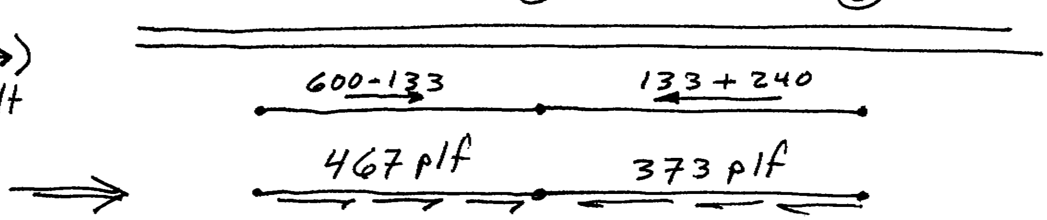
$V = 240(50) + 133(90)$

$w_w = \frac{V}{40} = \frac{23970}{40} \approx 600$ plf

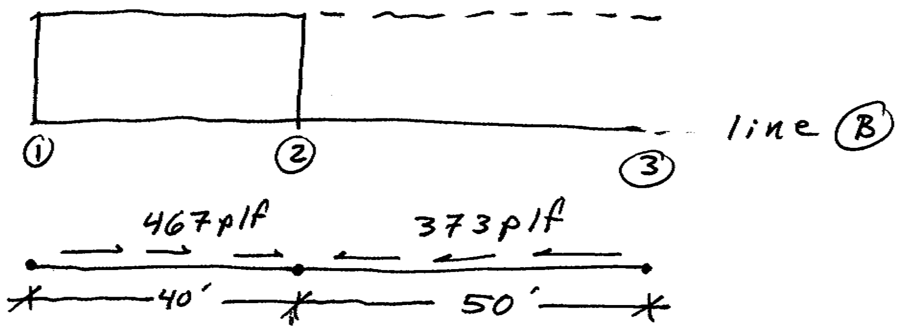
response of wall

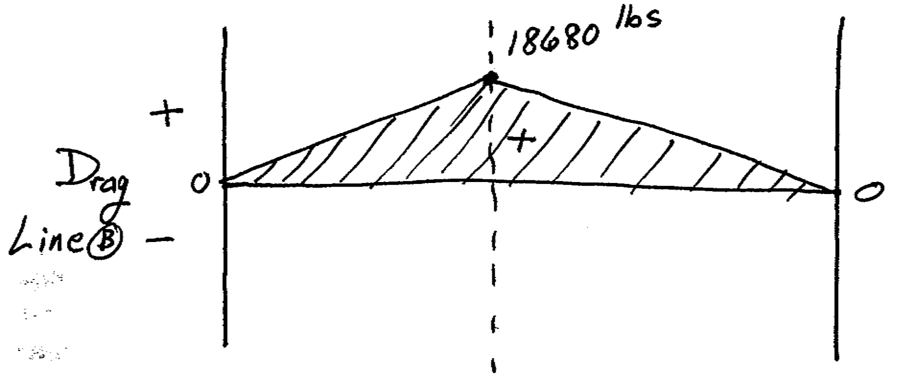


(+ →)
Result



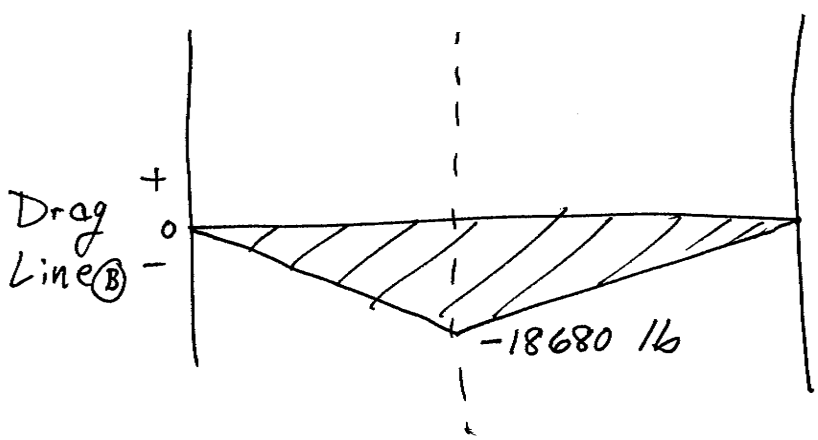
- Draw Drag Diagram Line (B)





in this case + means Compression drag

if 600 plf eave load was applied in opposite direction, drag diagram would be ...

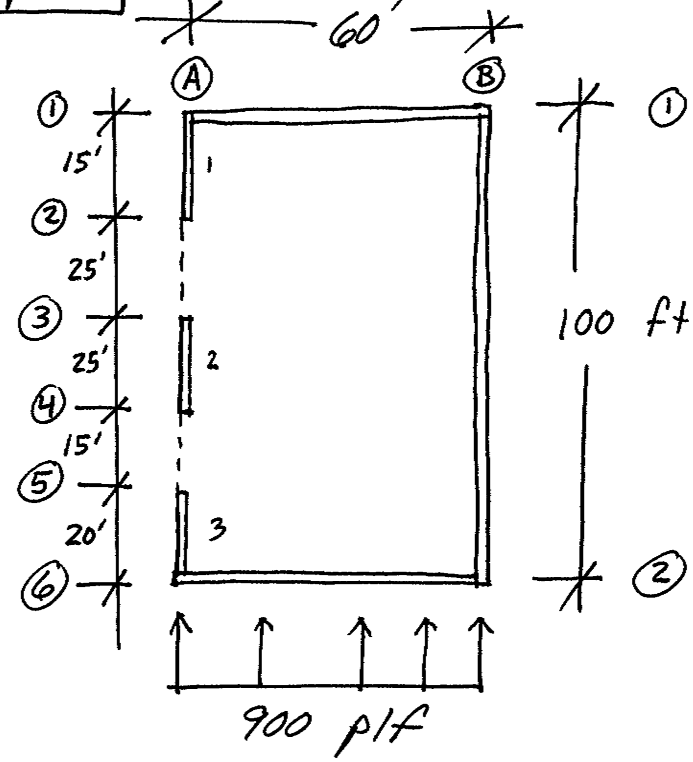


in this case − means tension drag

- Drag Force @ B2, Line B

T = C = 18.7 Kips

Example 2



Problem Draw Drag Diagram for line (A)

Solution:

- Edge shear @ Diaphragm, Line (A)

$$\longrightarrow \quad w_v = \frac{900(60)}{2(100)} = 270 \text{ plf}$$

- Total Shear to Line (A)

$$V = w_v(100) = 27000$$

- Walls Along Line (A) in proportion to their stiffness. For "long" walls (approx. ht to length ratio ≤ 1.0 ?) stiffness is directly proportional to wall length. Hence walls take load in proportion to their relative length (rigidity).

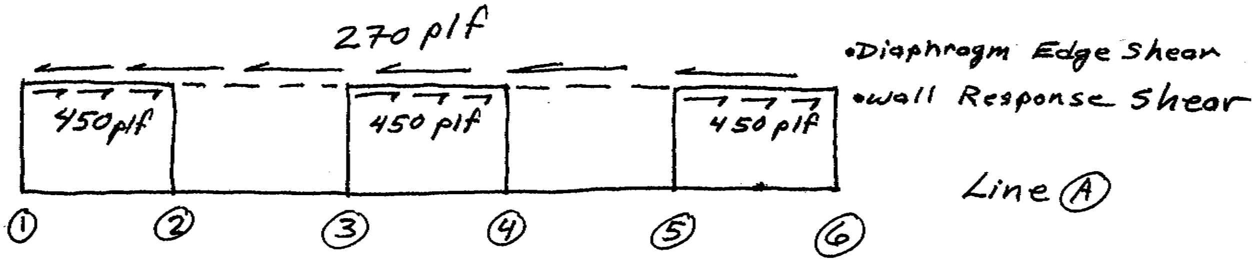
$$\Longrightarrow \quad V_1 = \frac{V(L_1)}{\Sigma L_i} = \frac{27000(15)}{15+25+20} = 6750^{\#} \qquad w_{V_1} = \frac{V_1}{L_1} = 450 \text{ plf}$$

$$V_2 = \frac{27000(25)}{60} = 11250^{\#} \qquad w_{V_2} = \frac{11250}{25} = 450 \text{ plf}$$

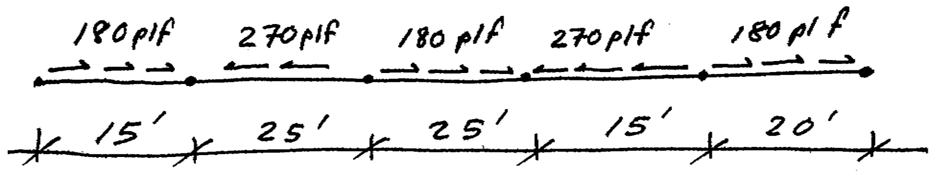
$$V_3 = \frac{27000(20)}{60} = 9000^{\#} \qquad W_{V_3} = \frac{9000}{20} = 450 \text{ plf}$$

Note: $w_{V_1} = w_{V_2} = w_{V_3}$, this will in general be true when V_i is proportional to length.

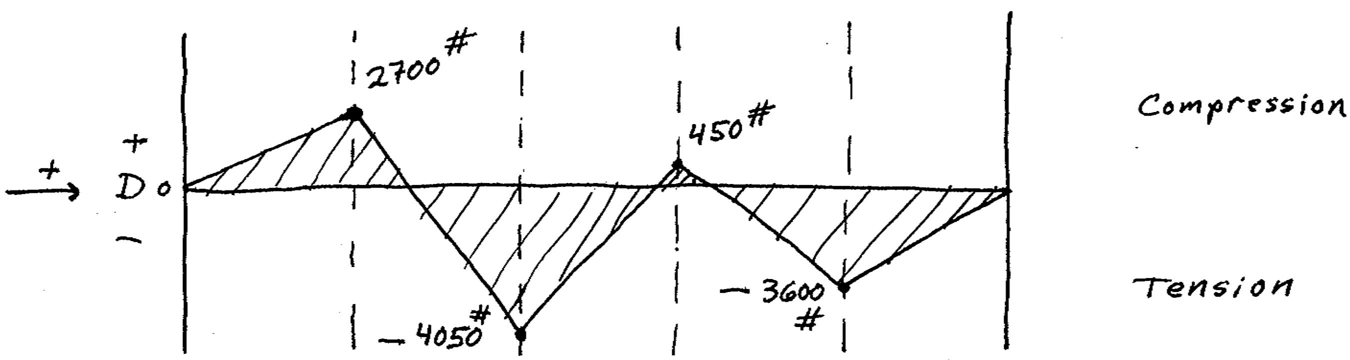
• Elevation Line (A)



• Combined shear Loads



• Drag Diagram Line (A)



Yaw's Drag Diagram Principle

When drag diagrams are constructed such that *response shear* is opposite in sign to the external diaphragm load, then positive drag force values on the drag diagram are *compressive* and negative drag force values are *tensile.*

Development of Drag diagram Principle 5-22-03

- eave ←