

(I) EQUATION

$2.5(10) = 25^k$
 2.5 k/ft
 10^k
 $A_y = 5^k$
 $B_y = 30^k$

$\sum M_A = -25^k(10^{\text{ft}}) + B_y(15^{\text{ft}}) - 10^k(20^{\text{ft}}) = 0$
 $B_y = 30^k$
 $\sum F_y = -2.5^{\text{k/ft}}(10^{\text{ft}}) - 10^k + 30^k + A_y = 0$
 $A_y = 5^k$

EQUILIBRIUM SIGN CONV.

BEAM (V&M) SIGN CONV.

right-face
left-face

FBD.

left-hand Free body

right-face

$\sum F_y = 0; 5^k - V = 0 \Rightarrow V = 5^k$
 $\sum M_{\text{cut}} = 0; M - 5(x) = 0 \Rightarrow M = 5x \text{ (k-ft)}$

$0 < x < 5'$

FBD₂

$\sum F_y = 0;$ $5^k - 2.5(x-5) - V = 0$
 $V = 5 - 2.5(x-5) \quad (k)$

$\sum M = 0;$ $M + \underbrace{2.5(x-5)}_R \cdot \underbrace{\frac{(x-5)}{2}}_d - 5x = 0$ } $5' < x < 15'$

$M = 5x - \frac{2.5}{2}(x-5)^2$

FBD₃

$\sum F_y = 0;$ $5^k + 30^k - 2.5 \frac{k}{ft} (10^{ft}) - V = 0$
 $V = 10^k$

$\sum M_{cut} = 0;$ $M + 25^k(x-10) - 30^k(x-15) - 5^k x = 0$
 $M =$ $15' < x < 20'$

