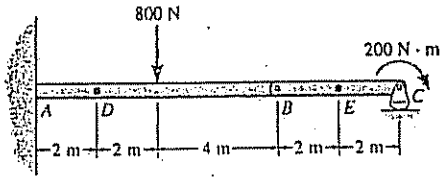
*4-16. Determine the internal normal force, shear force, and moment at points E and D of the compound beam.



Segment EC:

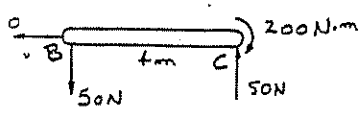
$\stackrel{+}{\rightarrow}\Sigma F_x = 0;\quad N_E = 0$ Ans

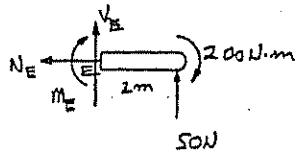
$+\uparrow\Sigma F_y = 0;\quad V_E + 50 = 0$

$V_E = -50\ \text{N}$ Ans

$\left(+\Sigma M_E = 0;\right.\quad -200 + 50\,(2) - M_E = 0$

$M_E = -100\ \text{N}\cdot\text{m}$ Ans





Segment DB:

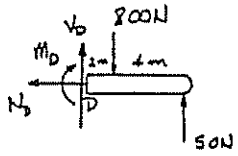
$\stackrel{+}{\rightarrow}\Sigma F_x = 0;\quad N_D = 0$ Ans

$+\uparrow\Sigma F_y = 0;\quad V_D - 800 + 50 = 0$

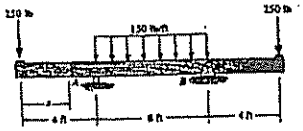
$V_D = 750\ \text{N}$ Ans

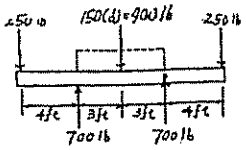
$\left(+\Sigma M_D = 0;\right.\quad -800\,(2) + 6\,(50) - M_D = 0$

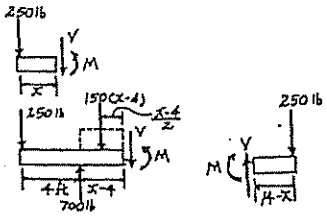
$M_D = -1300\ \text{N}\cdot\text{m} = -1.30\ \text{kN}\cdot\text{m}$ Ans



*4-28. Draw the shear and moment diagrams for the wood beam, and determine the shear and moment throughout the beam as functions of x.







Support Reactions : As shown on FBD.

Shear and Moment Functions :

For $0 \le x < 4$ ft

$+\uparrow\Sigma F_y = 0;\quad -250 - V = 0\quad V = -250$ lb Ans

$\left(+\Sigma M_{NA} = 0;\right.\quad M + 250x = 0$

$M = \{-250x\}$ lb·ft Ans

For $4\ \text{ft} < x < 10$ ft

$+\uparrow\Sigma F_y = 0;\quad -250 + 700 - 150(x-4) - V = 0$

$V = \{1050 - 150x\}$ lb Ans

$\left(+\Sigma M_{NA} = 0;\right.\quad M + 150(x-4)\left(\frac{x-4}{2}\right)$

$+250x - 700(x-4) = 0$

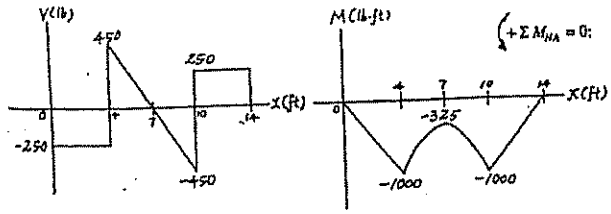
$M = \{-75x^2 + 1050x - 4000\}$ lb·ft Ans

For $10\ \text{ft} < x \le 14$ ft

$+\uparrow\Sigma F_y = 0;\quad V - 250 = 0\quad V = 250$ lb Ans

$\left(+\Sigma M_{NA} = 0;\right.\quad -M - 250(14-x) = 0$

$M = \{250x - 3500\}$ lb·ft Ans



4-29. Draw the shear and moment diagrams for the beam, and determine the shear and moment throughout the beam as functions of x.