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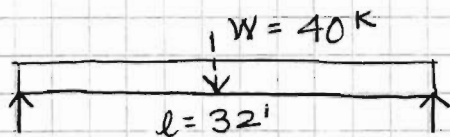
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# 14-1 (3) a

(1)

### DESIGNING A STEEL SECTION

GIVEN:  $f_b = 30 \text{ ksi}$



FOR A SIMPLY SUPPORTED UNIFORMLY LOADED BEAM,

$$\text{MAXIMUM MOMENT } M = \frac{Wl}{8}$$

$$\therefore M = \frac{40^k \times 32'}{8}$$

$$\therefore M = \underline{\underline{160^k \cdot \text{ft}}}$$

NOW,

$$f_b = \frac{Mc}{I} = \frac{M}{S}$$

$$\therefore S = \frac{M}{f_b} = \frac{160^k \cdot \text{ft} \times 12''}{30 \text{ ksi}}$$

$$\therefore S = \underline{\underline{64 \text{ in}^3}}$$

FOR  $S_x = 64 \text{ in}^3$ , in Table D-36,

SECTIONS APPROPRIATE ARE:

' W 16 X 40 '

W 18 X 40

W 14 X 48 → HEAVIER

W 21 X 44 → ALSO  
HEAVIER  
BUT STIFFER  
 $S_x = 81.6 \text{ in}^3$

∴ THE MOST ECONOMICAL SECTION

IS ' W 16 X 40 '.