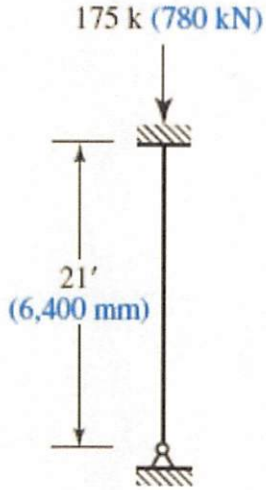
**4.8-3** Select a WT section for the compression member shown in Figure P4.8-3. The load is the total service load, with a live-to-dead load ratio of 2.5:1 . Use $F_y = 50$ ksi (345 MPa) .




$K = 0.80$

**a.** Use LRFD.

**b.** Use ASD.

$L_c = KL = 0.8(21\text{ ft}) = 16.8\text{ ft}$

$P_u = 1.2D + 1.6L = 1.2D + 1.6(2.5D) = 5.2D$

$D + 2.5D = 175^k \Rightarrow D = 50^k \quad L = 125^k$

a) $P_u = 1.2(50^k) + 1.6(125^k) = 260^k$

FROM TABLE 4-7 WITH $L_c = 16.8$ ft & $\phi_c P_n = 260^k$

CONSIDER BUCKLING ABOUT Y-AXIS & X-AXIS

| | X-AXIS | Y-AXIS |
|---|---|---|
| WT9X38 ⇒ | | |
| L=16 | $329^k$ | $318^k$ |
| L=18 | $294^k$ | $288^k$ |

INTERPOLATED FOR L=16.8

| | |
|---|---|
| X-AXIS | $315^k$ |
| Y-AXIS | $309^k$ |

b) $P_u = D + L = 50^k + 125^k = 175^k$

FROM TABLE 4-7 WITH $L_c = 16.8$ ft & $P_n/\Omega_c = 175^k$

| | X-AXIS | Y-AXIS |
|---|---|---|
| WT9X38 ⇒ | | |
| L=16 | $219^k$ | $212^k$ |
| L=18 | $196^k$ | $192^k$ |

L = 16.8 ft X-AXIS = $209.8^k$ Y = $204^k$