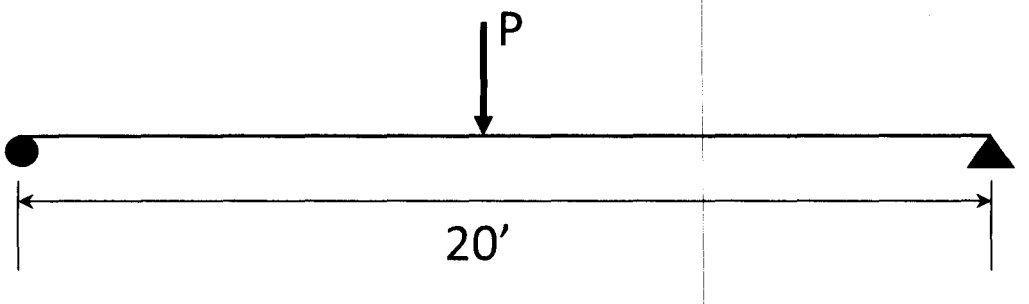
Steel Frames
Quiz 3

Determine the value of the load **P** that can be applied at the center of the W 14 x 53. The beam is simply-supported and spans 20'. The compression flange is laterally braced at the ends only. Assume the load **P** is 30% dead and 70% live.



$P_u = 1.2(.3)P + 1.6(.7)P = 1.48P$

$M_u = \frac{P_u L}{4} = \frac{1.48P(20')}{4} = 7.4P$

$L_b = 20'$

$L_p = 6.78'$

$L_r = 22.2'$

$BF = 7.93\ K$

$C_b = 1.32$

$\phi M_n = 1.32(327 - 7.93(20 - 6.78))$

$= 293.26$ ~~303.7~~ ft-K < 327 ft-K O.K.

293.26 ~~303.7~~ ft-K $= 7.4P$

$P = 39.6$ ~~40.7~~ K