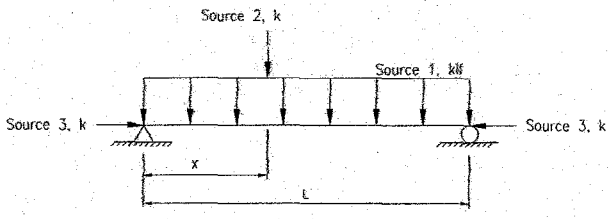
Load Combination Example Problem

Given: The simply supported floor beam shown gets loads from the following sources:

- (Source 1) floor loads (acting as a uniform load over the entire span). This load consists of 1.15 k/ft dead load, 1.85 k/ft of live load.
- (Source 2) a column located a distance "X" from one end. This is a point load source. The column load consists of 8.00 k dead load, 4.80 k live load, and 10.0 k snow load.
- (Source 3) an axial force (the member is part of the lateral force resisting system for the structure) that consists of 15.0 k wind load or 25 k earthquake load.

ASSUME L ≤ 100psf



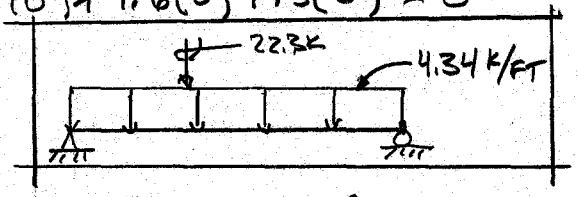
Wanted: Draw the load diagrams for LRFD-LC2b and LRFD-LC5b

Solution: LRFD LC2b = 1.2(D+F+T) + 1.6(L+H) + 0.5S

SOURCE#1: $W_u = 1.2(1.15^{k/ft}) + 1.6(1.85^{k/ft}) + 0.5(0) = 4.34^{k/ft}$

SOURCE#2: $P_u = 1.2(8.0^k) + 1.6(4.80^k) + .5(10^k) = 22.3^k$

SOURCE#3: $P_u = 1.2(0) + 1.6(0) + .5(0) = 0$



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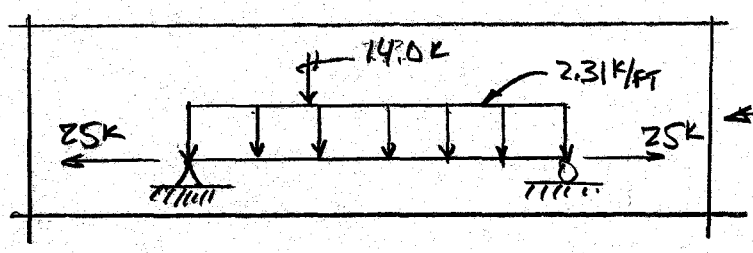
LRFD LC5b = 1.2D − E + .5L + 0.2S

SOURCE#1: $W_u = 1.2(1.15^{k/ft}) - 1(0) + .5(1.85^{k/ft}) + 0.2(0) = 2.31^{k/ft}$

SOURCE#2: $P_u = 1.2(8.0^k) - 1(0) + .5(4.80^k) + 0.2(10^k) = 14.0^k$

SOURCE#3: $P_u = 1.2(0) - 1(25^k) + .5(0) + 0.2(0) = -25^k$



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