Design Principles and Calculations - Non-composite Design

Non-composite Design

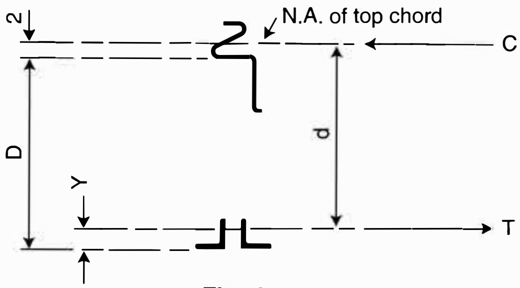


Fig. 4

The top chord must be verified for the loads applied at the non-composite stage. From the previous example, we have the following results:

- Dead load:

Slab $2\text{-}^{1}/_{2}$ inch:	*31 psf*
Formwork and joist:	*5 psf*
	36 psf

- Live load:

Construction live load:	*20*psf*
	56 psf

* Reduces beyond *25* foot span at a rate of *1 psf for each 2.5* feet of span.

Moment Capacity of Joist = C x d or T x d

i.e. $\frac{W_{nc} L^2}{8}$ x 12 = C x d or T x d, whichever is the lesser

W_{nc} = *56* x joist spacing = *plf*

L = clear span + *4" (ft.)*

C = area of top chord *(sq. in.)* x working stress *(psi)*

T = area of bottom chord *(sq. in.)* x working stress *(psi)*

d = effective lever arm in *inches*

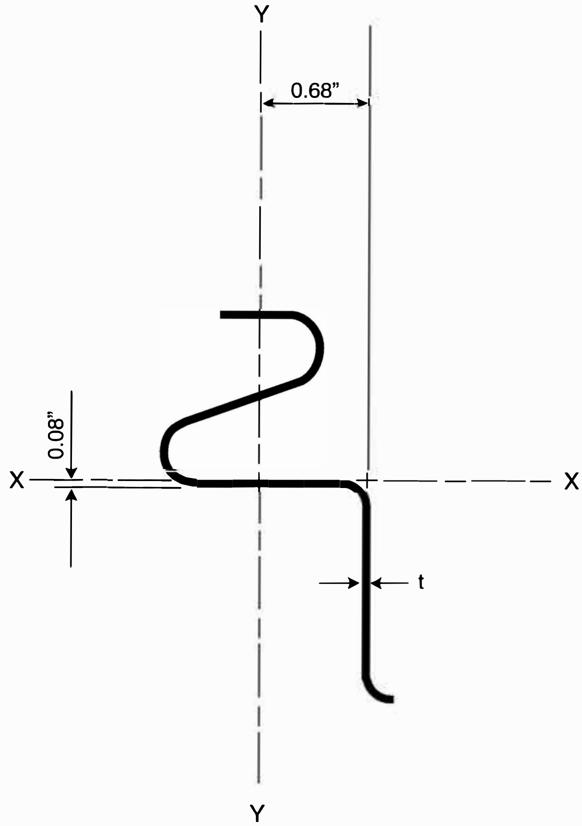
= $D + 0.08 - y$

From the above formula, the maximum "limiting span" may be computed for the non-composite (construction stage) condition. For spans beyond this value, either the top chord must be strengthened or joist propped. Strengthening of the top chord, when required, is usually accomplished by installing one or two rods in the curvatures of the "S" part of the top chord.

The bottom chord is sized for the total factored load which is more critical than the construction load.

Hambro top chord properties are provided to assist you in computing the non-composite joist capacities.

Top Chord Properties



I_x = 0.66 in.^4

Top Chord S_x = 0.45 in.^3

Bottom Chord S_x = 0.287 in.^3

L_y = 0.187 in.^4

S_y = 0.167 in.^3

t = *13 ga.* = *0.090 in.*

A_{net} = 0.56 in.^2

= *(deducting 3/8" deep slot = 6.25* x *0.090)*

F_y = *50 ksi min.*

F_a = *29.1 ksi*